UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2019

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 No. 1-15579

MSA SAFETY INCORPORATED

(Exact name of registrant as specified in its charter)

Pennsylvania	**46-4914539**
(State or other jurisdiction of incorporation or organization)	**(IRS Employer Identification No.)**
1000 Cranberry Woods Drive **Cranberry Township, Pennsylvania**	**16066-5207**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (724) 776-8600

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

Common Stock, no par value	**MSA**	**New York Stock Exchange**
(Title of each class)	**(Trading symbol(s))**	**(Name of each exchange on which registered)**

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

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

Large Accelerated Filer ☒	Accelerated filer	Non-accelerated filer	Smaller reporting company
			Emerging growth company

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

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

The aggregate market value of voting stock held by non-affiliates as of June 30, 2019 was approximately $3.7 billion. As of February 17, 2020, there were outstanding 38,858,321 shares of common stock, no par value.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the May 12, 2020 Annual Meeting of Shareholders are incorporated by reference into Part III.

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Forward-Looking Statements

This report may contain (and verbal statements made by MSA® Safety Incorporated (MSA) may contain) forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to future events or our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from any future results, levels of activity, performance or achievements expressed or implied by these forward-looking statements. These risks and other factors include, but are not limited to, those listed in this report under "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and elsewhere in this report. In some cases, you can identify forward-looking statements by words such as "may," "will," "should," "expects," "intends," "plans," "anticipates," "believes," "estimates," "predicts," "potential" or other comparable words. Actual results, performance or outcomes may differ materially from those expressed or implied by these forward-looking statements. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. We are under no duty to update publicly any of the forward-looking statements after the date of this report, whether as a result of new information, future events or otherwise.

PART I

Item 1. Business

Overview—Established in 1914, MSA Safety Incorporated is the global leader in the development, manufacture and supply of safety products that protect people and facility infrastructures. Recognized for their market leading innovation, many MSA products integrate a combination of electronics, mechanical systems and advanced materials to protect users against hazardous or life-threatening situations. The Company's comprehensive product line, which is governed by rigorous safety standards across highly regulated industries, is used by workers around the world in a broad range of markets, including the oil, gas and petrochemical industry, fire service, construction, industrial manufacturing applications, utilities, mining and the military. The Company's core products include breathing apparatus where self-contained breathing apparatus ("SCBA") is the principal product, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, firefighter helmets and protective apparel and fall protection devices.

The Company's leading market positions across nearly all of its core products are supported and enabled by a strong commitment to investing in new product development that continually raises the bar for safety equipment performance, all while upholding an unwavering commitment to integrity. We dedicate significant resources to research and development, which allows us to produce innovative safety products that are often first to market. Our global product development teams include cross-functional associates throughout the Company, including research and development, marketing, sales, operations and quality management. Our engineers and technical associates work closely with the safety industry's leading standards-setting groups and trade associations to develop industry specific product standards and to anticipate their impact on our product lines.

Segments—We tailor our product offerings and distribution strategy to satisfy distinct customer preferences that vary across geographic regions. To best serve these customer preferences, we have organized our business into six geographic operating segments that are aggregated into three reportable geographic segments: Americas, International and Corporate. Segment information is presented in Note 7 of the consolidated financial statements in Part II Item 8 of this Form 10-K.

Because our financial statements are stated in U.S. dollars and much of our business is conducted outside the U.S., currency fluctuations may affect our results of operations and financial position and may affect the comparability of our results between financial periods.

Products—We manufacture and sell a comprehensive line of safety products to protect the health and safety of workers and facility infrastructures around the world in the oil, gas and petrochemical industry, fire service, construction, industrial manufacturing applications, utilities, mining and the military. Our products protect people against a wide variety of hazardous or life-threatening situations.

The following is a brief description of each of our product categories:

Core products. MSA's corporate strategy includes a focus on driving sales of core products, where we have leading market positions and a distinct competitive advantage. Core products, as mentioned above, include breathing apparatus where SCBA is the principal product, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, firefighter helmets and protective apparel and fall protection devices. Core products comprised approximately 88% and 87% of sales in 2019 and 2018, respectively.

The following is a brief description of our core product offerings:

Breathing apparatus products. Breathing apparatus products include SCBA, face masks and respirators. SCBA is the primary product offering. SCBA are used by first responders, petrochemical plant workers and anyone entering an environment deemed immediately dangerous to life and health. Our primary breathing apparatus product in the Americas segment, the MSA G1 SCBA, is a revolutionary platform that offers many customizable and differentiated features, including the first and only Integrated Thermal Imaging Camera available on the market. We currently have 12 patents issued and an additional 2 patents pending for the MSA G1 SCBA. Our newest breathing apparatus product, the MSA M1 SCBA, represents the most advanced and ergonomic SCBA we have ever launched for our International markets. We sell breathing apparatus across both the Americas and International segments.

Fixed gas and flame detection instruments ("FGFD"). Our permanently installed fixed gas and flame detection instruments are used in oil, gas and petrochemical applications, wastewater, HVAC and general industrial production facilities to detect the presence or absence of various gases in the air. Typical applications of these instruments include the detection of an oxygen deficiency in confined spaces or the presence of combustible or toxic gases. FGFD product lines generate a meaningful portion of overall revenue from recurring business including replacement components and related service. We sell these instruments in both our Americas and International segments. Key products include:

- *Permanently installed gas detection monitoring systems.* This product line is used to monitor for combustible and toxic gases and oxygen deficiency in virtually any application where continuous monitoring is required. Our systems are used for gas detection in the oil and gas industry, petrochemical, pulp and paper, wastewater, refrigerant monitoring, pharmaceutical production and general industrial applications. These systems utilize a wide array of sensor technologies including electrochemical, catalytic, infrared and ultrasonic. During 2017, we launched a new line of advanced gas detection monitors. The Ultima®X5000 and S5000 gas monitors enhance facility and worker safety while lowering overall cost of ownership for our customers through differentiated sensor technology.

- *Flame detectors and open-path infrared gas detectors.* These instruments are used for plant-wide monitoring of toxic gases and for detecting the presence of flames. These systems use infrared optics to detect potentially hazardous conditions across long distances, making them suitable for use in such applications as offshore oil rigs, storage vessels, refineries, pipelines and ventilation ducts.

Portable gas detection instruments. Our hand-held portable gas detection instruments are used to detect the presence or absence of various gases in the air. The product is used by oil, gas and petrochemical workers, general industrial workers, miners, utility workers, first responders or anyone working in a confined space environment. Typical applications of these instruments include the detection of an oxygen deficiency in confined spaces or the presence of combustible or toxic gases. Our single- and multi-gas detectors provide portable solutions for detecting the presence of oxygen, combustible gases and various toxic gases, including hydrogen sulfide, carbon monoxide, ammonia and chlorine, either singularly or up to six gases at once. Our ALTAIR® 2X, ALTAIR 4XR and ALTAIR 5X Multigas Detectors, with our internally developed XCell® sensor technology, provide faster response times and unsurpassed durability. We sell portable gas detection instruments in both our Americas and International segments.

The acquisition of Sierra Monitor Corporation ("SMC"), a leading provider of fixed gas and flame detection instruments and Industrial Internet of Things solutions that connect and help protect high-value infrastructure assets, enables MSA to accelerate its strategy to enhance worker safety and accountability through the use of cloud technology and wireless connectivity. This acquisition enhances a key focus of the Company's Safety io® subsidiary, launched in 2018 primarily to leverage the capabilities of its portable gas detection portfolio as it relates to cloud connectivity. Our Safety io Grid product offers fleet management and live monitoring capabilities that interface with MSA's portable gas detection instruments.

Industrial head protection. We offer a complete line of industrial head protection and accessories that includes the iconic V-Gard® helmet brand, a bellwether product in MSA's portfolio for over 50 years. We offer customers a wide range of color choices and we are a world leader in the application of customized logos. Our industrial head protection products have a wide user base, including oil, gas and petrochemical workers, steel and construction workers, miners and industrial workers. Our Fas-Trac® III Suspension system was designed to provide enhanced comfort without sacrificing safety. Our strongest sales of head protection products have historically been in the Americas segment.

