

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, 2020
or

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

For the Transition Period from _____ to _____
Commission File Number 1-15885

MATERION CORPORATION
(Exact name of registrant as specified in its charter)

Ohio

(State or other jurisdiction of
incorporation or organization)

34-1919973

(I.R.S. Employer
Identification No.)

6070 Parkland Blvd., Mayfield Heights, Ohio 44124
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code
216-486-4200

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

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common Stock, no par value	MTRN	New York Stock Exchange

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

None
(Title of Class)

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 Section 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 the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant 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.

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

The aggregate market value of common shares, no par value, held by non-affiliates of the registrant (based upon the closing sale price on the New York Stock Exchange) on June 26, 2020 was \$1,175,158,375.

As of January 29, 2021, there were 20,330,126 common shares, no par value, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the 2021 Annual Meeting of Shareholders are incorporated by reference into Part III.

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Forward-looking Statements: Portions of the narrative set forth in this document that are not statements of historical or current facts are forward-looking statements. Our actual future performance may materially differ from that contemplated by the forward-looking statements as a result of a variety of factors. These factors include, in addition to those mentioned elsewhere herein: the ultimate impact of the COVID-19 pandemic on our business, results of operations, financial condition, and liquidity; the global economy, including the impact of tariffs and trade agreements; the impact of any U.S. Federal Government shutdowns and sequestrations; the condition of the markets which we serve, whether defined geographically or by segment; changes in product mix and the financial condition of customers; our success in developing and introducing new products and new product ramp-up rates; our success in passing through the costs of raw materials to customers or otherwise mitigating fluctuating prices for those materials, including the impact of fluctuating prices on inventory values; our success in identifying acquisition candidates and in acquiring and integrating such businesses, including the integration of Optics Balzers; the impact of the results of acquisitions on our ability to fully achieve the strategic and financial objectives related to these acquisitions, including, without limitation, the acquisition of Optics Balzers being accretive in the expected timeframe or at all; our success in implementing our strategic plans and the timely and successful completion and start-up of any capital projects; other financial and economic factors, including the cost and availability of raw materials (both base and precious metals), physical inventory valuations, metal financing fees, tax rates, exchange rates, interest rates, pension costs and required cash contributions and other employee benefit costs, energy costs, regulatory compliance costs, the cost and availability of insurance, credit availability, and the impact of the Company's stock price on the cost of incentive compensation plans; the uncertainties related to the impact of war, terrorist activities, and acts of God; changes in government regulatory requirements and the enactment of new legislation that impacts our obligations and operations; the conclusion of pending litigation matters in accordance with our expectation that there will be no material adverse effects; the disruptions on operations from, and other effects of, catastrophic and other extraordinary events including the COVID-19 pandemic; and the risk factors set forth in Part I, Item 1A of this Form 10-K.

Item 1. BUSINESS

THE COMPANY

Materion Corporation (referred to herein as the Company, our, we, or us), through its wholly owned subsidiaries, is an integrated producer of high-performance advanced engineered materials used in a variety of electrical, electronic, thermal, and structural applications with \$1.2 billion in net sales in 2020. The Company was incorporated in Ohio in 1931. Our products are sold into numerous end markets, including semiconductor, industrial, aerospace and defense, automotive, energy, consumer electronics, and telecom and data center.

SEGMENT INFORMATION

Our businesses are organized under four reportable segments: Performance Alloys and Composites, Advanced Materials, Precision Optics (formerly called Precision Coatings), and Other. Our Other reportable segment includes unallocated corporate costs. Additional information regarding our segments and business is presented below.

Performance Alloys and Composites

Performance Alloys and Composites (PAC) globally provides advanced engineered solutions comprised of beryllium and non-beryllium containing alloy systems and custom engineered parts in strip, bulk, rod, plate, bar, tube, and other customized shapes produced at manufacturing facilities located throughout the United States and Europe and sold through distribution hubs globally. This segment operates the world's largest bertrandite ore mine and refinery, which is located in Utah, providing feedstock hydroxide for its beryllium businesses and external sales. In addition to the products described below, this segment globally provides engineering and product development services to help our customers and partners with product design, including delivering prototype parts and other data to demonstrate that the products will perform under the specified design conditions. PAC operates through three global product lines: Advanced Alloys, Specialty Materials, and Performance Solutions:

- *Advanced Alloys* manufactures and globally provides to our customers three upstream (primary) product lines: alloyed metals, high-performance beryllium products, and beryllium hydroxide. Alloyed metals are made with copper and/or nickel (with or without beryllium) in ingot, shot, billet, plate, rod, bar, tube forms, and customized shapes. Depending on the application, the materials may provide one or a combination of superior strength, specific strength, wear and corrosion resistance, thermal and electrical conductivity, tribological benefits, and machinability. Applications for alloyed metals products include oil & gas drilling and production components, bearings, bushings, welding electrodes, plastic injection or metal die casting mold tooling, and electrical or electronic connectors. Major end markets for alloyed metals include industrial, automotive, aerospace and defense, energy, and telecom and data center. Alloyed metals compete with companies around the world that produce alloys with similar properties. High performance beryllium products are primarily beryllium metal products, which may also be alloys or other mixtures with aluminum and may be beryllium oxide. The materials are manufactured in billet, ingot, plate, sheet, powder, and customized shape forms. These materials are used in applications that require high stiffness and/or low density or high thermal conductivity and/or high electrical resistance, which are provided from the unique combination of material properties, or in applications requiring specific interactions with sub-atomic, high-energy particles, or in applications requiring strong affinity for oxygen such as in the manufacture of primary aluminum and magnesium. Beryllium hydroxide is produced at our milling operations in Utah from our bertrandite ore mine and purchased beryl ore. The hydroxide is used primarily as a raw material input for beryllium-containing alloys and, to a lesser extent, beryllium products. Key competitors include NGK Insulators, IBC Advanced Alloys Corp., Ningxia Orient Tantalum Industry Co., Ltd., Le Bronze Alloys, Minotti Metals, SA, KME AG & Co. KG, Aurubis AG, MKM Mansfelder Kupfer und Messing GmbH, AMPCO Metal, Chuetsu Metal Works Ltd, American Beryllia Inc., CBL Ceramics Limited, CoorsTek, Inc., and Ulba Metallurgical.
- *Specialty Materials* produces and provides our customers various thicknesses of precision strip products as well as various diameters of rod and wire products. The strip, rod, and wire products are beryllium and non-beryllium containing alloys that are made primarily with copper and nickel to provide unique combinations of high conductivity, high reliability, and high formability for use as connectors, contacts, springs, switches, relays, shielding, and bearings. In addition, Specialty Materials also produces and provides unique engineered strip metal products, which incorporate clad inlay and overlay metals, including precious and base metal electroplated systems, electron beam welded systems, contour profiled systems, and solder-coated metal systems. These engineered strip metal products provide a variety of thermal, electrical, or mechanical properties from a surface area or particular section of the material. Our precision cladding and plating capabilities allow for precious metal or other base metals to be applied in continuous strip form, only where it is needed, reducing the material cost to our customers as well as providing design flexibility and

performance. Major end markets include consumer electronics, telecom and data center, automotive, aerospace and defense, industrial, and energy. Key competitors include NGK Insulators, Wieland Electric, Inc., Aurubis Stolberg GmbH, Diehl Metall Stiftung & Co. KG, Nippon Mining, Wicked Group, Heraeus Inc., AMI Doco, Inc., and other North American continuous strip and plating companies.

- *Performance Solutions* provides engineered end-product technologies to our customers, including near-net shape and finished machined beryllium containing and non-beryllium containing products. These products and materials are used in applications that require high stiffness and/or low density due to their unique combination of properties. Performance Solutions provides beryllium metal and beryllium alloy components mainly to the aerospace and defense and energy end markets. Beryllium foil products are provided for radiographic and acoustic applications, beryllium oxide ceramics are provided for a wide range of heat sink and high temperature industrial applications, and our copper beryllium products meet the demanding strength and corrosion resistance specifications required for sub-sea telecommunication equipment. In addition, our engineering teams have developed several innovative non-beryllium materials to meet demanding wear resistance or strength-to-weight applications used in a variety of industries. Our ToughMet™ alloys provide extended life for industrial bushings and bearings and tremendous wear resistance in oil and gas rig components. Our SupremEX™ products offer the industry's highest quality aluminum silicon carbide metal matrix composite formulation, well suited for a wide range of applications from high performance engine components and aerospace structural components to high-stiffness consumer electronic components. Direct competitors include IBC Advanced Alloys, NGK Metals, CBL Ceramics Limited, and CoorsTek, Inc.

PAC's products are primarily sold directly from its facilities throughout the United States, Asia, and Europe, as well as distributed internationally through a network of company-owned service centers, outside distributors, and agents.

Advanced Materials

Advanced Materials produces advanced chemicals, microelectronics packaging, precious metal, non-precious metal, and specialty metal products, including vapor deposition targets, frame lid assemblies, clad and precious metal pre-forms, high temperature braze materials, and ultra-pure wire. These products are used in micro-electromechanical systems and power management integrated circuits, radio frequency devices, storage, display, architectural glass, solar, optical coating, and other applications within the semiconductor, energy, and industrial end markets. Advanced Materials also has metal recovery operations and in-house refining that allow for the recycling of precious metals.

Advanced Materials products are sold directly from its facilities throughout the United States, Asia, and Europe, as well as through direct sales offices and independent sales representatives throughout the world. Principal competition includes companies such as Honeywell International, Inc., Praxair, Inc., Solar Applied Materials Technology Corp., Grikin, Solaris, Ametek Electronic Components and Packaging, and Tanaka Holding Co., Ltd., as well as a number of smaller regional and national suppliers.

The majority of the sales into the semiconductor end market from this segment are vapor deposition targets, lids, wire, other related precious and non-precious metal products, advanced chemicals, and other microelectronic applications. These materials are used in wireless, light-emitting diode, handheld devices, and other applications, as well as in a number of applications within the energy and industrial end markets. Since we are an up-front material supplier, changes in our semiconductor sales levels do not necessarily correspond to changes in the end-use consumer demand in the same period due to down-stream inventory positions, the time to develop and deploy new products, and manufacturing lead times and scheduling. While our product and market development efforts allow us to capture new applications, we may lose existing applications and customers from time to time due to the rapid change in technologies and other factors.

Precision Optics

The Precision Optics segment included the following businesses at December 31, 2020:

Precision Optics produces sputter-coated precision thin film coatings and optical filter materials. Based in Westford, Massachusetts, the group has manufacturing facilities in the United States and China. This business also includes Optics Balzers AG (Optics Balzers), which was acquired in July 2020. See Note B to the Consolidated Financial Statements for additional discussion regarding our acquisition of Optics Balzers.

Large Area Coatings (LAC) produced high-performance sputter-coated precision flexible thin film materials. Based in Windsor, Connecticut, the business manufactured and distributed coated and converted thin film material solutions primarily for medical testing and diagnosis applications. As of December 31, 2020, the LAC business was shut down. See Note E to the Consolidated Financial Statements for further discussion.

Precision Optics' products are sold directly from its facilities throughout the United States, Europe, and Asia, as well as through direct sales offices and independent sales representatives throughout the world. Principal competition includes companies such as Viavi Corporation, II-VI, MKS Newport Optics, Alluxa, and a number of smaller regional and national suppliers.

Other

The Other segment is comprised of unallocated corporate costs.

OTHER GENERAL INFORMATION

Products

We are committed to providing high-quality, innovative, and reliable products that will enable our customers' technologies and fuel their own technological breakthroughs and growth.

Our products include precious and non-precious specialty metals, inorganic chemicals and powders, specialty coatings, specialty engineered beryllium and copper-based alloys, beryllium composites, ceramics, and engineered clad and plated metal systems.

We are constantly looking ahead to realign product and service portfolios toward the latest market and technology trends so that we are able to provide customers with an even broader scope of products, services, and specialized expertise. We believe we are an established leader in our markets.

Approximately 750 customers purchase our products throughout the semiconductor, industrial, aerospace and defense, automotive, energy, consumer electronics, and telecom and data center end markets. No single customer accounted for more than 10% of our total net sales for 2020.

Availability of Raw Materials

The principal raw materials we use are beryllium, aluminum, cobalt, copper, gold, nickel, palladium, platinum, ruthenium, silver, and tin. Ore reserve data can be found in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations." The availability of these raw materials, as well as other materials used by us, is adequate and generally not dependent on any one supplier.

Patents and Licenses

We own patents, patent applications, and licenses relating to certain of our products and processes. While our rights under these patents and licenses are of some importance to our operations, our business is not materially dependent on any one patent or license or on all of our patents and licenses as a group.

Backlog

The backlog of unshipped orders as of December 31, 2020, 2019, and 2018 was \$279.2 million, \$176.4 million, and \$266.0 million, respectively. Backlog is generally represented by purchase orders that may be terminated under certain conditions. We expect that substantially all of our backlog of orders at December 31, 2020 will be filled over the next 18 months.

Acquisitions

On July 17, 2020, the Company acquired 100% of the capital stock of Optics Balzers, an industry leader in thin film optical coatings. The purchase price for Optics Balzers was \$136.1 million, including the assumption of debt. This business operates within the Precision Optics segment and the results of operations are included as of the date of acquisition. Refer to Note B to the Consolidated Financial Statements for additional detail on the Company's acquisition.

Regulatory Matters

We are subject to a variety of laws that regulate the manufacturing, processing, use, handling, storage, transport, treatment, emission, release, and disposal of substances and wastes used or generated in manufacturing. For decades, we have operated our facilities under applicable standards of inplant and outplant emissions and releases. The inhalation of airborne beryllium particulate may present a health hazard to certain individuals.

On January 9, 2017, the U.S. Occupational Safety and Health Administration (OSHA) published a new standard for workplace exposure to beryllium that, among other things, lowered the permissible exposure by a factor of ten and established new requirements for respiratory protection, personal protective clothing and equipment, medical surveillance, hazard communication, and record keeping. Materion was a participant in the development of the new standards, which fundamentally

represent our current health and safety operating practices. On July 6, 2018, OSHA issued a Direct Final Rule that amended the text of the new standard to clarify OSHA’s intent with respect to certain terms and provisions of the standard, and on December 11, 2018, OSHA issued a Notice of Proposed Rulemaking concerning additional modifications to the standard “to clarify certain provisions and to simplify or improve compliance.” Other government and standard-setting organizations are also reviewing beryllium-related worker safety rules and standards, and will likely make them more stringent. The development, proposal, or adoption of more stringent standards may affect the buying decisions by the users of beryllium-containing products. If the standards are made more stringent and/or our customers or other downstream users decide to reduce their use of beryllium-containing products, our results of operations, liquidity, and financial condition could be materially adversely affected. The impact of this potential adverse effect would depend on the nature and extent of the changes to the standards, the cost and ability to meet the new standards, the extent of any reduction in customer use, and other factors. The magnitude of this potential adverse effect cannot be estimated.

In addition to laws that regulate the manufacturing, processing, use, handling, storage, transport, treatment, emission, release, and disposal of substances and wastes used or generated in manufacturing, we are subject to various laws around the world. For example, trade regulations, including tariffs or other import or export restrictions, may increase the cost of some of our raw materials or cross-border shipments, and limit our ability to do business in certain countries or with certain individuals. We are also required to comply with increasingly complex and changing laws and regulations enacted to protect business and personal data in the United States and other jurisdictions regarding privacy, data protection and data security, including those related to the collection, storage, use, transmission and protection of personal information and other consumer, customer, vendor or employee data. With respect to the laws and regulations noted above, as well as other applicable laws and regulations, the Company’s compliance programs may under certain circumstances involve material investments in the form of additional processes, training, personnel, information technology, and capital.

Human Capital Management

Materion employees are located throughout the world. Employee levels are managed to align with the pace of business and management believes it has sufficient human capital to operate its business successfully. We employed approximately 3,072 people globally as of December 31, 2020. Approximately 651 were in the Asia–Pacific region, 428 were in the Europe, the Middle East, and Africa (EMEA) region, and 1,993 were in the North America region. Among our total global employee population, approximately 2,224 were employed in manufacturing. Our strong employee base, along with their commitment to customer service excellence and uncompromising values, provide the foundation for our Company’s success.

Our employees are responsible for upholding our core values, which include working safely and collaboratively, conducting all aspects of business with the highest standards of ethics and integrity, leveraging processes and data to drive continuous improvement, empowering individuals and teams, embracing change, attracting and developing diverse global talent, and partnering for the betterment of the communities where we live and operate.

Health and Safety

The health, safety, and well-being of our employees is our highest priority and is a Materion core value. We have a strong Environmental, Health, and Safety (EHS) program that focuses on implementing policies and training programs, as well as performing self-audits to ensure our colleagues leave their workplace safely, every day. On an annual basis, our corporate strategic long-range strategies are reviewed and updated, improvement plans are developed for each global location, progress is tracked, and daily critical safety statistics and metrics are published internally. Our corporate intranet site is visible to all global employees, where we share detailed descriptions of serious injuries and near misses and their corrective actions, as well as other proactive measures to promote lessons learned and ensure worker safety. Safety awareness and employee engagement programs have been implemented at all global facilities. We also have onsite medical teams at two key manufacturing sites to provide medical testing for employees to determine any potential exposure to beryllium, of which Materion is a leading global supplier.

The COVID-19 pandemic has underscored for us the importance of keeping our employees safe and healthy. In response to the pandemic, the Company has taken actions aligned with the World Health Organization and the Centers for Disease Control and Prevention to protect its workforce so they can more safely and effectively perform their work. Our health and safety focus is evident in our response to the COVID-19 pandemic around the globe:

- adding work from home flexibility;
- encouraging those who are sick to stay home;
- increasing cleaning protocols across all locations;
- initiating regular communication regarding impacts of the COVID-19 pandemic, including health and safety protocols and procedures;
- implementing temperature screening of employees at all of our manufacturing facilities;
- establishing new physical distancing procedures for employees who need to be onsite;
- providing additional personal protective equipment and cleaning supplies;
- modifying work spaces with plexiglass dividers and touchless faucets;
- implementing protocols to address actual and suspected COVID-19 cases and potential exposure;

- prohibiting all domestic and international non-essential travel for all employees; and
- requiring masks to be worn in all locations where allowed by local law.

We manufacture products which are deemed essential to the critical infrastructure and all production sites have continued operating during the COVID-19 pandemic. As such, we have invested in creating physically safe work environments for our employees.

Diversity and Inclusion

As part of our human capital management initiatives to attract, develop, and retain diverse global talent, we track and report internally on key talent metrics including workforce demographics, critical role pipeline data, and diversity hiring analytics. This data-driven approach helps ensure that we stay aligned to our goal of creating a positive and dynamic global work environment where all employees can flourish. A truly innovative workforce needs to be diverse and leverage the skills and perspectives of a broad range of backgrounds and experiences. To attract a global workforce, we strive to create and embed a culture where employees can bring their whole selves to work.

Our employee resource groups (ERGs) are Company-sponsored groups of global employees that support and promote the specific mutual objectives of both the employees and the Company, with emphasis on the inclusion, diversity, and professional development of employees. The ERGs provide opportunities for employees to connect, develop, and grow together in a supportive environment. As of December 31, 2020, we had three ERGs: ELEVATE (Women), V.E.T. (veterans and allies of the military), and United Voices of Materion (all ethnic backgrounds). Our focus continues to be on the recruitment of diverse candidates as well as the development of our internal cadres of diverse leaders so that they can advance their careers and move into leadership positions throughout the Company. Additionally, in 2020, we launched professional development training for our female leaders in partnership with the PRADCO organization. We plan to offer professional development training again in 2021 with a new cohort of female leaders.

Talent Development

We continue to prioritize professional development and training for all global employees. By providing employees with wide-ranging development programs, opportunities, and paths to success, we empower them to realize their full potential. We strongly encourage employees to create a career development plan with focused milestones and ongoing two-way communication with their managers and supervisors. Apprenticeship programs have been implemented in some of our large plant sites, and we continue to introduce similar programs throughout the Company.

We are committed to identifying and developing the talents of our next generation of leaders. Our robust and fully integrated talent and succession-planning process supports the development of our talent pipeline for critical roles in operations management, commercial excellence and finance. On an annual basis, we conduct organizational reviews with our Chief Executive Officer and all business unit and function senior leaders to identify and evaluate our high potential diverse talent and succession plans for our most critical roles.

Available Information

We are subject to the informational requirements of the Securities Exchange Act of 1934. Therefore, we file periodic reports, proxy statements, and other information with the Securities and Exchange Commission (SEC).

We use our investor relations website, <https://investor.materion.com/>, as a channel for routine distribution of important information, including news releases, analyst presentations, and financial information. As soon as reasonably practicable, we make all documents that we file with, or furnish to, the SEC, including our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and any amendments to these reports, available free of charge via this website. The content on any website referred to in this Form 10-K is not incorporated by reference into this Form 10-K unless expressly noted.

Executive Officers of the Registrant

Incorporated by reference from information with respect to executive officers of Materion Corporation set forth in Item 10 in Part III of this Form 10-K.

Item 1A. RISK FACTORS

Our business, financial condition, results of operations, and cash flows can be affected by a number of factors, including, but not limited to, those set forth below and elsewhere in this Form 10-K, any one of which could cause our actual results to vary materially from recent results or from our anticipated future results. Therefore, an investment in us involves some risks, including the risks described below. Although the risks are organized by headings, and each risk is discussed separately, many

are interrelated. The risks discussed below are not the only risks that we may experience. If any of the following risks occur, our business, results of operations, or financial condition could be negatively impacted.

Risks Relating to the COVID-19 Pandemic

Our business, results of operations, financial position, and cash flows have been and are expected to continue to be adversely affected by the coronavirus (COVID-19) pandemic.

In December 2019, there was an outbreak of a novel strain of COVID-19 in China that has since spread to the majority of the regions of the world. The outbreak was subsequently declared a pandemic by the World Health Organization in March 2020. To date, the COVID-19 outbreak and preventative measures taken to contain or mitigate the outbreak have caused, and are continuing to cause, business slowdowns or shutdowns in affected areas and significant disruption in global financial markets. Although we are unable to predict the ultimate impact of the COVID-19 outbreak at this time, the pandemic has adversely affected, and is expected to continue to adversely affect, our business, results of operations, financial position, and cash flows. Such effects may be material and the potential impacts include, but are not limited to:

- disruptions to our facilities, including as a result of facility closures, reductions in operating hours, labor shortages, and changes in operating procedures, including additional cleaning and disinfecting procedures;
- disruptions in our supply chain due to transportation delays, travel restrictions, raw material cost increases, and closures of businesses or facilities;
- reductions in our operating effectiveness due to workforce disruptions resulting from “shelter in place,” “stay at home” orders, the need for social distancing, and the unavailability of key personnel necessary to conduct our business activities; and
- volatility in the global financial markets, which could have a negative impact on our ability to access capital and additional sources of financing in the future.

In addition, we cannot predict the impact that COVID-19 will have on our customers, employees, suppliers, and distributors, and any adverse impacts on these parties may have a material adverse impact on our business. The impact of COVID-19 may also exacerbate other risks discussed below, any of which could have a material effect on us. This situation is changing rapidly and additional impacts may arise that we are not aware of currently.

Risks Relating to Economic Conditions

The businesses of many of our customers are subject to significant fluctuations as a result of the cyclical nature of their industries and their sensitivity to general economic conditions, which could adversely affect their demand for our products and reduce our sales and profitability.

A substantial number of our customers are in the semiconductor, industrial, aerospace and defense, automotive, energy, consumer electronics, and telecom and data center end markets. Each of these end markets is cyclical in nature, influenced by a combination of factors which could have a negative impact on our business, including, among other things, periods of economic growth or recession, strength or weakness of the U.S. dollar, the strength of the semiconductor, automotive electronics, and oil and gas industries, the rate of construction of telecommunications infrastructure equipment, and government spending on defense.

Also, in times when growth rates in our markets are lower, or negative, there may be temporary inventory adjustments by our customers that may negatively affect our business.

Risks Relating to Our Business and Operations

Because we experience seasonal fluctuations in our sales, our quarterly results will fluctuate, and our annual performance will be affected by the fluctuations.

We expect seasonal patterns to continue, which may cause our quarterly results to fluctuate. If our revenue during any quarter were to fall below the expectations of investors or securities analysts, our share price could decline, perhaps significantly. Unfavorable economic conditions, lower than normal levels of demand, and other occurrences in any quarter could also harm our results of operations. For example, we have experienced customers building inventory in anticipation of increased demand, whereas in other periods, demand decreased because our customers had excess inventory.

A portion of our revenue is derived from the sale of defense-related products through various contracts and subcontracts. These contracts may be suspended, canceled, or delayed, which could have an adverse impact on our revenues.

In 2020, 13% of our value-added sales was derived from sales to customers in the aerospace and defense end market. A portion of these customers operate under contracts with the U.S. Government, which are vulnerable to termination at any time, for convenience or default. Some of the reasons for cancellation include, but are not limited to, budgetary constraints or re-appropriation of government funds, timing of contract awards, violations of legal or regulatory requirements, and changes in political agenda. If cancellations were to occur, it would result in a reduction in our revenue. Furthermore, significant reductions to defense spending could occur over the next several years due to government spending cuts, which could have a significant adverse impact on us. For example, high-margin defense application delays and/or push-outs may adversely impact our results of operations, including quarterly earnings.

The markets for our products are experiencing rapid changes in technology.

We operate in markets characterized by rapidly changing technology and evolving customer specifications and industry standards. New products may quickly render an existing product obsolete and unmarketable. For example, for many years thermal and mechanical performance have been at the forefront of device packaging for wireless communications infrastructure devices. In recent years, a tremendous effort has been put into developing simpler packaging solutions comprised of copper and other similar components. Our growth and future results of operations depend in part upon our ability to enhance existing products and introduce newly developed products on a timely basis that conform to prevailing and evolving industry standards, meet or exceed technological advances in the marketplace, meet changing customer specifications, achieve market acceptance, and respond to our competitors' products.

The process of developing new products can be technologically challenging and requires the accurate anticipation of technological and market trends. We may not be able to introduce new products successfully or do so on a timely basis. If we fail to develop new products that are appealing to our customers or fail to develop products on time and within budgeted amounts, we may be unable to recover our research and development costs, which could adversely affect our margins and profitability.

The availability of competitive substitute materials for beryllium-containing products may reduce our customers' demand for these products and reduce our sales.

In certain product applications, we compete with manufacturers of non-beryllium-containing products, including organic composites, metal alloys or composites, titanium, and aluminum. Our customers may choose to use substitutes for beryllium-containing products in their products for a variety of reasons, including, among other things, the lower costs of those substitutes, the health and safety concerns relating to these products (despite numerous studies affirming the safety of beryllium in these products), and the risk of litigation relating to beryllium-containing products. If our customers use substitutes for beryllium-containing materials in their products, the demand for beryllium-containing products may decrease, which could reduce our sales.

Our long and variable sales and development cycle makes it difficult for us to predict if and when a new product will be sold to customers.

Our sales and development cycle, which is the period from the generation of a sales lead or new product idea through the development of the product and the recording of sales, may typically take several years, making it very difficult to forecast sales and results of operations. Our inability to accurately predict the timing and magnitude of sales of our products, especially newly introduced products, could affect our ability to meet our customers' product delivery requirements or cause our results of operations to suffer if we incur expenses in a particular period that do not translate into sales during that period, or at all. In addition, these failures would make it difficult to plan future capital expenditure needs and could cause us to fail to meet our cash flow requirements.

The availability and prices of some raw materials we use in our manufacturing operations fluctuate, and increases in raw material costs can adversely affect our operating results and our financial condition.

We manufacture advanced engineered materials using various precious and non-precious metals, including aluminum, beryllium, cobalt, copper, gold, nickel, palladium, platinum, ruthenium, silver, and tin. The availability of, and prices for, these raw materials are subject to volatility and are influenced by worldwide economic conditions, speculative action, world supply and demand balances, inventory levels, availability of substitute metals, the U.S. dollar exchange rate, production costs of U.S. and foreign competitors, anticipated or perceived shortages, and other factors. Precious metal prices, including prices for gold and silver, have fluctuated significantly in recent years. Higher prices can cause adjustments to our inventory carrying values,

whether as a result of quantity discrepancies, normal manufacturing losses, differences in scrap rates, theft or other factors, which could have a negative impact on our profitability and cash flows. Also, the price of our products will generally increase in tandem with rising metal prices, as a result of changes in precious metal prices that are passed through to our customers, which could deter them from purchasing our products and adversely affect our net sales and operating profit.

Further, we maintain some precious metals and copper on a consigned inventory basis. The owners of the precious metals and copper charge a fee that fluctuates based on the market price of those metals and other factors. A significant increase in the market price or the consignment fee of precious metals and/or copper could increase our financing costs, which would increase our operating costs.

Utilizing precious metals in the manufacturing process creates challenges in physical inventory valuations that may impact earnings.

We manufacture precious, non-precious, and specialty metal products and also have metal cleaning operations and in-house refineries that allow for the reclaim of precious metals from internally generated or customer scrap. We refine that scrap through our internal operations and externally through outside vendors.

When taking periodic physical inventories in our refinery operations, we reconcile the actual precious metals to what was estimated prior to the physical inventory count. Those estimates are based in part on assays or samples of precious metals taken during the refining process. If those estimates are inaccurate, we may have an inventory long (more physical precious metal than what we had estimated) or short (less physical precious metal than what we had estimated). These fluctuations could have a material impact on our financial statements and may impact earnings. In the past, our gross margin has been reduced by a net quarterly physical inventory adjustment. Higher precious metal prices may magnify the value of any potential inventory long or short.

Because we maintain a significant inventory of precious metals, we may experience losses due to employee error or theft.

Because we manufacture products that contain precious metals, we maintain a significant amount of precious metals at certain of our manufacturing facilities. Accordingly, we are subject to the risk of precious metal shortages resulting from employee error or theft. In the past, we have had precious metal shortages resulting from employee error and theft, which could reoccur in the future.

While we maintain controls to prevent theft, including physical security measures, if our controls do not operate effectively or are designed ineffectively, our profitability could be adversely affected, including any charges that we might incur as a result of the shortage of our inventory and by costs associated with increased security, preventative measures, and insurance. Additionally, while we maintain insurance to cover the theft of our inventory, such coverage may not sufficiently cover any loss.

We have a limited number of manufacturing facilities, and damage to those facilities, or to critical pieces of equipment in these facilities, could interrupt our operations, increase our costs of doing business, and impair our ability to deliver our products on a timely basis.

Some of our facilities are interdependent. For instance, our manufacturing facility in Elmore, Ohio relies on our mining operation for its supply of beryllium hydroxide used in production of most of its beryllium-containing materials. Additionally, our Reading, Pennsylvania and Tucson, Arizona manufacturing facilities are dependent on materials produced by our Elmore, Ohio manufacturing facility, and our Wheatfield, New York manufacturing facility is dependent on our Buffalo, New York manufacturing facility. The destruction or closure of our mine, any of our manufacturing facilities, or to critical pieces of equipment within these facilities for a significant period of time as a result of harsh weather, fire, explosion, act of war or terrorism, or other natural disaster or unexpected event may interrupt our manufacturing capabilities, increase our capital expenditures and our costs of doing business, and impair our ability to deliver our products on a timely basis. In addition, many of our manufacturing facilities depend on one source for electric power and natural gas, which could be interrupted due to equipment failures, terrorism, or another cause.

If such events occur, we may need to resort to an alternative source of manufacturing or to delay production, which could increase our costs of doing business and/or result in lost sales. Our property damage and business interruption insurance may not cover all of our potential losses and may not continue to be available to us on acceptable terms, if at all.

A security breach of customer, employee, supplier, or company information may have a material adverse effect on our business, financial condition, and results of operations.

In the conduct of our business, we collect, use, transmit, store, and report data on information systems and interact with customers, vendors, and employees. Increased global information technology (IT) security threats and more sophisticated and targeted computer crime pose a risk to the security of our systems and networks and the confidentiality, availability, and integrity of our data. Despite our security measures, our IT systems and infrastructure may be vulnerable to customer viruses, cyber-attacks, security breaches caused by employee error or malfeasance, or other disruptions. Any such threat could compromise our networks and the information stored there could be accessed, publicly disclosed, lost, or stolen. A security breach of our computer systems could interrupt or damage our operations or harm our reputation, resulting in a loss of sales, operating profits, and assets. In addition, we could be subject to legal claims or proceedings and/or liability under laws that protect the privacy of personal information and regulatory penalties if confidential information relating to customers, suppliers, employees, or other parties is misappropriated from our computer systems.

Similar security threats exist with respect to the IT systems of our lenders, suppliers, consultants, advisers, and other third parties with whom we conduct business. A security breach of those computer systems could result in the loss, theft, or disclosure of confidential information and could also interrupt or damage our operations, harm our reputation, and subject us to legal claims.

Our defined benefit pension plans and other post-employment benefit plans are subject to financial market risks that could adversely impact our financial performance.

In 2019, the Company's Board of Directors approved changes to the U.S. defined benefit pension plan. The Company froze the pay and service amounts used to calculate the pension benefits for active participants as of January 1, 2020. The Company has defined benefit pension plans in other non-U.S. locations. Our pension expense and our required contributions to our pension plans are directly affected by the value of plan assets, the projected rate of return on plan assets, the actual rate of return on plan assets, and the actuarial assumptions we use to measure our defined benefit pension plan obligations, including the rate at which future obligations are discounted to a present value, or the discount rate. Significant changes in market interest rates and decreases in the fair value of plan assets and investment losses on plan assets would increase funding requirements and expenses and may adversely impact our results of operations.

We provide post-employment health benefits to eligible employees. Our retiree health expense is directly affected by the assumptions we use to measure our retiree health plan obligations, including the assumed rate at which health care costs will increase and the discount rate used to calculate future obligations. For retiree health accounting purposes, we have used a graded assumption schedule to assume the rate at which health care costs will increase. We cannot predict whether changing market or economic conditions, regulatory changes, or other factors will further increase our retiree health care expenses or obligations, diverting funds we would otherwise apply to other uses.

Unexpected events and natural disasters at our mine could increase the cost of operating our business.

A portion of our production costs at our mine are fixed regardless of current operating levels. Our operating levels are subject to conditions beyond our control that may increase the cost of mining for varying lengths of time. These conditions include, among other things, weather, fire, natural disasters, pit wall failures, and ore processing changes. Our mining operations also involve the handling and production of potentially explosive materials. It is possible that an explosion could result in death or injuries to employees and others and material property damage to third parties and us. Any explosion could expose us to adverse publicity or liability for damages and materially adversely affect our operations. Any of these events could increase our cost of operations.

Risks Related to Legal, Compliance and Regulatory Matters

We conduct our sales and distribution operations on a worldwide basis and are subject to the risks associated with doing business outside the United States.

We sell to customers outside of the United States from our United States and international operations. Revenue from international operations (principally Europe and Asia) accounted for approximately 45% in 2020, 37% in 2019, and 40% in 2018 of Net sales. We anticipate that international shipments will account for a significant portion of our sales for the foreseeable future. There are a number of risks associated with international business activities, including:

- burdens to comply with multiple and potentially conflicting foreign laws and regulations, including export requirements, tariffs and other barriers, environmental health and safety requirements, increasingly complex

requirements concerning privacy and data security, including the European Union's General Data Protection Regulation, and unexpected changes in any of these factors;

- difficulty in obtaining export licenses from the U.S. Government;
- political and economic instability and disruptions, including terrorist attacks;
- disadvantages of competing against companies from countries that are not subject to U.S. laws and regulations, including the Foreign Corrupt Practices Act (FCPA);
- potentially adverse tax consequences due to overlapping or differing tax structures;
- fluctuations in currency exchange rates; and
- disruptions in our business or the businesses of our suppliers or customers due to cyber security incidents, public health concerns (including viral outbreaks, such as the coronavirus) or natural disasters.

Any of these risks could have an adverse effect on our international operations by reducing the demand for our products or reducing the prices at which we can sell our products, which could result in an adverse effect on our business, financial position, results of operations, or cash flows. We may hedge our currency transactions to mitigate the impact of currency price volatility on our earnings; however, hedging activities may not be successful. For example, hedging activities may not cover the Company's net euro and yen exposure, which could have an unfavorable impact on our results of operations.

In addition, we could be adversely affected by violations of the FCPA and similar worldwide anti-bribery laws. The FCPA and similar anti-bribery laws in other jurisdictions generally prohibit companies and their intermediaries from making improper payments to non-U.S. officials for the purpose of obtaining or retaining business. While policies mandate compliance with these anti-bribery laws, we operate in many parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-bribery laws may conflict with local customs and practices. We cannot assure that our internal controls and procedures will always protect us from the reckless or criminal acts committed by our employees or agents. If we are found to be liable for FCPA violations or other anti-bribery laws, we could suffer from criminal or civil penalties or other sanctions, which could have a material adverse effect on our business.

Changes in laws or regulations or the manner of their interpretation or enforcement could adversely impact our financial performance and restrict our ability to operate our business or execute our strategies.

New laws or regulations, or changes in existing laws or regulations, or the manner of their interpretation or enforcement, could increase our cost of doing business and restrict our ability to operate our business or execute our strategies. In particular, there may be significant changes in U.S. laws and regulations and existing international trade agreements by the current U.S. presidential administration that could affect a wide variety of industries and businesses, including those businesses we own and operate. If the current U.S. presidential administration materially modifies U.S. laws and regulations and international trade agreements, our business, financial condition, and results of operations could be adversely affected.

We are exposed to lawsuits in the normal course of business, which could harm our business.

During the ordinary conduct of our business, we may become involved in certain legal proceedings, including those involving product liability claims, third-party lawsuits relating to exposure to beryllium, claims against us of infringement of intellectual property rights of third parties, or other litigation matters. Due to the uncertainties of litigation, we can give no assurance that we will prevail at the resolution of future claims. Certain of these matters involve types of claims that, if they result in an adverse ruling to us, could give rise to substantial liability, which could have a material adverse effect on our business, operating results, or financial condition.

Although we have insurance which may be applicable in certain circumstances, some jurisdictions preclude insurance coverage for punitive damage awards. Accordingly, our profitability could be adversely affected if any current or future claimants obtain judgments for any uninsured compensatory or punitive damages. Further, an unfavorable outcome or settlement of a pending beryllium case or adverse media coverage could encourage the commencement of additional similar litigation.