Firefighter helmets and protective apparel. We offer a complete line of fire helmets that includes our Cairns® and Gallet® helmet brands. Our Cairns helmets are primarily used by firefighters in North America while the Gallet helmets are primarily used by firefighters across our International segment. The acquisition of Globe® Holding Company, LLC ("Globe"), a leading innovator and provider of firefighter protective clothing and boots, strengthened our position as a leader in the North American market for firefighter personal protective equipment (PPE). MSA's firefighter safety PPE offering protects firefighters from head to toe, with Cairns Helmets, our industry leading G1 SCBA, and Globe turnout gear and boots.

Fall protection. Our broad line of fall protection equipment includes harnesses, lanyards, self-retracting lifelines, engineered systems and confined space equipment. Fall protection equipment is used by workers in the construction industry, oil, gas and petrochemical market, utilities industry, aerospace industry, general industrial applications and anyone working at height. MSA’s new V-Series fall protection equipment has transformed the Company’s harness and self-retracting lanyard portfolio, with approximately 50 new fall protection products launched over the past several years. The V-Series brand of fall protection equipment is inspired by MSA's iconic V-Gard hard hat, which is used by millions of workers around the world.

Non-core products. MSA maintains a portfolio of non-core products. Non-core products reinforce and extend the core offerings, drawing upon our customer relationships, distribution channels, geographical presence and technical experience. These products are complementary to the core offerings and have their roots within the core product value chain. Key non-core products include respirators, eye and face protection, ballistic helmets and gas masks. Ballistic helmet and gas mask sales are the primary sales to our military customers and were approximately $41 million globally in 2019 compared to $47 million in 2018.

Customers—Our customers generally fall into two categories: distributors and end-users. In our Americas segment, the majority of our sales are made through distribution. In our International segment, sales are made through both indirect and direct sales channels. For the year ended December 31, 2019, no individual customer represented more than 10% of our sales.

Sales and Distribution—Our sales and distribution team consists of marketing, field sales and customer service organizations. In most geographic areas, our field sales organizations work jointly with select distributors to call on end-users and educate them about hazards, exposure limits, safety requirements and product applications, as well as the specific performance attributes of our products. We believe that understanding end-user requirements is critical to increasing MSA's market share.

The in-depth customer training and education provided by our sales associates to our customers is critical to ensuring proper use of many of our products, such as SCBA and gas detection instruments. As a result of our sales associates working closely with end-users, they gain valuable insight into customer preferences and needs. To better serve our customers and to ensure that our sales associates are among the most knowledgeable and professional in the industry, we place significant emphasis on training our sales associates in product application, industry standards and regulations.

We believe our sales and distribution strategy allows us to deliver a customer value proposition that differentiates our products and services from those of our competitors, resulting in increased customer loyalty and demand.

In areas where we use indirect selling, we promote, distribute and service our products to general industry through authorized national, regional and local distributors. Some of our key distributors include W.W. Grainger Inc., Airgas, Casco Industries, Witmer Public Safety Group, Vallen Distribution, Ten-8 Fire Equipment, Essendant and Fastenal. We distribute fire service products primarily through specially trained local and regional distributors who provide advanced training and service capabilities to volunteer and paid municipal fire departments. Because of our broad and diverse product line and our desire to reach as many markets and market segments as possible, we have over 3,100 authorized distributor locations worldwide.

Competition—The global safety products market is broad and highly fragmented with few participants offering a comprehensive line of safety products. The sophisticated safety products market in which we compete is comprised of both core and non-core offerings and is a subset of the larger safety market. We maintain leading positions in nearly all of our core products. Over the long-term, we believe global demand for safety products will continue to grow. Purchases of these products are non-discretionary, protecting workers' health in hazardous and life-threatening work environments. Their use is often mandated by government and industry regulations, which are increasingly enforced on a global basis.

The safety products market is highly competitive, with participants ranging in size from small companies focusing on a single type of PPE to several large multinational corporations that manufacture and supply many types of sophisticated safety products. Our main competitors vary by region and product. We believe that participants in this industry compete primarily on the basis of product characteristics (such as functional performance, technology, cost of ownership, comfort, design and style), brand name recognition and after-market service support.

We believe we compete favorably within each of our operating segments as a result of our high quality, innovative offerings and strong brand trust and recognition.

Research and Development—To achieve and maintain our market leading positions, we operate several sophisticated research and development facilities. We believe our dedication and commitment to innovation and research and development allows us to produce state-of-the-art safety products that are often first to market and exceed industry standards. Our primary engineering groups are located in the United States, Germany and China. Our global product development teams include cross-geographic and cross-functional members from various areas throughout the Company, including research and development, marketing, sales, operations and quality management. These teams are responsible for setting product line strategies based on their understanding of customers' needs and available technology, as well as the opportunities and challenges they foresee in each product area. We believe our team-based, cross-geographical and cross-functional approach to new product development is a source of competitive advantage. Our approach to the new product development process allows us to tailor our product offerings and product line strategies to satisfy distinct customer preferences and industry regulations that vary across our operating segments.

We believe another important aspect of our approach to new product development is that our engineers and technical associates work closely with the safety industry’s leading standards-setting groups and trade associations. These organizations include the National Institute for Occupational Safety and Health ("NIOSH"), the National Fire Protection Association ("NFPA"), American National Standards Institute ("ANSI"), International Safety Equipment Association ("ISEA") and their overseas counterparts. Key members of our management team understand the impact that these standard-setting organizations have on our new product development pipeline. As such, management devotes significant time and attention to anticipating a new standard’s impact on our sales and operating results. Because of our understanding of customer needs, membership on global standards-setting bodies, investment in research and development and our unique new product development process, we believe we are well positioned to anticipate and adapt to changing product standards. While the length of the approval process can be unpredictable, we believe that we are well positioned to gain the approvals and certifications necessary to meet new government and multinational product regulations.

Patents and Intellectual Property—We own significant intellectual property, including a number of domestic and foreign patents, patent applications and trademarks related to our products, processes and business. Although our intellectual property plays an important role in maintaining our competitive position in a number of markets that we serve, no single patent, or patent application, trademark or license is, in our opinion, of such value to us that our business would be materially affected by the expiration or termination thereof, other than the “MSA” trademark. Our patents expire at various times in the future not exceeding 20 years. Our general policy is to apply for patents on an ongoing basis in the United States and other countries, as appropriate, to perfect our patent development. In addition to our patents, we have also developed or acquired a substantial body of manufacturing know-how that we believe provides a significant competitive advantage over our competitors.

Raw Materials and Suppliers—Many of the components of our products are formulated, machined, tooled or molded in-house from raw materials, which comprise approximately two-thirds of our cost of sales. For example, we rely on integrated manufacturing capabilities for breathing apparatus, gas masks, ballistic helmets, hard hats and circuit boards. The primary raw materials that we source from third parties include electronic components, rubber, high density polyethylene, chemical filter media, eye and face protective lenses, air cylinders, certain metals and ballistic resistant, flame resistant and non-ballistic fabrics. We purchase these materials both domestically and internationally, and we believe our supply sources are both well established and reliable. We have close vendor relationship programs with the majority of our key raw material suppliers. Although we generally do not have long-term supply contracts, thus far we have not experienced any significant problems in obtaining adequate raw materials. Please refer to MSA's Form SD filed on May 31, 2019 for further information on our conflict minerals analysis. Form SD may be obtained free of charge at www.sec.gov.

Associates—At December 31, 2019, we employed approximately 4,800 associates, of which approximately 1,900 were employed by our International segment. None of our U.S. associates are subject to the provisions of a collective bargaining agreement. Some of our associates outside the United States are members of unions. We have not experienced a significant work stoppage in over 10 years and believe our relations with our associates are strong.

Environmental Matters—Our facilities and operations are subject to laws and regulations relating to environmental protection and human health and safety. In the opinion of management, compliance with current environmental protection laws will not have a material adverse effect on our financial condition. See Item 1A, Risk Factors, for further information regarding our environmental risks which could impact the Company.

Seasonality—Our operating results are not significantly affected by seasonal factors. Sales are generally higher during the second and fourth quarters. During periods of economic expansion or contraction and following significant catastrophes, our sales by quarter have varied from this seasonal pattern. Government-related sales tend to increase in the fourth quarter. Americas sales tend to be strong during the oil and gas market turnaround seasons late in the first quarter, early in the second quarter and then again at the end of the third quarter and beginning of the fourth quarter. International segment sales are typically weaker for the Europe region in the summer holiday months of July and August and seasonality can be affected by the timing of delivery of larger orders. Invoicing and the delivery of larger orders can affect sales patterns variably across all reporting segments.

Available Information—Our Internet address is www.MSAsafety.com. We make the following filings available free of charge on the Investor Relations page on our website as soon as reasonably practicable after they have been electronically filed with or furnished to the Securities and Exchange Commission ("SEC"): our annual reports on Form 10-K, our quarterly reports on Form 10-Q, our current reports on Form 8-K and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as well as our proxy statement. Information contained on our website is not part of this annual report on Form 10-K or our other filings with the SEC. The SEC maintains an Internet site at www.sec.gov that contains reports, proxy and information statements and other information regarding issuers like us who file electronically with the SEC.

Item 1A. Risk Factors

Claims of injuries from our products, product defects or recalls of our products could have a material adverse effect on our business, operating results, financial condition and liquidity.

MSA and its subsidiaries face an inherent business risk of exposure to product liability claims arising from the alleged failure of our products to prevent the types of personal injury or death against which they are designed to protect. In the event the parties using our products are injured or any of our products prove to be defective, we could be subject to claims with respect to such injuries. In addition, we may be required to or may voluntarily recall or redesign certain products that could potentially be harmful to end users. Any claim or product recall that results in significant expense or negative publicity against us could have a material adverse effect on our business, operating results, financial condition and liquidity, including any successful claim brought against us in excess or outside of available insurance coverage.

Our subsidiary, Mine Safety Appliances Company, LLC, may experience losses from cumulative trauma product liability claims. The inability to collect insurance receivables and the transition to becoming largely self-insured for cumulative trauma product liability claims could have a material adverse effect on our business, operating results, financial condition and liquidity.

Our subsidiary, Mine Safety Appliances Company, LLC ("MSA LLC") was named as a defendant in1,605 cumulative trauma lawsuits comprised of 2,456 claims at December 31, 2019. Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred years ago and may have developed over long periods of time into diseases such as silicosis, asbestosis, mesothelioma or coal worker's pneumoconiosis. The products at issue were manufactured many years ago and are not currently offered by MSA LLC. A reserve has been established with respect to estimated amounts for cumulative trauma product liability claims currently asserted but not yet resolved and incurred but not reported ("IBNR") cumulative trauma product liability claims. Because our cumulative trauma product liability risk is subject to inherent uncertainties, including unfavorable trial rulings or developments, an increase in newly filed claims, or more aggressive settlement demands, and since MSA LLC is largely self-insured, there can be no certainty that MSA LLC may not ultimately incur losses in excess of presently recorded liabilities. These losses could have a material adverse effect on our business, operating results, financial condition and liquidity.

We will adjust the reserve from time to time based on whether the actual numbers, types and settlement values of claims asserted differ from current projections and estimates or there are significant changes in the facts underlying the assumptions used in establishing the reserve. Each of these factors may increase or decrease significantly within an individual period depending on, among other things, the timing of claims filings or settlements, or litigation outcomes during a particular period that are especially favorable or unfavorable to MSA LLC. We accordingly consider MSA LLC's claims experience over multiple periods and/or whether there are changes in MSA LLC's claims experience and trends that are likely to continue for a significant time into the future in determining whether to make an adjustment to the reserve, rather than evaluating such factors solely in the short term. Any future adjustments to the reserve may be material and could materially impact future periods in which the reserve is adjusted.

In the normal course of business, MSA LLC makes payments to settle these types of cumulative trauma product liability claims and for related defense costs, and records receivables for the amounts believed to be recoverable under insurance. MSA LLC has recorded insurance receivables totaling $63.8 million and notes receivables of $56.0 million at December 31, 2019. Since MSA LLC is now largely self-insured for cumulative trauma claims, additional amounts recorded as insurance receivables will be limited and based on calculating the amounts to be reimbursed pursuant to negotiated Coverage-in-Place Agreements. Various factors could affect the timing and amount of recovery of the insurance receivables, including assumptions regarding claims composition (which are relevant to calculating reimbursement under the terms of certain Coverage-In-Place Agreements) and the extent to which the issuing insurers may become insolvent in the future.

Unfavorable economic and market conditions could materially and adversely affect our business, results of operations and financial condition.

We are subject to risks arising from adverse changes in global economic conditions. We have significant operations in a number of countries outside the U.S., including some in emerging markets. Long-term economic uncertainty in some of the regions of the world in which we operate, such as Asia, Latin America, the Middle East and Europe, could result in declines in revenue, profitability and cash flow due to reduced orders, payment delays, supply chain disruptions or other factors caused by the economic challenges faced by our customers and suppliers.

A portion of MSA's sales are made to customers in the oil, gas and petrochemical market. We estimate that between 25% - 30% of our global business is sold into the energy market vertical with the most significant exposure in industrial head protection, portable gas detection and FGFD. Approximately 10% - 15% of consolidated revenue, primarily in industrial head protection and portable gas detection, is more exposed to a pullback in employment trends across the energy market. Another 5% - 10% of consolidated revenue, primarily in FGFD is more exposed to a pullback in capital equipment spending within the energy market. It is possible that the volatility in the oil, gas and petrochemical industry could negatively impact our business and could result in declines in our consolidated results of operations and cash flow.

A reduction in the spending patterns of government agencies or delays in obtaining government approval for our products could materially and adversely affect our net sales, earnings and cash flow.

The demand for our products sold to the fire service market, the homeland security market and other government agencies is, in large part, driven by available government funding. Government budgets are set annually and we cannot assure that government funding will be sustained at the same level in the future. A significant reduction in available government funding could result in declines in our consolidated results of operations and cash flow.

Our future results are subject to the risk that purchased components and materials are unavailable or available at excessive cost due to material shortages, excessive demand, currency fluctuation, inflationary pressure and other factors.

We depend on various components and materials to manufacture our products. Although we have not experienced any substantial difficulty in obtaining components and materials, it is possible that any of our supplier relationships could be terminated or otherwise disrupted. Any sustained interruption in our receipt of adequate supplies could have a material adverse effect on our business, results of operations and financial condition. Our inability to successfully manage price fluctuations due to market demand, currency risks or material shortages, or future price fluctuations could have a material adverse effect on our business and our consolidated results of operations and financial condition.

Our plans to continue to improve productivity and reduce complexity may not be successful, which could adversely affect our ability to compete.

MSA has integrated parts of its European operating segment that have historically been individually managed entities, into a centrally managed organization model. We have begun to and plan to continue to leverage the benefits of scale created from this approach and are in the process of implementing a more efficient and cost-effective enterprise resource planning system in additional locations across the International Segment. MSA runs the risk that these and similar initiatives may not be completed substantially as planned, may be more costly to implement than expected, or may not result in the efficiencies or cost savings anticipated. In addition, these various initiatives require MSA to implement a significant amount of organizational change which could divert management’s attention from other concerns, and if not properly managed, could cause disruptions in our day-to-day operations and have a negative impact on MSA's financial results. It is also possible that other major productivity and streamlining programs may be required in the future.

Our plans to improve future profitability through restructuring programs may not be successful and could lead to unintended consequences.

We have incurred and may incur restructuring charges primarily related to severance costs for staff reductions associated with our ongoing initiatives to drive profitable growth and right size our operations. For example in 2016, certain employees in the Americas segment were offered a voluntary retirement incentive package (“VRIP”). Non-cash special termination benefit expense of approximately $11.4 million was recorded in the first quarter of 2017 related to elections under the VRIP. Our cost structure in future periods is somewhat dependent upon our ability to maintain increased productivity without backfilling certain positions. If our programs are not successful, there could be a material adverse effect on our business and consolidated results of operations.

Our inability to successfully identify, consummate and integrate current and future acquisitions or to realize anticipated cost savings and other benefits could adversely affect our business.

One of our operating strategies is to selectively pursue acquisitions. On May 20, 2019, we completed the acquisition of Sierra Monitor Corporation ("SMC"), which is a leading provider of fixed gas and flame detection instruments and Industrial Internet of Things solutions that connect and help protect high-value infrastructure assets. Please refer to Note 13 of the consolidated financial statements in Part II Item 8 of this Form 10-K for further details. Any future acquisitions will depend on our ability to identify suitable acquisition candidates and successfully consummate such acquisitions. Acquisitions involve a number of risks including:

- failure of the acquired businesses to achieve the results we expect;
- diversion of our management's attention from operational matters;
- our inability to retain key personnel of the acquired businesses;
- risks associated with unanticipated events or liabilities;
- potential disruption of our existing business; and
- customer dissatisfaction or performance problems at the acquired businesses.