Health issues, litigation, and government regulations relating to our beryllium operations could significantly reduce demand for our products, limit our ability to operate, and adversely affect our profitability.

If exposed to respirable beryllium fumes, dusts, or powder, some individuals may demonstrate an allergic reaction to beryllium and may later develop a chronic lung disease known as chronic beryllium disease (CBD). Some people who are diagnosed with

CBD do not develop clinical symptoms at all. In others, the disease can lead to scarring and damage of lung tissue, causing clinical symptoms that include shortness of breath, wheezing, and coughing. Severe cases of CBD can cause disability or death.

Further, some scientists claim there is evidence of an association between beryllium exposure and lung cancer, and certain standard-setting organizations have classified beryllium and beryllium compounds as human carcinogens.

The health risks relating to exposure to beryllium have been, and will continue to be, a significant issue confronting the beryllium-containing products industry. The health risks associated with beryllium have resulted in product liability claims, employee, and third-party lawsuits. As of December 31, 2020, we had two CBD cases outstanding.

The increased levels of scrutiny by federal, state, foreign, and international regulatory authorities could lead to regulatory decisions relating to the approval or prohibition of the use of beryllium-containing materials for various uses. Concerns over CBD and other potential adverse health effects relating to beryllium, as well as concerns regarding potential liability from the use of beryllium, may discourage our customers' use of our beryllium-containing products and significantly reduce demand for our products. In addition, adverse media coverage relating to our beryllium-containing products could damage our reputation or cause a decrease in demand for beryllium-containing products, which could adversely affect our profitability.

Our bertrandite ore mining and beryllium-related manufacturing operations and some of our customers' businesses are subject to extensive health and safety regulations that impose, and will continue to impose, significant costs and liabilities, and future regulation could increase those costs and liabilities, or effectively prohibit production or use of beryllium-containing products.

We, as well as our customers, are subject to laws regulating worker exposure to beryllium. OSHA has published a new standard for workplace exposure to beryllium that, among other things, lowered the permissible exposure by a factor of ten and established new requirements for respiratory protection, personal protective clothing and equipment, medical surveillance, hazard communication, and recordkeeping. Materion was a participant in the development of the new standards, which fundamentally represent our current health and safety operating practices. Other government and standard-setting organizations are also reviewing beryllium-related worker safety rules and standards, and will likely make them more stringent. The development, proposal, or adoption of more stringent standards may affect buying decisions by the users of beryllium-containing products. If the standards are made more stringent and/or our customers or other downstream users decide to reduce their use of beryllium-containing products, our results of operations, liquidity, and financial condition could be materially adversely affected. The impact of this potential adverse effect would depend on the nature and extent of the changes to the standards, the cost and ability to meet the new standards, the extent of any reduction in customer use, and other factors. The magnitude of this potential adverse effect cannot be estimated.

Our bertrandite ore mining and manufacturing operations are subject to extensive environmental regulations that impose, and will continue to impose, significant costs and liabilities on us, and future regulation could increase these costs and liabilities or prevent production of beryllium-containing products.

We are subject to a variety of governmental regulations relating to the environment, including those relating to our handling of hazardous materials and air and wastewater emissions. Some environmental laws impose substantial penalties for non-compliance. Others, such as the federal Comprehensive Environmental Response, Compensation, and Liability Act, impose strict, retroactive, and joint and several liability upon entities responsible for releases of hazardous substances. Bertrandite ore mining is also subject to extensive governmental regulation on matters such as permitting and licensing requirements, plant and wildlife protection, reclamation and restoration of mining properties, the discharge of materials into the environment, and the effects that mining has on groundwater quality and availability. Future requirements could impose on us significant additional costs or obligations with respect to our extraction, milling, and processing of ore. If we fail to comply with present and future environmental laws and regulations, we could be subject to liabilities or our operations could be interrupted. In addition, future environmental laws and regulations could restrict our ability to expand our facilities or extract our bertrandite ore deposits. These environmental laws and regulations could also require us to acquire costly equipment, obtain additional financial assurance, or incur other significant expenses in connection with our business, which would increase our costs of production.

Risks Related to Our Debt

A major portion of our bank debt consists of variable-rate obligations, which subjects us to interest rate fluctuations.

Our credit facilities are secured by substantially all of our assets (other than non-mining real property and certain other assets). Our working capital line of credit includes variable-rate obligations, which expose us to interest rate risks. If interest rates increase, our debt service obligations on our variable-rate indebtedness would increase even if the amount borrowed remained

the same, resulting in a decrease in our net income. Additional information regarding our market risks is contained in Item 7A "Quantitative and Qualitative Disclosures About Market Risk."

Our failure to comply with the covenants contained in the terms of our indebtedness could result in an event of default, which could materially and adversely affect our operating results and our financial condition.

The terms of our credit facilities require us to comply with various covenants, including financial covenants. In the event of a global economic downturn, it could have a material adverse impact on our earnings and cash flow, which could adversely affect our ability to comply with our financial covenants and could limit our borrowing capacity. Our ability to comply with these covenants depends, in part, on factors over that we may have no control. A breach of any of these covenants could result in an event of default under one or more of the agreements governing our indebtedness which, if not cured or waived, could give the holders of the defaulted indebtedness the right to terminate commitments to lend and cause all amounts outstanding with respect to the indebtedness to be due and payable immediately. Acceleration of any of our indebtedness could result in cross-defaults under our other debt instruments. Our assets and cash flow may be insufficient to fully repay borrowings under all of our outstanding debt instruments if some or all of these instruments are accelerated upon an event of default, in which case we may be required to seek legal protection from our creditors.

The terms of our indebtedness may restrict our operations, including our ability to pursue our growth and acquisition strategies.

The terms of our credit facilities contain a number of restrictive covenants, including restrictions in our ability to, among other things, borrow and make investments, acquire other businesses, and consign additional precious metals. These covenants could adversely affect our business by limiting our ability to plan for or react to market conditions or to meet our capital needs, as well as adversely affect our ability to pursue our growth, acquisition strategies, and other strategic initiatives.

Risks Related to the Execution of Our Strategy

We may not be able to complete our acquisition strategy or successfully integrate acquired businesses.

We are active in pursuing acquisitions. We intend to continue to consider further growth opportunities through the acquisition of assets or companies and routinely review acquisition opportunities. We cannot predict whether we will be successful in pursuing any acquisition opportunities or what the consequences of any acquisition would be. Future acquisitions may involve the expenditure of significant funds and management time. Depending upon the nature, size, and timing of future acquisitions, we may be required to raise additional financing, which may not be available to us on acceptable terms, or at all. Further, we may not be able to successfully integrate any acquired business with our existing businesses or recognize any expected advantages from any completed acquisition.

In addition, there may be liabilities that we fail, or are unable, to discover in the course of performing due diligence investigations on the assets or companies we have already acquired or may acquire in the future. We cannot assure that rights to indemnification by the sellers of these assets or companies to us, even if obtained, will be enforceable, collectible, or sufficient in amount, scope, or duration to fully offset the possible liabilities associated with the business or property acquired. Any such liabilities, individually or in the aggregate, could have a materially adverse effect on our business, financial condition, and results of operations.

Our products are deployed in complex applications and may have errors or defects that we find only after deployment.

Our products are highly complex, designed to be deployed in complicated applications, and may contain undetected defects, errors, or failures. Although our products are generally tested during manufacturing, prior to deployment, they can only be fully tested when deployed in specific applications. For example, we sell beryllium-copper alloy strip products in a coil form to some customers, who then stamp the alloy for its specific purpose. On occasion, it is not until such customer stamps the alloy that a defect in the alloy is detected. Consequently, our customers may discover errors after the products have been deployed. The occurrence of any defects, errors, or failures could result in installation delays, product returns, termination of contracts with our customers, diversion of our resources, increased service and warranty costs, and other losses to our customers, end users, or to us. Any of these occurrences could also result in the loss of, or delay in, market acceptance of our products, and could damage our reputation, which could reduce our sales.

In addition to the risk of unanticipated warranty or recall expenses, our customer contracts may contain provisions that could cause us to incur penalties, be liable for damages, including liquidated damages, or incur other expenses, if we experience difficulties with respect to the functionality, deployment, operation, and availability of our products and services. In the event of late deliveries, late or improper installations or operations, failure to meet product or performance specifications or other

product defects, or interruptions or delays in our managed service offerings, our customer contracts may expose us to penalties, liquidated damages, and other liabilities. In the event we were to incur contractual penalties, such as liquidated damages or other related costs that exceed our expectations, our business, financial condition, and operating results could be materially and adversely affected.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

We operate manufacturing plants, service and distribution centers, and other facilities throughout the world. During 2020, we made effective use of our productive capacities at our principal facilities. We believe that the quality and production capacity of our facilities is sufficient to maintain our competitive position for the foreseeable future. Information as of December 31, 2020, with respect to our facilities that are owned or leased, and the respective segments in which they are included, is set forth below:

<u>Location</u>	<u>Owned or Leased</u>	<u>Approximate Number of Square Feet</u>
Corporate and Administrative Offices		
Mayfield Heights, Ohio ⁽¹⁾⁽²⁾	Leased	79,130
Manufacturing Facilities		
Albuquerque, New Mexico ⁽²⁾	Owned/Leased	13,000/63,223
Alzenau, Germany ⁽²⁾	Leased	136,433
Balzers, Lichtenstein ⁽³⁾	Leased	83,399
Bloomfield, Connecticut ⁽³⁾	Leased	44,800
Brewster, New York ⁽²⁾	Leased	75,000
Buffalo, New York ⁽²⁾	Owned	97,000
Delta, Utah ⁽¹⁾	Owned	100,836
Elmore, Ohio ⁽¹⁾	Owned/Leased	681,000/191,000
Farnborough, England ⁽¹⁾	Leased	10,000
Jena, Germany ⁽³⁾	Owned	25,833
Limerick, Ireland ⁽²⁾	Leased	23,000
Lincoln, Rhode Island ⁽¹⁾	Owned/Leased	130,000/26,451
Lorain, Ohio ⁽¹⁾	Owned	55,000
Milwaukee, Wisconsin ⁽²⁾	Owned	98,750
Penang, Malaysia ⁽³⁾	Leased	68,028
Reading, Pennsylvania ⁽¹⁾	Owned/Leased	128,863/287,000
Santa Clara, California ⁽²⁾	Leased	5,800
Shanghai, China ⁽³⁾	Leased	101,400
Singapore ⁽¹⁾⁽²⁾	Leased	24,500
Subic Bay, Philippines ⁽²⁾	Leased	5,000
Suzhou, China ⁽²⁾	Leased	21,743
Taoyuan City, Taiwan ⁽²⁾	Leased	32,523
Tucson, Arizona ⁽¹⁾	Owned	53,000
Tyngsboro, Massachusetts ⁽³⁾	Leased	38,000
Westford, Massachusetts ⁽³⁾	Leased	53,000
Wheatfield, New York ⁽²⁾	Owned	35,000
Windsor, Connecticut ⁽³⁾	Leased	34,700
Service, Sales, and Distribution Centers		
Elmhurst, Illinois ⁽¹⁾	Leased	28,500
Eschborn, Germany ⁽³⁾	Leased	538
Maastricht, The Netherlands ⁽²⁾	Leased	450
Port Charlotte, Florida ⁽³⁾	Leased	161
Seoul, Korea ⁽²⁾	Leased	13,654
Stuttgart, Germany ⁽¹⁾	Leased	24,800
Tokyo, Japan ⁽¹⁾	Leased	7,200

(1) PAC

(2) Advanced Materials

(3) Precision Optics

In addition to the above, the Company holds certain mineral rights on 7,500 acres in Juab County, Utah, from which the beryllium-bearing ore, bertrandite, is mined by the open pit method. A portion of these mineral rights are held under lease. Ore reserve data can be found in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations."

Item 3. LEGAL PROCEEDINGS

Our subsidiaries and our holding company are subject, from time to time, to a variety of civil and administrative proceedings arising out of our normal operations, including, without limitation, product liability claims, health, safety, and environmental claims, and employment-related actions. Among such proceedings are cases alleging that plaintiffs have contracted, or have been placed at risk of contracting, beryllium sensitization or CBD or other lung conditions as a result of exposure to beryllium (beryllium cases). The plaintiffs in beryllium cases seek recovery under negligence and various other legal theories and demand compensatory and often punitive damages, in many cases of an unspecified sum. Spouses of some plaintiffs claim loss of consortium.

Beryllium Claims

As of December 31, 2020, our subsidiary, Materion Brush Inc., was a defendant in two beryllium cases. During 2020, one new beryllium case was filed. In Richard Miller v. Dolphin, Inc. et al., case number CV2020-005163, filed in the Superior Court of Arizona, Maricopa County, the Company is one of six named defendants and 100 Doe defendants. The plaintiff alleges that he contracted beryllium disease from exposures to beryllium-containing products supplied to his employer, Karsten Manufacturing Corporation, where he was a production worker, and asserts claims for negligence, strict liability – failure to warn, strict liability – design defect, and fraudulent concealment. The plaintiff seeks general damages, medical expenses, loss of earnings, consequential damages, and punitive damages. A co-defendant, Dolphin, Inc., filed a cross-claim against the Company for indemnification. On August 12, 2020, the Company moved to dismiss the cross-claim for failure to state a claim upon which relief can be granted. The court denied the motion on October 23, 2020. On December 7, 2020, the Company filed a Petition for Special Action in the Court of Appeals seeking to appeal the motion to dismiss the cross-claim. The Court of Appeals declined to accept jurisdiction on December 30, 2020. The Company believes that it has substantive defenses and intends to vigorously defend this suit.

In 2019, one beryllium case was filed. In Ronald Dwayne Manning v. Arconic Inc. et al., case number 19CI000219, filed in the Superior Court of the State of California, Tehama County, and later removed to the United States District Court, Eastern District of California (Sacramento Division), case number 2:19-CV-02202-MCE-DMC, the Company is one of four named defendants and 120 Doe defendants. The plaintiff alleges that he contracted beryllium disease from exposures to beryllium-containing products during his employment as an auto mechanic, welder, sprinkler installer, and movie projector operator, and asserts claims for negligence, strict liability, fraudulent concealment, and breach of implied warranties. The plaintiff seeks economic damages, non-economic damages, consequential damages, and punitive damages. The Company believes that it has substantive defenses and intends to vigorously defend this suit.

The Company has insurance coverage, which may respond, subject to an annual deductible.

Other Claims

On October 14, 2020 Garett Lucyk et al. v. Materion Brush Inc., et al., case number 20CV0234, a wage and hour purported collective and class action, was filed in the Northern District of Ohio against the Company and its subsidiary, Materion Brush Inc. (collectively, the Company). Plaintiff, a former hourly production employee at the Company's Elmore, Ohio facility, alleges that he and other similarly situated employees nationwide are not paid for all time they spend donning and doffing personal protective equipment in violation of the Fair Labor Standards Act and Ohio law. Plaintiff also alleges the Company failed to include all remuneration he and others received for premium and bonus pay when computing overtime pay. The case is currently in the preliminary stages. The Company believes that it has substantive defenses and intends to vigorously defend this suit.

Item 4. MINE SAFETY DISCLOSURES

Information concerning mine safety violations or other regulatory matters required by Section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act and Item 104 of Regulation S-K (17 CFR 229.104) is included in Exhibit 95 to this Form 10-K.

PART II

Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

The Company's common shares are listed on the New York Stock Exchange under the symbol "MTRN". As of January 29, 2021, there were 710 shareholders of record.

Share Repurchases

The following table presents information with respect to repurchases of common stock made by us during the three months ended December 31, 2020.

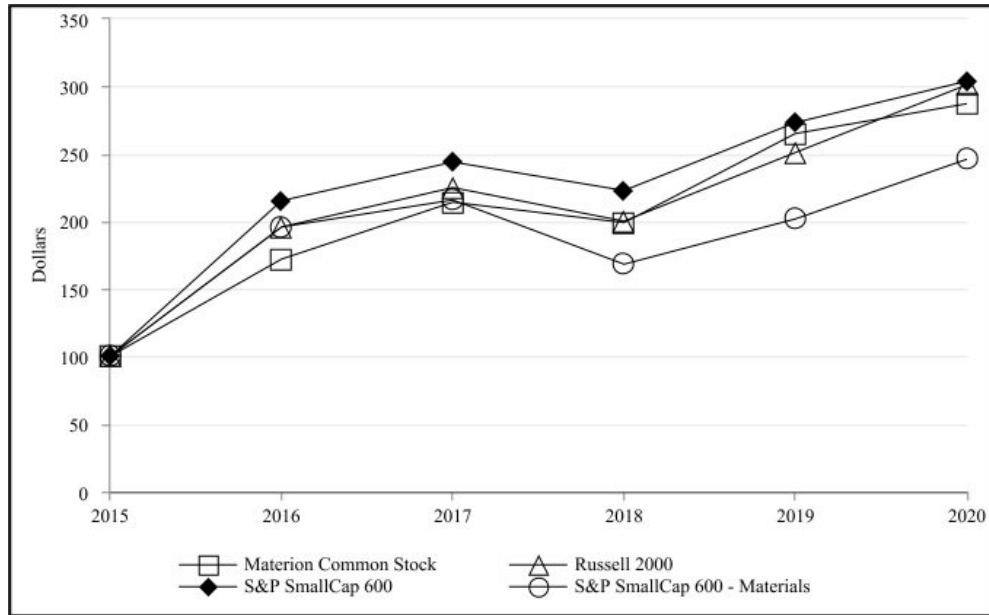
Period	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (2)	Maximum Dollar Value that May Yet Be Purchased Under the Plans or Programs (2)
September 26 through October 30, 2020	—	\$ —	—	\$ 8,316,239
October 31 through November 27, 2020	39	60.19	—	8,316,239
November 28 through December 31, 2020	109	60.75	—	8,316,239
Total	148	\$ 60.61	—	\$ 8,316,239

(1) Represents shares surrendered to the Company by employees to satisfy tax withholding obligations on stock appreciation rights issued under the Company's stock incentive plan.

(2) On January 14, 2014, we announced that our Board of Directors authorized the repurchase of up to \$50.0 million of our common stock; this Board authorization does not have an expiration date. During the three months ended December 31, 2020, we did not repurchase any shares under this program.

Performance Graph

The following graph sets forth the cumulative shareholder return on our common shares as compared to the cumulative total return of the Russell 2000 Index, the S&P SmallCap 600 Index, and the S&P SmallCap 600 Materials Index, as Materion Corporation is a component of these indices.



	2016	2017	2018	2019	2020
Materion Corporation	\$ 172	\$ 214	\$ 199	\$ 265	\$ 287
Russell 2000	196	225	200	251	301
S&P SmallCap 600	215	244	223	273	304
S&P SmallCap 600 - Materials	196	216	168	202	246

The above graph assumes that the value of our common shares and each index was \$100 on December 31, 2015 and that all applicable dividends were reinvested.

Item 6. SELECTED FINANCIAL DATA

Reserved.

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

OVERVIEW

We are an integrated producer of high-performance advanced engineered materials used in a variety of electrical, electronic, thermal, and structural applications. Our products are sold into numerous end markets, including semiconductor, industrial, aerospace and defense, automotive, energy, consumer electronics, and telecom and data center.

Coronavirus (COVID-19) Update

The significant macroeconomic impact of the ongoing COVID-19 pandemic impacted several of our markets beginning in the first quarter of 2020 primarily in the form of reduced demand, particularly in the consumer electronics, automotive, energy, aerospace and defense, and industrial end markets. During 2020, we recorded additional reserves for slow-moving and excess inventory of approximately \$1.3 million related to the collapse in demand in the oil and gas industry. We also reviewed for any other potential impairment indicators and did not identify any. We still may temporarily shut down our facilities in response to reduced demand, due to employees being impacted by COVID-19, or changes in government policy. We are not experiencing any significant supply chain disruptions. We expect reduced demand to continue at least through the first quarter of 2021, but the extent and timing cannot be reasonably estimated due to the evolving nature of this pandemic.

In 2020, the Company incurred \$4.1 million of expense primarily related to premium pay for production workers who were deemed essential to work onsite during the pandemic, as well as for personal protective equipment and temperature-checking services.

The impact of the COVID-19 pandemic is fluid and continues to evolve, and, therefore, we cannot predict the extent to which our business, results of operations, financial condition, or cash flows will ultimately be impacted.

The Company suspended its share buyback program in the first quarter of 2020. The Company subsequently decided to lift the suspension of its share buyback program in the fourth quarter of 2020. In addition, the Company has evaluated the impact of the CARES Act and has determined it does not have a material impact to its consolidated financial statements. See Note H to the Consolidated Financial Statements for additional discussion.

From a liquidity perspective, we believe we are well positioned to manage through this global crisis. In order to ensure we have more than adequate liquidity, we borrowed \$150.0 million under the revolving credit facility in April 2020, \$116.0 million of which was repaid during the second half of 2020. We ended 2020 with total cash of \$25.9 million and \$38.5 million of total debt, or in a net debt position of \$12.6 million. In addition, we had \$245.8 million of available borrowings under our revolving credit facility as of December 31, 2020.

Additionally, in July 2020, we completed the acquisition of Optics Balzers for a purchase price of \$136.1 million, including the assumption of debt. The transaction was funded with cash on hand, including a portion of the \$150.0 million borrowed under our revolving credit facility during the second quarter of 2020.

RESULTS OF OPERATIONS

During the fourth quarter of 2020, we elected to change our method for valuing inventories that previously used the last-in, first-out (LIFO) method to the first-in, first-out (FIFO) method. Total inventories accounted for under the LIFO method represented approximately 45% of the Company's total inventories as of December 31, 2019 prior to this change in method. We determined that the FIFO method is preferable as it results in uniformity across materially all of our global operations, more closely resembles the physical flow of our inventory, and improves comparability with our peers. The effects of the change in accounting principle have been retrospectively applied to all periods presented in Item 7. Refer to "Note A - Significant Accounting Policies" in the Notes to the Consolidated Financial Statements.

(Thousands except per share data)	2020	2019	2018
Net sales	\$ 1,176,274	\$ 1,185,424	\$ 1,207,815
Value-added sales	678,567	733,689	738,958
Gross margin	192,633	262,690	251,361
Gross margin as a % of Value-added sales	28 %	36 %	34 %
Selling, general, and administrative (SG&A) expense	133,963	147,164	153,489
SG&A expense as a % of Value-added sales	20 %	20 %	21 %
Research and development (R&D) expense	20,283	18,271	15,187
R&D expense as a % of Value-added sales	3 %	2 %	2 %
Goodwill impairment charges	9,053	11,560	—
Asset impairment charges	1,419	2,581	—
Restructuring expense	11,237	785	5,599
Other — net	8,463	11,783	15,334
Operating profit	8,215	70,546	61,752
Other non-operating (income) expense — net	(3,939)	3,431	42,683
Interest expense — net	3,879	1,579	2,471
Income before income taxes	8,275	65,536	16,598
Income tax (benefit) expense	(7,187)	12,142	(4,446)
Net income	15,462	53,394	21,044
Diluted earnings per share	0.75	2.59	1.02

2020 Compared to 2019

Net sales of \$1,176.3 million in 2020 decreased \$9.1 million from \$1,185.4 million in 2019. Increased net sales of \$97.1 million in our Advanced Materials segment were more than offset by decreased net sales of \$106.0 million and \$0.2 million in our Performance Alloys and Composites and Precision Optics segments, respectively, driven by lower sales volumes. The change in precious metal and copper prices favorably impacted net sales during 2020 by \$94.6 million.

Value-added sales is a non-GAAP financial measure that removes the impact of pass-through metal costs and allows for analysis without the distortion of the movement or volatility in metal prices and changes in mix due to customer-supplied material. Internally, we manage our business on this basis, and a reconciliation of net sales, the most directly comparable GAAP financial measure, to value-added sales is included herein. Value-added sales of \$678.6 million in 2020 were down 8% compared to 2019. The increase in semiconductor end market value-added sales was more than offset by the decrease in value-added sales due to reduced demand in the aerospace and defense, energy, telecom and data center, and industrial end markets.

Gross margin was \$192.6 million in 2020, or a 27% decrease from the \$262.7 million gross margin recorded in 2019. Gross margin expressed as a percentage of value-added sales decreased to 28% in 2020 from 36% in 2019. The decrease was primarily driven by lower volumes, as well as \$12.9 million of mine development costs relating to a recent mine expansion, \$3.8 million of costs related to the COVID-19 pandemic, and a \$1.3 million charge to reserves for slow-moving and excess inventory related to the collapse in demand in the oil and gas industry, all of which were recorded in 2020.

SG&A expense totaled \$134.0 million in 2020 as compared to \$147.2 million in 2019. The decrease in SG&A expense for 2020 was primarily driven by lower variable compensation expense and cost management actions, partially offset by integration and transaction costs related to the Optics Balzers acquisition. Expressed as a percentage of value-added sales, SG&A expense was 20% in both 2020 and 2019.

R&D expense consists primarily of direct personnel costs for pre-production evaluation and testing of new products, prototypes, and applications. R&D expense was \$20.3 million, an increase of 11% compared to 2019 and increased to 3% as a percentage of value-added sales in 2020. The increase in R&D expense reflects additional investment in new product and application development.

Goodwill and Asset impairment charges includes non-recurring charges relating to goodwill and other assets in our Precision Optics segment. Refer to Note N to the Consolidated Financial Statements for additional discussion.

Restructuring expense consists primarily of cost reduction actions taken in order to improve the efficiency of our operations. In 2020, we recorded \$11.2 million of restructuring charges. Of this amount, \$8.8 million relates to the closure of our Warren, Michigan and Fremont, California facilities in our Performance Alloys and Composites segment and \$1.7 million relates to the closure of our Large Area Coatings (LAC) business in our Precision Optics segment.

In 2019, we recorded \$0.8 million of expenses related to restructuring actions taken in our LAC business and our Other segment. Refer to Note E to the Consolidated Financial Statements for additional discussion.

Other-net totaled expense of \$8.5 million and \$11.8 million in 2020 and 2019, respectively. The decrease in Other-net was primarily driven by a \$3.3 million foreign exchange hedge gain realized in 2020. Refer to Note F to the Consolidated Financial Statements for the major components within Other-net.

Other non-operating (income) expense-net includes components of pension and post-retirement expense other than service costs. In 2019, other non-operating (income) expense-net included a non-cash pre-tax pension curtailment charge of \$3.3 million associated with the pension plan amendment to freeze the pay and service amounts used to calculate pension benefits effective January 1, 2020. Refer to Note P of the Consolidated Financial Statements for details of the components of net periodic benefit costs.

Interest expense - net was \$3.9 million in 2020 and \$1.6 million in 2019. The increase in interest expense in 2020 compared to 2019 is primarily due to increased borrowings under our revolving credit facility.

Income tax (benefit) expense for 2020 was a benefit of \$7.2 million compared to \$12.1 million of expense in 2019. The effects of percentage depletion, the research and development credit, and the release of a valuation allowance in a foreign jurisdiction were the primary factors for the difference between the effective and statutory tax rates in 2020. Refer to Note H to the Consolidated Financial Statements for further details on income taxes.

See the Management Discussion and Analysis section of our Annual Report on Form 10-K for the year ended December 31, 2019 for a discussion of our results for 2019 compared to 2018.

Segment Disclosures

The Company consists of four reportable segments: Performance Alloys and Composites, Advanced Materials, Precision Optics, and Other. The Other reportable segment includes unallocated corporate costs.

Performance Alloys and Composites

(Thousands)	2020	2019	2018
Net sales	\$ 394,195	\$ 500,201	\$ 500,590
Value-added sales	345,335	428,084	425,471
Operating profit	13,597	73,815	60,008

2020 Compared to 2019

Net sales from the Performance Alloys and Composites segment of \$394.2 million in 2020 decreased 21% compared to 2019. The decrease was due to reduced sales into all major end markets, with the largest declines in the aerospace and defense, energy, telecom and data center, and industrial end markets.

Value-added sales of \$345.3 million in 2020 were 19% lower than value-added sales of \$428.1 million in 2019. The decrease in value-added sales was due to the same factors driving the decrease in net sales.

Performance Alloys and Composites generated operating profit of \$13.6 million, or 4% of value-added sales, in 2020 as compared to \$73.8 million, or 17% of value-added sales, in 2019. The decrease in operating profit was primarily due to reduced sales volumes, as well as \$12.9 million of mine development costs recorded in 2020. In addition, restructuring charges of \$8.8 million were recorded in 2020 related to the closure of our Warren, Michigan and Fremont, California facilities.

Advanced Materials

(Thousands)	2020	2019	2018
Net sales	\$ 670,867	\$ 573,763	\$ 586,643
Value-added sales	233,958	224,254	223,714
Operating profit	22,120	25,124	16,732

2020 Compared to 2019

Net sales from the Advanced Materials segment of \$670.9 million in 2020 were 17% higher than net sales of \$573.8 million in 2019. The increase in net sales was primarily due to the impact of higher pass-through metal prices of \$92.6 million.

Value-added sales of \$234.0 million increased \$9.7 million compared to value-added sales of \$224.3 million in 2019 primarily due to increased value-added sales into the semiconductor end market, partially offset by reduced value-added sales into the energy and other end markets.

Advanced Materials generated operating profit of \$22.1 million in 2020, compared to \$25.1 million in 2019. Decreased operating profit in 2020, compared to 2019, was the result of unfavorable sales mix and reduced manufacturing yields.

Precision Optics

(Thousands)	2020	2019	2018
Net sales	\$ 111,212	\$ 111,460	\$ 120,582
Value-added sales	101,878	87,310	94,231
Operating (loss) profit	(4,382)	(3,550)	10,707

2020 Compared to 2019

Net sales from the Precision Optics segment of \$111.2 million in 2020 decreased slightly compared to net sales of \$111.5 million in 2019 primarily due to reduced sales volumes related to blood glucose test strip and projection display products and a lower mix of precious metal containing products, largely offset by an increase from sales attributable to our Optics Balzers acquisition.

Value-added sales of \$101.9 million in 2020 increased 17% compared to value-added sales of \$87.3 million in 2019. The increase was driven by our Optics Balzers acquisition, which was partially offset by reduced value-added sales related to blood glucose test strip and projection display products.

The Precision Optics segment generated operating losses of \$4.4 million and \$3.6 million in 2020 and 2019, respectively. The 2020 operating loss includes impairment charges of \$10.5 million and restructuring charges of \$2.1 million primarily related to the closure of our LAC business. The 2019 operating loss included impairment charges of \$14.1 million related to our LAC business.

Other

(Thousands)	2020	2019	2018
Net sales	\$ —	\$ —	\$ —
Value-added sales	(2,604)	(5,959)	(4,458)
Operating loss	(23,120)	(24,843)	(25,695)

2020 Compared to 2019

The Other reportable segment in total includes unallocated corporate costs.

Corporate costs of \$23.1 million in 2020 decreased \$1.7 million as compared to \$24.8 million in 2019. Corporate costs were 3% of total Company value-added sales in both 2020 and 2019. The decrease in corporate costs in 2020 compared to 2019 is primarily related to lower variable compensation expense and cost management actions, partially offset by transaction costs related to the Optics Balzers acquisition.

Value-Added Sales - Reconciliation of Non-GAAP Financial Measure

A reconciliation of net sales to value-added sales, a non-GAAP financial measure, for each reportable segment and for the Company in total for 2020, 2019, and 2018 is as follows:

(Thousands)	2020	2019	2018
Net sales			
Performance Alloys and Composites	\$ 394,195	\$ 500,201	\$ 500,590
Advanced Materials	670,867	573,763	586,643
Precision Optics	111,212	111,460	120,582
Other	—	—	—
Total	\$ 1,176,274	\$ 1,185,424	\$ 1,207,815
Less: pass-through metal costs			
Performance Alloys and Composites	\$ 48,860	\$ 72,117	\$ 75,119
Advanced Materials	436,909	349,509	362,929
Precision Optics	9,334	24,150	26,351
Other	2,604	5,959	4,458
Total	\$ 497,707	\$ 451,735	\$ 468,857
Value-added sales			
Performance Alloys and Composites	\$ 345,335	\$ 428,084	\$ 425,471
Advanced Materials	233,958	224,254	223,714
Precision Optics	101,878	87,310	94,231
Other	(2,604)	(5,959)	(4,458)
Total	\$ 678,567	\$ 733,689	\$ 738,958

The cost of gold, silver, platinum, palladium, and copper can be quite volatile. Our pricing policy is to directly pass the cost of these metals on to the customer in order to mitigate the impact of metal price volatility on our results from operations. Trends and comparisons of net sales are affected by movements in the market prices of these metals, but changes in net sales due to metal price movements may not have a proportionate impact on our profitability.

Internally, management reviews net sales on a value-added basis. Value-added sales is a non-GAAP financial measure that deducts the value of the pass-through metal costs from net sales. Value-added sales allow management to assess the impact of differences in net sales between periods, segments, or markets, and analyze the resulting margins and profitability without the distortion of movements in pass-through metal costs. The dollar amount of gross margin and operating profit is not affected by the value-added sales calculation. We sell other metals and materials that are not considered direct pass-throughs, and these costs are not deducted from net sales when calculating value-added sales.

Our net sales are also affected by changes in the use of customer-supplied metal. When we manufacture a precious metal product, the customer may purchase metal from us or may elect to provide its own metal, in which case we process the metal on a toll basis, and the metal value does not flow through net sales or cost of sales. In either case, we generally earn our margin based upon our fabrication efforts. The relationship of this margin to net sales can change depending upon whether or not the product was made from our metal or the customer's metal. The use of value-added sales removes the potential distortion in the comparison of net sales caused by changes in the level of customer-supplied metal.

By presenting information on net sales and value-added sales, it is our intention to allow users of our financial statements to review our net sales with and without the impact of the pass-through metals.

FINANCIAL POSITION

Cash Flow

A summary of cash flows provided by (used in) operating, investing, and financing activities is as follows:

(Thousands)	2020	2019	2018
Net cash provided by operating activities	\$ 101,057	\$ 99,222	\$ 76,374
Net cash (used in) investing activities	(194,707)	(26,484)	(33,828)
Net cash (used in) financing activities	(7,091)	(18,054)	(13,605)
Effects of exchange rate changes	1,612	(322)	(140)
Net change in cash and cash equivalents	\$ (99,129)	\$ 54,362	\$ 28,801

Net cash provided by operating activities totaled \$101.1 million in 2020 versus \$99.2 million in 2019. Increased operating cash flow from customer prepayments of \$49.4 million in 2020 was partially offset by \$37.9 million of decreased net income. Working capital requirements used cash of \$23.9 million during 2020 compared to using \$22.0 million in 2019. Cash flows used in accounts receivable decreased \$23.2 million. Three-month trailing days sales outstanding (DSO) was approximately 41 days at December 31, 2020 versus 47 days at December 31, 2019. Cash flows used for inventory were \$1.3 million in 2020, compared to providing \$20.5 million of cash in the prior year primarily in our Performance Alloys and Composites and Advanced Materials segments. Cash flows used for accounts payable and accrued expenses were \$21.9 million compared to the prior-year use of cash of \$18.6 million due to incentive compensation payouts. Price movements of precious and base metals are passed through to customers. Therefore, while sudden movements in the price of metals can cause a temporary imbalance in our cash receipts and payments in either direction, once prices stabilize, our cash flow tends to stabilize as well.

Net cash used in investing activities was \$194.7 million in 2020 compared to \$26.5 million in 2019 due to a \$130.7 million payment, net of cash acquired, for the Optics Balzers acquisition. In addition, capital expenditures increased \$43.0 million in 2020, compared to 2019, due to investments in new equipment funded by customer prepayments. See Notes B and L to the Consolidated Financial Statements for additional discussion.

Net cash used in financing activities decreased \$11.0 million from 2019 primarily due to net borrowings of \$34.0 million under our revolving credit facility in 2020, partially offset by the paydown of \$20.6 million of long-term debt, most of which was assumed in the Optics Balzers acquisition.

Dividends per common share increased 5% to \$0.455 per share in 2020. Total dividend payments to common shareholders were \$9.3 million in 2020 and \$8.9 million in 2019. In May 2020, the Board of Directors declared an increase in our quarterly dividend from \$0.11 to \$0.115 per share. We intend to pay a quarterly dividend on an ongoing basis, subject to a continuing strong capital structure and a determination that the dividend remains in the best interest of our shareholders.

Liquidity

We believe that cash flow from operations plus the available borrowing capacity and our current cash balance are adequate to support operating requirements, capital expenditures, projected pension plan contributions, the current dividend and share repurchase programs, environmental remediation projects, and strategic acquisitions. At December 31, 2020, cash and cash equivalents held by our foreign operations totaled \$20.0 million. We do not expect restrictions on repatriation of cash held outside of the United States to have a material effect on our overall liquidity, financial condition, or the results of operations for the foreseeable future.

A summary of key data relative to our liquidity, including the outstanding debt, cash balances, and available borrowing capacity, as of December 31, 2020 and December 31, 2019 is as follows:

(Thousands)	December 31,	
	2020	2019
Cash and cash equivalents	\$ 25,878	\$ 125,007
Total outstanding debt	38,506	2,218
Net (debt) cash	(12,628)	122,789
Available borrowing capacity	\$ 245,772	\$ 340,906

Net (debt) cash is a non-GAAP financial measure. We are providing this information because we believe it is more indicative of our overall financial position. It is also a measure our management uses to assess financing and other decisions. We believe that based on our typical cash flow generated from operations, we can support a higher leverage ratio in future periods.

The available borrowing capacity in the table above represents the additional amounts that could be borrowed under our revolving credit facility and other secured lines existing as of the end of each year depicted. The applicable debt covenants have been taken into account when determining the available borrowing capacity, including the covenant that restricts the borrowing capacity to a multiple of the twelve-month trailing earnings before interest, income taxes, depreciation and amortization, and other adjustments.

In 2019, we amended and restated the agreement governing our \$375.0 million revolving credit facility (Credit Agreement). The maturity date of the Credit Agreement was extended from 2020 to 2024, and the Credit Agreement provides more favorable interest rates under certain circumstances. In addition, the Credit Agreement provides the Company and its subsidiaries with additional capacity to enter into facilities for the consignment, borrowing, or leasing of precious metals and copper, and provides enhanced flexibility to finance acquisitions and other strategic initiatives. Borrowings under the Credit Agreement are secured by substantially all of the assets of the Company and its direct subsidiaries, with the exception of non-mining real property and certain other assets.