If we are unable to integrate or successfully manage businesses that we have recently acquired, including SMC, or may acquire in the future, we may not realize anticipated cost savings, improved manufacturing efficiencies and increased revenue, which may result in material adverse short- and long-term effects on our consolidated operating results, financial condition and liquidity. Even if we are able to integrate the operations of our acquired businesses into our operations, we may not realize the full benefits of the cost savings, revenue enhancements or other benefits that we may have expected at the time of acquisition. In addition, even if we achieve the expected benefits, we may not be able to achieve them within the anticipated time frame, and such benefits may be offset by costs incurred in integrating the acquired companies and increases in other expenses.

A failure of our information systems or a cybersecurity breach could materially and adversely affect our business, results of operations and financial condition.

The proper functioning and security of our information systems is critical to the operation and reputation of our business. Our information systems may be vulnerable to damage or disruption from natural or man-made disasters, computer viruses, power losses or other system or network failures. In addition, hackers, cyber-criminals and other persons could attempt to gain unauthorized access to our information systems with the intent of harming the Company, harming our information systems or obtaining sensitive information such as intellectual property, trade secrets, financial and business development information, and customer and vendor related information. If our information systems or security fail, or if there is any compromise or breach of our security, it could result in a violation of applicable privacy and other laws, legal and financial exposure, remediation costs, negative impacts on our customers' willingness to transact business with us, or a loss of confidence in our security measures, which could have an adverse effect on our business, our reputation and our consolidated results of operations and financial condition.

Like many companies, from time to time, we have experienced attacks on our computer systems by unauthorized outside parties. Because the techniques used by computer hackers and others to access or sabotage networks continually evolve and generally are not recognized until launched against a target, we may be unable to anticipate, prevent or detect these attacks. As a result, the impact of any future incident cannot be predicted, including the failure of our information systems or misappropriation of our technologies and/or processes. Any such system failure or loss of such information could harm our competitive position, or cause us to incur significant costs to remedy the damages caused by the incident. We routinely implement improvements to our network security safeguards as well as cybersecurity initiatives. We also maintain a robust cyber response plan, including an assessment of triggers for internal and external reporting of cyber incidents. We expect to continue devoting substantial resources to the security of our information technology systems. We cannot assure that such system improvements will be sufficient to prevent or limit the damage from any future cyber-attack or disruption to our information systems.

If we lose any of our key personnel or are unable to attract, train and/or retain qualified personnel or plan the succession of senior management, our ability to manage our business and continue our growth could be negatively impacted.

Our success depends in large part on the continued contributions of our key management, engineering and sales and marketing personnel, many of whom are highly skilled and would be difficult to replace. Our success also depends on the abilities of new personnel to function effectively, both individually and as a group. If we are unable to attract, effectively integrate and retain management, engineering or sales and marketing personnel, then the execution of our growth strategy and our ability to react to changing market requirements may be impeded, and our business could suffer as a result.

In addition, hiring, training, and successfully integrating replacement critical personnel could be time consuming, may cause additional disruptions to our operations, and may be unsuccessful, which could negatively impact future revenues. Competition for personnel is intense, and we cannot assure that we will be successful in attracting and retaining qualified personnel. The hiring of new personnel may also result in increased costs and we do not currently maintain key person life insurance.

Our success also depends on effective succession planning. Failure to ensure effective transfer of knowledge and smooth transitions involving senior management could hinder our strategic planning and execution. From time to time, senior management or other key employees may leave the Company. While we strive to reduce the negative impact of such changes, the loss of any key employee could result in significant disruptions to our operations, including adversely affecting the timeliness of product releases, the successful implementation and completion of company initiatives, the effectiveness of our disclosure controls and procedures and our internal control over financial reporting, and the results of our operations.

If we fail to introduce successful new products or extend our existing product lines, we could lose our market position and our financial performance could be materially and adversely affected.

In the safety products market, there are frequent introductions of new products and product line extensions. If we are unable to identify emerging consumer and technological trends, maintain and improve the competitiveness of our products and introduce new products, we may lose our market position, which could have a material adverse effect on our business, financial condition and results of operations. We continue to invest significant resources in research and development and market research. However, continued product development and marketing efforts are subject to the risks inherent in the development process. These risks include delays, the failure of new products and product line extensions to achieve anticipated levels of market acceptance and the risk of failed product introductions.

Damage to the reputation of MSA or to one or more of our product brands could adversely affect our business.

Developing and maintaining our reputation, as well as the reputation of our brands, is a critical factor in our relationship with customers, distributors and others. Our inability to address negative publicity or other issues, including concerns about product safety or quality, real or perceived, could negatively impact our business which could have a material adverse effect on our business, consolidated results of operations and financial condition.

Our ability to market and sell our products is subject to existing government regulations and standards. Changes in such regulations and standards or our failure to comply with them could materially and adversely affect our results of operations.

Most of our products are required to meet performance and test standards designed to protect the safety of people and infrastructures around the world. Our inability to comply with these standards could result in declines in revenue, profitability and cash flow. Changes in regulations could reduce the demand for our products or require us to re-engineer our products, thereby creating opportunities for our competitors. Regulatory approvals for our products may be delayed or denied for a variety of reasons that are outside of our control. Additionally, market anticipation of significant new standards can cause customers to accelerate or delay buying decisions.

The markets in which we compete are highly competitive, and some of our competitors have greater financial and other resources than we do. The competitive pressures faced by us could materially and adversely affect our business, results of operations and financial condition.

The safety products market is highly competitive, with participants ranging in size from small companies focusing on single types of safety products, to large multinational corporations that manufacture and supply many types of safety products. Our main competitors vary by region and product. We believe that participants in this industry compete primarily on the basis of product characteristics (such as functional performance, technology, cost of ownership, comfort, design and style), price, service and delivery, customer support, the ability to meet the special requirements of customers, brand name trust and recognition, and e-business capabilities. Some of our competitors have greater financial and other resources than we do and our business could be adversely affected by competitors' new product innovations, technological advances made to competing products and pricing changes made by us in response to competition from existing or new competitors. We may not be able to compete successfully against current and future competitors and the competitive pressures faced by us could have a material adverse effect our business, consolidated results of operations and financial condition. In addition, e-business is a rapidly developing area, and the execution of a successful e-business strategy involves significant time, investment and resources. If we are unable to successfully expand e-business capabilities in support of our customer needs, our brands may lose market share, which could negatively impact revenue and profitability.

We are subject to various federal, state and local laws and regulations across our global organization and any violation of these laws and regulations could adversely affect our results of operations.

We are subject to numerous, and sometimes conflicting, laws and regulations on matters as diverse as anti-corruption, import/export controls, product content requirements, trade restrictions, tariffs, taxation, sanctions, internal and disclosure control obligations, securities regulation, anti-competition, data privacy and labor relations, among others. This includes laws and regulations in emerging markets where legal systems may be less developed or familiar to us. Compliance with diverse legal requirements is costly, time consuming and requires significant resources. Violations of one or more of these laws or regulations in the conduct of our business could result in significant fines, criminal sanctions against us or our officers, prohibitions on doing business and damage to our reputation. These actions could result in liability for significant monetary damages, fines and/or criminal prosecution, unfavorable publicity and other reputational damage and have a material adverse effect on our business, consolidated results of operations and financial condition.

We are subject to various environmental laws and any violation of these laws could adversely affect our results of operations.

Included in the extensive laws, regulations and ordinances, to which we are subject, are those relating to the protection of the environment. Examples include those governing discharges to air and water, handling and disposal practices for solid and hazardous wastes and the maintenance of a safe workplace. These laws impose penalties for noncompliance and liability for response costs and certain damages resulting from past and current spills, disposals, or other releases of hazardous materials. We could incur substantial costs as a result of noncompliance with or liability for cleanup pursuant to these environmental laws. Such laws continue to change, and we may be subject to more stringent environmental laws in the future. If more stringent environmental laws are enacted, these future laws could have a material adverse effect on our business, consolidated results of operations and financial condition.

We benefit from free trade laws and regulations, such as the United States-Mexico-Canada Agreement and any changes to these laws and regulations could adversely affect our results of operations.

Existing free trade laws and regulations, such as the United States-Mexico-Canada Agreement, provide certain beneficial duties and tariffs for qualifying imports and exports, subject to compliance with the applicable classification and other requirements. Changes in laws or policies governing the terms of foreign trade, and in particular increased trade restrictions, tariffs or taxes on imports from countries where we manufacture products, such as China and Mexico, could have a material adverse effect on our business, consolidated results of operations and financial condition.

We are subject to various U.S and foreign tax laws and any changes in these laws related to the taxation of businesses and resolutions of tax disputes could adversely affect our results of operations.

The U.S. Congress, the Organization for Economic Co-operation and Development (or, OECD) and other government agencies in jurisdictions in which we and our affiliates invest or do business have maintained a focus on issues related to the taxation of multinational companies. The OECD has changed numerous long-standing tax principles through its base erosion and profit shifting ("BEPS") project which could adversely impact our effective tax rate.

We are subject to regular review and audit by both foreign and domestic tax authorities. While we believe our tax positions will be sustained, the final outcome of tax audits and related litigation may differ materially from the tax amounts recorded in our consolidated financial statements, which could have a material adverse effect on our consolidated results of operations, financial condition and cash flows.

We have significant international operations and are subject to the risks of doing business in foreign countries.

We have business operations in approximately 40 foreign countries. In 2019, approximately half of our net sales were made by operations located outside the United States. Those operations are subject to various political, economic and other risks and uncertainties, which could have a material adverse effect on our business. These risks include the following:

- unexpected changes in regulatory requirements;
- changes in trade policy or tariff regulations;
- changes in tax laws and regulations;
- unintended consequences due to changes to the Company's legal structure;
- additional valuation allowances on deferred tax assets due to an inability to generate sufficient profit in certain foreign jurisdictions;
- intellectual property protection difficulties or intellectual property theft;
- difficulty in collecting accounts receivable;
- complications in complying with a variety of foreign laws and regulations, some of which may conflict with U.S. laws;
- foreign privacy laws and regulations;
- trade protection measures and price controls;
- trade sanctions and embargoes;
- nationalization and expropriation;
- increased international instability or potential instability of foreign governments;
- effectiveness of worldwide compliance with MSA's anti-bribery policy, the U.S. Foreign Corrupt Practices Act, and similar local laws;
- difficulty in hiring and retaining qualified employees;
- the ability to effectively negotiate with labor unions in foreign countries;
- the need to take extra security precautions for our international operations;
- costs and difficulties in managing culturally and geographically diverse international operations;
- pandemics and similar disasters; and
- risks associated with the United Kingdom's decision to exit the European Union, including disruptions to trade and free movement of goods, services and people to and from the United Kingdom; increased foreign exchange volatility with respect to the British pound; and additional legal and economic uncertainty.

Any one or more of these risks could have a negative impact on the success of our international operations and, thereby, have a material adverse effect our business, consolidated results of operations and financial condition.

Because we derive a significant portion of our sales from the operations of our foreign subsidiaries, future currency exchange rate fluctuations could adversely affect our results of operations and financial condition, and could affect the comparability of our results between financial periods.

In 2019, our operations outside of the United States accounted for approximately one-half of our net sales. The results of our foreign operations are generally reported in local currency and then translated into U.S. dollars at the applicable exchange rates for inclusion in our consolidated financial statements. The exchange rates between some of these currencies and the U.S. dollar have fluctuated significantly in recent years and may continue to do so in the future. A weakening of the currencies in which sales are generated relative to the currencies in which costs are denominated would decrease our results of operations and cash flow. Although the Company uses instruments to hedge certain foreign currency risks, these hedges only offset a portion of the Company's exposure to foreign currency fluctuations.

In addition, because our consolidated financial statements are stated in U.S. dollars, such fluctuations may affect our consolidated results of operations and financial position, and may affect the comparability of our results between financial periods. Our inability to effectively manage our exchange rate risks or any volatility in currency exchange rates could have a material adverse effect on our business, consolidated results of operations and financial condition.

Our continued success depends on our ability to protect our intellectual property. If we are unable to protect our intellectual property, our business could be materially and adversely affected.

Our success depends, in part, on our ability to obtain and enforce patents, maintain trade secret protection and operate without infringing on the proprietary rights of third parties. We have been issued patents and have registered trademarks with respect to many of our products, but our competitors could independently develop similar or superior products or technologies, duplicate any of our designs, trademarks, processes or other intellectual property or design around any processes or designs on which we have or may obtain patents or trademark protection. In addition, it is possible that third parties may have, or will acquire, licenses for patents or trademarks that we may use or desire to use, so that we may need to acquire licenses to, or to contest the validity of, such patents or trademarks of third parties. Such licenses may not be made available to us on acceptable terms, if at all, and we may not prevail in contesting the validity of third party rights.

We also protect trade secrets, know-how and other confidential information against unauthorized use by others or disclosure by persons who have access to them, such as our employees, through contractual arrangements. These agreements may not provide meaningful protection for our trade secrets, know-how or other proprietary information in the event of any unauthorized use, misappropriation or disclosure of such trade secrets, know-how or other proprietary information. Our inability to maintain the proprietary nature of our technologies could have a material adverse effect on our consolidated results of operations and financial condition.

If our goodwill, other intangible assets and long-lived assets become impaired, we may be required to record significant charges to earnings.

We review our long-lived assets for impairment when events or changes in circumstances indicate the carrying amount may not be recoverable. Goodwill and indefinite-lived intangible assets are required to be assessed for impairment at least annually. Factors that may be considered a change in circumstances, indicating that the carrying amount of our goodwill, indefinite-lived intangible assets or long-lived assets may not be recoverable, include slower growth rates in our markets, reduced expected future cash flows, increased country risk premiums as a result of political uncertainty and a decline in stock price and market capitalization. We consider available current information when calculating our impairment charge. If there are indicators of impairment, our long-term cash flow forecasts for our operations deteriorate or discount rates increase, we may be required to recognize additional impairment charges in later periods. See Note 12 of the consolidated financial statements in Part II Item 8 of this Form 10-K for the carrying amounts of goodwill in each of our reporting segments and details on indefinite-lived intangible assets that we hold.

Risks related to our defined benefit pension and other post-retirement plans could adversely affect our results of operations and cash flow.

Significant changes in actual investment return on pension assets, discount rates, and other factors could adversely affect our results of operations and pension contributions in future periods. U.S. generally accepted accounting principles require that we calculate income or expense for the plans using actuarial valuations. These valuations reflect assumptions about financial markets and interest rates, which may change based on economic conditions. Funding requirements for our pension plans may become more significant. However, the ultimate amounts to be contributed are dependent upon, among other things, interest rates, underlying asset returns and the impact of legislative or regulatory changes related to pension funding obligations. For further information regarding our pension plans, refer to "Pensions and Other Post-retirement Benefits" in Note 14 of the consolidated financial statements in Part II Item 8 of this Form 10-K.

If we fail to meet our debt service requirements or the restrictive covenants in our debt agreements or if interest rates increase, our results of operations and financial condition could be materially and adversely affected.

We have a substantial amount of debt upon which we are required to make scheduled interest and principal payments and we may incur additional debt in the future. A significant portion of our debt bears interest at variable rates that may increase in the future.

The potential discontinuance of LIBOR is one such risk that could cause market volatility or disruption. In July 2017, the chief executive of the United Kingdom Financial Conduct Authority (the "FCA"), which regulates LIBOR, announced that the FCA intends to stop compelling banks to submit rates for the calculation of LIBOR after 2021. It is unknown whether any banks will continue to voluntarily submit rates for the calculation of LIBOR after 2021 or whether LIBOR will continue to be published by its administrator based on these submissions or on any other basis. It is not possible to predict the effect of these changes, other reforms, or the establishment of alternative reference rates, but the potential discontinuance of LIBOR could adversely affect our access to the debt and its cost of funding.