The Credit Agreement allows the Company to borrow money at a premium over LIBOR or prime rate and at varying maturities. The premium resets quarterly according to the terms and conditions available under the agreement. The Credit Agreement includes restrictive covenants relating to restrictions on additional indebtedness, acquisitions, dividends, and stock repurchases. In addition, the Credit Agreement includes covenants subject to a maximum leverage ratio and a minimum fixed charge coverage ratio. We were in compliance with all of our debt covenants as of December 31, 2020 and December 31, 2019. Cash on hand does not affect the covenants or the borrowing capacity under our debt agreements.

In July 2020, we completed the acquisition of 100% of the capital stock of Optics Balzers. The purchase price was approximately \$136.1 million, including the assumption of debt. The transaction was funded with cash on hand, including a portion of the \$150.0 million borrowed under our revolving credit facility in the second quarter of 2020.

Portions of our business utilize off-balance sheet consignment arrangements to finance metal requirements. Expansion of business volumes and/or higher metal prices can put pressure on the consignment line limitations from time to time. In 2019, we entered into a precious metals consignment agreement, maturing on August 27, 2022. The available and unused capacity under the metal financing lines totaled approximately \$50.0 million as of December 31, 2020, compared to \$140.7 million as of December 31, 2019. The availability is determined by Board approved levels and actual line capacity.

In January 2014, our Board of Directors approved a plan to repurchase up to \$50.0 million of our common stock. The timing of the share repurchases will depend on several factors, including market and business conditions, our cash flow, debt levels, and other investment opportunities. There is no minimum quantity requirement to repurchase our common stock for a given year, and the repurchases may be discontinued at any time. We repurchased 158,000 shares of our common stock for \$6.8 million during 2020. Since the approval of the repurchase plan, we have purchased 1,254,264 shares at a total cost of \$41.7 million, or an average of \$33.23 per share.

Contractual Obligations

The following table summarizes contractual obligations as of December 31, 2020:

(Millions)	2021	2022	2023	2024	2025	There- after	Total
Debt ⁽¹⁾	\$ 1.9	\$ 0.5	\$ 0.4	\$ 34.4	\$ 0.4	\$ 0.9	\$ 38.5
Interest payments on debt ⁽²⁾	—	—	—	—	—	—	—
Finance lease obligations ⁽³⁾	3.9	3.8	2.5	1.6	1.5	21.9	35.2
Non-cancelable lease payments ⁽⁴⁾	10.7	9.4	8.8	6.6	6.3	53.0	94.8
Pension plan contributions ⁽⁵⁾	—	—	—	—	—	—	—
Other long-term liabilities ⁽⁶⁾	0.9	2.5	0.3	0.5	0.6	2.4	7.2
Purchase obligations	23.1	3.7	3.1	1.1	0.6	0.6	32.2
Total	\$ 40.5	\$ 19.9	\$ 15.1	\$ 44.2	\$ 9.4	\$ 78.8	\$ 207.9

(1) Refer to Note O to the Consolidated Financial Statements.

(2) These amounts represent future interest payments related to our total debt, excluding any interest payments to be made on borrowings under our Credit Agreement.

(3) Refer to Note M to the Consolidated Financial Statements.

(4) The non-cancelable lease payments represent payments under operating leases with initial lease terms in excess of one year as of December 31, 2020.

- (5) Our domestic defined benefit pension plan is overfunded as of December 31, 2020. Contributions in future periods, if any, will be dependent upon regulatory requirements, the plan funded ratio, plan investment performance, discount rates, actuarial assumptions, plan amendments, our contribution objectives, and other factors. We anticipate funding those contributions with cash on hand, cash generated from operations, or borrowings under our existing lines of credit. It is not practical to estimate the required contributions beyond 2021 at the present time.
- (6) Other long-term liabilities include environmental remediation costs. We have an active environmental compliance program. We estimate the probable cost of identified environmental remediation projects and establish reserves accordingly. The environmental remediation reserve balance was \$5.5 million at December 31, 2020 and \$5.9 million at December 31, 2019. Environmental projects tend to be long term, and the associated payments are typically made over a number of years. Refer to Note T to the Consolidated Financial Statements for further discussion.

Off-balance Sheet Obligations

We maintain the majority of the precious metals and copper we use in production on a consignment basis in order to reduce our exposure to metal price movements and to reduce our working capital investment. Refer to Item 7A “Quantitative and Qualitative Disclosures about Market Risk.” The notional value of off-balance sheet precious metals and copper was \$400.0 million as of December 31, 2020 versus \$309.3 million as of December 31, 2019. We were in compliance with all of the covenants contained in the consignment agreements as of December 31, 2020 and December 31, 2019. Refer to Note J for additional information.

ORE RESERVES

We have proven and probable reserves of beryllium-bearing bertrandite ore in Juab County, Utah. We own approximately 90 percent of the proven reserves, with the remaining reserves leased from the State of Utah. We augment our proven reserves of bertrandite ore through the purchase of imported beryl ore from time to time. This beryl ore, which is approximately four percent beryllium, is also processed at the Utah extraction facility. Approximately 90 percent of the beryllium in ore is recovered in the extraction process. Estimating the quantity and/or grade of ore reserves requires the size, shape, and depth of ore bodies to be determined by analyzing geological data such as drilling samples. Economic assumptions used to estimate reserves change from period to period, and as additional geological and operational data is generated during the course of operations, estimates of reserves may change from period to period.

The term “proven reserves” means reserves for which (a) quantity is computed from dimensions revealed in outcrops, trenches, workings, or drill holes; grade and/or quality are computed from the results of detailed sampling, (b) the sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth, and mineral content of reserves are well-established, and (c) the ore is commercially recoverable through open-pit methods.

The term “probable reserves” means reserves for which quantity and grade and/or quality are computed from information similar to that used for proven reserves, but the sites for inspection, sampling, and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven reserves, is high enough to assume continuity between points of observation.

	Proven	Probable	Total
As of December 31, 2020			
Tonnage (in thousands)	7,797	962	8,759
Grade (% beryllium)	0.246 %	0.258 %	0.247 %
Beryllium pounds (in millions)	38.31	4.97	43.28
As of December 31, 2019			
Tonnage (in thousands)	7,851	962	8,813
Grade (% beryllium)	0.246 %	0.258 %	0.248 %
Beryllium pounds (in millions)	38.67	4.97	43.64

Based upon average production levels in recent years and our near-term production forecasts, proven and probable reserves would last a minimum of seventy-five years. The table below details our production of beryllium at our Utah location.

<u>(Thousands of Pounds of Beryllium)</u>	<u>2020</u>	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>2016</u>
Domestic ore	367	358	368	326	339
Purchased ore	—	3	—	12	23
Unyielded total	367	361	368	338	362
Annual yield	90 %	90 %	88 %	88 %	88 %
Beryllium produced	334	324	324	296	318
% of mill capacity	52 %	50 %	50 %	47 %	42 %

CRITICAL ACCOUNTING POLICIES

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires the inherent use of estimates and management's judgment in establishing those estimates. The following policies are considered by management to be critical because adherence to these policies relies significantly upon our judgment.

Revenue Recognition

Net sales consist primarily of revenue from the sale of precious and non-precious specialty metals, beryllium and copper-based alloys, beryllium composites, and other products into numerous end markets. The Company requires an agreement with a customer that creates enforceable rights and performance obligations. We recognize revenue, in an amount that reflects the consideration to which the Company expects to be entitled, when we satisfy a performance obligation by transferring control of a product to the customer. The core principle of the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 606 is supported by five steps which are outlined below with management's judgment in applying each.

1) Identify the contract with a customer

A contract with a customer exists when the Company enters into an enforceable contract with a customer that identifies each party's rights regarding the products to be transferred and the related payment terms related to these services, the contract has commercial substance, and the Company determines that collection of substantially all consideration for products that are transferred is probable based on the customer's intent and ability to pay.

Management exercises judgment in its assessment that it is probable that the Company will collect substantially all of the payments attributed to products or services that will be transferred to our customers. We regularly review the creditworthiness of our customers considering such factors as the macroeconomic environment, current market conditions, geographic considerations, historical collection experience, a customer's current credit standing, and the age of accounts receivable balances that may affect a customer's ability to pay. If after we have recognized revenue, collectability of an account receivable becomes doubtful, we establish appropriate allowances and reserves against accounts receivable with respect to the previously recognized revenue that remains uncollected. Allowances and reserves against accounts receivable are maintained for estimated probable losses and are sufficient enough to ensure that accounts receivable are stated at amounts that are considered collectible.

If management forms a judgment that a particular customer's financial condition has deteriorated but decides to deliver products or services to the customer, we will defer recognizing revenue relating to products sold to that customer until it is probable that we will collect substantially all of the consideration to which we are entitled, which typically coincides with the collection of cash.

2) Identify the performance obligations in the contract

Performance obligations promised in a contract are identified based on the products that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the product either on its own or together with other resources that are readily available from third parties or from the Company, and are distinct in the context of the contract, whereby the transfer of the product is separately identifiable from other promises in the contract.

Certain of the Company's contracts with customers may contain multiple performance obligations. As a result, management utilizes judgment to determine the appropriate accounting, including whether multiple promised products or services in a contract should be accounted for separately or as a group, how the consideration should be allocated among the performance obligations, and when to recognize revenue upon satisfaction of the performance obligations.

3) Determine the transaction price

The transaction price is determined based on the consideration to which the Company will be entitled in exchange for transferring services to the customer. The vast majority of our contracts contain fixed consideration terms. However, the

Company also has contracts with customers that include variable consideration. Volume discounts and rebates are offered as an incentive to encourage additional purchases and customer loyalty. Volume discounts and rebates typically require a customer to purchase a specified quantity of products, after which the price of additional products decreases. These contracts include variable consideration because the total amount to be paid by the customer is not known at contract inception and is affected by the quantity of products ultimately purchased. As a result, management applies judgment to estimate the volume discounts based on experience with similar contracts, customers, and current sales forecasts. Also, the Company has contracts, primarily relating to its precious metal products, where the transaction price includes variable consideration at contract inception because it is calculated based on a commodity index at a specified date. Management exercises judgment to determine the minimum amount to be included in the transaction price. Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur.

4) Allocate the transaction price to performance obligations in the contract

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation based on the relative standalone selling price. The Company typically determines standalone selling price based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, management uses judgment to estimate the standalone selling price taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations.

5) Recognize revenue when or as the Company satisfies a performance obligation

Management applies the principle of control to determine whether the customer obtains control of a product as it is created and if revenue should be recognized over time. The vast majority of the Company's performance obligations are satisfied at a point in time when control of the product transfers to the customer. Control of the product is generally transferred to the customer when the Company has a present right to payment, the customer has legal title, the customer has physical possession, the customer has the significant risks and rewards of ownership, and the customer has accepted the product.

However, for certain contracts, particularly relating to the U.S. government and relating to specialized products with no alternative use, we generally recognize revenue over time as we procure the product because of continuous transfer of control to the customer. This continuous transfer of control to the customer is supported by a termination for convenience clause in the contract that allows the customer to unilaterally terminate the contract, pay the Company for costs incurred plus a reasonable profit, and take control of any work in process. We generally use the cost-to-cost measure of progress for these contracts because it best depicts the transfer of control to the customer which occurs as we incur costs on the related contracts. Under the cost-to-cost measure of progress, the extent of progress towards completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. Therefore, revenue is recognized proportionally as costs are incurred for these contracts.

The Company recognizes revenue net of reserves for price adjustments, returns, and prompt payment discounts. Management generally estimates this amount using the expected value method. The Company has sufficient experience with our customers that provide predictive value that the reserves recorded are appropriate.

Other considerations

We receive payment from customers equal to the invoice price for most of our sales transactions.

Returned products are generally not accepted unless the customer notifies the Company in writing, and we authorize the product return by the customer.

Unearned revenue is recorded cash consideration from customers in advance of the shipment of the goods, which is a liability on our Consolidated Balance Sheets. This contract liability is subsequently reversed and the revenue, cost of sales, and gross margin are recorded when the Company has transferred control of the product to the customer. The related inventory also remains on our balance sheet until these revenue recognition criteria are met. Advanced billings are typically made in association with products with long manufacturing times and/or products paid relating to contracts with the government. Billings in advance of the shipments allow us to collect cash earlier than billing at the time of the shipment and, therefore, the collected cash can be used to reduce our investment in working capital. Refer to Note D of the Consolidated Financial Statements for additional details on our contract balances.

Pensions

The annual net periodic expense and benefit obligations related to the Company's defined benefit plans are determined on an actuarial basis. This determination requires critical assumptions regarding the discount rate, long-term rate of return on plan assets, increases in compensation levels, and amortization periods for actuarial gains and losses. Assumptions are determined based on Company data and appropriate market indicators and are evaluated each year as of the plans' measurement date. Changes in the assumptions to reflect actual experience, as well as the amortization of actuarial gains and losses, could result in a material change in the annual net periodic expense and benefit obligations reported in the financial statements.

The Company uses a spot-rate approach to estimate the service and interest cost components of net periodic benefit cost for its defined benefit pension plans. The spot-rate approach applies separate discount rates (along the yield curve) for each projected benefit payment in the calculation.

Our pension plan investment strategies are governed by a policy adopted by the Board of Directors. A senior management team oversees a group of outside investment analysts and brokerage firms that implement these strategies. The future return on pension assets is dependent upon the plan's asset allocation, which changes from time to time, and the performance of the underlying investments. As a result of our review of various factors, we used an expected rate of return on plan assets assumption of 5.75% at December 31, 2020 and 6.25% at December 31, 2019. This assumption is reflective of management's view of the long-term returns in the marketplace, as well as changes in risk profiles and available investments. Should the assets earn an average return less than the expected return assumption over time, in all likelihood the future pension expense would increase.

The impact of a change in the discount rate or expected rate of return assumption on pension expense can vary from year to year depending upon the undiscounted liability level, the current discount rate, the asset balance, other changes to the plan, and other factors. A 0.25 percentage point decrease to the discount rate would increase the 2021 projected pension expense approximately \$32 thousand. A 0.25 percentage point decrease in the expected rate of return assumption would increase the 2021 projected pension expense by approximately \$0.4 million.

Refer to Note P of the Consolidated Financial Statements for additional details on our pension and other post-employment benefit plans.

Deferred Taxes

We record deferred tax assets and liabilities based upon the temporary difference between the financial reporting and tax basis of assets and liabilities. If it is more likely than not that some portion or all of the deferred tax assets will not be realized, a valuation allowance is established. All available evidence, both positive and negative, is considered to determine whether a valuation allowance is needed. We review the expiration dates of certain deferred tax assets against projected income levels to determine if a valuation allowance is needed. Certain deferred tax assets do not have an expiration date. We also evaluate deferred tax assets for realizability due to cumulative operating losses by jurisdiction and record a valuation allowance as warranted. A valuation allowance may increase tax expense and reduce net income in the period it is recorded. If a valuation allowance is no longer required, it will reduce tax expense and increase net income in the period that it is reversed.

We had valuation allowances of \$14.1 million and \$17.7 million associated with certain federal, state, and foreign deferred tax assets as of year-end 2020 and 2019, respectively, primarily for net operating loss carryforwards.

Refer to Note H of the Consolidated Financial Statements for additional deferred tax details.

Precious Metal Physical Inventory Counts

We take and record the results of a physical inventory count of our precious metals on a quarterly basis. Our precious metal operations include a refinery that processes precious metal-containing scrap and other materials from our customers, as well as our own internally generated scrap. We also outsource portions of our refining requirements to other vendors, particularly those materials with longer processing times. The precious metal content within these various refine streams may be in solutions, sludges, and other non-homogeneous forms and can vary over time based upon the input materials, yield rates, and other process parameters. The determination of the weight of the precious metal content within the refine streams as part of a physical inventory count requires the use of estimates and calculations based upon assays, assumed recovery percentages developed from actual historical data and other analyses, the total estimated volumes of solutions and other materials within the refinery, data from our refine vendors, and other factors. The resulting calculated weight of the precious metals in our refine operations may differ, in either direction, from what our records indicate that we should have on hand, which would then result in an adjustment to our pre-tax income in the period when the physical inventory was taken, and the related estimates were made.

Goodwill and Other Intangible Assets

We use the acquisition method of accounting to allocate costs of acquired businesses to the assets acquired and liabilities assumed based on their estimated fair values at the dates of acquisition. The excess costs of acquired businesses over the fair values of the assets acquired and liabilities assumed are recognized as goodwill. The valuations of the acquired assets and liabilities will impact the determination of future operating results. Determining the fair value of assets acquired and liabilities assumed requires management's judgment and often involves the use of significant estimates and assumptions, including assumptions with respect to future cash inflows and outflows, revenue growth rates, discount rates, customer attrition rates, royalty rates, asset lives, contributory asset charges, and market multiples, among other items. We determine the fair values of intangible assets acquired generally in consultation with third-party valuation advisors.

Intangible assets other than goodwill are recognized if the benefit of the intangible asset is obtained through contractual or other legal rights, or if the intangible asset can be sold, transferred, licensed or exchanged, regardless of the Company's intent to do so. Goodwill represents the excess purchase price over the fair value of the tangible net assets and intangible assets acquired in a business combination and is reviewed annually for impairment or more frequently if impairment indicators arise. Finite-lived intangible assets are reviewed for impairment if facts and circumstances warrant. The Company conducted its annual impairment assessment as of the first day of the fourth quarter.

Goodwill is assigned to the reporting unit, which is the operating segment level or one level below the operating segment. Goodwill within the Advanced Materials segment totaled \$50.5 million as of December 31, 2020. Within the Precision Optics segment, goodwill totaled \$92.5 million. The remaining \$1.9 million is related to the Performance Alloys and Composites segment.

In the first quarter of 2020, we recorded a \$9.1 million charge to impair the remaining goodwill related to the closure of our LAC business. We did not identify any other events or circumstances during 2020 that required the performance of an interim impairment assessment.

For the purpose of the annual goodwill impairment assessment, we have the option to perform a qualitative assessment (commonly referred to as "step zero") to determine whether further quantitative analysis for impairment of goodwill or indefinite-lived intangible assets is necessary. In performing step zero for our impairment test, we are required to make assumptions and judgments including, but not limited to, macroeconomic conditions as related to our business, current and future financial performance of our reporting units, industry and market considerations, and cost factors such as changes in raw materials, labor, or other costs. If the step zero analysis indicates that it is more likely than not that the fair value of a reporting unit is less than its respective carrying value including goodwill, then we would perform an additional quantitative analysis. The next step compares the fair value of the reporting unit to its carrying value, including goodwill. An impairment charge is recognized for the amount the carrying value of the reporting unit exceeds its fair value. At our September 26, 2020 annual assessment date, we opted to perform a "step zero" qualitative assessment for each of our reporting units. The results of the step zero indicated that no goodwill impairment existed.

We also compared the market capitalization as of September 26, 2020 to the carrying value of our equity, noting no impairment indicators or triggering events.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to precious metal and commodity price, interest rate, foreign exchange rate, and utility cost differences. While the degree of exposure varies from year to year, our methods and policies designed to manage these exposures have remained fairly consistent over time. Generally, we attempt to minimize the effects of these exposures on our pre-tax income and cash flows through the use of natural hedges, which include pricing strategies, borrowings denominated in the same terms as the exposed asset, off-balance sheet financing arrangements, and other methods. Where we cannot use a natural hedge, we may use derivative financial instruments to minimize the effects of these exposures when practical and cost efficient. The use of off-balance sheet financing arrangements and derivative financial instruments is subject to policies approved by the Audit Committee of the Board of Directors with oversight provided by a group of senior financial managers at our corporate office.

Precious metals. We use gold and other precious metals in manufacturing various products. To reduce the exposure to market price changes, the majority of our precious metal requirements are maintained on a consigned inventory basis. We purchase the metal out of consignment from our suppliers when it is ready to ship to a customer as a finished product. Our purchase price forms the basis for the price charged to the customer for the precious metal content and, therefore, the current cost is matched to the selling price, and the price exposure is minimized.

We are charged a consignment fee by the financial institutions that own the precious metals. This fee is a function of the market price of the metal, the quantity of metal we have on hand, and the rate charged by the institution. Because of market forces and competition, the fee can only be charged to customers in a limited case-by-case basis. Should the market price of precious metals that we have on consignment increase by 20% from the prices on December 31, 2020, the additional pre-tax cost to us as a result of an increase in the consignment fee would be approximately \$1.5 million on an annual basis. This calculation assumes no changes in the quantity of metal held on consignment or the underlying fee and that none of the additional fees are charged to customers.

To further limit price and financing rate exposures, under some circumstances, we will require customers to furnish their own metal for processing. Customers may also elect to provide their own material for us to process on a toll basis as opposed to purchasing our material.

The available capacity of our existing credit lines to consign precious metals is a function of the quantity and price of the metals on hand. As prices increase, a given quantity of metal will utilize a larger proportion of the existing credit lines. A significant

prolonged increase in metal prices could result in our credit lines being fully utilized, and, absent securing additional credit line capacity from financial institutions, could require us to purchase precious metals rather than consign them, require customers to supply their own metal, and/or force us to turn down additional business opportunities. If we were in a significant precious metal ownership position, we might elect to use derivative financial instruments to hedge the potential price exposure. The cost to finance and potentially hedge the purchased inventory may also be higher than the consignment fee. The financial statement impact of the risk from rising metal prices impacting our credit availability cannot be estimated at the present time.

In certain circumstances, we may elect to fix the price of precious metals for a customer for a stated quantity over a specified period of time. In those cases, we may secure hedge contracts whose terms match the terms in the agreement with our customer so that the gain or loss on the contract with the customer due to subsequent movements in the precious metal price will generally be offset by a gain or loss on the hedge contract. At December 31, 2020, we did not have a material amount of such hedge contracts outstanding.

Copper. We also use copper in our production processes. When possible, fluctuations in the purchase price of copper are passed on to customers in the form of price adders or reductions. While over time our price exposure to copper is generally in balance, there can be a lag between the change in our cost and the pass-through to our customers, resulting in higher or lower margins in a given period. To mitigate this impact, we hedge a portion of this pricing risk.

We consign the majority of our copper inventory requirements. As with precious metals, the available capacity under the existing lines is a function of the quantity and price of metal on hand. Should the market cost of copper increase by 20% from the price as of December 31, 2020, the additional pre-tax cost to us as a result of an increase in the consignment fee would be approximately \$0.1 million on an annual basis. This calculation assumes no changes in the quantity of inventory or the underlying fee and that none of the additional fees are charged to customers.

Lower of cost or net realizable value. In our manufacturing processes, we use various metals that are not widely used by others or actively traded and, therefore, there is no established efficient market for derivative financial instruments that could be used to effectively hedge the related price exposures. For certain applications, our pricing practice with respect to these metals is to establish the selling price based upon our cost to purchase the material, limiting our price exposure. However, the inventory carrying value may be exposed to market fluctuations. The inventory value is maintained at the lower of cost or net realizable value and if the market value were to drop below the carrying value, the inventory would have to be reduced accordingly and a charge recorded against cost of sales. This risk is mainly associated with long manufacturing lead-time items and with sludges and scrap materials, which generally have longer processing times to be refined or processed into a usable form for further manufacturing and are typically not covered by specific sales orders from customers. We did not record any material lower of cost or net realizable value charges in 2020, 2019, or 2018 as a result of market price fluctuations of metals in our inventories.

Interest rates. We are exposed to changes in interest rates on our cash balances and borrowings under our Credit Agreement. We may manage this interest rate exposure by maintaining a combination of short-term and long-term debt and variable and fixed rate instruments. We may also use interest rate swaps to fix the interest rate on variable rate obligations, as we deem appropriate. There were no interest rate derivatives outstanding as of December 31, 2020. Excess cash is typically invested in high quality instruments that mature in 90 days or less. Investments are made in compliance with policies approved by the Board of Directors.

Foreign currencies. Portions of our international operations sell products priced in foreign currencies, mainly the euro and yen, while the majority of these products' costs are incurred in U.S. dollars. We are exposed to currency movements in that if the U.S. dollar strengthens, the translated value of the foreign currency sale and the resulting margin on that sale will be reduced. To minimize this exposure, we may purchase foreign currency forward contracts, options, and collars in compliance with approved policies. If the dollar strengthened, the decline in the translated value of our margins would be at least partially offset by a gain on the hedge contract. A decrease in the value of the dollar would result in larger margins but potentially a loss on the contract, depending upon the method used to hedge the exposure. Our current policy limits our hedges to 80% or less of the forecasted exposure.

The notional value of outstanding currency contracts was \$90.0 million as of December 31, 2020. If the dollar weakened 10% against the currencies we have hedged from the December 31, 2020 exchange rates, the reduced gain and/or increased loss on the outstanding contracts as of December 31, 2020 would reduce pre-tax profits by approximately \$1.6 million in 2020. This calculation does not take into account the increase in margins as a result of translating foreign currency sales at the more favorable exchange rates, any changes in margins from potential volume fluctuations caused by currency movements, or the translation effects on any other foreign currency denominated income statement or balance sheet item.

Utilities. The cost of natural gas and electricity used in our operations may vary from year to year and from season to season. We attempt to minimize these fluctuations and the exposure to higher costs by utilizing fixed price agreements of set durations, when deemed appropriate, obtaining competitive bidding between regional energy suppliers, and other methods.

Economy. We are exposed to changes in global economic conditions and the potential impact those changes may have on various facets of our business. We have a program in place to closely monitor the credit worthiness and financial condition of our key providers of financial services, including our bank group and insurance carriers, as well as the credit worthiness of customers and vendors, and have various contingency plans in place.

Our bank lines are established with a number of different banks in order to mitigate our exposure with any one financial institution. All of the banks in our bank group had credit in good standing as of December 31, 2020. The financial statement impact from the risk of one or more of the banks in our bank group reducing our lines due to their insolvency or other causes cannot be estimated at the present time.

Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Management's Report on Internal Control over Financial Reporting

The management of Materion Corporation and subsidiaries is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Materion Corporation and subsidiaries' internal control system was designed to provide reasonable assurance to the Company's management and Board of Directors regarding the preparation and fair presentation of published financial statements. All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation.

Materion Corporation and subsidiaries' management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2020. In making this assessment, it used the framework set forth by the Committee of Sponsoring Organizations of the Treadway Commission (the COSO criteria) in Internal Control - Integrated Framework (2013).

The Company completed the acquisition of Optics Balzers AG (Optics Balzers) on July 17, 2020. As permitted by SEC guidance, the scope of our evaluation of internal control over financial reporting as of December 31, 2020 did not include the internal control over financial reporting of Optics Balzers. The results of Optics Balzers are included in our consolidated financial statements from the date of acquisition and constituted 22% of total assets as of December 31, 2020.

Based on our assessment we believe that, as of December 31, 2020, the Company's internal control over financial reporting is effective.

The effectiveness of our internal control over financial reporting as of December 31, 2020 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report.

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Materion Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Materion Corporation and subsidiaries (the Company) as of December 31, 2020 and 2019, the related consolidated statements of income, comprehensive income, shareholders' equity and cash flows for each of the three years in the period ended December 31, 2020, and the related notes and financial statement schedule listed in the Index at Item 15(a) (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 18, 2021 expressed an unqualified opinion thereon.

Change in Accounting Principles

As discussed in Note A to the consolidated financial statements, the Company elected to change its method of accounting for certain inventories to the first-in, first-out ("FIFO") method during the year ended December 31, 2020.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. 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 audits 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 financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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 financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters 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 matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Description of the matter

Reconciliation of Precious Metals Consignment Inventory

At December 31, 2020, the notional value of the Company's off-balance sheet precious metals was \$400.0 million. As discussed in Note J to the consolidated financial statements, the Company uses estimates to measure the precious metal content within various refinement streams which can vary over time based upon the input materials, yield rates, and other process parameters.

Auditing the reconciliation of precious metals consignment inventory is complex due to the highly detailed nature of the inventory reconciliation and the amount of information that is obtained from third parties. A physical inventory is performed by the Company on a quarterly basis to verify the existence of inventory. The precious metals inventory reconciliation includes estimates based on assays, assumed recovery percentages developed from actual historical data and other analyses, the total estimated volume of solutions and other materials within the refinery, data from refine vendors, and other factors. The reconciliation of precious metals consignment inventory presents the resulting calculated weight of the precious metals generated from these estimates within the Company's refine operations. This calculated weight may differ, from what the Company's records indicate should be on hand, which would then result in an adjustment to pre-tax income.

How we addressed the matter in our audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's reconciliation of the precious metals consignment inventory processes. This included controls over management's review of the significant inputs into and underlying the reconciliation.

To test the Company's reconciliation of the precious metals physical consignment inventory, our procedures included, among others, evaluating the significant assumptions and data used to estimate the total value of the precious metal which was identified through the physical inventory. We observed the physical inventory process, tested inventory activity from the date of observation through December 31, 2020, evaluated the underlying data used in the reconciliation, and confirmed the consigned inventory held with the third parties. We assessed the historical accuracy of management's estimates, which are based on assays, assumed recovery percentages developed from actual historical data and other analyses, the total estimated volume of solutions and other materials within the refinery, data from their refine vendors, and other factors and assessed the historical accuracy of management's analysis to evaluate the assumptions that were most significant to the calculated weight of the precious metal inventory.

Accounting for Business Combinations

Description of the matter

During 2020, the Company completed its acquisition of Optics Balzers AG for a purchase price of \$136.1 million, including the assumption of debt, as disclosed in Note B to the consolidated financial statements. The transaction was accounted for as a business combination.

Auditing the Company's accounting for its acquisition of Optics Balzers AG was complex due to the significant estimation required by management and its specialists to determine the fair value of the acquired intangible assets, specifically customer relationships. The significant estimation was primarily due to the subjectivity of the assumptions used by management to measure the fair value of the customer relationships intangible asset and the sensitivity of the respective fair value to the significant underlying assumptions. The Company used a multi-period excess earnings method under the income approach to value this intangible asset. The significant assumptions used to estimate the fair value included the discount rate and certain assumptions that form the basis of future cash flows (including revenue growth rates and attrition rate). These assumptions relate to the future performance of the acquired business, are forward-looking and could be affected by future economic and market conditions.

How we addressed the matter in our audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's accounting for the recognition and measurement of customer relationships intangible assets that address the risks of material misstatement. Our tests included controls over the recognition and measurement of customer relationships, including the valuation models and underlying assumptions, as described above, used to develop such estimates.

To test the estimated fair value of customer relationships, we performed audit procedures that included, among others, evaluating the methods and significant assumptions used by the Company, as described above, and evaluating the completeness and accuracy of the underlying data supporting the significant assumptions and estimates. We also utilized our specialists to review the valuation methodology, discount rate, and attrition rate.

/s/ Ernst & Young LLP

We have served as the Company's auditor since at least 1958, but we are unable to determine the specific year.
Cleveland, Ohio
February 18, 2021

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Materion Corporation

Opinion on Internal Control over Financial Reporting

We have audited Materion Corporation and subsidiaries' internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Materion Corporation and subsidiaries (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on the COSO criteria.

As indicated in the accompanying Management's Report on Internal Control Over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Optic Balzers AG, which is included in the 2020 consolidated financial statements of the Company and constituted 22% of total assets as of December 31, 2020. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of Optics Balzers AG.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of Materion Corporation and subsidiaries as of December 31, 2020 and 2019, the related consolidated statements of income, comprehensive income, shareholders' equity and cash flows for each of the three years in the period ended December 31, 2020, and the related notes and financial statement schedule listed in the Index at Item 15(a) and our report dated February 18, 2021 expressed an unqualified opinion thereon.

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's 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 included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and 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/ Ernst & Young LLP

Cleveland, Ohio
February 18, 2021

Materion Corporation and Subsidiaries
Years Ended December 31, 2020, 2019, and 2018

Consolidated Statements of Income

(Thousands except per share amounts)	2020	2019*	2018*
Net sales	\$ 1,176,274	\$ 1,185,424	\$ 1,207,815
Cost of sales	983,641	922,734	956,454
Gross margin	192,633	262,690	251,361
Selling, general, and administrative expense	133,963	147,164	153,489
Research and development expense	20,283	18,271	15,187
Goodwill impairment charges (Note N)	9,053	11,560	—
Asset impairment charges (Note N)	1,419	2,581	—
Restructuring expense (Note E)	11,237	785	5,599
Other — net (Note F)	8,463	11,783	15,334
Operating profit	8,215	70,546	61,752
Other non-operating (income) expense — net (Note P)	(3,939)	3,431	42,683
Interest expense — net (Note G)	3,879	1,579	2,471
Income before income taxes	8,275	65,536	16,598
Income tax (benefit) expense (Note H)	(7,187)	12,142	(4,446)
Net income	\$ 15,462	\$ 53,394	\$ 21,044
Basic earnings per share:			
Net income per share of common stock	\$ 0.76	\$ 2.62	\$ 1.04
Diluted earnings per share:			
Net income per share of common stock	\$ 0.75	\$ 2.59	\$ 1.02
Weighted-average number of shares of common stock outstanding:			
Basic	20,338	20,365	20,212
Diluted	20,603	20,655	20,613

*Years ended December 31, 2019 and 2018 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

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

Materion Corporation and Subsidiaries
Years Ended December 31, 2020, 2019, and 2018
Consolidated Statements of Comprehensive Income

(Thousands)	2020	2019*	2018*
Net income	\$ 15,462	\$ 53,394	\$ 21,044
Other comprehensive income:			
Foreign currency translation adjustment	9,030	(421)	(484)
Derivative and hedging activity, net of tax benefit of \$28, \$5, and \$672, respectively	(80)	(4)	138
Pension and post-employment benefit adjustment, net of tax benefit (expense) of \$651, (\$4,741), and (\$13,300), respectively	(2,127)	13,197	45,049
Other comprehensive income	6,823	12,772	44,703
Comprehensive income	<u>\$ 22,285</u>	<u>\$ 66,166</u>	<u>\$ 65,747</u>

*Years ended December 31, 2019 and 2018 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

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

Materion Corporation and Subsidiaries
Years Ended December 31, 2020, 2019, and 2018

Consolidated Statements of Cash Flows

(Thousands)	2020	2019*	2018*
Cash flows from operating activities:			
Net income	\$ 15,462	\$ 53,394	\$ 21,044
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation, depletion, and amortization	42,384	41,116	35,524
Amortization of deferred financing costs in interest expense	790	962	1,009
Stock-based compensation expense (non-cash)	5,528	7,170	5,313
Amortization of pension and post-retirement costs	(151)	386	5,551
Loss on sale of property, plant, and equipment	466	344	518
Deferred income tax (benefit) expense	(9,850)	3,945	(1,912)
Impairment charges	10,472	14,141	—
Net pension curtailments and settlements	94	3,328	41,406
Changes in assets and liabilities net of acquired assets and liabilities:			
Decrease (increase) in accounts receivable	(707)	(23,933)	(7,219)
Decrease (increase) in inventory	(1,288)	20,485	3,978
Decrease (increase) in prepaid and other current assets	2,475	869	1,814
Increase (decrease) in accounts payable and accrued expenses	(21,877)	(18,575)	8,820
Increase (decrease) in unearned revenue	2,935	(2,538)	477
Increase (decrease) in interest and taxes payable	(157)	(805)	435
Increase (decrease) in unearned income due to customer prepayments	54,103	4,733	—
Domestic pension plan contributions	—	(4,500)	(42,000)
Other — net	378	(1,300)	1,616
Net cash provided by operating activities	101,057	99,222	76,374
Cash flows from investing activities:			
Payments for acquisition, net of cash acquired	(130,715)	—	—
Payments for purchase of property, plant, and equipment	(67,274)	(24,251)	(27,702)
Payments for mine development	—	(2,277)	(6,558)
Proceeds from settlement of currency exchange contract	3,249	—	—
Proceeds from sale of property, plant, and equipment	33	44	432
Net cash used in investing activities	(194,707)	(26,484)	(33,828)
Cash flows from financing activities:			
Proceeds from short-term debt under revolving credit agreement, net	34,000	—	—
Repayment of long-term debt	(20,634)	(823)	(777)
Principal payments under finance lease obligations	(2,213)	(1,200)	(861)
Cash dividends paid	(9,257)	(8,856)	(8,389)
Deferred financing costs	—	(2,130)	—
Repurchase of common stock	(6,766)	(199)	(422)
Payments of withholding taxes for stock-based compensation awards	(2,221)	(4,846)	(3,156)
Net cash used in financing activities	(7,091)	(18,054)	(13,605)
Effects of exchange rate changes	1,612	(322)	(140)
Net change in cash and cash equivalents	(99,129)	54,362	28,801
Cash and cash equivalents at beginning of period	125,007	70,645	41,844
Cash and cash equivalents at end of period	\$ 25,878	\$ 125,007	\$ 70,645

*Years ended December 31, 2019 and 2018 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

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

Materion Corporation and Subsidiaries
December 31, 2020 and 2019
Consolidated Balance Sheets

(Thousands)	2020	2019*
Assets		
Current assets		
Cash and cash equivalents (Note A)	\$ 25,878	\$ 125,007
Accounts receivable (Note A)	166,447	154,751
Inventories, net (Notes A and J)	250,778	236,253
Prepaid and other current assets	20,896	21,736
Total current assets	463,999	537,747
Deferred income taxes (Notes A and H)	3,134	1,666
Property, plant, and equipment (Notes A and K)	998,312	916,965
Less allowances for depreciation, depletion, and amortization	(688,626)	(684,689)
Property, plant, and equipment — net	309,686	232,276
Operating lease, right-of-use asset (Note M)	62,089	23,413
Intangible assets (Notes A and N)	54,672	6,380
Other assets (Note P)	19,364	17,937
Goodwill (Notes A and N)	144,916	79,011
Total Assets	\$ 1,057,860	\$ 898,430
Liabilities and Shareholders' Equity		
Current liabilities		
Short-term debt (Note O)	\$ 1,937	\$ 868
Accounts payable	55,640	43,206
Salaries and wages	18,809	41,167
Other liabilities and accrued items	40,887	32,477
Income taxes (Notes A and H)	1,898	1,342
Unearned revenue (Note D)	7,713	3,380
Total current liabilities	126,884	122,440
Other long-term liabilities	14,313	11,560
Operating lease liabilities (Note M)	56,761	18,091
Finance lease liabilities (Note M)	20,539	17,424
Retirement and post-employment benefits (Note P)	41,877	32,466
Unearned income (Notes A and L)	86,761	32,891
Long-term income taxes (Notes A and H)	2,689	3,451
Deferred income taxes (Notes A and H)	15,864	13,104
Long-term debt (Note O)	36,542	1,260
Shareholders' equity		
Serial preferred stock (no par value; 5,000 authorized shares, none issued)	—	—
Common stock (no par value; 60,000 authorized shares, issued shares of 27,148 for both 2020 and 2019)	258,642	249,674
Retained earnings	631,058	624,954
Common stock in treasury (6,820 shares for 2020 and 6,744 shares for 2019)	(199,187)	(186,845)
Accumulated other comprehensive loss (Note Q)	(38,639)	(45,462)
Other equity	3,756	3,422
Total shareholders' equity	655,630	645,743
Total Liabilities and Shareholders' Equity	\$ 1,057,860	\$ 898,430

*December 31, 2019 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

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

Materion Corporation and Subsidiaries
Years Ended December 31, 2020, 2019, and 2018
Consolidated Statements of Shareholders' Equity

(Thousands)	Common Shares		Shareholders' Equity					
	Common Shares	Common Shares Held in Treasury	Common Stock	Retained Earnings*	Common Stock In Treasury	Accumulated Other Comprehensive Income (Loss)	Other Equity	Total*
Balance at January 1, 2018 (previously reported)	20,107	7,042	\$ 223,484	\$ 536,116	\$ (166,128)	\$ (102,937)	\$ 4,446	\$ 494,981
Inventory accounting method change*	—	—	—	32,134	—	—	—	32,134
Balance at January 1, 2018*	20,107	7,042	223,484	568,250	(166,128)	(102,937)	4,446	527,115
Net income*	—	—	—	21,044	—	—	—	21,044
Other comprehensive income	—	—	—	—	—	2,722	—	2,722
Net pension curtailments and settlements	—	—	—	—	—	41,406	—	41,406
Tax Cuts and Jobs Act Reclassification	—	—	—	(575)	—	575	—	—
Cumulative effect of accounting change	—	—	—	425	—	—	—	425
Cash dividends declared (\$0.415 per share)	—	—	—	(8,389)	—	—	—	(8,389)
Stock-based compensation activity	202	(203)	11,131	(49)	(5,768)	—	—	5,314
Payments for withholding taxes for stock-based compensation awards	(60)	60	—	—	(3,156)	—	—	(3,156)
Repurchase of shares	(10)	10	—	—	(422)	—	—	(422)
Directors' deferred compensation	3	(3)	89	—	48	—	42	179
Balance at December 31, 2018*	20,242	6,906	\$ 234,704	\$ 580,706	\$ (175,426)	\$ (58,234)	\$ 4,488	\$ 586,238
Net income*	—	—	—	53,394	—	—	—	53,394
Other comprehensive income	—	—	—	—	—	9,444	—	9,444
Net pension curtailments and settlements	—	—	—	—	—	3,328	—	3,328
Cumulative effect of accounting change	—	—	—	(179)	—	—	—	(179)
Cash dividends declared (\$0.435 per share)	—	—	—	(8,856)	—	—	—	(8,856)
Stock-based compensation activity	252	(252)	14,876	(111)	(7,595)	—	—	7,170
Payments for withholding taxes for stock-based compensation awards	(89)	89	—	—	(4,846)	—	—	(4,846)
Repurchase of shares	(5)	5	—	—	(199)	—	—	(199)
Directors' deferred compensation	4	(4)	94	—	1,221	—	(1,066)	249
Balance at December 31, 2019*	20,404	6,744	\$ 249,674	\$ 624,954	\$ (186,845)	\$ (45,462)	\$ 3,422	\$ 645,743
Net income	—	—	—	15,462	—	—	—	15,462
Other comprehensive income	—	—	—	—	—	6,729	—	6,729
Net pension curtailments and settlements	—	—	—	—	—	94	—	94
Cash dividends declared (\$0.455 per share)	—	—	—	(9,257)	—	—	—	(9,257)
Stock-based compensation activity	117	(117)	8,867	(101)	(3,147)	—	—	5,619
Payments for withholding taxes for stock-based compensation awards	(39)	39	—	—	(2,221)	—	—	(2,221)
Repurchase of shares	(158)	158	—	—	(6,766)	—	—	(6,766)
Directors' deferred compensation	4	(4)	101	—	(208)	—	334	227
Balance at December 31, 2020	20,328	6,820	\$ 258,642	\$ 631,058	\$ (199,187)	\$ (38,639)	\$ 3,756	\$ 655,630

*The balances at January 1, 2018 and the years ended December 31, 2018 and 2019 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

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

Materion Corporation and Subsidiaries
Notes to Consolidated Financial Statements

Note A — Significant Accounting Policies

Organization: Materion Corporation (the Company) is a holding company with subsidiaries that have operations in the United States, Europe, and Asia. These operations manufacture advanced engineered materials used in a variety of end markets, including semiconductor, industrial, aerospace and defense, automotive, energy, consumer electronics, and telecom and data center. The Company has four reportable segments: Performance Alloys and Composites, Advanced Materials, Precision Optics, and Other. Other includes unallocated corporate costs.