Our debt agreements require us to comply with certain restrictive covenants. If we are unable to generate sufficient cash to service our debt or if interest rates increase, our consolidated results of operations and financial condition could be materially and adversely affected. Additionally, a failure to comply with the restrictive covenants contained in our debt agreements could result in a default, which if not waived by our lenders, could substantially increase borrowing costs and require accelerated repayment of our debt. Please refer to Note 11 of the consolidated financial statements in Part II Item 8 of this Form 10-K for commentary on our compliance with the restrictive covenants.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal executive offices are located at 1000 Cranberry Woods Drive, Cranberry Township, PA, United States. We own or lease our primary facilities. Our primary manufacturing locations in the Americas segment are located in Cranberry Township, PA; Murrysville, PA; and Jacksonville, NC, and our primary distribution center is located in New Galilee, PA. The primary manufacturing locations in the International segment are located in Berlin, Germany; Suzhou, China; Devizes, United Kingdom; and Châtillon-sur-Chalaronne, France. Our primary research and development centers are located in Cranberry Township, PA; Berlin, Germany; and Suzhou, China.

We believe that all of our facilities, including the manufacturing facilities, are in good repair and in suitable condition for the purposes for which they are used.

Item 3. Legal Proceedings

Please refer to Note 19 to the consolidated financial statements in Part II Item 8 of this Form 10-K.

Item 4. Mine Safety Disclosures

Not applicable.

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Information about our Executive Officers

The following sets forth the names and ages of our executive officers as ofFebruary 20, 2020:

Name	Age	Title
Nishan J. Vartanian(a)	60	President and Chief Executive Officer since May 2018.
Steven C. Blanco(b)	53	Vice President and President, MSA Americas segment since August 2017.
Kenneth D. Krause(c)	45	Senior Vice President, Chief Financial Officer and Treasurer since February 2018.
Bob Leenen(d)	46	Vice President and President, MSA International segment since September 2017.
Stephanie L. Sciullo(e)	35	Vice President and Chief Legal Officer since January 2020.

(a) Prior to his present position, Mr. Vartanian was President and Chief Operating Officer since June 2017; Senior Vice President and President, MSA Americas since July 2015; and prior thereto served as Vice President and President, MSA North America.
(b) Prior to his present position, Mr. Blanco served as Vice President and General Manager, Northern North America since August 2015 and prior thereto was Vice President, Global Operational Excellence.
(c) Prior to his present position, Mr. Krause was Vice President, Chief Financial Officer and Treasurer since December 2015; Vice President, Strategic Finance since August 2015; and prior thereto served as Treasurer and Executive Director, Global Finance and Assistant Treasurer.
(d) Prior to his present position, Mr. Leenen was Regional Chief Financial Officer, MSA International and Finance Director, Europe.
(e) Prior to her present position, Ms. Sciullo served as Deputy General Counsel since 2016 and prior thereto was Associate General Counsel.

PART II

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

Our common stock is traded on the New York Stock Exchange under the symbol "MSA." On February 17, 2020, there were 177 registered holders of our shares of common stock.

Issuer Purchases of Equity Securities

Period	Total Number of Shares Purchased	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number of Shares that May Yet Be Purchased Under the Plans or Programs
October 1 — October 31, 2019	—	$ —	—	647,687
November 1 — November 30, 2019	—	—	—	627,514
December 1 — December 31, 2019	12,528	126.80	—	615,447

The share repurchase program authorizes up to$100.0 million in repurchases of MSA common stock in the open market and in private transactions. The share purchase program has no expiration date. The maximum number of shares that may be purchased is calculated based on the dollars remaining under the program and the respective month-end closing share price. We have purchased a total of 352,406 shares, or $22.2 million, since this program's inception.

The above shares purchased during the quarter relate to stock compensation transactions.

We do not have any other share repurchase programs.

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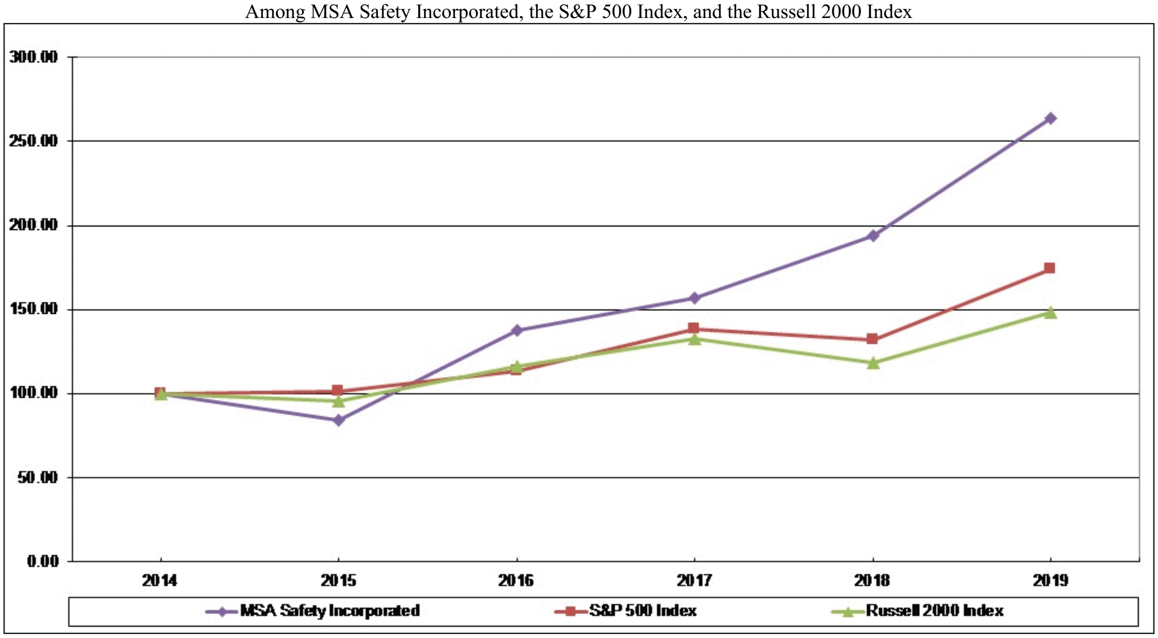
Comparison of Five-Year Cumulative Total Return

The following paragraph compares the most recent five year performance of MSA stock with (1) the Standard & Poor's 500 Composite Index and (2) the Russell 2000 Index. Because our competitors are principally privately held concerns or subsidiaries or divisions of corporations engaged in multiple lines of business, we do not believe it feasible to construct a peer group comparison on an industry or line-of-business basis. The Russell 2000 Index, while including corporations both larger and smaller than MSA in terms of market capitalization, is composed of corporations with an average market capitalization similar to us.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN
ASSUMES INITIAL INVESTMENT OF $100

Among MSA Safety Incorporated, the S&P 500 Index, and the Russell 2000 Index



Assumes $100 invested on December 31, 2014 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

	Value at December 31,					
	2014	2015	2016	2017	2018	2019
MSA Safety Incorporated	$ 100.00	$ 84.15	$ 137.84	$ 157.06	$ 194.10	$ 264.15
S&P 500 Index	100.00	101.38	113.51	138.29	132.23	173.86
Russell 2000 Index	100.00	95.59	115.95	132.94	118.30	148.49

Item 6. Selected Financial Data

(In thousands, except as noted)	2019[a]	2018	2017[b]	2016[c]	2015[d]
Statement of Income Data:					
Net sales	$ 1,401,981	$ 1,358,104	$ 1,196,809	$ 1,149,530	$ 1,130,783
Income from continuing operations	137,649	125,115	26,956	94,107	69,590
(Loss) income from discontinued operations	—	—	—	(755)	1,217
Net income attributable to MSA Safety Incorporated	136,440	124,150	26,027	91,936	70,807
Earnings per share attributable to MSA common shareholders:					
Basic per common share (in dollars):					
Income from continuing operations	$ 3.52	$ 3.23	$ 0.68	$ 2.47	$ 1.86
(Loss) income from discontinued operations	—	—	—	(0.02)	0.03
Net income	3.52	3.23	0.68	2.45	1.89
Diluted per common share (in dollars):					
Income from continuing operations	$ 3.48	$ 3.18	$ 0.67	$ 2.44	$ 1.84
(Loss) income from discontinued operations	—	—	—	(0.02)	0.03
Net income	3.48	3.18	0.67	2.42	1.87
Dividends paid per common share (in dollars)	1.64	1.49	1.38	1.31	1.27
Weighted average common shares outstanding—basic	38,653	38,362	37,997	37,456	37,293
Weighted average common shares outstanding—diluted	39,189	38,961	38,697	37,986	37,710
Balance Sheet Data:					
Total assets	$ 1,739,693 [e]	$ 1,608,012	$ 1,684,826	$ 1,353,920 [f]	$ 1,422,863
Long-term debt, net	328,394	341,311	447,832	363,836 [f]	458,022
Total MSA Safety Incorporated shareholders' equity	725,800	633,882	597,601	558,165	516,496