Refer to Note C for additional segment details. The Company distributes its products through a combination of company-owned facilities and independent distributors and agents.

Business Combinations: The Company records assets acquired and liabilities assumed at the date of acquisition at their respective fair values. Intangible assets acquired in a business combination are recognized and reported apart from goodwill. Goodwill represents the excess purchase price over the fair value of the tangible net assets and intangible assets acquired in a business combination. Acquisition-related expenses are recognized separately from the business combination and are expensed as incurred.

The amounts reflected in Note B to the Consolidated Financial Statements are the results of the preliminary purchase price allocation for the Optics Balzers acquisition and will be updated upon completion of the final valuation. The Company is required to complete the purchase price allocation within 12 months of the acquisition date. If such completion of the allocation results in a change in the preliminary values, the measurement period adjustment will be recognized in the period in which the adjustment amount is determined.

Use of Estimates: The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results may differ from those estimates.

Change in Accounting Principle: During the fourth quarter of 2020, the Company changed its method of accounting for certain domestic inventory from the last-in, first-out (LIFO) method to the first-in, first-out (FIFO) method. All prior periods presented have been retroactively adjusted to apply the new method of accounting.

Consolidation: The Consolidated Financial Statements include the accounts of Materion Corporation and its subsidiaries. All of the Company's subsidiaries were wholly owned as of December 31, 2020. Intercompany accounts and transactions are eliminated in consolidation.

Cash Equivalents: All highly liquid investments with a maturity of three months or less when purchased are considered to be cash equivalents.

Accounts Receivable: An allowance for doubtful accounts is maintained for the expected losses resulting from the inability of customers to pay amounts due. The Company considers the current market conditions and credit losses related to the Company's trade receivables based on the macroeconomic environment, geographic considerations, and other expected market trends. Additionally, the allowance is based upon identified delinquent accounts, customer payment patterns, and other analyses of historical data and trends. Accounts receivable were net of an allowance for credit losses of \$0.5 million and \$0.4 million at December 31, 2020 and 2019, respectively. The change in the allowance for credit losses includes expense and net write-offs, none of which are material. The Company extends credit to customers based upon their financial condition, and collateral is not generally required.

Property, Plant, and Equipment: Property, plant, and equipment is stated on the basis of cost. Depreciation is computed principally by the straight-line method, except certain assets for which depreciation may be computed by the units-of-production method. The depreciable lives that are used in computing the annual provision for depreciation by class of asset are primarily as follows:

	<u>Years</u>
Land improvements	10 to 20
Buildings	20 to 40
Leasehold improvements	Life of lease
Machinery and equipment	3 to 15
Furniture and fixtures	4 to 10
Automobiles and trucks	3 to 8
Research equipment	3 to 10
Computer hardware	3 to 10
Computer software	3 to 10

An asset acquired under a finance lease will be recorded at the lesser of the present value of the projected lease payments or the fair value of the asset and will be depreciated in accordance with the above schedule. Leasehold improvements will be depreciated over the life of the improvement if it is shorter than the life of the lease. Repair and maintenance costs are expensed as incurred.

Mineral Resources and Mine Development: Property acquisition costs are capitalized as mineral resources on the balance sheet and are depleted using the units-of-production method based upon total estimated recoverable proven reserves of the beryllium-bearing bertrandite ore body. The Company uses beryllium pounds as the unit of accounting measure, and depletion expense is recorded on a pro-rata basis based upon the amount of beryllium pounds extracted as a percentage of total estimated beryllium pounds contained in all ore bodies.

Mine development costs at the Company's open pit surface mine include drilling, infrastructure, and other related costs to delineate an ore body, and the removal of overburden to initially expose an ore body. Before mineralization is classified as proven and probable reserves, costs are classified as exploration expense. Capitalization of mine development project costs that meet the definition of an asset begins once mineralization is classified as proven and probable reserves.

Historically, the Company's mine development costs involved the development of a new source of ore, and, as such, mine development costs incurred were capitalized during the pre-production phase of a mine and amortized into inventory as the ore was extracted. In 2020, the Company expanded a mine to further develop an ore body. Since the pre-production phase ended when ore was first extracted from this mine, the Company recognized approximately \$12.9 million of mine development costs in 2020 as a component of cost of sales. This expansion is expected to benefit future periods.

Drilling and related costs are capitalized for an ore body where proven and probable reserves exist, and the activities are directed at obtaining additional information on the ore body. All other drilling and related costs are expensed as incurred. Drilling costs incurred during the production phase for operational ore control are allocated to inventory costs and then included as a component of costs applicable to sales.

The costs of removing overburden and waste materials to access the ore body at an open-pit mine prior to the production phase are capitalized during the development of an open-pit mine and are capitalized at each pit. These costs are amortized as the ore is extracted using the units-of-production method based upon total estimated recoverable proven reserves for the individual pit. The Company uses beryllium pounds as the unit of accounting measure for recording amortization.

To the extent that the aforementioned costs benefit an entire ore body, the costs are amortized over the estimated useful life of the ore body. Costs incurred to access specific ore blocks or areas that only provide benefit over the life of that area are amortized over the estimated life of that specific ore block area.

Goodwill and Other Intangible Assets: Goodwill is reviewed annually for impairment or more frequently if impairment indicators arise. The Company conducts its annual goodwill and indefinite-lived intangible asset impairment assessment as of the first day of the fourth quarter, or more frequently under certain circumstances. For the purpose of the goodwill impairment assessment, the Company has the option to perform a qualitative assessment (commonly referred to as "step zero") to determine whether further quantitative analysis for impairment of goodwill or indefinite-lived intangible assets is necessary or a quantitative assessment ("step one") where the Company estimates the fair value of each reporting unit using a discounted cash flow method (income approach). Goodwill is assigned to the reporting unit, which is the operating segment level or one level below the operating segment. Intangible assets with finite lives are amortized using the straight-line method or effective interest

method, as applicable, over the periods estimated to be benefited, which is generally 20 years or less. Finite-lived intangible assets are also reviewed for impairment if facts and circumstances warrant.

Long-Lived Asset Impairment: Management performs impairment tests of long-lived assets, including property and equipment, whenever an event occurs or circumstances change that indicate that the carrying value may not be recoverable or the useful life of the asset has changed. Upon indications of impairment, assets and liabilities are grouped at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. The asset group would be considered impaired when the estimated future undiscounted cash flows generated by the asset group are less than its carrying value. If such undiscounted cash flows indicate that the carrying value of the asset group is not recoverable, impairment losses are measured by comparing the estimated fair value of the asset group to its carrying amount.

Derivatives: The Company recognizes all derivatives on the balance sheet at fair value. If the derivative is designated and effective as a cash flow hedge, changes in the fair value of the derivative are recognized in other comprehensive income, a component of shareholders' equity, until the hedged item is recognized in earnings. If the derivative is designated as a fair value hedge, changes in fair value are offset against the change in the fair value of the hedged asset, liability, or commitment through earnings. The ineffective portion of a derivative's change in fair value, if any, is recognized in earnings immediately. If a derivative is not a hedge, changes in its fair value are adjusted through the income statement.

Asset Retirement Obligation: The Company records a liability to recognize the legal obligation to remove an asset at the time the asset is acquired or when the legal liability arises. The liability is recorded for the present value of the ultimate obligation by discounting the estimated future cash flows using a credit-adjusted risk-free interest rate. The liability is accreted over time, with the accretion charged to expense. An asset equal to the fair value of the liability is recorded concurrent with the liability and depreciated over the life of the underlying asset.

Unearned Income: Expenditures for capital equipment to be reimbursed under government contracts are recorded in property, plant, and equipment, while the reimbursements for those expenditures are recorded in unearned income, a liability on the balance sheet. When the assets subject to reimbursement are placed in service, the total cost is depreciated over the useful lives, and the unearned income liability is reduced and credited to cost of sales on the Consolidated Statements of Income ratably with the annual depreciation expense.

Also included in Unearned Income as of December 31, 2020 are \$58.8 million of customer prepayments. See Note L for additional discussion.

Advertising Costs: The Company expenses all advertising costs as incurred. Advertising costs were \$0.3 million in 2020, \$0.7 million in 2019, and \$1.2 million in 2018.

Stock-based Compensation: The Company recognizes stock-based compensation expense based on the grant date fair value of the award over the period during which an employee is required to provide service in exchange for the award. Stock-based awards include performance-based restricted stock units (PRSUs), restricted stock units (RSUs), and stock appreciation rights (SARs). The fair value of PRSUs and RSUs is primarily based on the closing market price of a share of the Company's common stock on the date of grant, modified as appropriate to take into account the features of such grants. SARs are granted with an exercise price equal to the closing price of the Company's common shares on the date of grant. The fair value of SARs is determined using a Black-Scholes option-pricing model, which incorporates assumptions regarding the expected volatility, the expected option life, the risk-free interest rate, and the expected dividend yield. See Note R for additional information about stock-based compensation.

Capitalized Interest: Interest expense associated with active capital asset construction and mine development projects is capitalized and amortized over the future useful lives of the related assets.

Income Taxes: The Company uses the liability method in measuring the provision for income taxes and recognizing deferred tax assets and liabilities on the balance sheet. The Company will record a valuation allowance to reduce the deferred tax assets to the amount that is more likely than not to be realized, as warranted by current facts and circumstances. The Company applies a more-likely-than-not recognition threshold for all tax uncertainties and will record a liability for those tax benefits that have a less than 50% likelihood of being sustained upon examination by the taxing authorities.

Net Income Per Share: Basic earnings per share (EPS) is computed by dividing income available to common stockholders by the weighted-average number of common shares outstanding for the period. Diluted EPS reflects the assumed conversion of all dilutive common stock equivalents as appropriate using the treasury stock method.

New Pronouncements Adopted: In June 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-13, *Financial Instruments - Credit Losses*. This ASU requires an entity to change its accounting

approach in determining impairment of certain financial instruments, including trade receivables, from an “incurred loss” to a “current expected credit loss” model. The standard is effective for fiscal years beginning after December 15, 2019, including interim periods within such fiscal years. The Company adopted this guidance as of January 1, 2020, and the adoption did not have a material effect on the Company’s consolidated financial statements.

In August 2018, the FASB issued ASU 2018-14 *Defined Benefit Plans (Topic 715-20) - Changes to the Disclosure Requirements for Defined Benefit Plans*, which intends to improve disclosure effectiveness by adding, removing, or clarifying certain disclosure requirements related to defined benefit pension or other postretirement plans. The standard is effective for fiscal years ending after December 15, 2020. The Company adopted this guidance as of December 31, 2020. The effect of the adoption did not materially impact the Company’s financial statements or related disclosures.

No other recently issued or effective ASUs had, or are expected to have, a material effect on the Company’s results of operations, financial condition, or liquidity.

Inventories: Inventories are stated at the lower of cost or net realizable value. In the fourth quarter of 2020, the Company voluntarily changed its method of inventory costing for the majority of its domestic inventories to the FIFO method from the LIFO method. Except for its bertrandite ore mine which values inventory using a weighted average cost method, the Company’s remaining inventories are valued using the FIFO method. The Company believes that a current costing method is preferable as it improves comparability with its most similar peers, it more closely resembles the physical flow of its inventory (i.e., it provides better matching of revenues and expenses), and it results in uniformity across a significant majority of the Company’s inventory. Prior to the change in method, inventories valued on the LIFO cost method were approximately 45% of the Company’s total inventories as of December 31, 2020.

The effects of the change in accounting principle from LIFO to FIFO have been retrospectively applied to all periods presented. As a result of the retrospective application of the change in accounting principle, certain financial statement line items in the Company’s consolidated balance sheets as of December 31, 2019 and the consolidated statements of income, comprehensive income, shareholders’ equity, and cash flows for the years ended December 31, 2019 and 2018 were adjusted as necessary.

As a result of the retrospective application of this change in accounting method, the following financial statement line items within the accompanying financial statements were adjusted, as follows:

Consolidated Statements of Income

(Thousands except per share amounts)

Selected Items	2020			2019			2018		
	As Computed Under LIFO	As Reported Under FIFO	Difference	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment
Cost of sales	\$ 981,722	\$ 983,641	\$ 1,919	\$ 926,280	\$ 922,734	\$ (3,546)	\$ 956,710	\$ 956,454	\$ (256)
Gross margin	194,552	192,633	(1,919)	259,144	262,690	3,546	251,105	251,361	256
Operating profit	10,134	8,215	(1,919)	67,000	70,546	3,546	61,496	61,752	256
Income before income taxes	10,194	8,275	(1,919)	61,990	65,536	3,546	16,342	16,598	256
Income tax (benefit) expense	(6,748)	(7,187)	(439)	11,330	12,142	812	(4,504)	(4,446)	58
Net income	16,942	15,462	(1,480)	50,660	53,394	2,734	20,846	21,044	198
Basic earnings per share:									
Net income per share of common stock	\$ 0.83	\$ 0.76	\$ (0.07)	\$ 2.49	\$ 2.62	\$ 0.13	\$ 1.03	\$ 1.04	\$ 0.01
Diluted earnings per share:									
Net income per share of common stock	\$ 0.82	\$ 0.75	\$ (0.07)	\$ 2.45	\$ 2.59	\$ 0.14	\$ 1.01	\$ 1.02	\$ 0.01

Consolidated Statements of Comprehensive Income

(Thousands)

Selected Items	2020			2019			2018		
	As Computed Under LIFO	As Reported Under FIFO	Difference	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment
Net income	\$ 16,942	\$ 15,462	\$ (1,480)	\$ 50,660	\$ 53,394	\$ 2,734	\$ 20,846	\$ 21,044	\$ 198
Comprehensive income	23,765	22,285	(1,480)	63,432	66,166	2,734	65,549	65,747	198

Consolidated Balance Sheets

(Thousands)

Selected Items	2020			2019		
	As Computed Under LIFO	As Reported Under FIFO	Difference	Previously Reported	As Adjusted	Adjustment
Inventories, net	\$ 206,834	\$ 250,778	\$ 43,944	\$ 190,390	\$ 236,253	\$ 45,863
Prepaid and other current assets	23,470	20,896	(2,574)	21,839	21,736	(103)
Deferred income taxes (liability)	8,081	15,864	7,783	2,410	13,104	10,694
Retained earnings	597,471	631,058	33,587	589,888	624,954	35,066

Consolidated Statements of Cash Flows

(Thousands)

Selected Items	2020			2019			2018		
	As Computed Under LIFO	As Reported Under FIFO	Difference	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment
Net income	\$ 16,942	\$ 15,462	\$ (1,480)	\$ 50,660	\$ 53,394	\$ 2,734	\$ 20,846	\$ 21,044	\$ 198
Deferred income tax (benefit) expense	(6,940)	(9,850)	(2,910)	2,584	3,945	1,361	(1,318)	(1,912)	(594)
Decrease (increase) in inventory	(3,207)	(1,288)	1,919	24,031	20,485	(3,546)	4,234	3,978	(256)
Decrease (increase) in prepaid and other current assets	4	2,475	2,471	1,418	869	(549)	1,162	1,814	652

As a result of the retrospective application of this change in accounting principle, the following financial statement line items within the unaudited interim 2020 and 2019 quarterly condensed consolidated financial statements were adjusted, as follows:

Quarterly Data (unaudited)

(Thousands except per share amounts)

Selected Items	2020					
	First Quarter			Second Quarter		
	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment
Cost of sales	\$ 232,371	\$ 233,376	\$ 1,005	\$ 223,378	\$ 224,513	\$ 1,135
Gross margin	45,575	44,570	(1,005)	48,090	46,955	(1,135)
Operating (loss) profit	(4,563)	(5,568)	(1,005)	8,706	7,571	(1,135)
(Loss) Income before income taxes	(3,865)	(4,870)	(1,005)	8,298	7,163	(1,135)
Income tax (benefit) expense	(762)	(992)	(230)	1,620	1,360	(260)
Net (loss) income	(3,103)	(3,878)	(775)	6,678	5,803	(875)
Basic earnings per share:						
Net (loss) income per share of common stock	\$ (0.15)	\$ (0.19)	\$ (0.04)	\$ 0.33	\$ 0.29	\$ (0.04)
Diluted earnings per share:						
Net (loss) income per share of common stock	\$ (0.15)	\$ (0.19)	\$ (0.04)	\$ 0.32	\$ 0.28	\$ (0.04)

(Thousands except per share amounts)

Selected Items	2020						
	Third Quarter			Fourth Quarter			
	Previously Reported	As Adjusted	Adjustment	As Computed Under LIFO	As Reported	Difference	
Cost of sales	\$ 240,531	\$ 241,860	\$ 1,329	\$ 285,442	\$ 283,892	\$ (1,550)	
Gross margin	46,640	45,311	(1,329)	54,247	55,797	1,550	
Operating (loss) profit	713	(616)	(1,329)	5,278	6,828	1,550	
(Loss) Income before income taxes	455	(874)	(1,329)	5,306	6,856	1,550	
Income tax (benefit) expense	(6,041)	(6,345)	(304)	(1,565)	(1,210)	355	
Net income	6,496	5,471	(1,025)	6,871	8,066	1,195	
Basic earnings per share:							
Net income per share of common stock	\$ 0.32	\$ 0.27	\$ (0.05)	\$ 0.34	\$ 0.40	\$ 0.06	
Diluted earnings per share:							
Net income per share of common stock	\$ 0.32	\$ 0.27	\$ (0.05)	\$ 0.33	\$ 0.39	\$ 0.06	

(Thousands except per share amounts)

Selected Items	2019						
	First Quarter			Second Quarter			
	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment	
Cost of sales	\$ 232,129	\$ 231,835	\$ (294)	\$ 228,249	\$ 225,846	\$ (2,403)	
Gross margin	69,312	69,606	294	69,594	71,997	2,403	
Operating profit	21,387	21,681	294	22,750	25,153	2,403	
Income before income taxes	20,676	20,970	294	19,138	21,541	2,403	
Income tax expense	3,770	3,837	67	3,598	4,148	550	
Net income	16,906	17,133	227	15,540	17,393	1,853	
Basic earnings per share:							
Net income per share of common stock	\$ 0.83	\$ 0.85	\$ 0.02	\$ 0.76	\$ 0.85	\$ 0.09	
Diluted earnings per share:							
Net income per share of common stock	\$ 0.82	\$ 0.83	\$ 0.01	\$ 0.75	\$ 0.84	\$ 0.09	

(Thousands except per share amounts)

Selected Items	2019						
	Third Quarter			Fourth Quarter			
	Previously Reported	As Adjusted	Adjustment	Previously Reported	As Adjusted	Adjustment	
Cost of sales	\$ 240,748	\$ 239,374	\$ (1,374)	\$ 225,154	\$ 225,679	\$ 525	
Gross margin	65,231	66,605	1,374	55,007	54,482	(525)	
Operating profit	6,289	7,663	1,374	16,574	16,049	(525)	
Income before income taxes	5,726	7,100	1,374	16,450	15,925	(525)	
Income tax expense	2,263	2,578	315	1,699	1,579	(120)	
Net income	3,463	4,522	1,059	14,751	14,346	(405)	
Basic earnings per share:							
Net income per share of common stock	\$ 0.17	\$ 0.22	\$ 0.05	\$ 0.72	\$ 0.70	\$ (0.02)	
Diluted earnings per share:							
Net income per share of common stock	\$ 0.17	\$ 0.22	\$ 0.05	\$ 0.71	\$ 0.69	\$ (0.02)	

Note B — Acquisition

On July 17, 2020, the Company acquired 100% of the capital stock of Optics Balzers, an industry leader in thin film optical coatings. The purchase price for Optics Balzers was \$136.1 million, including the assumption of \$22.5 million of debt. The transaction was funded with cash on hand, including a portion of the \$150.0 million borrowed under our revolving credit facility during the first half of 2020. This business operates within the Precision Optics segment, and the results of operations are included as of the date of acquisition. The combination of Materion and Optics Balzers creates a premier optical thin film coating solutions provider with a highly complementary geographic, product, and end market portfolio.

The preliminary purchase price allocation for the acquisition is as follows:

(Thousands)	July 17, 2020
Assets:	
Cash and cash equivalents	\$ 5,390
Accounts receivable	8,484
Inventories	10,715
Prepaid and other current assets	937
Property, plant, and equipment	46,791
Operating lease, right-of-use assets	13,357
Intangible assets	49,300
Goodwill	70,639
Total assets acquired	<u>\$ 205,613</u>
Liabilities:	
Short-term debt	\$ 600
Accounts payable	2,851
Salaries and wages	4,392
Other liabilities and accrued items	3,678
Income taxes	61
Unearned revenue	1,259
Other long-term liabilities	207
Operating lease liabilities	12,356
Finance lease liabilities	2,642
Retirement and post-employment benefits	6,586
Unearned income	1,835
Long-term income taxes	181
Deferred income taxes	10,934
Long-term debt	21,926
Total liabilities assumed	<u>\$ 69,508</u>
Net assets acquired	<u>\$ 136,105</u>

Assets acquired and liabilities assumed are recognized at their respective fair values as of the acquisition date. The Company engaged specialists to assist in the valuation of property, plant, and equipment, intangible assets, and retirement and post-employment benefits. The estimates in the purchase price allocation are based on available information and will be revised during the measurement period, not to exceed 12 months, as additional information becomes available on tax-related items, and as additional analysis is performed. Such revisions are not expected to have a material impact on the Company's results of operations and financial position. No material measurement period adjustments have been recorded since the acquisition date.

The Company's consolidated financial statements include the results of operations of Optics Balzers from the acquisition date through December 31, 2020. The amount of Net sales and operating results attributable to the acquisition during this period were not material.

Acquisition-related transaction and integration costs totaled \$6.5 million in 2020. These costs are included in selling, general, and administrative expense in the Consolidated Statements of Income.

As part of the acquisition, the Company recorded approximately \$70.6 million of goodwill in its Precision Optics segment. Goodwill was calculated as the excess of the purchase price over the estimated fair values of the tangible net assets and intangible assets acquired and primarily attributable to the synergies expected to arise after the acquisition dates. The goodwill is not expected to be deductible for U.S. tax purposes.

The following table reports the intangible assets by asset category as of the closing date:

(Thousands)	Value at Acquisition	Weighted Average Life
Customer relationships	\$ 40,141	18 years
Technology	4,059	5 years
Licenses and other	5,100	5 years
Total	<u>\$ 49,300</u>	

Note C — Segment Reporting and Geographic Information

Certain amounts below have been adjusted to reflect the retrospective application of the Company's change in inventory accounting method, as described in Note A.

The Company has the following operating segments: Performance Alloys and Composites, Advanced Materials, Precision Optics, and Other. The Company's operating segments represent components of the Company for which separate financial information is available that is utilized on a regular basis by the Chief Executive Officer, the Company's Chief Operating Decision Maker, in determining how to allocate the Company's resources and evaluate performance. The segments are determined based on several factors, including the availability of discrete financial information and the Company's organizational and management structure.

Performance Alloys and Composites provides advanced engineered solutions comprised of beryllium and non-beryllium containing alloy systems and custom engineered parts in strip, bulk, rod, plate, bar, tube, and other customized shapes.

Advanced Materials produces advanced chemicals, microelectric packaging, precious metal, non-precious metal, and specialty metal products, including vapor deposition targets, frame lid assemblies, clad and precious metal preforms, high temperature braze materials, and ultra-fine wire.

Precision Optics produces thin film coatings, optical filter materials, sputter-coated, and precision-converted thin film materials.

The Other reportable segment includes unallocated corporate costs and assets.

Financial information for reportable segments was as follows:

(Thousands)	Performance Alloys and Composites	Advanced Materials	Precision Optics	Other	Total
2020					
Net sales	\$ 394,195	\$ 670,867	\$ 111,212	\$ —	\$ 1,176,274
Intersegment sales	6	35,912	—	—	35,918
Operating profit (loss)	13,597	22,120	(4,382)	(23,120)	8,215
Depreciation, depletion, and amortization	25,782	8,061	6,564	1,977	42,384
Expenditures for long-lived assets	53,841	9,003	908	3,522	67,274
Total Assets	477,892	251,637	268,004	60,327	1,057,860
2019					
Net sales	\$ 500,201	\$ 573,763	\$ 111,460	\$ —	\$ 1,185,424
Intersegment sales	38	70,047	—	—	70,085
Operating profit (loss)	73,815	25,124	(3,550)	(24,843)	70,546
Depreciation, depletion, and amortization	24,437	8,955	5,695	2,029	41,116
Expenditures for long-lived assets	15,520	7,572	1,045	2,391	26,528
Total Assets	442,885	214,961	78,981	161,603	898,430
2018					
Net sales	\$ 500,590	\$ 586,643	\$ 120,582	\$ —	\$ 1,207,815
Intersegment sales	37	50,460	—	—	50,497
Operating profit (loss)	60,008	16,732	10,707	(25,695)	61,752
Depreciation, depletion, and amortization	17,434	8,575	7,066	2,449	35,524
Expenditures for long-lived assets	15,396	15,523	1,983	1,358	34,260
Total Assets	453,345	206,393	90,537	93,035	843,310

Intersegment sales are eliminated in consolidation.

The primary measure of evaluating segment performance is operating profit. From an assets perspective, segments are evaluated based upon a return on invested capital metric, which includes inventory, accounts receivable, and property, plant, and equipment.

A reconciliation of total segment operating profit to total consolidated income before income taxes is as follows:

(Thousands)	2020	2019	2018
Total operating profit for reportable segments	8,215	70,546	61,752
Other non-operating (income) expense - net	(3,939)	3,431	42,683
Interest expense - net	3,879	1,579	2,471
Income before income taxes	\$ 8,275	\$ 65,536	\$ 16,598

Other geographic information includes the following:

(Thousands)	2020	2019	2018
Net sales			
United States	\$ 641,727	\$ 743,345	\$ 726,881
Asia	329,968	256,114	270,672
Europe	189,281	169,132	186,081
All other	15,298	16,833	24,181
Total	\$ 1,176,274	\$ 1,185,424	\$ 1,207,815
Property, plant, and equipment, net by country deployed			
United States	\$ 223,340	\$ 194,596	\$ 215,395
All other	86,346	37,680	35,623
Total	\$ 309,686	\$ 232,276	\$ 251,018

International sales include sales from international operations and direct exports from our U.S. operations. No individual country, other than the United States, or customer accounted for 10% or more of the Company's net sales for the years presented.

The following table disaggregates revenue for each segment by end market for 2020 and 2019:

(Thousands)	Performance Alloys and Composites	Advanced Materials	Precision Optics	Other	Total
2020					
End Market					
Semiconductor	\$ 4,626	\$ 526,553	\$ 456	\$ —	\$ 531,635
Industrial	90,884	38,052	18,096	—	147,032
Aerospace and Defense	67,173	6,241	19,539	—	92,953
Consumer Electronics	47,983	479	21,566	—	70,028
Automotive	66,489	6,262	3,532	—	76,283
Energy	20,587	75,768	—	—	96,355
Telecom and Data Center	44,313	2,183	—	—	46,496
Other	52,140	15,329	48,023	—	115,492
Total	\$ 394,195	\$ 670,867	\$ 111,212	\$ —	\$ 1,176,274
2019					
End Market					
Semiconductor	\$ 5,353	\$ 432,658	\$ 711	\$ —	\$ 438,722
Industrial	106,334	29,917	14,253	—	150,504
Aerospace and Defense	109,717	5,647	20,731	—	136,095
Consumer Electronics	72,360	1,254	18,201	—	91,815
Automotive	69,057	8,179	969	—	78,205
Energy	41,101	74,613	—	—	115,714
Telecom and Data Center	61,344	2,981	—	—	64,325
Other	34,935	18,514	56,595	—	110,044
Total	\$ 500,201	\$ 573,763	\$ 111,460	\$ —	\$ 1,185,424

Note D — Revenue Recognition

Net sales consist primarily of revenue from the sale of precious and non-precious specialty metals, beryllium and copper-based alloys, beryllium composites, and other products into numerous end markets. The Company requires an agreement with a customer that creates enforceable rights and performance obligations. The Company generally recognizes revenue, in an amount that reflects the consideration to which it expects to be entitled, upon satisfaction of a performance obligation by transferring control over a product to the customer. Control over the product is generally transferred to the customer when the

Company has a present right to payment, the customer has legal title, the customer has physical possession, the customer has the significant risks and rewards of ownership, and/or the customer has accepted the product.

Shipping and Handling Costs: The Company accounts for shipping and handling activities related to contracts with customers as costs to fulfill its promise to transfer the associated products. Accordingly, customer payments for shipping and handling costs are recorded as a component of net sales, and related costs are recorded as a component of cost of sales.

Taxes Collected from Customers and Remitted to Governmental Authorities: Revenue is recorded net of taxes collected from customers that are remitted to governmental authorities, with the collected taxes recorded as current liabilities until remitted to the relevant government authority.

Product Warranty: Substantially all of the Company's customer contracts contain a warranty that provides assurance that the purchased product will function as expected and in accordance with certain specifications. The warranty is intended to safeguard the customer against existing defects and does not provide any incremental service to the customer.

Transaction Price Allocated to Future Performance Obligations: ASC 606 requires that the Company disclose the aggregate amount of transaction price that is allocated to performance obligations that have not yet been satisfied at December 31, 2020. Remaining performance obligations include non-cancelable purchase orders and customer contracts. The guidance provides certain practical expedients that limit this requirement. As such, the Company does not disclose the value of unsatisfied performance obligations for contracts with an original expected length of one year or less. After considering the practical expedient, at December 31, 2020, the aggregate amount of the transaction price allocated to remaining performance obligations was approximately \$10.2 million.

Contract Costs: 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. These costs primarily relate to sales commissions, which are included in selling, general, and administrative expenses.

Contract Balances: The timing of revenue recognition, billings, and cash collections resulted in the following contract assets and contract liabilities:

(Thousands)	December 31, 2020	December 31, 2019	\$ change	% change
Accounts receivable, trade	\$ 156,821	\$ 141,168	\$ 15,653	11 %
Unbilled receivables	8,832	13,583	(4,751)	(35) %
Unearned revenue	7,713	3,380	4,333	128 %

Accounts receivable, trade represents payments due from customers relating to the transfer of the Company's products and services. The Company believes that its receivables are collectible and appropriate allowances for doubtful accounts have been recorded. Impairment losses (bad debt) incurred relating to our receivables were immaterial during 2020.

Unbilled receivables represent expenditures on contracts, plus applicable profit margin, not yet billed. Unbilled receivables are normally billed and collected within one year. Billings made on contracts are recorded as a reduction of unbilled receivables.

Unearned revenue is recorded for consideration received from customers in advance of satisfaction of the related performance obligations. The Company recognized approximately \$3.2 million of the December 31, 2019 unearned amounts as revenue during 2020.

As a practical expedient, the Company does not adjust the promised amount of consideration for the effects of a significant financing component because the period between the transfer of a product or service to a customer and when the customer pays for that product or service will be one year or less. The Company does not include extended payment terms in its contracts with customers.

Note E — Restructuring

During 2020, the Company committed to a plan to sell its Large Area Coatings (LAC) business (a reporting unit within the Precision Optics segment) and determined that it met the criteria to be classified as held for sale. The Company recorded a goodwill impairment charge of \$9.1 million in the first quarter of 2020 to write-off the remaining balance of goodwill for the LAC reporting unit. In addition, the Company estimated the fair value of the disposal group as a whole, less costs to sell, and compared the fair value to the remaining carrying value. Based on this review, the Company recorded an additional \$1.4 million asset impairment loss. During the third quarter of 2020, the Company concluded that it intended to close its LAC business and, as a result, only a portion of the fixed assets of the LAC business are classified as held for sale. At December 31, 2020, fixed assets totaling \$0.2 million were classified as held for sale and reflected within Prepaid and other current assets in the Consolidated Balance Sheet.

Costs associated with the closure of the LAC business totaled \$1.7 million in 2020 and included \$0.7 million of severance associated with approximately 20 employees and \$1.0 million of facility and other related costs.

Remaining severance payments of \$0.6 million and facility costs of \$1.0 million related to these initiatives are reflected within Salaries and wages and Other liabilities and accrued items, respectively, in the Consolidated Balance Sheet. The Company expects to incur additional costs related to these initiatives of approximately \$0.2 million in the first quarter of 2021.

In addition, in 2020, the Company completed additional cost reduction actions in order to align costs with commensurate business levels in its Precision Optics segment. These actions were accomplished through elimination of vacant positions, consolidation of roles, and staff reductions. Costs associated with these actions totaled \$0.4 million and included severance associated with approximately 28 employees and other related costs, all of which was paid during 2020.

Also, in 2020, the Company initiated a restructuring plan in its PAC segment to close its Warren, Michigan and Fremont, California locations. Costs associated with the plan totaled \$8.8 million in 2020 and included \$2.1 million of severance associated with approximately 63 employees, and \$5.3 million of facility and other related costs.

Remaining severance payments of \$0.5 million and facility costs of \$0.5 million related to these initiatives are reflected within Salaries and wages and Other liabilities and accrued items in the Consolidated Balance Sheet as of December 31, 2020. The Company does not expect to incur any additional costs associated with these initiatives.

In 2019, the Company initiated a restructuring plan in its LAC business to reduce headcount, idle certain machinery and equipment, and exit a facility in Windsor, Connecticut. Costs associated with this plan also included severance and related costs for 19 employees, all of which was paid out by the end of 2020.

In addition, in 2019, the Company completed cost reduction actions in order to align costs with commensurate business levels. These actions were accomplished through elimination of vacant positions, consolidation of roles, and staff reduction. Costs associated with these actions were in the Other segment and included severance associated with seven employees and other related costs. All severance payments were paid by the end of 2020.

Costs associated with cost reduction actions in 2018 were in the Advanced Materials segment and included severance associated with approximately forty employees and other related costs. Remaining severance payments amount to approximately \$0.3 million as of December 31, 2020.

These costs are presented in the Company's segment results as follows:

(Thousands)	2020	2019	2018
Performance Alloys and Composites	\$ 8,763	\$ —	\$ —
Advanced Materials	—	—	5,599
Precision Optics	2,052	328	—
Other	422	457	—
Total	\$ 11,237	\$ 785	\$ 5,599

Note F — Other-net

Other-net is summarized for 2020, 2019, and 2018 as follows:

(Thousands)	(Income) Expense		
	2020	2019	2018
Metal consignment fees	\$ 8,587	\$ 9,247	\$ 10,999
Amortization of intangible assets	2,377	1,400	2,265
Foreign currency (gain) loss	(2,569)	666	1,487
Net loss on disposal of fixed assets	466	344	518
Rental income	—	(87)	(416)
Other items	(398)	213	481
Total other-net	\$ 8,463	\$ 11,783	\$ 15,334

Note G — Interest expense-net

The following chart summarizes the interest incurred, capitalized, and paid for 2020, 2019, and 2018:

(Thousands)	2020	2019	2018
Interest incurred, net	\$ 3,889	\$ 1,641	\$ 2,870
Less: Capitalized interest	10	62	399
Total net expense	\$ 3,879	\$ 1,579	\$ 2,471
Interest paid	\$ 3,442	\$ 1,799	\$ 1,436

The increase in interest expense for 2020 versus 2019 was primarily due to increased borrowings under our revolving credit facility during 2020. The decrease in interest expense in 2019 compared to 2018 was primarily due to interest income earned on investments held in money market accounts. Amortization of deferred financing costs within interest expense was \$0.8 million in 2020 and \$1.0 million in both 2019 and 2018.

Note H — Income Taxes

Certain amounts below have been adjusted to reflect the retrospective application of the Company's change in inventory accounting method, as described in Note A.

On March 27, 2020, the Coronavirus Aid, Relief and Economic Security (CARES) Act was signed into law. The CARES Act, among other things, includes provisions relating to refundable payroll tax credits, deferment of employer social security payments, net operating loss carryback periods, alternative minimum tax credit refunds, and modifications to the net interest deduction limitations. The Company has examined the impact of the CARES Act on its business and has determined it does not have a material impact to its consolidated financial statements.

On July 9, 2020, the U.S. Treasury Department issued final tax regulations related to the foreign-derived intangible income and global intangible low-taxed income (GILTI) provisions. The U.S. Treasury Department also released final tax regulations on July 20, 2020 permitting a taxpayer to elect to exclude from its GILTI inclusion items of income subject to a high effective rate of foreign tax. On December 31, 2020, the U.S. Treasury Department issued final tax regulations for certain employee remuneration in excess of \$1 million under IRC Section 162(m). The Company has applied the new legislation to its consolidated financial statements.

On December 22, 2017, comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (TCJA) was enacted in the United States. The SEC staff issued Staff Accounting Bulletin No. 118 (SAB 118) to address the application of U.S. GAAP in situations where a registrant did not have the necessary information available, prepared, or analyzed in reasonable detail to complete the accounting for certain income tax effects of the TCJA. The Company applied the guidance in SAB 118 when accounting for the enactment-date effects of the TCJA in 2017 and 2018.

The Company completed its accounting for all of the enactment-date income tax effects of the TCJA in the fourth quarter of 2018. During 2018, the Company recognized adjustments to the provisional amounts recorded as of December 31, 2017 and included the adjustments as a component of income tax expense. In 2018, the Company recorded a \$11.1 million net tax benefit related to the enactment-date effects of the TCJA, including a \$2.8 million tax benefit for the re-measurement of deferred tax assets and liabilities, a \$1.2 million tax benefit for the one-time transition tax on the mandatory deemed repatriation of foreign earnings, and a \$7.1 million tax benefit related to the generation of foreign tax credits and the reversal of the valuation allowance related to foreign tax credits.

Income before income taxes and income tax expense (benefit) are comprised of the following:

(Thousands)	2020	2019	2018
Income (loss) before income taxes:			
Domestic	\$ (1,153)	\$ 60,271	\$ 20,528
Foreign	9,428	5,265	(3,930)
Total income before income taxes	<u>\$ 8,275</u>	<u>\$ 65,536</u>	<u>\$ 16,598</u>
Income tax expense:			
Current income tax expense (benefit):			
Domestic	\$ 812	\$ 6,995	\$ (5,244)
Foreign	1,851	1,202	2,710
Total current	<u>\$ 2,663</u>	<u>\$ 8,197</u>	<u>\$ (2,534)</u>
Deferred income tax (benefit) expense:			
Domestic	\$ (5,641)	\$ 2,687	\$ (4,677)
Foreign	(4,209)	1,258	2,765
Total deferred	<u>\$ (9,850)</u>	<u>\$ 3,945</u>	<u>\$ (1,912)</u>
Total income tax (benefit) expense	<u>\$ (7,187)</u>	<u>\$ 12,142</u>	<u>\$ (4,446)</u>

A reconciliation of the U.S. federal statutory income tax rate to the Company's effective income tax rate is as follows:

	2020	2019	2018
U.S. federal statutory rate	21.0 %	21.0 %	21.0 %
State and local income taxes, net of federal tax effect	(10.0)	1.0	0.2
Effect of excess of percentage depletion over cost depletion	(43.0)	(4.3)	(17.5)
Manufacturing production deduction, including impact of NOL carryback	—	—	6.2
Foreign derived intangible income deduction	(1.8)	(3.0)	(2.8)
Non-deductible goodwill impairment	7.1	1.1	—
Tax Cuts and Jobs Act impact	—	2.3	(66.7)
Research and development tax credit	(16.4)	(1.1)	(7.5)
Foreign tax credit	—	(0.3)	(1.9)
Impact of foreign operations	(5.3)	0.9	1.8
Non-deductible transaction costs	6.9	0.2	1.3
Interest from tax authorities	(3.8)	—	—
Adjustment to unrecognized tax benefits	1.8	0.2	2.7
Equity compensation	(5.3)	(3.2)	(4.3)
Non-deductible officers' compensation	6.8	0.8	—
Valuation allowance	(45.5)	2.1	38.1
Other items	0.6	0.8	2.6
Effective tax rate	<u>(86.9)%</u>	<u>18.5 %</u>	<u>(26.8)%</u>

Deferred tax assets and (liabilities) are determined based on temporary differences between the financial reporting and tax basis of assets and liabilities. Deferred tax assets and (liabilities) recorded in the Consolidated Balance Sheets consist of the following:

(Thousands) Asset (liability)	December 31,	
	2020	2019
Post-employment benefits other than pensions	\$ 1,564	\$ 1,626
Other reserves	226	543
Deferred compensation	3,322	3,314
Environmental reserves	1,301	1,384
Lease liabilities	10,469	4,614
Pensions	7,456	5,149
Accrued compensation expense	2,683	5,364
Net operating loss and credit carryforwards	12,685	13,513
Research and development tax credit carryforward	26	25
Subtotal	39,732	35,532
Valuation allowance	(14,134)	(17,676)
Total deferred tax assets	25,598	17,856
Depreciation	(12,112)	(10,780)
Lease assets	(10,261)	(4,428)
Inventory	(3,532)	(7,954)
Amortization	(10,754)	(2,426)
Mine development	(1,669)	(3,706)
Total deferred tax liabilities	(38,328)	(29,294)
Net deferred tax liabilities	\$ (12,730)	\$ (11,438)

The Company had deferred income tax assets offset with a valuation allowance for certain foreign and state net operating losses, state investment and research and development tax credit carryforwards, and deferred tax assets that are not likely to be realized for several of the Company's controlled foreign corporations. The Company intends to maintain a valuation allowance on these deferred tax assets until a realization event occurs to support reversal of all or a portion of the allowance.

At December 31, 2020, for income tax purposes, the Company had foreign net operating loss carryforwards of \$27.8 million that do not expire, and \$7.1 million that expire in calendar years 2021 through 2027. The Company also had state net operating loss carryforwards of \$20.5 million that expire in calendar years 2021 through 2040 and state tax credits of \$3.7 million that expire in calendar years 2021 through 2035. A valuation allowance of \$9.5 million has been provided against certain foreign and state net operating loss carryforwards and state tax credits due to uncertainty of their realization.

The Company files income tax returns in the U.S. federal jurisdiction, and in various state, local, and foreign jurisdictions. With limited exceptions, the Company is no longer subject to U.S. federal examinations for years before 2015, state and local examinations for years before 2016, and foreign examinations for tax years before 2011.

We operate under a tax holiday in Malaysia, which is effective through July 31, 2022, and may be extended if certain additional requirements are satisfied. The tax holiday is conditional upon our meeting certain employment, sales, and investment thresholds. The impact of this holiday decreased foreign taxes by \$0.5 million in 2020. The benefit of the tax holiday on net income per share (diluted) was \$0.03 in 2020.

A reconciliation of the Company's unrecognized tax benefits (excluding interest and penalties) for the year-to-date periods ended December 31, 2020 and 2019 is as follows:

(Thousands)	2020	2019
Balance at January 1	\$ 3,221	\$ 2,883
Additions to tax provisions related to the current year	191	—
Additions to tax positions related to prior years	—	399
Reduction to tax positions related to prior years	(349)	—
Lapses on statutes of limitations	(703)	(61)
Balance at December 31	<u>\$ 2,360</u>	<u>\$ 3,221</u>

Included in the balance as of December 31, 2020 and December 31, 2019 are \$2.7 million and \$2.4 million, respectively, of unrecognized tax benefits that would impact the Company's effective tax rate if recognized. We believe it is reasonably possible that a decrease of up to \$1.6 million of unrecognized tax benefits related to federal exposures may be recognized in the next twelve months as a result of the lapse of the statute of limitations.

The Company recognizes interest and penalties related to unrecognized tax benefits on the income tax expense line in the accompanying Consolidated Statements of Income. Accrued interest and penalties are included on the related tax liability line in the Consolidated Balance Sheets. The amount of interest and penalties, net of the related tax benefit, recognized in earnings was immaterial during 2020, 2019, and 2018. As of December 31, 2020 and 2019, accrued interest and penalties, net of the related tax benefit, were immaterial.

Income taxes paid during 2020, 2019, and 2018, were approximately \$3.9 million, \$9.3 million, and \$2.6 million, respectively.

No additional income taxes have been provided for any remaining undistributed foreign earnings not subject to the transition tax, or any additional outside basis difference inherent in these entities, as these amounts continue to be indefinitely reinvested in foreign operations as of December 31, 2020. The amount of such unrepatriated earnings totaled \$98.4 million as of December 31, 2020. It is not practicable to estimate the additional income taxes and applicable withholding taxes that would be payable on the remittance of such undistributed earnings.

Note I — Earnings Per Share

The following table sets forth the computation of basic and diluted EPS:

(Thousands except per share amounts)	2020	2019*	2018*
Numerator for basic and diluted EPS:			
Net income	\$ 15,462	\$ 53,394	\$ 21,044
Denominator:			
Denominator for basic EPS:			
Weighted-average shares outstanding	20,338	20,365	20,212
Effect of dilutive securities:			
Stock appreciation rights	39	72	170
Restricted stock units	102	75	85
Performance-based restricted stock units	124	143	146
Diluted potential common shares	<u>265</u>	<u>290</u>	<u>401</u>
Denominator for diluted EPS:			
Adjusted weighted-average shares outstanding	<u>20,603</u>	<u>20,655</u>	<u>20,613</u>
Basic EPS	<u>\$ 0.76</u>	<u>\$ 2.62</u>	<u>\$ 1.04</u>
Diluted EPS	<u>\$ 0.75</u>	<u>\$ 2.59</u>	<u>\$ 1.02</u>

*Amounts for the years ended December 31, 2019 and 2018 have been adjusted to reflect the change in inventory accounting method, as described in Note A.

Equity awards covering shares of common stock totaling 166,255 in 2020, 71,199 in 2019, and 65,122 in 2018 were excluded from the diluted EPS calculation as their effect would have been anti-dilutive.

Note J — Inventories, net

Inventories are stated at the lower of cost or net realizable value. In the fourth quarter of 2020, the Company voluntarily changed its method of inventory costing for the majority of its domestic inventories to the FIFO method from the LIFO method. The Company believes that the FIFO method is preferable as it results in uniformity across the Company's global operations, provides better matching of revenues and expenses, and improves comparability with the Company's peers.

Inventories in the Consolidated Balance Sheets are summarized as follows:

(Thousands)	December 31,	
	2020	2019*
Raw materials and supplies	\$ 42,905	\$ 35,612
Work in process	200,741	175,135
Finished goods	7,132	25,506
Inventories, net	<u>250,778</u>	<u>236,253</u>

*December 31, 2019 amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A.

The Company takes and records the results of a physical inventory count of its precious metals on a quarterly basis. The Company's precious metal operations include a refinery that processes precious metal-containing scrap and other materials from its customers, as well as its own internally generated scrap. The Company also outsources portions of its refining requirements to other vendors, particularly those materials with longer processing times. The precious metal content within these various refine streams may be in solutions, sludges, and other non-homogeneous forms and can vary over time based upon the input materials, yield rates, and other process parameters. The determination of the weight of the precious metal content within the refine streams as part of a physical inventory count requires the use of estimates and calculations based upon assays, assumed recovery percentages developed from actual historical data and other analyses, the total estimated volumes of solutions and other materials within the refinery, data from the Company's refine vendors, and other factors. The resulting calculated weight of the precious metals in the Company's refine operations may differ, in either direction, from what its records indicate that the Company should have on hand, which would then result in an adjustment to its pre-tax income in the period when the physical inventory was taken, and the related estimates were made.

The Company maintains the majority of the precious metals and copper used in production on a consignment basis in order to reduce our exposure to metal price movements and to reduce our working capital investment. The notional value of off-balance sheet precious metals and copper was \$400.0 million as of December 31, 2020 versus \$309.3 million as of December 31, 2019.

Note K — Property, Plant, and Equipment

Property, plant, and equipment on the Consolidated Balance Sheets is summarized as follows:

(Thousands)	December 31,	
	2020	2019
Land	\$ 5,686	\$ 4,874
Buildings	165,144	150,323
Machinery and equipment	645,195	639,310
Software	43,652	44,652
Construction in progress	69,297	16,699
Allowances for depreciation	(662,724)	(669,250)
Subtotal	<u>266,250</u>	<u>186,608</u>
Finance leases	34,301	26,069
Allowances for depreciation	(4,914)	(3,569)
Subtotal	<u>29,387</u>	<u>22,500</u>
Mineral resources	4,979	4,980
Mine development	30,058	30,058
Allowances for amortization and depletion	(20,988)	(11,870)
Subtotal	<u>14,049</u>	<u>23,168</u>
Property, plant, and equipment — net	<u>\$ 309,686</u>	<u>\$ 232,276</u>

The Company received \$63.5 million from the U.S. Department of Defense (DoD), in previous periods, for reimbursement of the DoD's share of the cost of equipment. This amount was recorded in property, plant, and equipment and the reimbursements are reflected in Unearned income on the Consolidated Balance Sheets. The equipment was placed in service during 2012, and its full cost is being depreciated in accordance with Company policy. The unearned income liability is being reduced ratably with the depreciation expense recorded over the life of the equipment. Unearned income was reduced by \$4.3 million in both 2020 and 2018 and \$4.4 million in 2019 and credited to cost of sales in the Consolidated Statements of Income, offsetting the impact of the depreciation expense on the associated equipment on the Company's cost of sales and gross margin.

We recorded depreciation and depletion expense of \$30.9 million in 2020, \$30.3 million in 2019, and \$33.3 million in 2018. Depreciation, depletion, and amortization as shown on the Consolidated Statement of Cash Flows is also net of the reduction in the unearned income liability in 2020, 2019, and 2018. The net carrying value of capitalized software was \$5.0 million and \$7.9 million at December 31, 2020 and December 31, 2019, respectively. Depreciation expense related to software was \$1.8 million, \$2.4 million, and \$2.6 million in 2020, 2019, and 2018, respectively.

Note L — Customer Prepayments

The Company entered into investment and master supply agreements with a customer to procure equipment to manufacture product for the customer. The customer will make prepayments to the Company in the amount of approximately \$70 million in the aggregate to enable the Company to purchase and install certain equipment and make necessary infrastructure improvements to supply product to the customer. The Company will own the equipment and be responsible for operating and maintenance costs. The prepayment from the customer will be applied when commercial production of the product is sold and delivered to the customer in connection with a master supply agreement. Accordingly, as of December 31, 2020, \$58.8 million of prepayments are classified as Unearned income in the Consolidated Balance Sheet and the liabilities are expected to be settled as commercial shipments are made.

Note M — Leasing Arrangements

The Company leases warehouse and manufacturing real estate, and manufacturing and computer equipment under operating leases with lease terms ranging up to 25 years. Several operating lease agreements contain options to extend the lease term and/or options for early termination. The lease term consists of the non-cancelable period of the lease, periods covered by options to extend the lease if the Company is reasonably certain to exercise the option, and periods covered by an option to terminate the lease if the Company is reasonably certain not to exercise the option. As of December 31, 2020, we had no material leases that had yet to commence.

The discount rate implicit within the leases is generally not determinable, and, therefore, the Company determines the discount rate based on its incremental borrowing rate. The incremental borrowing rate for leases is determined based on the lease term in which lease payments are made, adjusted for impacts of collateral.

The components of operating and finance lease cost for 2020 and 2019 were as follows:

(Thousands)	2020	2019
Components of lease expense		
Operating lease cost	\$ 10,602	\$ 9,835
Finance lease cost		
Amortization of right-of-use assets	1,324	1,414
Interest on lease liabilities	1,021	1,028
Total lease cost	\$ 12,947	\$ 12,277

Operating lease expense under ASC 840 amounted to \$11.6 million during 2018. The Company straight-lines its expense of fixed payments for operating leases over the lease term and expenses the variable lease payments in the period incurred. These variable lease payments are not included in the calculation of right-of-use assets or lease liabilities.

Supplemental balance sheet information related to the Company's operating and finance leases as of December 31, 2020 and 2019 was as follows:

(Thousands, except lease term and discount rate)	2020	2019
Supplemental balance sheet information		
Operating Leases		
Operating lease right-of-use assets	\$ 62,089	\$ 23,413
Other liabilities and accrued items	6,908	6,542
Operating lease liabilities	56,761	18,091
Finance Leases		
Property, plant, and equipment	\$ 34,301	\$ 26,069
Allowances for depreciation, depletion, and amortization	(4,914)	(3,570)
Finance lease assets, net	\$ 29,387	\$ 22,499
Other liabilities and accrued items	\$ 2,925	\$ 1,265
Finance lease liabilities	20,539	17,424
Total principal payable on finance leases	\$ 23,464	\$ 18,689
Weighted Average Remaining Lease Term		
Operating leases	12.72	4.69
Finance leases	16.59	19.47
Weighted Average Discount Rate		
Operating leases	6.46%	5.91%
Finance leases	4.88%	5.31%

Future maturities of the Company's lease liabilities as of December 31, 2020 are as follows:

(Thousands)	Finance Leases	Operating Leases
2021	\$ 3,877	\$ 10,707
2022	3,827	9,415
2023	2,536	8,750
2024	1,595	6,608
2025	1,432	6,278
2026 and thereafter	21,906	53,041
Total lease payments	35,173	94,799
Less amount of lease payment representing interest	11,709	31,130
Total present value of lease payments	\$ 23,464	\$ 63,669

Supplemental cash flow information related to leases was as follows:

(Thousands)	2020	2019
Supplemental cash flow information		
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	\$ 16,216	\$ 15,841
Operating cash flows from finance leases	1,021	1,028
Financing cash flows from finance leases	2,213	1,200
Right-of-use assets obtained in exchange for lease obligations:		
Operating leases	43,037	32,534
Finance leases	6,736	3,919

Note N — Intangible Assets and Goodwill

Intangible Assets

The cost and accumulated amortization of intangible assets subject to amortization as of December 31, 2020 and 2019, is as follows:

(Thousands)	2020			2019		
	Gross Carrying Amount	Accumulated Amortization	Net	Gross Carrying Amount	Accumulated Amortization	Net
Customer relationships	\$ 81,231	\$ (38,773)	\$ 42,458	\$ 39,601	\$ (37,692)	\$ 1,909
Technology	16,915	(13,290)	3,625	13,377	(12,816)	561
Licenses and other	11,457	(4,840)	6,617	4,257	(3,046)	1,211
Total	\$ 109,603	\$ (56,903)	\$ 52,700	\$ 57,235	\$ (53,554)	\$ 3,681

During 2020, the Company acquired \$40.1 million in customer relationships with a useful life of eighteen years, as well as \$4.1 million in technology and \$5.1 million in other intangible assets, both of which have a five years useful life.

Amortization expense for 2020, 2019, and 2018 was \$2.4 million, \$1.4 million, and \$2.3 million, respectively.

Estimated amortization expense for each of the five succeeding years is as follows:

(Thousands)	Amortization Expense
2021	4,596
2022	4,585
2023	4,565
2024	4,563
2025	4,084

Intangible assets also includes deferred financing costs relating to the Company's revolving credit and consignments lines of \$2.0 million and \$2.7 million at December 31, 2020 and 2019, respectively.

Goodwill

In 2020, the Company acquired Optics Balzers for a total purchase price of \$136.1 million, including the assumption of debt, and recorded goodwill of \$70.6 million. Optics Balzers is included in the Precision Optics segment.

The balance of goodwill at December 31, 2020 and 2019 was \$144.9 million and \$79.0 million, respectively.

A summary of changes in goodwill by reportable segment is as follows:

(Thousands)	Performance Alloys and Composites	Advanced Materials	Precision Optics	Total
Balance at December 31, 2018	\$ 1,899	\$ 50,276	\$ 38,482	\$ 90,657
Impairment charge	—	—	(11,560)	(11,560)
Other	—	(86)	—	(86)
Balance at December 31, 2019	\$ 1,899	\$ 50,190	\$ 26,922	\$ 79,011
Acquisition	—	—	70,577	70,577
Impairment charge	—	—	(9,053)	(9,053)
Other	—	337	4,044	4,381
Balance at December 31, 2020	\$ 1,899	\$ 50,527	\$ 92,490	\$ 144,916

In 2020, the Company recorded a \$9.1 million goodwill impairment charge to write-off the remaining balance of goodwill for the LAC reporting unit which was closed as of December 31, 2020. See Note E for additional details of the restructuring plan. During the third quarter of 2019, the LAC reporting unit began to experience a decline in sales volume from a significant customer. Based on an assessment that the decline in sales volume was expected to continue, the Company initiated a restructuring plan at the end of the third quarter to reduce the LAC reporting unit's cost structure. Refer to Note E for further details of the restructuring plan. The Company considered these factors to be impairment indicators. As a result, the Company performed an interim impairment analysis as of September 27, 2019 using a "step one" quantitative assessment for the LAC reporting unit. The LAC reporting unit prepared an operating forecast that included several assumptions including future sales growth from new products and applications, as well as assumptions regarding future industry-specific market conditions, capital expenditures, and working capital changes. In addition to the estimates of future cash flows, other significant estimates involved in the determination of fair value of the reporting unit were the weighted average cost of capital (discount rate), annual growth rate, and terminal growth rate used in the discounted cash flow (DCF) model. The discount rates used in the DCF model consider market and industry data as well as specific risk premiums for the LAC reporting unit. The Company first reviewed long-lived assets, which resulted in an impairment charge of \$2.6 million in the third quarter of 2019. The Company then performed a goodwill impairment analysis which resulted in an \$11.6 million charge in the third quarter of 2019, which represents the excess of the carrying value over the estimated fair value of LAC. The Company estimated fair value using a discounted cash flow analysis for goodwill and estimated market values for other assets. These non-cash charges relating to goodwill and other assets were recorded in Goodwill impairment charges and Asset impairment charges, respectively, in the Consolidated Statements of Income.

The results of the Company's 2020, 2019, and 2018 annual goodwill impairment assessments indicated that no other goodwill impairment existed.

Accumulated impairment losses were \$20.6 million and \$11.6 million at December 31, 2020 and 2019, respectively, all of which related to the LAC reporting unit.

Note O — Debt

Long-term debt in the Consolidated Balance Sheets is summarized as follows:

(Thousands)	December 31,	
	2020	2019
Borrowings under Credit Agreement with average interest rate of 1.65% at December 31, 2020	\$ 34,000	\$ —
Foreign debt	3,157	—
Fixed rate industrial development revenue bonds	1,322	2,218
Total long-term debt outstanding	38,479	2,218
Current portion of long-term debt	(1,937)	(868)
Gross long-term debt	36,542	1,350
Unamortized deferred financing fees	—	(90)
Long-term debt	\$ 36,542	\$ 1,260

Maturities on long-term debt instruments as of December 31, 2020 are as follows:

(Thousands)		
2021	\$	1,937
2022		500
2023		387
2024		34,387
2025		387
2026 and thereafter		881
Total	\$	<u>38,479</u>

In September 2019, the Company amended and restated the agreement governing its \$375.0 million revolving credit facility (Credit Agreement). The maturity date of the Credit Agreement was extended from 2020 to 2024, and the Credit Agreement provides more favorable interest rates under certain circumstances. In addition, the Credit Agreement provides the Company and its subsidiaries with additional capacity to enter into facilities for the consignment, borrowing, or leasing of precious metals and copper, and provides enhanced flexibility to finance acquisitions and other strategic initiatives. The Credit Agreement also provides for an uncommitted incremental facility whereby, under certain conditions, the Company may be able to borrow additional term loans in an aggregate amount not to exceed \$200.0 million. Borrowings under the Credit Agreement are secured by substantially all of the assets of the Company and its direct subsidiaries, with the exception of non-mining real property and certain other assets. The Credit Agreement allows the Company to borrow money at a premium over LIBOR or prime rate and at varying maturities. The premium resets quarterly according to the terms and conditions available under the Credit Agreement. The Company borrowed \$150.0 million under the Credit Agreement during 2020 as a precaution in light of the COVID-19 pandemic. A portion of the amount borrowed was used to fund the Optics Balzers acquisition. At December 31, 2020, there was \$34.0 million outstanding under this Credit Agreement. No amounts were outstanding at December 31, 2019.

The Credit Agreement includes restrictive covenants relating to restrictions on additional indebtedness, acquisitions, dividends, and stock repurchases. In addition, the Credit Agreement includes covenants subject to a maximum leverage ratio and a minimum fixed charge coverage ratio. The Company was in compliance with all of its debt covenants as of December 31, 2020 and December 31, 2019.

At December 31, 2020 and 2019 there was \$48.1 million and \$41.8 million outstanding against the letters of credit sub-facility, respectively. The Company pays a variable commitment fee that may reset quarterly (0.2% as of December 31, 2020) of the available and unborrowed amounts under the revolving credit line.

The available borrowings under the individual existing credit lines total \$245.8 million as of December 31, 2020.

In April 2011, the Company entered into an agreement with the Toledo-Lucas County Port Authority and the Dayton-Montgomery County Port Authority in Ohio to co-issue \$8.0 million in taxable development revenue bonds, with a fixed amortization term that will mature in 2021. The interest rate on these bonds was fixed at 4.90%, and the unamortized balance of the bonds was \$1.3 million and \$2.2 million at December 31, 2020 and 2019, respectively.

Note P — Pensions and Other Post-Employment Benefits

The obligation and funded status of the Company's pension and other post-employment benefit plans are shown below. The Pension Benefits column aggregates defined benefit pension plans in the U.S., Germany, Liechtenstein, and England, and the U.S. supplemental retirement plans. The Other Benefits column includes the domestic retiree medical and life insurance plan.

(Thousands)	Pension Benefits		Other Benefits	
	2020	2019	2020	2019
Change in benefit obligation				
Benefit obligation at beginning of year	\$ 186,760	\$ 170,136	\$ 8,681	\$ 11,375
Service cost	1,403	5,918	59	67
Interest cost	5,234	6,292	213	399
Net pension curtailments and settlements	(609)	(12,212)	—	—
Acquisition	30,360	—	—	—
Plan amendments	(799)	—	—	—
Actuarial loss (gain)	24,259	20,409	224	(2,192)
Benefit payments	(4,612)	(3,170)	(989)	(981)
Foreign currency exchange rate changes and other	4,111	(613)	2	13
Benefit obligation at end of year	<u>246,107</u>	<u>186,760</u>	<u>8,190</u>	<u>8,681</u>
Change in plan assets				
Fair value of plan assets at beginning of year	174,046	145,046	—	—
Plan settlements	—	—	—	—
Acquisition	23,774	—	—	—
Actual return on plan assets	30,330	27,264	—	—
Employer contributions	614	4,702	—	—
Employee contributions	498	124	—	—
Benefit payments from fund	(4,720)	(2,933)	—	—
Expenses paid from assets	(234)	(391)	—	—
Foreign currency exchange rate changes and other	1,868	234	—	—
Fair value of plan assets at end of year	<u>226,176</u>	<u>174,046</u>	<u>—</u>	<u>—</u>
Funded status at end of year	<u>\$ (19,931)</u>	<u>\$ (12,714)</u>	<u>\$ (8,190)</u>	<u>\$ (8,681)</u>
Amounts recognized in the Consolidated Balance Sheets consist of:				
Other assets	\$ 13,074	\$ 11,298	\$ —	\$ —
Other liabilities and accrued items	(470)	(997)	(866)	(1,012)
Retirement and post-employment benefits	(32,535)	(23,015)	(7,324)	(7,669)
Net amount recognized	<u>\$ (19,931)</u>	<u>\$ (12,714)</u>	<u>\$ (8,190)</u>	<u>\$ (8,681)</u>

The benefit obligation increased in 2020 primarily due to the Optics Balzers acquisition, as well as actuarial losses that were driven by decreases in the discount rate as well as participant census data updates.

In 2019, the Company's Board of Directors approved changes to the U.S. defined benefit pension plan. The Company froze the pay and service amounts used to calculate the pension benefits for active participants as of January 1, 2020. The Company recognized a non-cash pretax pension curtailment charge of \$3.3 million associated with the plan amendment in 2019.

The following amounts are included within accumulated other comprehensive loss at December 31, 2020:

(Thousands)	Pension Benefits		Other Benefits	
	2020	2019	2020	2019
Amounts recognized in other comprehensive income (before tax) consist of:				
Net actuarial loss (gain)	\$ 49,472	\$ 48,073	\$ (3,973)	\$ (4,529)
Net prior service cost (credit)	(799)	—	(3,552)	(5,049)
Net amount recognized	<u>\$ 48,673</u>	<u>\$ 48,073</u>	<u>\$ (7,525)</u>	<u>\$ (9,578)</u>

The following table provides information regarding the accumulated benefit obligation:

(Thousands)	Pension Benefits		Other Benefits	
	2020	2019	2020	2019
Additional information				
Accumulated benefit obligation for all defined benefit pension plans	\$ 243,953	\$ 185,402	\$ —	\$ —
For defined benefit pension plans with benefit obligations in excess of plan assets:				
Aggregate benefit obligation	62,012	25,640	—	—
Aggregate fair value of plan assets	29,938	3,045	—	—
For defined benefit pension plans with accumulated benefit obligations in excess of plan assets:				
Aggregate accumulated benefit obligation	59,858	24,482	—	—
Aggregate fair value of plan assets	29,938	3,045	—	—

The following table summarizes components of net benefit cost:

(Thousands)	Pension Benefits			Other Benefits		
	2020	2019	2018	2020	2019	2018
Net benefit cost						
Service cost	\$ 1,403	\$ 5,918	\$ 6,953	\$ 59	\$ 67	\$ 111
Interest cost	5,234	6,292	9,554	213	399	396
Expected return on plan assets	(9,333)	(8,777)	(14,231)	—	—	—
Amortization of prior service credit	—	483	(123)	(1,497)	(1,497)	(1,497)
Recognized net actuarial loss (gain)	1,678	3,304	7,171	(332)	(93)	—
Net periodic benefit (credit) cost	(1,018)	7,220	9,324	(1,557)	(1,124)	(990)
Net pension curtailments and settlements	94	3,328	41,406	—	—	—
Total net benefit (credit) cost	\$ (924)	\$ 10,548	\$ 50,730	\$ (1,557)	\$ (1,124)	\$ (990)

In 2019, net benefit cost includes a \$3.3 million curtailment charge related to the freeze of our U.S. defined benefit plan effective January 1, 2020.

Net benefit cost for 2018 includes settlement charges of \$41.4 million primarily related to the rereasurement of the periodic benefit obligation of the U.S. plans in conjunction with the purchase of a group annuity contract from Mutual of America.

Components of net periodic benefit cost, other than service cost, are included in Other non-operating (income) expense in the Consolidated Statements of Income. Additionally, Pension Benefit Guaranty Corporation premiums are reported within expected return on plan assets.

The following table summarizes amounts recognized in other comprehensive income (OCI):

(Thousands)	Pension Benefits			Other Benefits		
	2020	2019	2018	2020	2019	2018
Change in other comprehensive income						
OCI at beginning of year	\$ 48,073	\$ 65,409	\$ 122,802	\$ (9,578)	\$ (8,976)	\$ (8,020)
Increase (decrease) in OCI:						
Recognized during year — prior service cost (credit)	—	(3,811)	123	1,497	1,497	1,497
Recognized during year — net actuarial (losses) gains	(1,678)	(3,304)	(7,171)	332	93	—
Occurring during year — prior service cost	(799)	—	—	—	—	—
Occurring during year — net actuarial losses (gains)	3,146	2,062	(8,997)	224	(2,192)	(2,453)
Other adjustments	(94)	(12,212)	(41,406)	—	—	—
Foreign currency exchange rate changes	25	(71)	58	—	—	—
OCI at end of year	\$ 48,673	\$ 48,073	\$ 65,409	\$ (7,525)	\$ (9,578)	\$ (8,976)

In determining the projected benefit obligation and the net benefit cost, as of a December 31 measurement date, the Company used the following weighted-average assumptions:

	Pension Benefits			Other Benefits		
	2020	2019	2018	2020	2019	2018
Weighted-average assumptions used to determine benefit obligations at fiscal year end						
Discount rate	2.14 %	3.12 %	4.07 %	2.45 %	3.20 %	4.11 %
Rate of compensation increase	2.22 %	3.00 %	3.87 %	3.00 %	3.00 %	4.00 %
Weighted-average assumptions used to determine net cost for the fiscal year						
Discount rate	8.37 %	4.16 %	3.63 %	3.20 %	4.11 %	3.43 %
Expected long-term return on plan assets	5.70 %	6.06 %	6.63 %	N/A	N/A	N/A
Rate of compensation increase	2.87 %	2.99 %	3.98 %	3.00 %	4.00 %	4.00 %

Discount Rate. The discount rate used to determine the present value of the projected and accumulated benefit obligation at the end of each year is established based upon the available market rates for high quality, fixed income investments whose maturities match the plan's projected cash flows.

The Company uses a spot-rate approach to estimate the service and interest cost components of net periodic benefit cost for its defined benefit pension plans. The spot-rate approach applies separate discount rates for each projected benefit payment in the calculation.

Expected Long-Term Return on Plan Assets. Management establishes the domestic expected long-term rate of return assumption by reviewing historical trends and analyzing the current and projected market conditions in relation to the plan's asset allocation and risk management objectives. Consideration is given to both recent plan asset performance as well as plan asset performance over various long-term periods of time, with an emphasis on the assumption being a prospective, long-term rate of return. Management consults with and considers the opinions of its outside investment advisers and actuaries when establishing the rate and reviews assumptions with the Audit Committee of the Board of Directors.

Rate of Compensation Increase. The rate of compensation increase assumption was not applicable for the domestic defined benefit plan in 2019 due to the Company freezing the plan effective January 1, 2020. The rate of compensation assumption for the domestic retiree medical plan was 3.0% in 2020 and 4.0% in 2019 for both the domestic defined benefit pension plan and the domestic retiree medical plan.

Assumptions for the defined benefit pension plans in Germany, Liechtenstein, and England are determined separately from the U.S. plan assumptions, based on historical trends and current and projected market conditions in each respective country. One plan in Germany is unfunded.

Assumed health care trend rates at fiscal year end	2020	2019
Health care trend rate assumed for next year	6.00%	6.25%
Rate that the trend rate gradually declines to (ultimate trend rate)	5.00%	5.00%
Year that the rate reaches the ultimate trend rate	2025	2025

Plan Assets

The following tables present the fair values of the Company's defined benefit pension plan assets as of December 31, 2020 and 2019 by asset category. The Company has some investments that are valued using net asset value (NAV) as the practical expedient and have not been classified in the fair value hierarchy. Refer to Note S for definitions of the fair value hierarchy.

(Thousands)	December 31, 2020			
	Total	Level 1	Level 2	Level 3
Cash	\$ 2,204	\$ 2,204	\$ —	\$ —
Equity securities (a)	49,293	49,293	—	—
Fixed-income securities (b)	20,375	20,375	—	—
Other types of investments:				
Real estate fund (c)	6,105	6,105	—	—
Total	77,977	77,977	—	—
Investments measured at NAV: (d)				
Pooled investment fund (e)	143,503			
Multi-strategy hedge funds (f)	4,624			
Private equity funds	72			
Total assets at fair value	\$ 226,176			

(Thousands)	December 31, 2019			
	Total	Level 1	Level 2	Level 3
Cash	\$ 1,718	\$ 1,718	\$ —	\$ —
Equity securities (a)	47,722	47,722	—	—
Fixed-income securities (b)	3,923	3,923	—	—
Other types of investments:				
Real estate fund (c)	3,121	3,121	—	—
Total	56,484	56,484	—	—
Investments measured at NAV: (d)				
Pooled investment fund (e)	113,187			
Multi-strategy hedge funds (f)	4,277			
Private equity funds	98			
Total assets at fair value	\$ 174,046			

- (a) Equity securities are primarily comprised of corporate stock and mutual funds directly held by the plans. Equity securities are valued using the closing price reported on the active market on which the individual securities are traded.
- (b) Fixed income securities are primarily comprised of governmental and corporate bonds directly held by the plans. Governmental and corporate bonds are valued using both market observable inputs for similar assets that are traded on an active market and the closing price on the active market on which the individual securities are traded.
- (c) Includes a mutual fund that typically invests at least 80% of its assets in equity and debt securities of companies in the real estate industry or related industries or in companies which own significant real estate assets at the time of investment.
- (d) Certain assets that are measured at fair value using the NAV practical expedient have not been classified in the fair value hierarchy.
- (e) Pooled investment fund consists of various investment types including equity investments covering a range of geographies and including investment managers that hold long and short positions, property investments, and other

multi-strategy funds which combine a range of different credit, equity, and macro-orientated ideas and dynamically allocate funds across asset classes.