[a] Includes SMC from the date of acquisition on May 20, 2019.
[b] Includes Globe from the date of acquisition on July 31, 2017. In addition, we were able to reasonably estimate the potential liability for IBNR cumulative trauma product liability claims in the fourth quarter of 2017 and recognized a significant charge which reduced net income by approximately $85 million as compared to prior years as we became substantially self insured for cumulative trauma product liability claims during 2017. See Note 19 to the consolidated financial statements in Part II Item 8 of this Form 10-K for additional information.
[c] Includes Senscient from the date of acquisition on September 19, 2016.
[d] Includes Latchways from the date of acquisition on October 21, 2015.
[e] The Company adopted Accounting Standards Update (ASU) 2016-02, *Leases,* on January 1, 2019, which requires lessees to record a right-of-use asset and a liability for virtually all leases. The adoption of this ASU increased total assets by $54 million. This ASU was adopted using the modified retrospective transition method and all prior periods were reported in accordance with ASC 840, Leases.
[f] The Company adopted ASU No. 2015-03, *Interest - Imputation of Interest* and ASU No. 2015-15, *Interest - Imputation of Interest* on January 1, 2016, which requires an entity to present the debt issuance costs related to a recognized debt liability as a direct deduction from the carrying amount of that debt liability, consistent with debt discounts. December 31, 2015 financial information was recast to apply this change in accounting principle retrospectively.

The data presented in the Selected Financial Data table should be read in conjunction with comments provided in Management's Discussion and Analysis of Financial Condition and Results of Operations in Part II Item 7 and the consolidated financial statements in Part II Item 8 of this Form 10-K.

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

The following discussion and analysis should be read in conjunction with the historical financial statements and other financial information included elsewhere in this annual report on Form 10-K. This discussion may contain forward-looking statements that involve risks and uncertainties. The forward-looking statements are not historical facts, but rather are based on current expectations, estimates, assumptions and projections about our industry, business and future financial results. Our actual results could differ materially from the results contemplated by these forward-looking statements due to a number of factors, including those discussed in the sections of this annual report entitled "Forward-Looking Statements" and "Risk Factors."

MSA Safety Incorporated ("MSA") is organized into six geographical operating segments that are aggregated into three reportable geographic segments: Americas, International and Corporate. The Americas segment is comprised of our operations in North America and Latin America geographies. The International segment is comprised of our operations of all geographies outside of the Americas. Certain global expenses are allocated to each segment in a manner consistent with where the benefits from the expenses are derived. Please refer to Note 7—Segment Information of the consolidated financial statements in Part II Item 8 of this Form 10-K for further information.

On July 31, 2017, the Company acquired 100% of the common stock of Globe Holding Company, LLC ("Globe") for $215 million in cash plus a working capital adjustment of $1.4 million. Based in Pittsfield, NH, Globe is a leading innovator and provider of firefighter protective clothing and boots. This acquisition aligns with the Company's corporate strategy in that it strengthened our leading position in the North American fire service market. The transaction was funded through borrowings on our unsecured senior revolving credit facility. The data presented in Part II Item 6 of this Form 10-K should be read in conjunction with the following comments. Additionally, please refer to Note 13—Acquisitions of the consolidated financial statements in Part II Item 8 of this Form 10-K for further information.

On May 20, 2019, the Company acquired 100% of the common stock of Sierra Monitor Corporation ("SMC") in an all-cash transaction valued at $33.2 million, net of cash acquired. Based in Milpitas, California, in the heart of Silicon Valley, SMC is a leading provider of fixed gas and flame detection instruments and Industrial Internet of Things solutions that connect and help protect high-value infrastructure assets. The acquisition enables MSA to accelerate its strategy to enhance worker safety and accountability through the use of cloud technology and wireless connectivity. This acquisition enhances a key focus of the Company's Safety io subsidiary, launched in 2018 primarily to leverage the capabilities of its portable gas detection portfolio as it relates to cloud connectivity. The transaction was funded through borrowings on our unsecured senior revolving credit facility. The data presented in Part II Item 6 of this Form 10-K should be read in conjunction with the following comments. Additionally, please refer to Note 13—Acquisitions of the consolidated financial statements in Part II Item 8 of this Form 10-K for further information.

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Discussion of our results; liquidity and capital resources; and cumulative translation adjustments for the year ended December 31, 2018 compared to the year ended December 31, 2017 can be found under Part II Item 7 of our Form 10-K for the year ended December 31, 2018 as filed with the SEC.

BUSINESS OVERVIEW

We are a global leader in the development, manufacture and supply of safety products that protect people and facility infrastructures. Recognized for their market leading innovation, many MSA products integrate a combination of electronics, mechanical systems and advanced materials to protect users against hazardous or life-threatening situations. The Company's comprehensive product line, which is governed by rigorous safety standards across highly regulated industries, is used by workers around the world in a broad range of markets, including the oil, gas and petrochemical industry, fire service, construction, industrial manufacturing applications, utilities, mining and the military. MSA's core products include breathing apparatus where self-contained breathing apparatus ("SCBA") is the principal product, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, firefighter helmets and protective apparel, and fall protection devices. We are committed to providing our customers with service unmatched in the safety industry and, in the process, enhancing our ability to provide a growing line of safety solutions for customers in key global markets.

We tailor our product offerings and distribution strategy to satisfy distinct customer preferences that vary across geographic regions. To best serve these customer preferences, we have organized our business into six geographical operating segments that are aggregated into three reportable geographic segments: Americas, International and Corporate. In 2019, 65% and 35% of our net sales were made by our Americas and International segments, respectively.

Americas. Our largest manufacturing and research and development facilities are located in the United States. We serve our markets across the Americas with manufacturing facilities in the U.S., Mexico and Brazil. Operations in the other countries within the Americas segment focus primarily on sales and distribution in their respective home country markets.

International. Our International segment includes companies in Europe, Middle East, and the Asia Pacific region. In our largest International affiliates (in Germany, France, United Kingdom (U.K.), Ireland and China), we develop, manufacture and sell a wide variety of products. In China, the products manufactured are sold primarily in China as well as regional markets. Operations in other International segment countries focus primarily on sales and distribution in their respective home country markets. Although some of these companies may perform limited production, most of their sales are of products manufactured in our plants in Germany, France, the U.S., U.K., Ireland and China or are purchased from third party vendors.

Corporate. The Corporate segment primarily consists of general and administrative expenses incurred in our corporate headquarters, costs associated with corporate development initiatives, legal expense, interest expense, foreign exchange gains or losses, and other centrally-managed costs. Corporate general and administrative costs comprise the majority of the expense in the Corporate segment. During the years ended December 31, 2019, 2018 and 2017 corporate general and administrative costs were $37.3 million, $31.2 million, and $37.6 million, respectively.

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Net Sales (In millions)	**2019**	**2018**	**Dollar Increase (Decrease)**	**Percent Increase (Decrease)**
Consolidated	**$1,402.0**	**$1,358.1**	**$43.9**	**3.2%**
Americas	915.1	854.3	60.8	7.1%
International	486.9	503.8	(16.9)	(3.4)%

Net Sales. Net sales for the year ended December 31, 2019, were $1.40 billion, an increase of $43.9 million, from $1.36 billion for the year ended December 31, 2018. Constant currency sales increased by 5% for the year ended December 31, 2019. Please refer to the Net Sales table below for a reconciliation of the year over year sales change.

Net Sales (Percent Change)	Year Ended December 31, 2019 versus December 31, 2018 Americas	International	Consolidated
GAAP reported sales change	**7.1%**	**(3.4)%**	**3.2%**
Currency translation effects	0.7%	4.2%	2.0%
Constant currency sales change	7.8%	0.8%	5.2%

Note: Constant currency sales change is a non-GAAP financial measure provided by the Company to give a better understanding of the Company's underlying business performance. Constant currency sales change is calculated by removing the percentage impact from currency translation effects from the overall percentage change in net sales.