(f) Includes a fund that invests in a broad portfolio of hedge funds.

The Company's domestic defined benefit pension plan investment strategy, as approved by the Governance and Organization Committee of the Board of Directors, is to employ an allocation of investments that will generate returns equal to or better than the projected long-term growth of pension liabilities so that the plan will be self-funding. The return objective is to maximize investment return to achieve and maintain a 100% funded status over time, taking into consideration required cash contributions. The allocation of investments is designed to maximize the advantages of diversification while mitigating the risk and overall portfolio volatility to achieve the return objective. Risk is defined as the annual variability in value and is measured in terms of the standard deviation of investment return. Under the Company's investment policies, allowable investments include domestic equities, international equities, fixed income securities, cash equivalents, and alternative securities (which include real estate, private venture capital investments, hedge funds, and tactical asset allocation). Ranges, in terms of a percentage of the total assets, are established for each allowable class of security. Derivatives may be used to hedge an existing security or as a risk reduction strategy. Current asset allocation guidelines are to invest 10% to 40% in equity securities, 60% to 90% in fixed income securities and cash, and up to 20% in alternative securities. Management reviews the asset allocation on a quarterly or more frequent basis and makes revisions as deemed necessary.

None of the plan assets noted above are invested in the Company's common stock.

Cash Flows

Employer Contributions. The Company does not expect to contribute to its domestic defined benefit pension plan in 2021.

All plan participants with an accrued benefit may elect an immediate payout in lieu of their future monthly annuity if the lump sum amount does not exceed \$100,000.

Estimated Future Benefit Payments. The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid:

(Thousands)	Pension Benefits	Other Benefits	
		Gross Benefit Payment	Net of Medicare Part D Subsidy
2021	4,987	867	853
2022	5,854	812	800
2023	7,401	746	736
2024	8,689	667	659
2025	8,924	603	596
2026 through 2030	54,116	2,140	2,120

Other Benefit Plans

In addition to the plans shown above, the Company also has certain foreign subsidiaries with accrued unfunded pension and other post-employment arrangements. The liability for these arrangements was \$1.7 million at December 31, 2020 and \$1.4 million at December 31, 2019, and was included in retirement and post-employment benefits in the Consolidated Balance Sheets.

The Company also sponsors defined contribution plans available to substantially all U.S. employees. The Company's annual defined contribution expense, including the expense for the enhanced defined contribution plan, was \$9.8 million in 2020, \$7.0 million in 2019, and \$5.2 million in 2018.

Note Q — Accumulated Other Comprehensive (Loss) Income

Changes in the components of accumulated other comprehensive (loss) income, including amounts reclassified out, for 2020, 2019, and 2018, and the balances in accumulated other comprehensive (loss) income as of December 31, 2020, 2019, and 2018 are as follows:

(Thousands)	Gains and Losses On Cash Flow Hedges				Pension and Post- Employment Benefits	Foreign Currency Translation	Total
	Foreign Currency	Precious Metals	Copper	Total			
Balance at December 31, 2017	\$ 959	\$ (196)	\$ —	\$ 763	\$ (99,592)	\$ (4,108)	\$ (102,937)
Other comprehensive income (loss) before reclassifications	(333)	467	(569)	(435)	11,396	(484)	10,477
Amounts reclassified from accumulated other comprehensive income	10	(109)	—	(99)	46,953	—	46,854
Other comprehensive income (loss) before tax	(323)	358	(569)	(534)	58,349	(484)	57,331
Deferred taxes on current period activity	(627)	83	(128)	(672)	13,300	—	12,628
Other comprehensive income (loss) after tax	304	275	(441)	138	45,049	(484)	44,703
Balance at December 31, 2018	\$ 1,263	\$ 79	\$ (441)	\$ 901	\$ (54,543)	\$ (4,592)	\$ (58,234)
Balance at December 31, 2018	\$ 1,263	\$ 79	\$ (441)	\$ 901	\$ (54,543)	\$ (4,592)	\$ (58,234)
Other comprehensive income (loss) before reclassifications	108	(1,285)	209	(968)	9,085	(421)	7,696
Amounts reclassified from accumulated other comprehensive income	(29)	595	393	959	8,853	—	9,812
Other comprehensive income (loss) before tax	79	(690)	602	(9)	17,938	(421)	17,508
Deferred taxes on current period activity	18	(159)	136	(5)	4,741	—	4,736
Other comprehensive income (loss) after tax	61	(531)	466	(4)	13,197	(421)	12,772
Balance at December 31, 2019	\$ 1,324	\$ (452)	\$ 25	\$ 897	\$ (41,346)	\$ (5,013)	\$ (45,462)
Balance at December 31, 2019	\$ 1,324	\$ (452)	\$ 25	\$ 897	\$ (41,346)	\$ (5,013)	\$ (45,462)
Other comprehensive income (loss) before reclassifications	(1,268)	(1,675)	218	(2,725)	(2,721)	9,030	3,584
Amounts reclassified from accumulated other comprehensive income	222	2,041	354	2,617	(57)	—	2,560
Other comprehensive income (loss) before tax	(1,046)	366	572	(108)	(2,778)	9,030	6,144
Deferred taxes on current period activity	(241)	84	129	(28)	(651)	—	(679)
Other comprehensive income (loss) after tax	(805)	282	443	(80)	(2,127)	9,030	6,823
Balance at December 31, 2020	\$ 519	\$ (170)	\$ 468	\$ 817	\$ (43,473)	\$ 4,017	\$ (38,639)

Reclassifications from accumulated other comprehensive income of gains and losses on foreign currency cash flow hedges are recorded in Net sales in the Consolidated Statements of Income while gains and losses on precious metal cash flow hedges are recorded in Cost of sales in the Consolidated Statements of Income. Refer to Note S for additional details on cash flow hedges.

Reclassifications from accumulated other comprehensive income for pension and post-employment benefits are included in the computation of the net periodic pension and post-employment benefit expense. Refer to Note P for additional details on pension and other post-employment expenses.

Note R — Stock-based Compensation

Stock incentive plans (the 2006 Stock Incentive Plan and the 2006 Non-employee Director Equity Plan) were approved at the May 2006 annual meeting of shareholders. These plans authorize the granting of option rights, stock appreciation rights (SARs), performance-restricted shares, performance shares, performance units, restricted shares, and restricted stock units (RSUs). The 2006 Stock Incentive Plan and the 2006 Non-employee Director Equity Plan were amended to, among other things, add additional shares to the plans. These amendments were last approved by shareholders at the May 2017 annual meeting.

Stock-based compensation expense, which includes awards settled in shares and in cash and is recognized as a component of selling, general, and administrative (SG&A) expenses, was \$5.7 million, \$11.1 million, and \$11.4 million in 2020, 2019, and 2018, respectively. The Company derives a tax deduction measured by the excess of the market value over the grant price at the date stock-based awards vest or are exercised. The Company recognized \$0.5 million, \$2.1 million, and \$1.2 million of tax benefits in 2020, 2019, and 2018, respectively, relating to the issuance of common stock for the exercise/vesting of equity awards.

The following sections provide information on awards settled in shares.

SARs. The Company grants SARs to certain employees. Upon exercise of vested SARs, the participant will receive a number of shares of common stock equal to the spread (the difference between the market price of the Company's common shares at the time of exercise and the strike price established on the grant date) divided by the common share price. The strike price of the SARs is equal to the market value of the Company's common shares on the day of the grant. The number of SARs available to be issued is established by plans approved by the shareholders. The vesting period and the life of the SARs are established at the time of grant. The exercise of the SARs is generally satisfied by the issuance of treasury shares. SARs vest in equal installments annually over three years. SARs expire in seven years.

The following table summarizes the Company's SARs activity during 2020:

(Shares in thousands)	Number of SARs	Weighted-average Exercise Price Per Share	Aggregate Intrinsic Value (thousands)	Weighted-average Remaining Term (Years)
Outstanding at December 31, 2019	250	\$ 44.95		
Granted	65	50.95		
Exercised	(29)	40.70		
Cancelled	(32)	51.43		
Outstanding at December 31, 2020	254	46.18	\$ 4,454	4.2
Vested and expected to vest as of December 31, 2020	254	46.18	4,454	4.2
Exercisable at December 31, 2020	148	41.00	3,368	3.4

A summary of the status and changes of shares subject to SARs and the related average price per share follows:

(Shares in thousands)	Number of SARs	Weighted-average Grant Date Fair Value
Nonvested as of December 31, 2019	178	\$ 14.72
Granted	65	13.67
Vested	(109)	13.21
Cancelled	(28)	15.50
Nonvested as of December 31, 2020	106	\$ 15.46

As of December 31, 2020, \$0.9 million of expense with respect to non-vested SARs has yet to be recognized as expense over a weighted-average period of approximately 20 months. The total fair value of shares vested during 2020 was \$1.5 million, compared to \$1.9 million in both 2019 and 2018.

The weighted-average grant date fair value for 2020, 2019, and 2018 was \$13.67, \$17.76, and \$15.73, respectively. The fair value will be amortized to compensation cost on a straight-line basis over the vesting period of three years, or earlier if the employee is retirement eligible as defined in the Plan. Stock-based compensation expense relating to SARs was \$0.9 million in both 2020 and 2019 and \$0.7 million in 2018.

The fair value of the SARs was estimated on the grant date using the Black-Scholes pricing model with the following assumptions:

	2020	2019	2018
Risk-free interest rate	1.41 %	2.47 %	2.58 %
Dividend yield	0.9 %	0.7 %	0.8 %
Volatility	31.8 %	31.7 %	31.9 %
Expected lives (in years)	4.8	5.2	5.5

The risk-free rate of return was based on U.S. Treasury yields with a maturity equal to the expected life of the award. The dividend yield was based on the Company's historical dividend rate and stock price. The expected volatility of stock was derived by referring to changes in the Company's historical common stock prices over a time-frame similar to the expected life of the award. In addition to considering the vesting period and contractual term of the award for the expected life assumption, the Company analyzes actual historical exercise experience for previously granted awards.

Restricted Stock Units (RSUs) - Employees. The Company may grant RSUs to employees of the Company. These units constitute an agreement to deliver shares of common stock to the participant at the end of the vesting period, which is defined at the date of the grant, and are forfeited should the holder's employment terminate during the restriction period. The fair market value of the RSUs is determined on the date of the grant and is amortized over the vesting period. The vesting period is typically three years unless the recipient is retirement eligible and continued vesting is approved by the Board of Directors.

The fair value of the RSUs settled in stock is based on the closing stock price on the date of grant. The weighted-average grant date fair value for 2020, 2019, and 2018 was \$51.55, \$58.33, and \$50.35, respectively. Cash-settled RSUs are accounted for as liability-based compensation awards and adjusted based on the closing price of Materion's common stock over the vesting period of three years.

Stock-based compensation expense relating to stock-settled RSUs was \$2.7 million in 2020, \$2.2 million in 2019, and \$1.2 million in 2018. The unamortized compensation cost on the outstanding RSUs was \$4.3 million as of December 31, 2020 and is expected to be recognized over a weighted-average period of 28 months. The total fair value of shares vested during both 2020 and 2019 was \$1.2 million, compared to \$1.4 million in 2018.

The following table summarizes the stock-settled RSU activity during 2020:

(Shares in thousands)	Number of Shares	Weighted-average Grant Date Fair Value
Outstanding at December 31, 2019	145	\$ 50.79
Granted	84	51.55
Vested	(33)	36.39
Forfeited	(35)	53.52
Outstanding at December 31, 2020	161	\$ 53.50

RSUs - Non-Employee Directors. In 2020, 2019, and 2018, 15,976, 11,048, and 14,728 RSUs, with a one year vesting period, were granted to certain non-employee members of the Board of Directors. The weighted-average grant date fair value of these RSUs were \$48.42, \$68.79, and \$51.60 in 2020, 2019, and 2018, respectively. The Company recognized \$0.7 million of expense with respect to these awards in each of the last three years. At December 31, 2020, \$0.3 million of expense with respect to non-vested RSU awards granted to the Board of Directors has yet to be recognized and will be amortized into expense over a weighted-average period of approximately four months.

Long-term Incentive Plans. Under long-term incentive compensation plans, executive officers and selected other employees receive restricted stock unit awards based upon the Company's performance over the defined period, typically three years. Total units earned for grants made in 2020, 2019, and 2018, may vary between 0% and 200% of the units granted based on the attainment of performance targets during the related three-year period. All grants will be settled in Materion common shares and are equity classified. Vesting of performance-based awards is contingent upon the attainment of threshold performance objectives.

The following table summarizes the activity related to equity-based, performance-based RSUs during 2020:

(Shares in thousands)	Number of Shares	Weighted- average Grant Date Fair Value
Outstanding at December 31, 2019	169	\$ 52.74
Granted	46	57.65
Vested	(63)	30.28
Forfeited	(26)	63.59
Outstanding at December 31, 2020	126	\$ 63.61

Compensation expense is based upon the performance projections for the plan period of three years, the percentage of requisite service rendered, and the fair market value of the Company's common shares on the date of grant. The offset to the compensation expense for the portion of the award to be settled in shares is recorded within shareholders' equity and was \$2.0 million for 2020, \$3.3 million for 2019, and \$2.7 million for 2018.

Directors' Deferred Compensation. Non-employee directors may defer all or part of their compensation into the Company's common stock. The fair value of the deferred shares is determined at the share acquisition date and is recorded within shareholders' equity. At December 31, 2020, shareholders' equity included 0.1 million shares related to this plan.

Note S — Fair Value Information and Derivative Financial Instruments

The Company measures and records financial instruments at fair value. A hierarchy is used for those instruments measured at fair value that distinguishes between assumptions based upon market data (observable inputs) and the Company's assumptions (unobservable inputs). The hierarchy consists of three levels:

- Level 1 — Quoted market prices in active markets for identical assets and liabilities;
- Level 2 — Inputs other than Level 1 inputs that are either directly or indirectly observable; and
- Level 3 — Unobservable inputs developed using estimates and assumptions developed by the Company, which reflect those that a market participant would use.

The following table summarizes the financial instruments measured at fair value in the Consolidated Balance Sheets at December 31, 2020 and 2019:

(Thousands)	Total	Fair Value Measurements		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Other Significant Unobservable Inputs (Level 3)
December 31, 2020				
Financial Assets				
Deferred compensation investments	\$ 3,802	\$ 3,802	\$ —	\$ —
Foreign currency forward contracts	107	—	107	—
Precious metal swaps	127	—	127	—
Copper swaps	632	—	632	—
Total	\$ 4,668	\$ 3,802	\$ 866	\$ —
Financial Liabilities				
Deferred compensation liability	\$ 3,802	\$ 3,802	\$ —	\$ —
Foreign currency forward contracts	1,203	—	1,203	—
Precious metal swaps	349	—	349	—
Copper swaps	27	—	27	—
Total	\$ 5,381	\$ 3,802	\$ 1,579	\$ —
December 31, 2019				
Financial Assets				
Deferred compensation investments	\$ 3,391	\$ 3,391	\$ —	\$ —
Foreign currency forward contracts	188	—	188	—
Precious metal swaps	35	—	35	—
Copper swaps	61	—	61	—
Total	\$ 3,675	\$ 3,391	\$ 284	\$ —
Financial Liabilities				
Deferred compensation liability	\$ 3,391	\$ 3,391	\$ —	\$ —
Foreign currency forward contracts	211	—	211	—
Precious metal swaps	623	—	623	—
Copper swaps	28	—	28	—
Total	\$ 4,253	\$ 3,391	\$ 862	\$ —

The Company uses a market approach to value the assets and liabilities for financial instruments in the table above. Outstanding contracts are valued through models that utilize market observable inputs, including both spot and forward prices, for the same underlying currencies and metals. The Company's deferred compensation investments and liabilities are based on the fair value of the investments corresponding to the employees' investment selections, primarily in mutual funds, based on quoted prices in active markets for identical assets. Deferred compensation investments are primarily presented in Other assets. Deferred compensation liabilities are primarily presented in Other long-term liabilities.

The carrying values of the other working capital items and debt in the Consolidated Balance Sheets approximate fair values at December 31, 2020 and 2019.

The Company uses derivative contracts to hedge portions of its foreign currency exposures and may also use derivatives to hedge a portion of its precious metal exposures. The objectives and strategies for using derivatives in these areas are as follows:

Foreign Currency. The Company sells a portion of its products to overseas customers in their local currencies, primarily the euro and yen. The Company secures foreign currency derivatives, mainly forward contracts and options, to hedge these anticipated sales transactions. The purpose of the hedge program is to protect against the reduction in the dollar value of foreign currency sales from adverse exchange rate movements. Should the dollar strengthen significantly, the decrease in the translated value of the foreign currency sales should be partially offset by gains on the hedge contracts. Depending upon the methods used, the hedge contracts may limit the benefits from a weakening U.S. dollar.

The use of forward contracts locks in a firm rate and eliminates any downside from an adverse rate movement as well as any benefit from a favorable rate movement. The Company may from time to time choose to hedge with options or a tandem of options known as a collar. These hedging techniques can limit or eliminate the downside risk but can allow for some or all of the benefit from a favorable rate movement to be realized. Unlike a forward contract, a premium is paid for an option; collars, which are a combination of a put and call option, may have a net premium but can be structured to be cash neutral. The Company will primarily hedge with forward contracts due to the relationship between the cash outlay and the level of risk.

Precious Metals. The Company maintains the majority of its precious metal production requirements on consignment in order to reduce its working capital investment and the exposure to metal price movements. When a precious metal product is fabricated and ready for shipment to the customer, the metal is purchased out of consignment at the current market price. The price paid by the Company forms the basis for the price charged to the customer. This methodology allows for changes in either direction in the market prices of the precious metals used by the Company to be passed through to the customer and reduces the impact changes in prices could have on the Company's margins and operating profit. The consigned metal is owned by financial institutions who charge the Company a financing fee based upon the current value of the metal on hand.

In certain instances, a customer may want to establish the price for the precious metal at the time the sales order is placed rather than at the time of shipment. Setting the sales price at a different date than when the material would be purchased potentially creates an exposure to movements in the market price of the metal. Therefore, in these limited situations, the Company may elect to enter into a forward contract to purchase precious metal. The forward contract allows the Company to purchase metal at a fixed price on a specific future date. The price in the forward contract serves as the basis for the price to be charged to the customer. By doing so, the selling price and purchase price are matched, and the Company's price exposure is reduced.

The Company refines precious metal-containing materials for its customers and typically will purchase the refined metal from the customer at current market prices. In limited circumstances, the customer may want to fix the price to be paid at the time of the order as opposed to when the material is refined. The customer may also want to fix the price for a set period of time. The Company may then elect to enter into a hedge contract, either a forward contract or a swap, to fix the price for the estimated quantity of metal to be purchased, thereby reducing the exposure to adverse movements in the price of the metal. The Company may also enter into hedges to mitigate the risk relating to the prices of the metals which we process or refine.

The Company may from time to time elect to purchase precious metal and hold in inventory rather than on consignment due to potential credit line limitations or other factors. These purchases are typically held for a short duration. A forward contract will be secured at the time of the purchase to fix the price to be used when the metal is transferred back to the consignment line, thereby limiting any price exposure during the time when the metal was owned.

Copper. The Company also uses copper in its production processes. When possible, fluctuations in the purchase price of copper are passed on to customers in the form of price adders or reductions. While over time the Company's price exposure to copper is generally in balance, there can be a lag between the change in the Company's cost and the pass-through to its customers, resulting in higher or lower margins in a given period. To mitigate this impact, the Company hedges a portion of this pricing risk.

A team consisting of senior financial managers reviews the estimated exposure levels, as defined by budgets, forecasts, and other internal data, and determines the timing, amounts, and instruments to use to hedge exposures. Management analyzes the effective hedged rates and the actual and projected gains and losses on the hedging transactions against the program objectives, targeted rates, and levels of risk assumed. Foreign currency contracts are typically layered in at different times for a specified exposure period in order to minimize the impact of market rate movements.

The use of derivatives is governed by policies adopted by the Audit and Risk Committee of the Board of Directors. The Company will only enter into a derivative contract if there is an underlying identified exposure. Contracts are typically held to maturity. The Company does not engage in derivative trading activities and does not use derivatives for speculative purposes. The Company only uses hedge contracts that are denominated in the same currency or metal as the underlying exposure.

All derivatives are recorded on the balance sheet at fair value. If the derivative is designated and effective as a cash flow hedge, changes in the fair value of the derivative are recognized in OCI until the hedged item is recognized in earnings. The ineffective portion of a derivative's fair value, if any, is recognized in earnings immediately. If a derivative is not a hedge, changes in the fair value are adjusted through income. The fair values of the outstanding derivatives are recorded on the balance sheet as assets (if the derivatives are in a gain position) or liabilities (if the derivatives are in a loss position). The fair values will also be classified as short-term or long-term depending upon their maturity dates.

The following table summarizes the notional amount and the fair value of the Company's outstanding derivatives not designated as hedging instruments (on a gross basis) and balance sheet classification as of December 31, 2020 and 2019:

(Thousands)	December 31, 2020		December 31, 2019	
	Notional Amount	Fair Value	Notional Amount	Fair Value
Foreign currency forward contracts				
Prepaid expenses	\$ 62,012	\$ 107	\$ 13,734	\$ 95
Other liabilities and accrued items	7,695	55	5,757	16

These outstanding foreign currency derivatives were related to balance sheet hedges and intercompany loans. Other-net included foreign currency gains relating to these derivatives of \$2.7 million in 2020, primarily due to a gain realized on the settlement of a foreign currency hedge for the purchase of Optics Balzers. In 2019, Other-net included \$0.1 million of foreign currency losses relating to these derivatives.

The following table summarizes the notional amount and the fair value of the Company's outstanding derivatives designated as cash flow hedges (on a gross basis) and balance sheet classification at December 31, 2020 and 2019:

(Thousands)	December 31, 2020		December 31, 2019	
	Notional Amount	Fair Value	Notional Amount	Fair Value
Prepaid expenses				
Foreign currency forward contracts - yen	\$ —	\$ —	\$ 1,025	\$ 10
Foreign currency forward contracts - euro	—	—	3,466	83
Precious metal swaps	2,155	127	1,116	34
Copper swaps	6,225	632	1,951	61
	8,380	759	7,558	188
Other assets				
Precious metal swaps	—	—	157	1
Other liabilities and accrued items				
Foreign currency forward contracts - yen	2,668	59	2,355	12
Foreign currency forward contracts - euro	17,611	1,089	15,686	183
Precious metal swaps	4,964	349	7,034	618
Copper swaps	2,445	27	1,266	28
	27,688	1,524	26,341	841
Other long-term liabilities				
Precious metal swaps	—	—	149	5
Total	\$ 36,068	\$ 765	\$ 34,205	\$ 657

All of these contracts were designated and effective as cash flow hedges. No ineffectiveness expense was recorded in 2020, 2019, or 2018.

The fair value of derivative contracts recorded in accumulated other comprehensive loss totaled \$0.8 million and \$0.7 million as of December 31, 2020 and December 31, 2019, respectively. Deferred losses of \$0.8 million at December 31, 2020 are expected to be reclassified to earnings within the next 18-month period.

The following table summarizes the pre-tax amounts reclassified from accumulated other comprehensive income relating to the hedging relationship of the Company's outstanding derivatives designated as cash flow hedges and income statement classification for years ended December 31, 2020 and 2019:

(Thousands)	Line item	2020	2019
Hedging relationship			
Foreign currency forward contracts	Net sales	\$ 222	\$ (29)
Precious metal swaps	Cost of sales	2,041	595
Copper swaps	Cost of sales	354	393
Total		\$ 2,617	\$ 959

The derivative activity in the table above is reflected in cash flows from operating activities.

Note T — Contingencies and Commitments

Beryllium Cases

The Company is a defendant from time to time in proceedings in various state and federal courts brought by plaintiffs alleging that they have contracted, or have been placed at risk of contracting, beryllium sensitization or Chronic Beryllium Disease (CBD) or related ailments as a result of exposure to beryllium. Plaintiffs in beryllium cases seek recovery under theories of negligence and various other legal theories and seek compensatory and punitive damages, in many cases of an unspecified sum. Spouses, if any, often claim loss of consortium.

Employee cases, in which plaintiffs have a high burden of proof, have historically involved relatively small losses to the Company. Third-party plaintiffs (typically employees of customers) face a lower burden of proof than do the Company's employees, but these cases have generally been covered by varying levels of insurance. Management has vigorously contested the beryllium cases brought against the Company.

Non-employee beryllium cases are covered by insurance, subject to certain limitations. The insurance covers defense costs and indemnity payments (resulting from settlements or court verdicts) and is subject to various levels of deductibles. Defense and indemnity costs were less than or equal to the deductible in both 2020 and 2019.

As of December 31, 2020, the Company was a defendant in two beryllium litigation cases, one of which was outstanding as of December 31, 2019. The Company does not expect the resolution of these matters to have a material impact on its consolidated financial statements.

Although it is not possible to predict the outcome of any pending litigation, the Company provides for costs related to litigation matters when a loss is probable, and the amount is reasonably estimable. Litigation is subject to many uncertainties, and it is possible that some of the actions could be decided unfavorably in amounts exceeding the Company's reserves. An unfavorable outcome or settlement of a beryllium case or adverse media coverage could encourage the commencement of additional similar litigation. The Company is unable to estimate its potential exposure to unasserted claims.

Based upon currently known facts and assuming collectibility of insurance, the Company does not believe that resolution of the current or any potential future beryllium proceedings will have a material adverse effect on the financial condition or cash flow of the Company. However, the Company's results of operations could be materially affected by unfavorable results in one or more cases.

Environmental Proceedings

The Company has an active program for environmental compliance that includes the identification of environmental projects and estimating the impact on the Company's financial performance and available resources. Environmental expenditures that relate to current operations, such as wastewater treatment and control of airborne emissions, are either expensed or capitalized as appropriate. The Company records reserves for the probable costs for identified environmental remediation projects. The Company's environmental engineers perform routine ongoing analyses of the remediation sites and will use outside consultants to assist in their analyses from time to time. Accruals are based upon their analyses and are established based on the reasonably estimable loss or range of loss. The accruals are revised for the results of ongoing studies, changes in strategies, inflation, and for differences between actual and projected costs. The accruals may also be affected by rulings and negotiations with regulatory agencies. The timing of payments often lags the accrual, as environmental projects typically require a number of years to complete.

The environmental reserves recorded represent the Company's best estimate of what is reasonably possible and cover existing or currently foreseen projects based upon current facts and circumstances. The Company does not believe that it is reasonably possible that the cost to resolve environmental matters for sites where the investigative work and work plan development are substantially complete will be materially different than what has been accrued while the ultimate loss contingencies for sites that are in the preliminary stages of investigation cannot be reasonably determined at the present time. As facts and circumstances change, the ultimate cost may be revised, and the recording of additional costs may be material in the period in which the additional costs are accrued. The Company does not believe that the ultimate liability for environmental matters will have a material impact on its financial condition or liquidity due to the nature of known environmental matters and the extended period of time during which environmental remediation normally takes place.

The undiscounted reserve balance at the beginning of the year, the amounts expensed and paid, and the balance at December 31, 2020 and 2019 are as follows:

(Thousands)	2020		2019	
Reserve balance at beginning of year	\$	5,937	\$	6,521
Expensed		288		482
Paid		(749)		(1,066)
Reserve balance at end of year	\$	5,476	\$	5,937
Ending balance recorded in:				
Other liabilities and accrued items	\$	845	\$	982
Other long-term liabilities		4,631		4,955

The majority of spending in both 2020 and 2019 was for various remediation projects at the Elmore, Ohio plant site.

Asset Retirement Obligations

The Company has asset retirement obligations related to its mine in Utah, as well as for certain leased facilities where the Company is contractually obligated to restore the facility back to its original condition at the end of the lease. The following represents a roll forward of the Company's asset retirement obligation liabilities for the years ended December 31, 2020 and 2019:

(Thousands)	2020		2019	
Asset retirement obligation at beginning of period	\$	1,421	\$	1,257
Accretion expense		137		164
Change in liability		207		—
Asset retirement obligation at end of period	\$	1,765	\$	1,421

These obligations are reflected in Other long-term liabilities on the Consolidated Balance Sheet.

Other

The Company is subject to various legal or other proceedings that relate to the ordinary course of its business. The Company believes that the resolution of these proceedings, individually or in the aggregate, will not have a material adverse impact upon the Company's consolidated financial statements.

On October 14, 2020 Garett Lucyk, et al. v. Materion Brush Inc., et. al., case number 20CV0234, a wage and hour purported collective and class action, was filed in the Northern District of Ohio against the Company and its subsidiary, Materion Brush Inc. (collectively, the Company). Plaintiff, a former hourly production employee at the Company's Elmore, Ohio facility, alleges that he and other similarly situated employees nationwide are not paid for all time they spend donning and doffing personal protective equipment in violation of the Fair Labor Standards Act and Ohio law. Plaintiff also alleges the Company failed to include all remuneration he and others received for premium and bonus pay when computing overtime pay. The case is currently in the preliminary stages. The Company believes that it has substantive defenses and intends to vigorously defend this suit.

At December 31, 2020, the Company had outstanding letters of credit totaling \$48.1 million related to workers' compensation, consigned precious metal guarantees, environmental remediation issues, and other matters. The majority of the Company's outstanding letters of credit expire in 2021 and are expected to be renewed.

Note U — Quarterly Data (Unaudited)

The following tables summarize selected quarterly financial data for the years ended December 31, 2020 and 2019:

(Thousands except per share amounts)	2020				
	First Quarter*	Second Quarter*	Third Quarter*	Fourth Quarter	Total
Net sales	\$ 277,946	\$ 271,468	\$ 287,171	\$ 339,689	\$ 1,176,274
Gross margin	44,570	46,955	45,311	55,797	192,633
Percent of net sales	16.0 %	17.3 %	15.8 %	16.4 %	16.4 %
Net (loss) income ⁽¹⁾	\$ (3,878)	\$ 5,803	\$ 5,471	\$ 8,066	\$ 15,462
Net (loss) income per share of common stock:					
Basic	\$ (0.19)	\$ 0.29	\$ 0.27	\$ 0.40	0.76
Diluted ⁽²⁾	(0.19)	0.28	0.27	0.39	0.75

	2019				
	First Quarter*	Second Quarter*	Third Quarter*	Fourth Quarter*	Total
Net sales	\$ 301,441	\$ 297,843	\$ 305,979	\$ 280,161	\$ 1,185,424
Gross margin	69,606	71,997	66,605	54,482	262,690
Percent of net sales	23.1 %	24.2 %	21.8 %	19.4 %	22.2 %
Net income ⁽³⁾	\$ 17,133	\$ 17,393	\$ 4,522	\$ 14,346	\$ 53,394
Net income per share of common stock:					
Basic	\$ 0.85	\$ 0.85	\$ 0.22	\$ 0.70	2.62
Diluted	0.83	0.84	0.22	0.69	2.59

⁽¹⁾ The net loss for the first quarter of 2020 includes the impact of \$10.8 million of non-cash impairment charges. See Note N for additional information.

⁽²⁾ Since the Company reported a net loss for the first quarter of 2020, the effect of potential common shares were excluded from diluted earnings per share, as their inclusion would have been anti-dilutive.

⁽³⁾ Net income for the third quarter of 2019 includes the impact of \$14.1 million of non-cash impairment charges. For additional information refer to Note N.

*Certain amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A.

The Company follows a 13-week quarterly accounting cycle pursuant to which the first three fiscal quarters end on a Friday and the fiscal year always ends on December 31.

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

Item 9A. CONTROLS AND PROCEDURES

a) Evaluation of Disclosure Controls and Procedures

The Company carried out an evaluation under the supervision and with participation of the Company's management, including the chief executive officer and chief financial officer, of the effectiveness of the design and operation of disclosure controls and procedures as of December 31, 2020 pursuant to Rules 13a-15(b) and 15d-15(b) under the Securities Exchange Act of 1934, as amended (Exchange Act). Based on that evaluation, management, including the chief executive officer and chief financial officer, concluded that disclosure controls and procedures are effective as of December 31, 2020.

b) Management's Report on Internal Control over Financial Reporting

The Report of Management on Internal Control over Financial Reporting and the Report of Independent Registered Public Accounting Firm thereon are set forth in Item 8 of this Form 10-K and are incorporated herein by reference.

c) Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting identified in connection with the evaluation required by Rules 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the three months ended December 31, 2020 that have materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B. OTHER INFORMATION

None.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information under "Election of Directors" in Materion Corporation's Proxy Statement for the 2021 Annual Meeting of Shareholders (Proxy Statement), to be filed with the Securities and Exchange Commission pursuant to Regulation 14A, is incorporated herein by reference.

A listing of executive officers, their ages, positions, and offices held over the past five years, is as follows:

<u>Name</u>	<u>Age</u>	<u>Positions and Offices Held</u>
Jugal K. Vijayvargiya	52	President and Chief Executive Officer (March 2017-Present); President Delphi Electronics and Safety, a global technology solutions provider to the automotive and transportation sectors (prior to March 2017)
Shelly M. Chadwick	49	Vice President, Finance and Chief Financial Officer (November 2020-Present); Vice President Finance and Chief Accounting Officer at The Timken Company, a world leader in engineered bearings and power transmission products (November 2016-November 2020); Vice President, Treasury and Investor Relations at The Timken Company (prior to November 2016)
Gregory R. Chemnitz	63	Vice President, General Counsel and Secretary (January 2017-Present); Vice President, General Counsel (prior to January 2017)

The information required by Item 10 with respect to directors, the Audit and Risk Committee of the Board of Directors, and Audit and Risk Committee financial experts is incorporated herein by reference from the section entitled "Corporate Governance; Committees of the Board of Directors — Audit and Risk Committee" and "Audit and Risk Committee Expert, Financial Literacy and Independence" in the Proxy Statement.

We have adopted a Policy Statement on Significant Corporate Governance Issues and a Code of Conduct Policy that applies to our chief executive officer and senior financial officers, including the principal financial and accounting officer, controller, and other persons performing similar functions, in compliance with applicable New York Stock Exchange and Securities and Exchange Commission requirements. The aforementioned materials and any amendments thereto, along with the charters of the Audit and Risk, Nominating, Governance, and Corporate Social Responsibility, and Compensation and Human Capital Committees of our Board of Directors, which also comply with applicable requirements, are available on our website at <http://materion.com>, and copies are also available upon request by any shareholder to Secretary, Materion Corporation, 6070 Parkland Boulevard, Mayfield Heights, Ohio 44124.

Item 11. EXECUTIVE COMPENSATION

Incorporated by reference from the sections of the Proxy Statement entitled "Executive Compensation" and "2020 Compensation of Non-Employee Directors."

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required under Item 12 regarding security ownership is incorporated by reference from the section of the Proxy Statement entitled "Security Ownership of Certain Beneficial Owners and Management." The information required by Item 12 regarding securities authorized for issuance under equity compensation plans is incorporated by reference from the section of the Proxy Statement entitled "Equity Compensation Plan Information."

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Incorporated by reference from the sections of the Proxy Statement entitled "Related Party Transactions" and "Corporate Governance; Committees of the Board of Directors — Director Independence."

Item 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Incorporated by reference from the section of the Proxy Statement entitled "Ratification of Independent Registered Public Accounting Firm."

PART IV

Item 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) 1. Financial Statements and Supplemental Information

See Index to Consolidated Financial Statements in Item 8 of this Form 10-K.

(a) 2. Financial Statement Schedules

The following consolidated financial information for the years ended December 31, 2020, 2019, and 2018 is submitted herewith:

Schedule II — Valuation and qualifying accounts.

All other schedules for which provision is made in the applicable accounting regulations of the Securities and Exchange Commission are not required under the related instructions or are inapplicable, and therefore have been omitted.

(a) 3. Exhibits

All documents referenced below were filed pursuant to the Exchange Act by Materion Corporation, file number 001-15885, unless otherwise noted.

- 3.1 [Amended and Restated Articles of Incorporation of Materion Corporation](#) (filed as Exhibit 3.2 to the Company's Quarterly Report on Form 10-Q for the period ended on June 27, 2014), incorporated herein by reference.
- 3.2 [Amended and Restated Code of Regulations](#) (filed as Exhibit 3.1 to the Company's Quarterly Report on Form 10-Q for the period ended June 27, 2014), incorporated herein by reference.
- 4.1 [Description of Materion Corporation Common Stock](#) (filed as Exhibit 4.1 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019), incorporated herein by reference.
- 4.2 [Third Amended and Restated Credit Agreement, dated September 24, 2019, by and among Materion Corporation, Materion Netherlands B.V., the other foreign borrowers from time to time party thereto, the financial institutions from time to time party thereto as lenders, JPMorgan Chase Bank, N.A. as administrative agent, Wells Fargo Bank, National Association and Bank of America, N.A., as co-syndication agents, and KeyBank National Association, as documentation agent](#) (filed as Exhibit 10.1 to the Company's 8-K filed on September 30, 2019), incorporated herein by reference.
- 10.1 [Metals Consignment Agreement, dated as of August 27, 2019](#), among Materion Corporation, certain of its subsidiaries and Bank of Montreal (filed as Exhibit 10.1 to the Company's Form 8-K Filed on August 29, 2019), incorporated herein by reference.
- 10.2 [The Bank of Nova Scotia Consignment Agreement with Materion Advanced Materials Germany GMBH](#) dated as of February 28, 2017 (filed as Exhibit 99.1 to the Company's Form 8-K filed on March 1, 2017), incorporated herein by reference.
- 10.3 [Form of Indemnification Agreement entered into by the Company and its executive officers](#) (filed as Exhibit 10a to the Company's Annual Report on Form 10-K for the year ended December 31, 2008), incorporated herein by reference.
- 10.4 [Form of Indemnification Agreement entered into by the Company and its directors](#) (filed as Exhibit 10b to the Company's Annual Report on Form 10-K for the year ended December 31, 2008), incorporated herein by reference.
- 10.5* [Amended and Restated Form of Severance Agreement for Executive Officers](#) (filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the period ended June 27, 2008), incorporated herein by reference.
- 10.6* [Amendment No. 1 to Amended and Restated Severance Agreement, dated May 4, 2011](#) (filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the period ended July 1, 2011), incorporated herein by reference.
- 10.7* [Amended and Restated Form of Severance Agreement for Key Employees](#) (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended June 27, 2008), incorporated herein by reference.
- 10.8* [Form of Severance Agreement for Key Employees](#) (filed as Exhibit 10f to the Company's Annual Report on Form 10-K for the year ended December 31, 2015), incorporated herein by reference.
- 10.9* [Severance Agreement for Jugal Vijayvargiya](#) dated as of March 3, 2017 (filed as Exhibit 10.2 to the Company's Form 8-K filed on March 3, 2017), incorporated herein by reference.

- 10.10* [CEO Offer Letter for Jugal Vijayvargiya](#) dated as of March 1, 2017 (filed as Exhibit 10.1 to the Company's Form 8-K filed on March 3, 2017), incorporated herein by reference.
- 10.11*# [Severance Agreement for Shelly M. Chadwick](#) dated as of December 15, 2020.
- 10.12*# [CFO Offer Letter for Shelly M. Chadwick](#) dated as of October 24, 2020.
- 10.13* Form of Trust Agreement between the Company and Key Trust Company of Ohio, N.A. (formerly Ameritrust Company National Association) on behalf of the Company's executive officers (filed as Exhibit 10e to the Company's Annual Report on Form 10-K for the year ended December 31, 1994), incorporated herein by reference.
- 10.14* [2019 Management Incentive Plan](#) (filed as Exhibit 10.12 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019), incorporated herein by reference.
- 10.15* [Materion and Subsidiaries Management Incentive Plan for the 2020 Plan Year](#) (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended March 27, 2020), incorporated herein by reference.
- 10.16* [Materion Corporation 2006 Stock Incentive Plan](#) (as Amended and Restated as of May 3, 2017) (filed as Exhibit 4.3 to the Registration Statement on Form S-8 (Registration No. 333-217633), incorporated herein by reference.
- 10.17* [Form of 2018 Restricted Stock Unit Agreement](#) covering grants made in 2018 and 2019 (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended March 30, 2018), incorporated herein by reference.
- 10.18* [Form of 2020 Restricted Stock Unit Agreement \(Stock-Settled\)](#) under the Materion Corporation 2006 Stock Incentive Plan (As Amended and Restated as of May 3, 2017), covering grants made in 2020 (filed as Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the period ended March 27, 2020), incorporated herein by reference.
- 10.19* [Form of 2018 Performance-Based Restricted Stock Unit Agreement](#) covering grants made in 2018 and 2019 (filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the period ended March 30, 2018), incorporated herein by reference.
- 10.20* [Form of 2020 Performance-Based Restricted Stock Units Agreement](#) under the Materion Corporation 2006 Stock Incentive Plan (As Amended and Restated as of May 3, 2017), covering grants made in 2020 (filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the period ended March 27, 2020), incorporated herein by reference.
- 10.21* [Form of 2010 Stock Appreciation Rights Agreement](#) (filed as Exhibit 10.34 to the Company's Annual Report on Form 10-K for the year ended December 31, 2009), incorporated herein by reference.
- 10.22* [Form of 2016 Stock Appreciation Rights Agreement](#) (filed as Exhibit 10ad to the Company's Annual Report on Form 10-K for the year ended December 31, 2015), incorporated herein by reference.
- 10.23* [Form of 2020 Appreciation Rights Agreement under the Materion Corporation 2006 Stock Incentive Plan](#) (As Amended and Restated as of May 3, 2017), covering grants made in 2020 (filed as Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the period ended March 27, 2020), incorporated herein by reference.
- 10.24* [Materion Corporation Supplemental Retirement Benefit Plan](#) (filed as Exhibit 10.1 to the Company's Form 8-K filed on September 19, 2011), incorporated herein by reference.
- 10.25* [Amendment No. 1 to the Supplemental Retirement Benefit Plan](#) (filed as Exhibit 10al to the Company's Annual Report on Form 10-K for the year ended December 31, 2012), incorporated herein by reference.
- 10.26* [Amendment No. 2 to the Supplemental Retirement Benefit Plan](#) (filed as Exhibit 10ah to the Company's Annual Report on Form 10-K for the year ended December 31, 2013), incorporated herein by reference.
- 10.27* [Materion Corporation 2006 Non-employee Director Equity Plan](#) (as Amended and Restated as of May 3, 2017) (filed as Exhibit 4.3 to the Registration Statement on Form S-8 (Registration No. 333-217618), incorporated herein by reference.
- 10.28* [Form of 2020 Non-Employee Directors Restricted Stock Unit Agreement](#) (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended June 26, 2020), incorporated herein by reference.
- 10.29* [Amended and Restated Executive Deferred Compensation Plan II](#) (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended March 28, 2008), incorporated herein by reference.
- 10.30* [Amendment No. 1 to the Amended and Restated Executive Deferred Compensation Plan II](#) (filed as Exhibit 10bf to the Company's Annual Report on Form 10-K for the year ended December 31, 2008), incorporated herein by reference.
- 10.31* [Amendment No. 2 to the Amended and Restated Executive Deferred Compensation Plan II](#) (filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the period ended July 3, 2009), incorporated herein by reference.

10.32* [Amendment No. 3 to the Amended and Restated Executive Deferred Compensation Plan II](#), dated July 6, 2011 (filed as Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the period ended July 1, 2011), incorporated herein by reference.

10.33* [Materion Corporation Restoration & Deferred Compensation Plan, dated March 4, 2015](#) (filed as Exhibit 10.1 to the Company's Form 8-K filed on March 10, 2015), incorporated herein by reference.

10.34* [Trust Agreement between the Company and Fidelity Investments dated September 26, 2006 for certain deferred compensation plans for Non-employee Directors of the Company](#) (filed as Exhibit 99.4 to the Current Report on Form 8-K filed by the Company on September 29, 2006), incorporated herein by reference.

10.35* [Trust Agreement between the Company and Fidelity Management Trust Company, dated June 25, 2009 relating to the Executive Deferred Compensation Plan II](#) (filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the period ended July 3, 2009), incorporated herein by reference.

(18.1)# [LIFO Preferability Letter](#).

(21)# [Subsidiaries of the Registrant](#).

(23)# [Consent of Ernst & Young LLP](#).

(24)# [Powers of Attorney](#).

(31.1)# [Certification of Chief Executive Officer required by Rule 13a-14\(a\) or 15d-14\(a\)](#).

(31.2)# [Certification of Chief Financial Officer required by Rule 13a-14\(a\) or 15d-14\(a\)](#).

(32)# [Certifications of Chief Executive Officer and Chief Financial Officer required by 18 U.S.C. Section 1350](#).

(95)# [Mine Safety Disclosure Pursuant to Section 1503\(a\) of the Dodd-Frank Wall Street Reform and Consumer Protection Act for the Fiscal Year Ended December 31, 2020](#).

(101.INS)# Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.

(101.SCH)# Inline XBRL Taxonomy Extension Schema Document.

(101.CAL)# Inline XBRL Taxonomy Extension Calculation Linkbase Document.

(101.DEF)# Inline XBRL Taxonomy Extension Definition Linkbase Document.

(101.LAB)# Inline XBRL Taxonomy Extension Label Linkbase Document.

(101.PRE)# Inline XBRL Taxonomy Extension Presentation Linkbase Document.

(104)# Cover Page Interactive Data File (formatted in Inline XBRL and contained in the Exhibit 101 attachments)

* Denotes a compensatory plan or arrangement.

Filed or furnished herewith.

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.

MATERION CORPORATION

By: /s/ Jugal K. Vijayvargiya
Jugal K. Vijayvargiya
President and Chief Executive Officer

February 18, 2021

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>/s/ Jugal K. Vijayvargiya</u> Jugal K. Vijayvargiya	President and Chief Executive Officer and Director (Principal Executive Officer)	February 18, 2021
<u>/s/ Shelly M. Chadwick</u> Shelly M. Chadwick	Vice President, Finance and Chief Financial Officer (Principal Financial and Accounting Officer)	February 18, 2021
<u> *</u> Vinod M. Khilnani	Director	February 18, 2021
<u> *</u> Emily M. Liggett	Director	February 18, 2021
<u> *</u> Robert J. Phillippy	Director	February 18, 2021
<u> *</u> Patrick Prevost	Director	February 18, 2021
<u> *</u> N. Mohan Reddy	Director	February 18, 2021
<u> *</u> Craig S. Shular	Director	February 18, 2021
<u> *</u> Darlene J. S. Solomon	Director	February 18, 2021
<u> *</u> Robert B. Toth	Director	February 18, 2021

* Shelly M. Chadwick, by signing her name hereto, does sign and execute this report on behalf of each of the above-named officers and directors of Materion Corporation, pursuant to Powers of Attorney executed by each such officer and director filed with the Securities and Exchange Commission.

By: /s/ Shelly M. Chadwick
Shelly M. Chadwick
Attorney-in-Fact

February 18, 2021

Materion Corporation and Subsidiaries
Schedule II—Valuation and Qualifying Accounts

(Thousands)	2020	2019	2018
Allowance for uncollectible accounts:			
Balance at Beginning of Period	\$ 392	\$ 616	\$ 640
Additions:			
Charged to Costs and Expenses (1)	224	(39)	271
Deductions (2)	(80)	(185)	(295)
Balance at End of Period	\$ 536	\$ 392	\$ 616
Allowance for inventory reserves:			
Balance at Beginning of Period	\$ 14,697	\$ 13,065	\$ 14,381
Additions:			
Charged to Costs and Expenses (3)	9,282	2,367	3,175
Deductions (4)	(1,830)	(735)	(4,491)
Balance at End of Period	\$ 22,149	\$ 14,697	\$ 13,065
Valuation allowance on deferred tax assets:			
Balance at Beginning of Period	\$ 17,676	\$ 15,917	\$ 16,246
Additions:			
Charged to Costs and Expenses (5)	884	2,475	9,700
Deductions (6)	(4,426)	(716)	(10,029)
Balance at End of Period	\$ 14,134	\$ 17,676	\$ 15,917

- (1) Provision for uncollectible accounts included in expenses.
(2) Bad debts written-off, net of recoveries
(3) Provisions for surplus and obsolete inventory and lower cost or net realizable value included in expenses.
(4) Inventory write-offs.
(5) Increase in valuation allowance is recorded as a component of the provision for income taxes.
(6) Includes valuation allowances recorded against other comprehensive income.

*Certain amounts have been adjusted to reflect the change in inventory accounting method, as described in Note A to the Consolidated Financial Statements.

SEVERANCE AGREEMENT

THIS SEVERANCE AGREEMENT (this "Agreement"), dated as of December 15, 2020, is made and entered into by and between Materion Corporation, an Ohio corporation (the "Company"), and Shelly Chadwick (the "Executive").

WITNESSETH:

WHEREAS, the Executive is an executive of the Company and is expected to make major contributions to the growth and financial strength of the Company; and

WHEREAS, the Company desires to provide additional inducement for the Executive to continue to remain in the employ of the Company by providing certain severance benefits in the event of the Executive's termination by the Company; and

WHEREAS, the Company recognizes that the possibility of a Change in Control (as defined below) exists and that such possibility, and the uncertainty it may create among management, may result in the distraction or departure of management personnel, to the detriment of the Company and its shareholders; and

WHEREAS, the Company desires to assure itself of the continuity of management and desires to establish certain minimum severance benefits for certain of its executives, including the Executive, applicable in the event of a Change in Control; and

WHEREAS, the Company wishes to ensure that its executives are not unduly distracted by the circumstances attendant to the possibility of a Change in Control and to encourage the continued attention and dedication of such executives, including the Executive, to their assigned duties with the Company; and

WHEREAS, the Company and the Executive desire for this Agreement to take into account certain changes in the Company's compensation and employee benefit programs.

NOW, THEREFORE, the Company and the Executive agree as follows:

1. Certain Defined Terms. In addition to terms defined elsewhere herein, the following terms have the following meanings when used in this Agreement with initial capital letters:

(a) "Affiliate" means with respect to any Person, any holder of more than 10% of the outstanding shares or equity interests of such Person or any other Person which directly or indirectly controls, is controlled by or is under common control with such Person. A Person shall be deemed to control another Person if such Person possesses, directly or indirectly, the

power to direct or cause the direction of the management and policies of the “controlled” Person, whether through ownership of voting securities, by contract or otherwise.

- (b) “Base Pay” means the Executive’s annual base salary rate as in effect from time to time.
- (c) “Board” means the Board of Directors of the Company.
- (d) “Cause” means that the Executive shall have:
 - (i) been convicted of a criminal violation involving fraud, embezzlement, theft or violation of federal antitrust statutes or federal securities laws in connection with his duties or in the course of his employment with the Company or any Affiliate of the Company;
 - (ii) committed intentional wrongful damage to property of the Company or any Affiliate of the Company;
 - (iii) committed intentional wrongful disclosure of secret processes or confidential information of the Company or any Affiliate of the Company; or
 - (iv) intentionally engaged in any activity in violation of Section 8;

and any such act shall have been demonstrably and materially harmful to the Company. For purposes of this Agreement, no act or failure to act on the part of the Executive shall be deemed “intentional” if it was due primarily to an error in judgment or negligence, but shall be deemed “intentional” only if done or omitted to be done by the Executive not in good faith and without reasonable belief that the Executive’s action or omission was in the best interest of the Company. Notwithstanding the foregoing, the Executive shall not be deemed to have been terminated for “Cause” hereunder unless and until there shall have been delivered to the Executive a copy of a resolution duly adopted by the affirmative vote of not less than three quarters of the Board then in office at a meeting of the Board called and held for such purpose, after reasonable notice to the Executive and an opportunity for the Executive, together with the Executive’s counsel (if the Executive chooses to have counsel present at such meeting), to be heard before the Board, finding that, in the good faith opinion of the Board, the Executive had committed an act constituting “Cause” as herein defined and specifying the particulars thereof in detail. Nothing herein will limit the right of the Executive or his beneficiaries to contest the validity or propriety of any such determination.

- (e) “Change in Control” means
 - (i) The acquisition by any individual, entity or group (within the meaning of Section 13(d)(3) or 14(d)(2) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”)) (a “Person”) of beneficial ownership (within the meaning of Rule 13d3 promulgated under the Exchange Act) of voting securities of the Company where

such acquisition causes such Person to own (X) 30% or more of the combined voting power of the then outstanding voting securities of the Company entitled to vote generally in the election of directors (the “Outstanding Company Voting Securities”) without the approval of the Incumbent Board as defined in (ii) below or (Y) 35% or more of the Outstanding Voting Securities of the Company with the approval of the Incumbent Board; *provided, however*, that for purposes of this subsection (i), the following acquisitions shall not be deemed to result in a Change of Control: (A) any acquisition directly from the Company that is approved by the Incumbent Board (as defined in subsection (ii), below), (B) any acquisition by the Company or a subsidiary of the Company, (C) any acquisition by any employee benefit plan (or related trust) sponsored or maintained by the Company or any corporation controlled by the Company, (D) any acquisition by any Person pursuant to a transaction described in clauses (A), (B) and (C) of subsection (iii) below, or (E) any acquisition by, or other Business Combination (as defined in (iii) below) with, a person or group of which employees of the Company or any subsidiary of the Company control a greater than 25% interest (a “MBO”) but only if the Executive is one of those employees of the Company or any subsidiary of the Company that are participating in the MBO; *provided, further*, that if any Person’s beneficial ownership of the Outstanding Company Voting Securities reaches or exceeds 30% or 35%, as the case may be, as a result of a transaction described in clause (A) or (B) above, and such Person subsequently acquires beneficial ownership of additional voting securities of the Company, such subsequent acquisition shall be treated as an acquisition that causes such Person to own 30% or 35% or more, as the case may be, of the Outstanding Company Voting Securities; and *provided, further*, that if at least a majority of the members of the Incumbent Board determines in good faith that a Person has acquired beneficial ownership (within the meaning of Rule 13d3 promulgated under the Exchange Act) of 30% or more of the Outstanding Company Voting Securities inadvertently, and such Person divests as promptly as practicable a sufficient number of shares so that such Person beneficially owns (within the meanings of Rule 13d3 promulgated under the Exchange Act) less than 30% of the Outstanding Company Voting Securities, then no Change of Control shall have occurred as a result of such Person’s acquisition; or

(ii) individuals who, as of the date hereof, constitute the Board (the “Incumbent Board”) (as modified by this clause (ii)) cease for any reason to constitute at least a majority of the Board; *provided, however*, that any individual becoming a director subsequent to the date hereof whose election, or nomination for election by the Company’s shareholders, was approved by a vote of at least a majority of the directors then comprising the Incumbent Board (either by a specific vote or by approval of the proxy statement of the Company in which such person is named as a nominee for director, without objection to such nomination) shall be considered as though such individual were a member of the Incumbent Board, but excluding, for this purpose, any such individual whose initial assumption of office occurs as a result of an actual or threatened election contest with respect to the election or removal of directors or other actual or threatened solicitation of proxies or consents by or on behalf of a Person other than the Board; or

(iii) the consummation of a reorganization, merger or consolidation or sale or other disposition of all or substantially all of the assets of the Company or the acquisition of assets of another corporation, or other transaction (a "Business Combination") excluding, however, such a Business Combination pursuant to which (A) the individuals and entities who were the ultimate beneficial owners of voting securities of the Company immediately prior to such Business Combination beneficially own, directly or indirectly, more than 65% of, respectively, the then outstanding shares of common stock and the combined voting power of the then outstanding voting securities entitled to vote generally in the election of directors, as the case may be, of the entity resulting from such Business Combination (including, without limitation, an entity that as a result of such transaction owns the Company or all or substantially all of the Company's assets either directly or through one or more subsidiaries), (B) no Person (excluding any employee benefit plan (or related trust) of the Company, the Company or such entity resulting from such Business Combination) beneficially owns, directly or indirectly 30% or more, if such Business Combination is approved by the Incumbent Board or 35% or more, if such Business Combination is not approved by the Incumbent Board, of the combined voting power of the then outstanding securities entitled to vote generally in the election of directors of the entity resulting from such Business Combination and (C) at least a majority of the members of the board of directors of the corporation resulting from such Business Combination were members of the Incumbent Board at the time of the execution of the initial agreement, or of the action of the Board, providing for such Business Combination; or

(iv) approval by the shareholders of the Company of a complete liquidation or dissolution of the Company except pursuant to a Business Combination described in clauses (A), (B) and (C) of subsection (iii), above.

(f) "Change in Control Severance Period" means the period of time commencing on the date of the first occurrence of a Change in Control and continuing until the earlier of (i) the second anniversary of the occurrence of the Change in Control, or (ii) the Executive's death; *provided, however*, that commencing on each anniversary of the Change in Control, the Change in Control Severance Period will automatically be extended for an additional year unless, not later than 90 calendar days prior to such anniversary date, either the Company or the Executive shall have given written notice to the other that the Change in Control Severance Period is not to be so extended.

(g) "Code" means the Internal Revenue Code of 1986, as amended, and the regulations thereunder.

(h) "Employee Benefits" means the benefits and service credit for benefits as provided under any and all employee retirement income and welfare benefit policies, plans, programs or arrangements in which Executive is entitled to participate, including without limitation any stock purchase, savings, pension, supplemental executive retirement, or other retirement income or welfare benefit, deferred compensation, group or other life, health, medical/hospital or other insurance (whether funded by actual insurance or self-insured by the Company

or an Affiliate of the Company), disability, expense reimbursement and other employee benefit policies, plans, programs or arrangements.

(i) “Incentive Pay” means the annual bonus, incentive or other payment of compensation under the Management Incentive Plan or, if such Management Incentive Plan is no longer in effect, the annual bonus, incentive or other payment of compensation in addition to Base Pay, made or to be made in regard to services rendered in any year or other period pursuant to any bonus, incentive, profit-sharing, performance, discretionary pay or similar agreement, policy, plan, program or arrangement (whether or not funded) of the Company or an Affiliate of the Company, or any successor thereto.

(j) “Subsidiary” means an entity in which the Company directly or indirectly beneficially owns 50% or more of the Outstanding Company Voting Securities.

(k) “Term” means the period commencing as of the date hereof and expiring on the close of business on December 31, 2022; *provided, however*, that (i) commencing on January 1, 2023 and each January 1 thereafter, the Term will automatically be extended for an additional year unless, not later than September 30 of the immediately preceding year, the Company or the Executive shall have given notice that it or the Executive, as the case may be, does not wish to have the Term extended; (ii) if a Change in Control occurs during the Term, the Term shall expire and this Agreement will terminate at the expiration of the Change in Control Severance Period; and (iii) subject to the last sentence of Section 9, if, prior to a Change in Control, the Executive ceases for any reason to be an employee of the Company and any Affiliate of the Company, thereupon without further action the Term shall be deemed to have expired and this Agreement will immediately terminate and be of no further effect. For purposes of this Section 1(k), the Executive shall not be deemed to have ceased to be an employee of the Company and any Affiliate of the Company by reason of the transfer of Executive’s employment between the Company and any Affiliate of the Company, or among any Affiliates of the Company.

(l) “Termination Date” means the date on which the Executive’s employment is terminated (the effective date of which shall be the date of termination, or such other date that may be specified by the Executive if the termination is pursuant to Section 2(b) or 3(b)), provided that in each case such date constitutes a “separation from service,” as defined for purposes of Section 409A of the Code.

2. Termination Following a Change in Control.

(a) In the event of the occurrence of a Change in Control during the Term, the Executive’s employment may be terminated by the Company or an Affiliate of the Company during the Change in Control Severance Period and the Executive shall be entitled to the benefits provided by Section 4(a) unless such termination is the result of the occurrence of one or more of the following events:

- (i) The Executive’s death;

(ii) If the Executive becomes permanently disabled within the meaning of, and begins actually to receive disability benefits pursuant to, the long-term disability plan in effect for, or applicable to, Executive immediately prior to the Change in Control; or

(iii) Cause.

(b) In the event of the occurrence of a Change in Control during the Term, the Executive may terminate employment with the Company and any Affiliate of the Company during the Change in Control Severance Period with the right to severance compensation as provided in Section 4(a) upon the occurrence of one or more of the following events (regardless of whether any other reason, other than Cause as hereinabove provided, for such termination exists or has occurred, including, without limitation, other employment):

(i) Failure to elect or reelect or otherwise to maintain the Executive in the office or the position, or a substantially equivalent or better office or position, of or with the Company and/or an Affiliate of the Company (or any successor thereto by operation of law or otherwise), as the case may be, which the Executive held immediately prior to a Change in Control, or the removal of the Executive as a Director of the Company and/or an Affiliate of the Company (or any successor thereto) if the Executive shall have been a Director of the Company and/or an Affiliate of the Company immediately prior to the Change in Control;

(ii) (A) A significant adverse change in the nature or scope of the authorities, powers, functions, responsibilities or duties attached to the position with the Company and any Affiliate of the Company which the Executive held immediately prior to the Change in Control, (B) a reduction in the aggregate of the Executive's Base Pay and Incentive Pay opportunity received from the Company and any Affiliate of the Company, or (C) the termination or denial of the Executive's rights to Employee Benefits or any long-term, stock option, performance share, performance unit, or similar equity or equity-based award opportunity or a reduction in the scope or value thereof, any of which is not remedied by the Company within 10 calendar days after receipt by the Company of written notice from the Executive of such change, reduction or termination, as the case may be;

(iii) The liquidation, dissolution, merger, consolidation or reorganization of the Company or the transfer of all or substantially all of its business and/or assets, unless the successor or successors (by liquidation, merger, consolidation, reorganization, transfer or otherwise) to which all or substantially all of its business and/or assets have been transferred (by operation of law or otherwise) assumed all duties and obligations of the Company under this Agreement pursuant to Section 11(a);

(iv) The Company relocates its principal executive offices (if such offices are the principal location of Executive's work), or requires the Executive to have his principal location of work changed, to any location that, in either case, is in excess of 50 miles from the location thereof immediately prior to the Change in Control, or requires the Executive to travel away from his office in the course of discharging his

responsibilities or duties hereunder at least 20% more (in terms of aggregate days in any calendar year or in any calendar quarter when annualized for purposes of comparison to any prior year) than was required of Executive in any of the three full years immediately prior to the Change in Control without, in either case, his prior written consent; or

(v) Without limiting the generality or effect of the foregoing, any material breach of this Agreement by the Company or any successor thereto which is not remedied by the Company within 10 calendar days after receipt by the Company of written notice from the Executive of such breach.

(c) A termination by the Company pursuant to Section 2(a) or by the Executive pursuant to Section 2(b) will not affect any rights that the Executive may have pursuant to any agreement, policy, plan, program or arrangement of the Company or an Affiliate of the Company providing Employee Benefits or covering long-term or equity (or equity-based) awards (except as provided in Section 4(a) and Annex A), which rights shall be governed by the terms thereof.

3. Involuntary Termination.

(a) In the event that the Executive's employment terminates other than during the Change in Control Severance Period, the Executive shall be entitled to the benefits provided by Section 4(b) unless such termination is the result of the occurrence of one or more of the following events:

(i) The Executive's death;

(ii) If the Executive becomes permanently disabled within the meaning of, and begins actually to receive disability benefits pursuant to, the long-term disability plan in effect for, or applicable to, Executive immediately prior to his Termination Date;

(iii) A termination of Executive's employment by the Company or any Affiliate of the Company for Cause; or

(iv) A termination of Executive's employment by the Executive for any reason other than as provided in Section 3(b) below.

(b) Notwithstanding the foregoing, the Executive may terminate employment with the Company and any Affiliate of the Company with the right to severance compensation as provided in Section 4(b) upon the occurrence of one or more of the following events (regardless of whether any other reason, other than Cause as hereinabove provided, for such termination exists or has occurred, including without limitation other employment):

(i) Failure to elect or reelect or otherwise to maintain the Executive in the office or the position, or a substantially equivalent or better office or position, of or with the Company and/or an Affiliate of the Company (or any successor thereto by operation of law or otherwise), as the case may be, which the Executive holds as of the commencement of your employment or the removal of the Executive as a Director of the

Company and/or an Affiliate of the Company (or any successor thereto) if the Executive is elected or appointed as a Director of the Company and/or an Affiliate of the Company;

(ii) (A) A significant adverse change in the nature or scope of the authorities, powers, functions, responsibilities or duties attached to the position with the Company and any Affiliate of the Company which the Executive holds as of the commencement of your employment, (B) a reduction in the aggregate of the Executive's Base Pay and Incentive Pay opportunity received from the Company and any Affiliate of the Company, provided however, that such a reduction in the aggregate of the Executive's Base Pay, Incentive Pay and long-term equity opportunity is not part of a general reduction in executive officer compensation opportunity, or (C) the termination or denial of the Executive's rights to Employee Benefits or any long-term, stock option, performance share, performance unit, or similar equity or equity-based award opportunity or a reduction in the scope or value thereof;

(iii) The liquidation, dissolution, merger, consolidation or reorganization of the Company or the transfer of all or substantially all of its business and/or assets, unless the successor or successors (by liquidation, merger, consolidation, reorganization, transfer or otherwise) to which all or substantially all of its business and/or assets have been transferred (by operation of law or otherwise) assumed all duties and obligations of the Company under this Agreement pursuant to Section 11(a);

(iv) Receipt of notice from the Company or its successor not to extend the Term; or

(v) Without limiting the generality or effect of the foregoing, any material breach of this Agreement by the Company or any successor thereto.

The Executive will only have the right to receive the severance benefits set forth in Section 4(b) if, upon the occurrence of any of the events set forth in this Section 3(b), the Executive provides the Company with written notice of the occurrence of such event within 90 calendar days after the Executive has knowledge of such occurrence, the Company fails to remedy the event within 30 calendar days after receipt by the Company of such written notice from the Executive, and the Executive terminates his employment with the Company and any Affiliate of the Company within 60 calendar days following the expiration of such 30-day cure period.

(c) A termination by the Company pursuant to Section 3(a) or by the Executive pursuant to Section 3(b) will not affect any rights that the Executive may have pursuant to any agreement, policy, plan, program or arrangement of the Company or an Affiliate of the Company providing Employee Benefits or covering long-term or equity (or equity-based) awards (except as provided in Section 4(b) and Annex B), which rights shall be governed by the terms thereof.

4. Severance Compensation.

(a) If, following the occurrence of a Change in Control during the Term, the Company or an Affiliate of the Company terminates the Executive's employment during the Change in Control Severance Period other than pursuant to Section 2(a)(i), 2(a)(ii) or 2(a)(iii), or if the Executive terminates his employment pursuant to Section 2(b) (if Section 2(b) is operative), then, provided the Executive signs, returns and does not revoke a release of claims in a form provided by the Company within 30 days after his Termination Date, the Company (subject to Section 4(e)) will pay to the Executive the lump sum payment amounts described in Annex A on the 30th day after the Termination Date (the "Payment Date") and will continue to provide to the Executive the benefits described in Annex A for the periods described therein. There shall be no duplication of amounts paid or benefits provided under this Agreement and long-term or equity (or equity-based) awards.

(b) If the Company or an Affiliate of the Company terminates the Executive's employment other than during the Change in Control Severance Period and other than pursuant to Section 3(a)(i), 3(a)(ii), 3(a)(iii) or 3(a)(iv), or if the Executive terminates his employment pursuant to Section 3(b), then, provided the Executive signs, returns and does not revoke a release of claims in a form provided by the Company within 30 days after his Termination Date, the Company (subject to Section 4(e)) will pay to the Executive the lump sum payment amounts described in Annex B on the Payment Date (or such other date as specified in Annex B) and will continue to provide to the Executive the benefits described in Annex B for the periods described therein. In no event shall the Executive be entitled to the amounts described in both Annex A and Annex B, and there shall be no other duplication of benefits payable pursuant to this Agreement.

(c) Notwithstanding any provision of this Agreement to the contrary, the parties' respective rights and obligations under this Section 4 and under Sections 5, 7, 8, 9 and 13 will survive any termination or expiration of this Agreement or the termination of the Executive's employment following a Change in Control for any reason whatsoever.

(d) Unless otherwise expressly provided by the applicable plan, program or agreement, after the occurrence of a Change in Control during the Term, the Company shall pay in cash to the Executive a lump sum amount equal to the value of any annual bonus (including, without limitation, incentive-based annual cash bonuses and performance units, but not including any long-term or equity-based compensation or compensation provided under a qualified plan) earned or accrued with respect to the Executive's service during the performance period or periods that includes the date on which the Change in Control occurred, disregarding any applicable vesting requirements; *provided that* such amount shall be calculated at the plan target or payout rate, but prorated to base payment only on the portion of the Executive's service that had elapsed during the applicable performance period. Such payment shall take into account service rendered through the Termination Date. To the extent such payment is exempt under Section 409A of the Code, it shall be made on the Payment Date. To the extent such payment constitutes "deferred compensation" under Section 409A of the Code, it shall be made at the same time it would have been made in the absence of the Change in Control.

(e) Notwithstanding the foregoing provisions of this Section 4, Annex A and Annex B, if the Executive is a "specified employee," determined pursuant to procedures adopted by the

Company in compliance with Section 409A of the Code, on his Termination Date, amounts that would otherwise be payable pursuant to this Agreement that are nonexempt nonqualified deferred compensation under Section 409A of the Code during the six-month period immediately following the Executive's Termination Date (the "Delayed Payments") and benefits that would otherwise be provided pursuant to this Agreement (the "Delayed Benefits") during the six-month period immediately following the Executive's Termination Date (such period, the "Delay Period") will instead be paid or made available on the earlier of (i) the first business day of the seventh month after Executive's Termination Date, or (ii) the Executive's death (the applicable date, the "Permissible Payment Date").

(f) Each payment to be made to the Executive under the provisions of this Section 4, Annex A and Annex B shall be considered to be a separate payment and not one of a series of payments for purposes of Section 409A of the Code. Further, coverages provided during one taxable year shall not affect the degree to which coverages will be provided in any other taxable year.

5. Limitation on Payments and Benefits. If any amount or benefit to be paid or provided under this Agreement or otherwise pursuant to or by reason of any other agreement, policy, plan, program or arrangement, including without limitation any stock option, performance share, performance unit, stock appreciation right or similar right, or the lapse or termination of any restriction on or the vesting or exercisability of any of the foregoing would be an "Excess Parachute Payment" within the meaning of Section 280G of the Code (or any successor provision thereto), but for the application of this sentence, then the payments and benefits to be paid or provided under this Agreement or otherwise shall be reduced to the minimum extent necessary (but in no event to less than zero) so that no portion of any such payment or benefit, as so reduced, constitutes an Excess Parachute Payment; *provided, however*, that the foregoing reduction shall be made only if and to the extent that such reduction would result in an increase in the aggregate payments and benefits to be provided, determined on an after-tax basis (taking into account the excise tax imposed pursuant to Section 4999 of the Code, or any successor provision thereto, any tax imposed by a comparable provision of state law, and any applicable federal, state and local income taxes ("Excise Tax"). The determination of whether any reduction in such payments or benefits to be provided under this Agreement or otherwise is required pursuant to the preceding sentence shall be made by an independent accounting firm selected by the Company (the "Accounting Firm"), which Accounting Firm shall provide detailed supporting calculations both to the Company and the Executive within 15 business days of the Termination Date or such earlier time as is requested by the Company and, if requested by the Executive, an opinion that he has substantial authority not to report any Excise Tax on the Executive's Federal income tax return with respect to the Excess Parachute Payments. Any such determination by the Accounting Firm will be binding upon the Company and the Executive. The fact that the Executive's right to payments or benefits may be reduced by reason of the limitations contained in this Section 5 shall not of itself limit or otherwise affect any other rights of the Executive. In the event that any payment or benefit intended to be provided under this Agreement or otherwise is required to be reduced pursuant to this Section 5, the Company shall reduce the Executive's payments and/or benefits, to the extent required, in the following order: (i) the lump sum payment described in paragraph (1) of Annex A; (ii) the lump

sum payment described in Section 4(d) of this Agreement; (iii) the benefits described in Paragraph (4) of Annex A; (iv) the benefits described in Paragraph (2) of Annex A; and (v) the accelerated vesting of long-term and equity or equity-based awards (if any) described in Paragraph (3) of Annex A.

6. No Mitigation Obligation. The Company hereby acknowledges that it will be difficult and may be impossible for the Executive to find reasonably comparable employment following the Termination Date. Accordingly, the payment of the severance compensation by the Company to the Executive in accordance with the terms of this Agreement is hereby acknowledged by the Company to be reasonable, and the Executive will not be required to mitigate the amount of any payment provided for in this Agreement by seeking other employment or otherwise, nor will any profits, income, earnings or other benefits from any source whatsoever create any mitigation, offset, reduction or any other obligation on the part of the Executive hereunder or otherwise, except as expressly provided in the last sentences of Paragraph (2)(a) on both Annex A and Annex B.

7. Legal Fees and Expenses.

(a) It is the intent of the Company that the Executive not be required to incur legal fees and the related expenses associated with the reasonable interpretation, enforcement or defense of Executive's rights under this Agreement by litigation or otherwise because the reasonable cost and expense thereof would substantially detract from the benefits intended to be extended to the Executive hereunder. Accordingly, if it should appear to the Executive that the Company has failed to comply with any of its obligations under this Agreement or in the event that the Company or any other person takes or threatens to take any action to declare this Agreement void or unenforceable, or institutes any litigation or other action or proceeding designed to deny, or to recover from, the Executive the benefits provided or intended to be provided to the Executive hereunder, the Company irrevocably authorizes the Executive from time to time to retain counsel of Executive's choice, at the reasonable expense of the Company as hereafter provided, to advise and represent the Executive in connection with any such reasonable interpretation, enforcement or defense, including without limitation the initiation or defense of any litigation or other legal action, whether by or against the Company or any Director, officer, stockholder or other person affiliated with the Company, in any jurisdiction. Notwithstanding any existing or prior attorney-client relationship between the Company and such counsel, the Company irrevocably consents to the Executive's entering into an attorney-client relationship with such counsel, and in that connection the Company and the Executive agree that a confidential relationship shall exist between the Executive and such counsel. Without respect to whether the Executive prevails, in whole or in part, in connection with any of the foregoing, the Company will pay and be solely financially responsible for any and all reasonable attorneys' and related fees and reasonable expenses incurred by the Executive in connection with any of the foregoing. Such payments shall be made no later than December 31 of the year following the year in the which the Executive incurs the expenses, provided that in no event will the amount of expenses eligible for reimbursement in one year affect the amount of expenses to be reimbursed, or in-kind benefits to be provided, in any other taxable year.

(b) Without limiting the obligations of the Company pursuant to Section 7(a) hereof, in the event a Change in Control occurs during the Term, the performance of the Company's obligations under this Agreement, including, without limitation, this Section 7 and Annex A, shall be secured by amounts deposited or to be deposited in trust pursuant to certain trust agreements to which the Company shall be a party providing that the benefits to be provided hereunder and the reasonable fees and expenses of counsel selected from time to time by the Executive pursuant to Section 7(a) shall be paid, or reimbursed to the Executive if paid by the Executive, either in accordance with the terms of such trust agreements, or, if not so provided, on a regular, periodic basis upon presentation by the Executive to the trustee of a statement or statements prepared by such counsel in accordance with its customary practices. Any failure by the Company to satisfy any of its obligations under this Section 7(b) shall not limit the rights of the Executive hereunder. Subject to the foregoing, the Executive shall have the status of a general unsecured creditor of the Company and shall have no right to, or security interest in, any assets of the Company or any Affiliate of the Company. Notwithstanding anything contained in this Agreement to the contrary, in no event shall any amount be transferred to a trust described in this Section 7(b) if, pursuant to Section 409A(b)(3)(A) of the Code, such amount would, for purposes of Section 83 of the Code, be treated as property transferred in connection with the performance of services.

8. Competitive Activity; Confidentiality; Nonsolicitation.

(a) Acknowledgements and Agreements. The Executive hereby acknowledges and agrees that in the performance of the Executive's duties to the Company during the Term, the Executive will be brought into frequent contact with existing and potential customers of the Company throughout the world. The Executive also agrees that trade secrets and confidential information of the Company, more fully described in Section 8(j) of this Agreement, gained by the Executive during the Executive's association with the Company, have been developed by the Company through substantial expenditures of time, effort and money and constitute valuable and unique property of the Company. The Executive further understands and agrees that the foregoing makes it necessary for the protection of the business of the Company that the Executive not compete with the Company during the Term and not compete with the Company for a reasonable period thereafter, as further provided in the following subsections.

(b) Covenants During the Term. During the Term and prior to the Termination Date, the Executive will not compete with the Company. In accordance with this restriction, but without limiting its terms, during the term of the Executive's employment, the Executive will not:

- (i) enter into or engage in any business which competes with the business of the Company;
- (ii) solicit customers, business, patronage or orders for, or sell, any products or services in competition with, or for any business that competes with, the business of the Company;

(iii) divert, entice or otherwise take away any customers, business, patronage or orders of the Company or attempt to do so; or

(iv) promote or assist, financially or otherwise, any person, firm, association, partnership, corporation or other entity engaged in any business which competes with the business of the Company.

(c) Covenants Following Termination. For a period of two (2) years following the Termination Date, if the Executive has received or is receiving benefits under this Agreement, the Executive will not:

(i) enter into or engage in any business which competes with the Company's business within the Restricted Territory (as defined in Section 8(g));

(ii) solicit customers, business, patronage or orders for, or sell, any products or services in competition with, or for any business, wherever located, that competes with, the Company's business within the Restricted Territory;

(iii) divert, entice or otherwise take away any customers, business, patronage or orders of the Company within the Restricted Territory, or attempt to do so; or

(iv) promote or assist, financially or otherwise, any person, firm, association, partnership, corporation or other entity engaged in any business which competes with the Company's business within the Restricted Territory.

(d) Indirect Competition. For the purposes of Sections 8(b) and 8(c), inclusive, but without limitation thereof, the Executive will be in violation thereof if the Executive engages in any or all of the activities set forth therein directly as an individual on the Executive's own account, or indirectly as a partner, joint venturer, employee, agent, salesperson, consultant, officer and/or director of any firm, association, partnership, corporation or other entity, or as a stockholder of any corporation in which the Executive or the Executive's spouse, child or parent owns, directly or indirectly, individually or in the aggregate, more than five percent (5%) of the outstanding stock.

(e) The Company. For the purposes of this Section 8, the Company shall include any and all direct and indirect subsidiary, parent, affiliated, or related companies of the Company for which the Executive worked or had responsibility at the time of termination of the Executive's employment and at any time during the two (2) year period prior to such termination.

(f) The Company's Business. For the purposes of Sections 8(b), 8(c), 8(k) and 8(l), inclusive, the Company's business is defined to be the manufacture, marketing and sale of high performance engineered materials serving global telecommunications, computer, automotive electronics, industrial components and optical media markets, as further described in any and all manufacturing, marketing and sales manuals and materials of the Company as the same may be altered, amended, supplemented or otherwise changed from time to time, or of any other

products or services substantially similar to or readily substitutable for any such described products and services.

(g) Restricted Territory. For the purposes of Section 8(c), the Restricted Territory shall be defined as and limited to:

(i) any geographic areas serviced by the Company during the two (2) year period following the Termination Date as to any business segment, product, service, or activity for which the Executive worked, to which the Executive was assigned or had any responsibility (either direct or supervisory), in which the Executive was involved in research and/or development, or about which the Executive had access to any trade secrets or confidential business and technical information of the Company, at the time of the Termination Date and at any time during the two (2) year period prior to the Termination Date; and

(ii) all of the specific customer accounts, whether within or outside of the geographic area described in (i) above, with which the Executive had any contact or for which the Executive was assigned or had any responsibility (either direct or supervisory), in which the Executive was involved in solicitation or development, or about which the Executive had access to any trade secrets or confidential business and technical information of the Company, at the time of Termination Date and at any time during the two (2) year period prior to the Termination Date.

(h) Extension. If it shall be judicially determined that the Executive has violated any of the Executive's obligations under Section 8(c), then the period applicable to each obligation that the Executive shall have been determined to have violated shall automatically be extended by a period of time equal in length to the period during which such violation(s) occurred.

(i) Non-Solicitation. The Executive will not directly or indirectly, during the period of two (2) years following the Termination Date, solicit or induce or attempt to solicit or induce any employee(s), sales representative(s), agent(s) or consultant(s) of the Company and/or of its parent, or its other subsidiary, affiliated or related companies to terminate their employment, representation or other association with the Company and/or its parent or its other subsidiary, affiliated or related companies.

(j) Further Covenants.

(i) The Executive will keep in strict confidence, and will not, directly or indirectly, at any time during or after the Executive's employment with the Company, disclose, furnish, disseminate, make available or, except in the course of performing the Executive's duties of employment, use any trade secrets or confidential business and technical information of the Company or its customers or vendors, including without limitation as to when or how the Executive may have acquired such information. Such confidential information shall include, without limitation, the Company's unique selling, manufacturing and servicing methods and business techniques, training, service and business manuals, promotional materials, training courses and other training and

instructional materials, vendor and product information, customer and prospective customer lists, other customer and prospective customer information and other business information. The Executive specifically acknowledges that all such confidential information, whether reduced to writing, maintained on any form of electronic media, or maintained in the Executive's mind or memory and whether compiled by the Company, and/or the Executive, derives independent economic value from not being readily known to or ascertainable by proper means by others who can obtain economic value from its disclosure or use, that reasonable efforts have been made by the Company to maintain the secrecy of such information, that such information is the sole property of the Company and that any retention and use of such information by the Executive during the Executive's employment with the Company (except in the course of performing the Executive's duties and obligations to the Company) or after the termination of the Executive's employment shall constitute a misappropriation of the Company's trade secrets.

(ii) The U.S. Defend Trade Secrets Act of 2016 ("DTSA") provides that an individual shall not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that (A) is made in confidence to a federal, state or local government official, either directly or indirectly, or to an attorney, and solely for the purpose of reporting or investigating a suspected violation of law; or (B) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal. In addition, the DTSA provides that an individual who files a lawsuit for retaliation by an employer for reporting a suspected violation of law may disclose the trade secret to the attorney of the individual and use the trade secret information in the court proceeding, if the individual files any document containing the trade secret under seal and does not disclose the trade secret, except pursuant to court order.

(iii) The Executive agrees that upon termination of the Executive's employment with the Company, for any reason, the Executive shall return to the Company, in good condition, all property of the Company, including without limitation, the originals and all copies of any materials which contain, reflect, summarize, describe, analyze or refer or relate to any items of information listed in Section 8(j)(i) of this Agreement. In the event that such items are not so returned, the Company will have the right to charge the Executive for all reasonable damages, costs, attorneys' fees and other expenses incurred in searching for, taking, removing and/or recovering such property.

(iv) Nothing in this Agreement prevents the Executive from providing, without prior notice to the Company, information to governmental authorities regarding possible legal violations or otherwise testifying or participating in any investigation or proceeding by any governmental authorities regarding possible legal violations (and for purpose of clarity the Executive is not prohibited from providing information voluntarily to the Securities and Exchange Commission pursuant to Section 21F of the Exchange Act.

(k) Discoveries and Inventions; Work Made for Hire.

(i) The Executive hereby assigns and agrees to assign to the Company, its successors, assigns or nominees, all of the Executive's rights to any discoveries, inventions and improvements, whether patentable or not, made, conceived or suggested, either solely or jointly with others, by the Executive while in the Company's employ, whether in the course of the Executive's employment with the use of the Company's time, material or facilities or that is in any way within or related to the existing or contemplated scope of the Company's business. Any discovery, invention or improvement relating to any subject matter with which the Company was concerned during the Executive's employment and made, conceived or suggested by the Executive, either solely or jointly with others, within two (2) years following termination of the Executive's employment under this Agreement or any successor agreements shall be irrefutably presumed to have been so made, conceived or suggested in the course of such employment with the use of the Company's time, materials or facilities. Upon request by the Company with respect to any such discoveries, inventions or improvements, the Executive will execute and deliver to the Company, at any time during or after the Executive's employment, all appropriate documents for use in applying for, obtaining and maintaining such domestic and foreign patents as the Company may desire, and all proper assignments therefor, when so requested, at the expense of the Company, but without further or additional consideration.

(ii) The Executive acknowledges that, to the extent permitted by law, all work papers, reports, documentation, drawings, photographs, negatives, tapes and masters therefor, prototypes and other materials (hereinafter, "items"), including without limitation, any and all such items generated and maintained on any form of electronic media, generated by the Executive during the Executive's employment with the Company shall be considered a "work made for hire" and that ownership of any and all copyrights in any and all such items shall belong to the Company. The item will recognize the Company as the copyright owner, will contain all proper copyright notices, e.g., "(creation date) Materion Corporation, All Rights Reserved," and will be in condition to be registered or otherwise placed in compliance with registration or other statutory requirements throughout the world.

(l) Communication of Contents of Agreement. During the Executive's employment and for two (2) years thereafter, the Executive will communicate the contents of this Section 8 of this Agreement to any person, firm, association, partnership, corporation or other entity which the Executive intends to be employed by, associated with, or represent and which is engaged in a business that is competitive to the business of the Company.

(m) Relief. The Executive acknowledges and agrees that the remedy at law available to the Company for breach of any of the Executive's obligations under this Agreement would be inadequate. The Executive therefore agrees that, in addition to any other rights or remedies that the Company may have at law or in equity, temporary and permanent injunctive relief may be granted in any proceeding which may be brought to enforce any provision contained in Sections 8(b), 8(c), 8(i), 8(j), 8(k) and 8(l), inclusive, of this Agreement, without the necessity of proof of actual damage.

(n) Reasonableness. The Executive acknowledges that the Executive's obligations under this Section 8 are reasonable in the context of the nature of the Company's business and the competitive injuries likely to be sustained by the Company if the Executive was to violate such obligations. The Executive further acknowledges that this Agreement is made in consideration of, and is adequately supported by the agreement of the Company to perform its obligations under this Agreement and by other consideration, which the Executive acknowledges constitutes good, valuable and sufficient consideration.

9. Employment Rights. Nothing expressed or implied in this Agreement will create any right or duty on the part of the Company or the Executive to have the Executive remain in the employment of the Company or any Affiliate of the Company. Any termination of employment of the Executive or the removal of the Executive from the office or position in the Company or any Affiliate of the Company that occurs following the commencement of any discussion with a third person that ultimately results in a Change in Control, shall be deemed to be a termination or removal of the Executive after a Change in Control for purposes of this Agreement.

10. Withholding of Taxes. The Company may withhold from any amounts payable under this Agreement all federal, state, city or other taxes as the Company is required to withhold pursuant to any applicable law, regulation or ruling.

11. Successors and Binding Agreement.

(a) The Company will require any successor (whether direct or indirect, by purchase, merger, consolidation, reorganization or otherwise) to all or substantially all of the business or assets of the Company, by agreement in form and substance reasonably satisfactory to the Executive, expressly to assume and agree to perform this Agreement in the same manner and to the same extent the Company would be required to perform if no such succession had taken place. This Agreement will be binding upon and inure to the benefit of the Company and any successor to the Company, including without limitation any persons acquiring directly or indirectly all or substantially all of the business or assets of the Company whether by purchase, merger, consolidation, reorganization or otherwise (and such successor shall thereafter be deemed the "Company" for the purposes of this Agreement), but will not otherwise be assignable, transferable or delegable by the Company.

(b) This Agreement will inure to the benefit of and be enforceable by the Executive's personal or legal representatives, executors, administrators, successors, heirs, distributees and legatees.

(c) This Agreement is personal in nature and neither of the parties hereto shall, without the consent of the other, assign, transfer or delegate this Agreement or any rights or obligations hereunder except as expressly provided in Sections 11(a) and 11(b). Without limiting the generality or effect of the foregoing, the Executive's right to receive payments hereunder will not be assignable, transferable or delegable, whether by pledge, creation of a security interest, or otherwise, other than by a transfer by Executive's will or by the laws of descent and distribution and, in the event of any attempted assignment or transfer contrary to this

Section 11(c), the Company shall have no liability to pay any amount so attempted to be assigned, transferred or delegated.

12. Notices. For all purposes of this Agreement, all communications, including without limitation notices, consents, requests or approvals, required or permitted to be given hereunder will be in writing and will be deemed to have been duly given when hand delivered or dispatched by electronic facsimile transmission (with receipt thereof orally confirmed), or five business days after having been mailed by United States registered or certified mail, return receipt requested, postage prepaid, or three business days after having been sent by a nationally recognized overnight courier service such as FedEx or UPS, addressed to the Company (to the attention of the Secretary of the Company) at its principal executive office and to the Executive at his principal residence, or to such other address as any party may have furnished to the other in writing and in accordance herewith, except that notices of changes of address shall be effective only upon receipt.

13. Compliance with Section 409A of the Code. To the extent applicable, it is intended that this Agreement be exempt from or comply with the provisions of Section 409A of the Code. This Agreement shall be administered in a manner consistent with this intent. References to Section 409A shall include any proposed, temporary or final regulation, or any other formal guidance, promulgated with respect to such section by the U.S. Department of Treasury or the Internal Revenue Service.

14. Governing Law; Choice of Forum. The validity, interpretation, construction and performance of this Agreement will be governed by and construed in accordance with the substantive laws of the State of Ohio, without giving effect to the principles of conflict of laws of such State. Further, any litigation arising out of this Agreement shall be venued in a court of competent jurisdiction located in Cuyahoga County, Ohio. In executing this Agreement, the Executive acknowledges that the Executive has purposefully availed himself or herself of the benefits and privileges of the jurisdictions of such courts, that the Executive waives any objections of the basis of forum, venue, and/or jurisdiction, and that the Executive willfully and knowingly submits himself or herself to the jurisdiction of such courts. The Executive further agrees that any litigation concerning, in whole or in part, Section 8 of this Agreement shall be filed either in the United States District Court for the Northern District of Ohio located in Cleveland, Ohio or in the Cuyahoga County Court of Common Pleas, Commercial Docket located in Cleveland, Ohio.

15. Validity. If any provision of this Agreement or the application of any provision hereof to any person or circumstance is held invalid, unenforceable or otherwise illegal, the remainder of this Agreement and the application of such provision to any other person or circumstance will not be affected, and the provision so held to be invalid, unenforceable or otherwise illegal will be reformed to the extent (and only to the extent) necessary to make it enforceable, valid or legal.

16. Miscellaneous. No provision of this Agreement may be modified, waived or discharged unless such waiver, modification or discharge is agreed to in writing signed by the Executive and the Company. No waiver by either party hereto at any time of any breach by the

other party hereto or compliance with any condition or provision of this Agreement to be performed by such other party will be deemed a waiver of similar or dissimilar provisions or conditions at the same or at any prior or subsequent time. No agreements or representations, oral or otherwise, expressed or implied with respect to the subject matter hereof have been made by either party which are not set forth expressly in this Agreement. References to Sections are to Sections of this Agreement.

17. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original but all of which together will constitute one and the same agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be duly executed and delivered as of the date first above written.

MATERION CORPORATION

By: /s/ Jugal Vijayvargiya
Jugal Vijayvargiya
Chief Executive Officer

/s/ Shelly Chadwick
Shelly Chadwick

CHANGE IN CONTROL SEVERANCE COMPENSATION

(1) A lump sum payment in an amount equal to two times the sum of (A) Base Pay (at the highest rate in effect for any period prior to the Termination Date), plus (B) Incentive Pay (in an amount equal to not less than the higher of (1) the average aggregate Incentive Pay earned in the three fiscal years immediately preceding the year in which the Termination Date occurred or (2) the plan target opportunity amount for the year in which the Termination Date occurred).

(2) (a) For a period of 24 months following the Termination Date (the “Change in Control Continuation Period”), the Company will arrange to provide the Executive with Employee Benefits that are welfare benefits including, without limitation, medical and life insurance (but not perquisites, stock option, performance share, performance unit, stock purchase, stock appreciation or similar compensatory benefits or benefits covered by Paragraph (3) below) substantially similar (except with respect to the cost of health care benefits) to those that the Executive was receiving or entitled to receive immediately prior to the Termination Date (or, if greater, immediately prior to the reduction, termination, or denial described in Section 2(b)(ii)). If and to the extent that any benefit described in this Paragraph (2) is not or cannot be paid or provided under any policy, plan, program or arrangement of the Company or any Affiliate of the Company, as the case may be, then the Company will itself pay or provide for the payment to the Executive, his dependents and beneficiaries, of such Employee Benefits along with, in the case of any benefit described in this Paragraph (2) which is subject to tax because it is not or cannot be paid or provided under any such policy, plan, program or arrangement of the Company or any Affiliate of the Company, an additional amount such that after payment by the Executive, or his dependents or beneficiaries, as the case may be, of all taxes so imposed, the recipient retains an amount equal to such taxes. Without otherwise limiting the purposes or effect of Section 6, Employee Benefits otherwise receivable by the Executive pursuant to this Paragraph (2) will be reduced to the extent comparable welfare benefits are actually received by the Executive from another employer during the Change in Control Continuation Period following the Executive’s Termination Date, and any such benefits actually received by the Executive shall be reported by the Executive to the Company.

(b) The Executive will pay the full cost for health care continuation coverage (including medical, dental and vision coverage) described in Paragraph (2)(a) on an after-tax basis. On the Payment Date and on January 2 of the following year, the Company will make a payment (the “Health Plans Premium Reimbursement”) to the Executive equal to the difference between (i) the amount the Executive will be required to pay during the calendar year of payment for such health care continuation coverage, and (ii) the amount the Executive would have been required to pay if the Executive were only required to pay the amount a similarly situated active employee would pay for such coverage, provided that the Company will not provide any payment pursuant to this Paragraph (2)(b) after the date on which the Executive becomes employed (other than on a part-time or temporary basis) by any other person or entity that makes health care coverage available to the Executive and his eligible dependents. The

Company shall reimburse the amount of any federal, state and local taxes imposed on the Executive as a result of the Health Plans Premium Reimbursement or the receipt of benefits under the health care continuation coverage, such reimbursement to be made subject to Section 4(e) and no later than December 31 of the year following the year in which the Executive remits the applicable taxes.

(c) Notwithstanding the foregoing, or any other provision of the Agreement, for purposes of determining the period of continuation coverage to which the Executive or any of his dependents is entitled pursuant to Section 4980B of the Code (or any successor provision thereto) under the Company's medical, dental and other group health plans, or successor plans, the Executive's "qualifying event" shall be the termination of the Change in Control Continuation Period. Further, for purposes of the immediately preceding sentence and for any other purpose including, without limitation, the calculation of service or age to determine Executive's eligibility for benefits under any retiree medical benefits or life insurance plan or policy, the Executive shall be considered to have remained actively employed on a full-time basis through the termination of the Change in Control Continuation Period.

(3) Upon the occurrence of a Change in Control, the provisions of the applicable long-term and equity (or equity-based) award agreements and plans, or any other documents or arrangements applicable at such time that provide for the treatment of such long-term and equity (or equity-based) awards in connection with or after a change in control, will govern the treatment of all long-term and equity (or equity-based) awards held by the Executive.

(4) Reasonable fees for outplacement services, by a firm selected by the Executive, at the expense of the Company in an amount not in excess of \$20,000; provided that Executive incurs such outplacement services no later than December 31 of the second year following the year in which Executive's Termination Date occurs, and provided further that the payment of fees for outplacement services will not be made any later than the last day of the third year following the year in which Executive's Date of Termination occurs.

INVOLUNTARY TERMINATION SEVERANCE COMPENSATION

(1) A lump sum payment in an amount equal to 1 times the sum of (A) Base Pay (at the highest rate in effect for any period prior to the Termination Date), plus (B) Incentive Pay (in an amount equal to (1) if the Termination Date occurs prior to the end of the third fiscal year following the date hereof, the plan target opportunity amount for the year in which the Termination Date occurred or (2) if the Termination Date occurs on or after the end of the third fiscal year following the date hereof, the average aggregate Incentive Pay earned in the three fiscal years immediately preceding the year in which the Termination Date occurred).

(2) (a) For a period of 12 months following the Termination Date (the "Continuation Period"), the Company will arrange to provide the Executive with Employee Benefits that are welfare benefits including, without limitation, medical and life insurance (but not perquisites, stock option, performance share, performance unit, stock purchase, stock appreciation or similar compensatory benefits or benefits) substantially similar (except with respect to the cost of health care benefits) to those that the Executive was receiving or entitled to receive immediately prior to the Termination Date (or, if greater, immediately prior to the reduction, termination, or denial described in Section 2(b)(ii)). If and to the extent that any benefit described in this Paragraph (2) is not or cannot be paid or provided under any policy, plan, program or arrangement of the Company or any Affiliate of the Company, as the case may be, then the Company will itself pay or provide for the payment to the Executive, his dependents and beneficiaries, of such Employee Benefits along with, in the case of any benefit described in this Paragraph (2) which is subject to tax because it is not or cannot be paid or provided under any such policy, plan, program or arrangement of the Company or any Affiliate of the Company, an additional amount such that after payment by the Executive, or his dependents or beneficiaries, as the case may be, of all taxes so imposed, the recipient retains an amount equal to such taxes. Without otherwise limiting the purposes or effect of Section 6, Employee Benefits otherwise receivable by the Executive pursuant to this Paragraph (2) will be reduced to the extent comparable welfare benefits are actually received by the Executive from another employer during the Continuation Period following the Executive's Termination Date, and any such benefits actually received by the Executive shall be reported by the Executive to the Company.

(b) The Executive will pay the full cost for health care continuation coverage (including medical, dental and vision coverage) described in Paragraph (2)(a) on an after-tax basis. On the Payment Date and on January 2 of the following year, the Company will make a payment (the "Health Plans Premium Reimbursement") to the Executive equal to the difference between (i) the amount the Executive will be required to pay during the calendar year of payment for such health care continuation coverage, and (ii) the amount the Executive would have been required to pay if the Executive were only required to pay the amount a similarly situated active employee would pay for such coverage, provided that the Company will not provide any payment pursuant to this Paragraph (2)(b) after the date on which the Executive becomes employed (other than on a part-time or temporary basis) by any other person or entity that makes health care coverage available to the Executive and his eligible dependents. The

Company shall reimburse the amount of any federal, state and local taxes imposed on the Executive as a result of the Health Plans Premium Reimbursement or the receipt of benefits under the health care continuation coverage, such reimbursement to be made subject to Section 4(e) and no later than December 31 of the year following the year in which the Executive remits the applicable taxes.

(c) Notwithstanding the foregoing, or any other provision of the Agreement, for purposes of determining the period of continuation coverage to which the Executive or any of his dependents is entitled pursuant to Section 4980B of the Code (or any successor provision thereto) under the Company's medical, dental and other group health plans, or successor plans, the Executive's "qualifying event" shall be the termination of the Continuation Period. Further, for purposes of the immediately preceding sentence and for any other purpose including, without limitation, the calculation of service or age to determine Executive's eligibility for benefits under any retiree medical benefits or life insurance plan or policy, the Executive shall be considered to have remained actively employed on a full-time basis through the termination of the Continuation Period.

(3) Vesting acceleration of all time-based equity (or equity-based) awards then-held by the Executive, to the extent they remain unvested, prorated based on the number of days that the Executive was employed during the period from the applicable date of grant (or last vesting date, as applicable) until the Executive's Date of Termination, and settlement of such vested awards on the date(s) on which payment would otherwise have been made pursuant to the applicable award agreement if the Executive had continued employment through such date(s).

(4) Vesting of all performance-based equity (or equity-based) awards then-held by the Executive based on actual achievement of the applicable performance conditions if the Executive had remained employed until the last day of the applicable performance period (as determined by the Board or a committee thereof after completion of the performance period), prorated based on the number of days that the Executive was employed during such performance period.

(5) Reasonable fees for outplacement services, by a firm selected by the Executive, at the expense of the Company in an amount not in excess of \$20,000; provided that Executive incurs such outplacement services no later than December 31 of the second year following the year in which Executive's Termination Date occurs, and provided further that the payment of fees for outplacement services will not be made any later than the last day of the third year following the year in which Executive's Date of Termination occurs.

MATERION CORPORATION
6070 Parkland Boulevard, Mayfield Heights, OH 44124
p 216.486.4200 f 216.383.4005 www.materion.com



October 23, 2020

Shelly M. Chadwick
7566 Huntington Road
Hudson, Ohio 44236

Dear Shelly,

It is with great pleasure that I extend to you an offer of employment for the full-time position of Chief Financial Officer, reporting directly to me and based at our Mayfield Heights, Ohio headquarters. This offer assumes a start date of December 1, 2020.

The terms of this offer are as follows:

- **Base Pay:** An annual base salary of \$420,000, paid bi-weekly (\$16,153.85). Base salaries are reviewed yearly. Employees hired by April 30 are eligible for a merit increase, effective August 1 of the current year.
- **Annual Cash Incentive:** Participation in the Management Incentive Plan at a target bonus of 70%. Employees hired on or before September 30 of the Plan Year are eligible for a prorated Plan award based on the number of months of participation. Plan details are included in the attached Management Incentive Plan document.
- **Annual Long-Term Incentive Awards:** Beginning in 2021, you will be eligible to receive equity awards under the Company's long-term incentive plan in a total amount commensurate with your position and performance. The current target long-term incentive opportunity for your position is 140% of your annual base salary as of January 1st of the grant year. All awards are subject to approval by the Compensation Committee of the Board of Directors and any performance-based awards are also subject to the Company's "claw back" policies.
- **Sign-on Bonus:** Sign-on bonus of \$144,500, payable with your first, regular pay period after 30 days of employment. You will be required to repay this bonus if you voluntarily terminate your employment without completing 12 months of active service.
- **Special Restricted Stock Unit Grant (RSUs):** You will receive, within 60 days of your date of hire, a special RSU grant valued at \$920,000 in grant date fair value, which shall vest as to one-fourth of the number of RSUs on each of the first four anniversaries of the Effective Date, subject to your continued service through such date and will be settled in stock.
- **Paid Time Off:** You are eligible for 25 days of paid time off (20 vacation and 5 personal), in addition to 11 paid company holidays per year. Details are included in the attached Benefit Highlights Summary.
- **Severance Agreements:** In 2021 you will receive both an Involuntary Severance agreement and Change in Control agreement. Under the Involuntary Severance Agreement, you will be eligible to receive twelve months Base Pay plus annual Incentive Pay (MIP). These agreements must be approved by the Board of Directors.

- **Benefits:** Materion's comprehensive benefits package includes; medical, dental and vision coverage, a Health Savings Account (HSA) option, life insurance, short and long-term disability, a Retirement Savings Plan that includes a 401(k) company match and an automatic annual company contribution, as well as several other voluntary benefits. Details are included in the attached Benefit Highlights Summary.

This offer of employment is contingent upon successful completion of a pre-employment background check, health and drug screen. Upon written acceptance of this offer, you will be contacted by Human Resources to schedule and complete your physical and drug screen. Please be aware, in view of the emergent COVID19 pandemic, your physical and drug screen appointment may be delayed.

On your start date, you will be required to acknowledge that you have read and agree to abide by Materion's Confidentiality and Non-Compete Agreement, as well as our Code of Conduct Policy, both of which are attached for your reference. You will also be required to comply with all other company policies during your employment.

Also, on your first day, you will be required to complete an I-9 Employment Eligibility Verification Form as well as supply originals of both the signed offer letter and Materion's Confidentiality and Non-Compete Agreement.

While we anticipate a long-term working relationship, your employment with Materion Corporation is on an "at will" basis and neither this offer letter, our compensation and benefit programs, nor our policies and procedures are to be construed as an employment contract. This letter supersedes all prior negotiations, representations, understandings and agreements, whether written and/or oral.

It is your obligation to conform to the Non-Compete and/or Confidentiality Agreements signed by your former employer(s). If you accept this offer, we require that you do not bring any confidential information, trade secrets, equipment, data and/or contact information from your former employer(s).

Shelly, I am excited by the prospect of having you join Materion's executive team. Please return a signed copy of this letter to Cheryl Goodman at Cheryl.Goodman@materion.com to acknowledge your acceptance of this offer and the mutually agreed upon start date.

Best Regards,

Jugal Vijayvargia
Jugal Vijayvargia
President & CEO

Offer Accepted By:

/s/ Shelly M. Chadwick
Shelly M. Chadwick

October 24, 2020

Date

February 18, 2021

Board of Directors
Materion Corporation
6070 Parkland Blvd
Mayfield Heights, Ohio 44124

Ladies and Gentlemen:

Note A of the Notes to the consolidated financial statements of Materion Corporation included in its Annual Report on Form 10-K for the year ended December 31, 2020 describes a change in the method of accounting for inventory valuation from the last-in, first-out (LIFO) method to the first-in, first-out (FIFO) method for certain inventories. There are no authoritative criteria for determining a “preferable” inventory method based on the particular circumstances; however, we conclude that such change in the method of accounting is to an acceptable alternative method which, based on your business judgment to make this change and for the stated reasons, is preferable in your circumstances.

Very truly yours,

/s/ Ernst & Young LLP
Cleveland, Ohio

Subsidiaries of Registrant

The Company has the following subsidiaries, all of which are wholly owned and included in the consolidated financial statements.

Name of Subsidiary	State or Country of Incorporation
Aerospace Metal Composites Limited	England
Egbert Corp.	Ohio
Materion Advanced Chemicals Inc.	Wisconsin
Materion Advanced Materials Technologies and Services Netherlands BV	Netherlands
Materion Advanced Materials Technologies and Services Suzhou Ltd.	China
Materion Advanced Materials Technologies and Services Corp.	New Mexico
Materion Singapore PTE. Ltd.	Singapore
Materion Advanced Materials Technologies and Services Inc.	New York
Materion Taiwan Co. Ltd.	Taiwan
Materion Advanced Materials Germany GmbH	Germany
Materion Japan Ltd.	Japan
Materion Brush (Singapore) PTE Ltd.	Singapore
Materion Brush GmbH	Germany
Materion Brush Inc.	Ohio
Materion Brush Singapore Shanghai	China
Materion Brush Singapore India SRO	India
Materion Brush Ltd.	England
Materion Czech S.R.O.	Czech Republic
Materion Ireland Holdings Ltd.	Ireland
Materion Ireland Ltd.	Ireland
Materion Large Area Coatings LLC	Delaware
Materion Natural Resources Inc.	Utah
Materion Korea Ltd.	Korea
Materion Precision Optics (Shanghai) Limited	China
Materion UK Limited	England
Materion Precision Optics and Thin Film Coatings Inc.	Massachusetts
Materion Services Inc.	Ohio
Materion Technical Materials Inc.	Ohio
Materion Advanced Materials Technologies and Services Far East Philippines PTD LTD.	Philippines
EIS Optics Limited Taiwan	Taiwan
Optics Balzers AG	Liechtenstein
Optics Balzers GmbH	Germany
Optics Balzers Jena GmbH	Germany
Optics Balzers Malaysia Sdn. Bhd.	Malaysia
Optics Balzers USA Inc.	United States

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

- (1) Registration Statement Number 333-88994 on Form S-8 dated May 24, 2002;
- (2) Registration Statement Number 333-127130 on Form S-8 dated August 3, 2005;
- (3) Registration Statement Number 333-133428 on Form S-8 dated April 20, 2006;
- (4) Registration Statement Number 333-133429 on Form S-8 dated April 20, 2006;
- (5) Registration Statement Number 333-145149 on Form S-8 dated August 6, 2007;
- (6) Registration Statement Number 333-173915 on Form S-8 dated May 4, 2011;
- (7) Registration Statement Number 333-173916 on Form S-8 dated May 4, 2011;
- (8) Registration Statement Number 333-173917 on Form S-8 dated May 4, 2011;
- (9) Registration Statement Number 333-195761 on Form S-8 dated May 7, 2014;
- (10) Registration Statement Number 333-195762 on Form S-8 dated May 7, 2014;
- (11) Registration Statement Number 333-217633 on Form S-8 dated May 3, 2017; and
- (12) Registration Statement Number 333-217618 on Form S-8 dated May 3, 2017.

of our reports dated February 18, 2021, with respect to the consolidated financial statements and schedule of Materion Corporation and subsidiaries and the effectiveness of internal control over financial reporting of Materion Corporation and subsidiaries included in this Annual Report (Form 10-K) of Materion Corporation and subsidiaries for the year ended December 31, 2020.

/s/ Ernst & Young LLP
Cleveland, Ohio
February 18, 2021

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each of the undersigned directors and officers of MATERION CORPORATION, an Ohio corporation (the "Corporation"), hereby constitutes and appoints Jugal K. Vijayvargiya, Shelly M. Chadwick, Gregory R. Chemnitz, and Michael J. Solecki, and each of them, their true and lawful attorney or attorneys-in-fact, with full power of substitution and revocation, for them and in their names, place and stead, to sign on their behalf as a director or officer, or both, as the case may be, of the Corporation, an Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K for the fiscal year ended December 31, 2020, and to sign any and all amendments to such Annual Report, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission granting unto said attorney or attorneys-in-fact, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as they might or could do in person, hereby ratifying and confirming all that said attorney or attorneys-in-fact or any of them or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN WITNESS WHEREOF, the undersigned have hereunto set their hands as of the 3rd day of February, 2021.

/s/ JUGAL K. VIJAYVARGIYA

Jugal K. Vijayvargiya, President,
Chief Executive Officer and Director
(Principal Executive Officer)

/s/ SHELLY M. CHADWICK

Shelly M. Chadwick, Vice President, Finance
and Chief Financial Officer
(Principal Financial and Accounting Officer)

/s/ VINOD M. KHILNANI

Vinod M. Khilnani, Director

/s/ EMILY M. LIGGETT

Emily M. Liggett, Director

/s/ ROBERT J. PHILLIPPY

Robert J. Phillippy, Director

/s/ PATRICK PREVOST

Patrick Prevost, Director

/s/ N. MOHAN REDDY

N. Mohan Reddy, Director

/s/ CRAIG S. SHULAR

Craig S. Shular, Director

/s/ DARLENE J. S. SOLOMON

Darlene J. S. Solomon, Director

/s/ ROBERT B. TOTH

Robert B. Toth, Director

CERTIFICATIONS

I, Jugal K. Vijayvargiya, certify that:

- 1) I have reviewed this annual report on Form 10-K of Materion Corporation (the “registrant”);
- 2) Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
- 3) Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
- 4) The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
- 5) The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
 - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
 - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Dated: February 18, 2021

/s/ Jugal K. Vijayvargiya

Jugal K. Vijayvargiya

President and Chief Executive Officer

CERTIFICATIONS

I, Shelly M. Chadwick, certify that:

- 1) I have reviewed this annual report on Form 10-K of Materion Corporation (the “registrant”);
- 2) Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
- 3) Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
- 4) The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
- 5) The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
 - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
 - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Dated: February 18, 2021

/s/ Shelly M. Chadwick

Shelly M. Chadwick
Vice President, Finance and
Chief Financial Officer

Certification Pursuant to
18 U.S.C. Section 1350,
As Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002

Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, in connection with the filing of the Annual Report on Form 10-K of Materion Corporation (the "Company") for the year ended December 31, 2020, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned officers of the Company certifies, that, to such officer's knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)), and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company as of the dates and for the periods expressed in the Report.

Dated: February 18, 2021

/s/ Jugal K. Vijayvargiya

Jugal K. Vijayvargiya
President and Chief Executive Officer

/s/ Shelly M. Chadwick

Shelly M. Chadwick
Vice President, Finance and
Chief Financial Officer

Materion Corporation

**Mine Safety Disclosure Pursuant to Section 1503(a) of the Dodd-Frank Wall Street Reform and
Consumer Protection Act for the Year Ended December 31, 2020**

Materion Natural Resources Inc., a wholly owned subsidiary, operates a beryllium mining complex in the State of Utah which is regulated by both the U.S. Mine Safety and Health Administration (“MSHA”) and state regulatory agencies. We endeavor to conduct our mining and other operations in compliance with all applicable federal, state and local laws and regulations. We present information below regarding certain mining safety and health citations which MSHA has levied with respect to our mining operations.

Section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Section 1503(a)”) requires the Company to present certain information regarding mining safety in its periodic reports filed with the Securities and Exchange Commission.

The following table reflects citations, orders and notices issued to Materion Natural Resources Inc. by MSHA during the year ended December 31, 2020 (the “Reporting Period”) and contains certain additional information as required by Section 1503(a) and Item 104 of Regulation S-K, including information regarding mining-related fatalities, proposed assessments from MSHA and legal actions (“Legal Actions”) before the Federal Mine Safety and Health Review Commission, an independent adjudicative agency that provides administrative trial and appellate review of legal disputes arising under the Mine Act.

Included below is the information required by Section 1503(a) with respect to the beryllium mining complex (MSHA Identification Number 4200706) for the Reporting Period:

(A)	Total number of alleged violations of mandatory health or safety standards that could significantly and substantially contribute to the cause and effect of a mine safety or health hazard under Section 104 of the Mine Act for which Materion Natural Resources Inc. received a citation from MSHA	0
(B)	Total number of orders issued under Section 104(b) of the Mine Act	0
(C)	Total number of citations and orders for alleged unwarrantable failure by Materion Natural Resources Inc. to comply with mandatory health or safety standards under Section 104(d) of the Mine Act	0
(D)	Total number of alleged flagrant violations under Section 110(b)(2) of the Mine Act	0
(E)	Total number of imminent danger orders issued under Section 107(a) of the Mine Act	0
(F)	Total dollar value of proposed assessments from MSHA under the Mine Act	\$492
(G)	Total number of mining-related fatalities	0
(H)	Received notice from MSHA of a pattern of violations under Section 104(e) of the Mine Act	No
(I)	Received notice from MSHA of the potential to have a pattern of violations under Section 104(e) of the Mine Act	No
(J)	Total number of Legal Actions pending as of the last day of the Reporting Period	0
(K)	Total number of Legal Actions instituted during the Reporting Period	0
(L)	Total number of Legal Actions resolved during the Reporting Period	0