Net sales for the Americas segment were $915.1 million for the year ended December 31, 2019, an increase of $60.8 million, or 7%, compared to $854.3 million for the year ended December 31, 2018. During 2019, constant currency sales in the Americas segment increased 8% compared to the prior year period, driven primarily by growth across the portfolio.

Net sales for the International segment were $486.9 million for the year ended December 31, 2019, a decrease of $16.9 million, or 3%, compared to $503.8 million for the year ended December 31, 2018. Constant currency sales in the International segment increased 1% during 2019, as we recognized higher sales throughout our industrial and gas detection product portfolio partially offset by lower breathing apparatus sales and weaker non-core sales primarily in Europe on lower ballistic helmet sales. The decline in breathing apparatus sales year-over-year was driven by a large non-recurring order in our Pacific Asia region during 2018.

Refer to Note 7—Segment Information to the consolidated financial statements in Part II Item 8 of this Form 10-K, for information regarding sales by product group.

We are planning for mid-single digit revenue growth on a constant currency basis for the full year of 2020.

Gross profit. Gross profit for the year ended December 31, 2019 was $636.6 million, an increase of $24.7 million, or 4.0%, compared to $611.9 million for the year ended December 31, 2018. The ratio of gross profit to net sales was 45.4% in 2019 compared to 45.1% in 2018. The higher gross profit ratio during 2019 is primarily attributable to new product launches and pricing initiatives, partially offset by higher non-cash charges associated with LIFO accounting and costs associated with our acquisition of SMC, notably the amortization of the step-up value of inventory. See Note 13—Acquisitions of the consolidated financial statements in Part II Item 8 of this Form 10-K.

Selling, general and administrative expenses. Selling, general and administrative expenses were $330.5 million for the year ended December 31, 2019, an increase of $5.7 million, or 1.8%, compared to $324.8 million for the year ended December 31, 2018. Selling, general and administrative expenses were 23.6% of net sales in 2019 compared to 23.9% of net sales in 2018. The decrease was the result of ongoing productivity improvements in the Americas segment and savings from restructuring programs in the International Segment, partially offset by higher costs associated with our SMC acquisition. The following table presents a reconciliation of the year-over-year expense change for selling, general, and administrative expenses.

Selling, general, and administrative expenses (Percent Change)	Year Ended December 31, 2019 versus December 31, 2018 Consolidated
GAAP reported change	**1.8%**
Currency translation effects	**2.0%**
Constant currency change	**3.8%**
Less: Acquisitions and related strategic transaction costs	**(3.0)%**
Organic constant currency change	**0.8%**

Note: Organic constant currency change is a non-GAAP financial measure provided by the Company to give a better understanding of the Company's underlying business performance. Organic constant currency change in selling, general, and administrative expenses is calculated by removing the percentage impact from acquisitions and related strategic transaction costs as well as currency translation effects from the overall percentage change in GAAP selling, general, and administrative expense. Management believes excluding acquisitions and currency translation effects provide investors with a greater level of clarity into spending levels on a year-over-year basis.

Research and development expense. Research and development ("R&D") expense was $57.8 million for the year ended December 31, 2019, an increase of $5.1 million, or 9.8%, compared to $52.7 million for the year ended December 31, 2018. Research and development expense was 4.1% of net sales in 2019, compared to 3.9% of net sales in 2018. We continue to develop new products for global safety markets, including the recently launched V-Gard H1 Safety Helmet and V-Series family of fall protection products. In 2020, MSA plans to launch its connected firefighter ecosystem powered by LUNAR as well as the Altair io 360 Gas Detector, an area monitor that operates with the simplicity of a smart-home device. We capitalized approximately $5.0 million and $1.6 million of software development costs during the years ended December 31, 2019 and 2018, respectively.

Restructuring charges. During the year ended December 31, 2019, the Company recorded restructuring charges of $13.8 million, primarily related to footprint rationalization and other restructuring programs associated with our ongoing initiatives to drive profitable growth in our International segment. Included as part of restructuring charges in 2019, we recognized a non-cash settlement charge of $2.5 million for the termination of our pension plan in the United Kingdom. This compared to charges of $13.2 million during the year ended December 31, 2018, primarily related to severance costs for staff reductions associated with our ongoing initiatives to drive profitable growth in Europe and the legal and operational realignment of our U.S. and Canadian operations.

Currency exchange. Currency exchange losses were $19.8 million during the year ended December 31, 2019, compared to $2.3 million during the year ended December 31, 2018. The increase in currency exchange losses was primarily due to the recognition of non-cash cumulative translation losses of approximately $15.3 million as a result of the approval of our plan to close our South Africa affiliates during the first quarter of 2019. This charge is related to the historical translation of the elements of the financial statements for the business from the functional currency to the U.S. Dollar. The translation impact has been historically recorded as currency translation adjustment, a separate component of accumulated other comprehensive loss within the shareholders' equity section of the Consolidated Balance Sheet. The remaining currency exchange losses in both periods were related to foreign currency exposure on unsettled inter-company balances. Refer to Note 17—Derivative Financial Instruments of the consolidated financial statements in Part II Item 8 of this Form 10-K for information regarding our currency exchange rate risk management strategy.

Product liability and other operating expense. Product liability and other operating expense during the year ended December 31, 2019 was $28.4 million compared to $45.3 million for the year ended December 31, 2018. The expense in both periods primarily relates to an increase in our reserve for cumulative trauma product liability claims resulting from the Company’s revision of its estimates of potential liability for cumulative trauma product liability claims as part of its annual review process, as well as defense costs incurred for uninsured asserted cumulative trauma product liability claims. Please refer to Note 19—Contingencies of the consolidated financial statements in Part II Item 8 of this Form 10-K for additional information.

GAAP operating income. Consolidated operating income for the year ended December 31, 2019 was $186.2 million compared to $173.5 million for the year ended December 31, 2018. The increase in operating results was driven by higher sales volumes and lower product liability and other operating expense partially offset by higher currency exchange losses, as well as higher R&D costs related to new product launches.

Adjusted operating income. Americas adjusted operating income for the year ended December 31, 2019 was $226.6 million, an increase of $19.8 million, or 10%, compared to $206.8 million for the year ended December 31, 2018. The increase was related to the higher level of sales and margin expansion driven by new product launches and pricing initiatives as well as savings realized from previously executed restructuring programs.

International adjusted operating income for the year ended December 31, 2019 was $59.9 million, consistent with adjusted operating income of $59.9 million for the year ended December 31, 2018. Despite realizing a lower level of sales, cost reduction programs helped to maintain adjusted operating income and improved adjusted operating margin.

Corporate segment adjusted operating loss for the year ended December 31, 2019 was $35.6 million, an increase of $3.7 million, or 12%, compared to an operating loss of $31.9 million for the year ended December 31, 2018, primarily due to higher professional service expenses partially offset by lower legal expenses.

The following tables represent a reconciliation from GAAP operating income to adjusted operating income (loss) and adjusted EBITDA. Adjusted operating margin % is calculated as adjusted operating income (loss) divided by net sales and adjusted EBITDA margin % is calculated as adjusted EBITDA divided by net sales.

	Year Ended December 31, 2019			
(In thousands)	**Americas**	**International**	**Corporate**	**Consolidated**
Net sales	$ 915,118	$ 486,863	$ —	$ 1,401,981
GAAP operating income				186,230
Restructuring charges (Note 2)				13,846
Currency exchange losses, net				19,814
Product liability expense (Note 19)				26,619
Strategic transaction costs (Note 13)				4,400
Adjusted operating income (loss)	226,596	59,910	(35,597)	250,909
Adjusted operating margin %	24.8%	12.3%		
Depreciation and amortization	24,691	12,938	391	38,020
Adjusted EBITDA	251,287	72,848	(35,206)	288,929
Adjusted EBITDA %	27.5%	15.0%		

	Year Ended December 31, 2018			
(In thousands)	**Americas**	**International**	**Corporate**	**Consolidated**
Net sales	$ 854,287	$ 503,817	$ —	$ 1,358,104
GAAP operating income				173,479
Restructuring charges (Note 2)				13,247
Currency exchange losses, net				2,330
Product liability expense (Note 19)				45,327
Strategic transaction costs (Note 13)				421
Adjusted operating income (loss)	206,839	59,866	(31,901)	234,804
Adjusted operating margin %	24.2%	11.9%		
Depreciation and amortization	24,143	13,303	406	37,852
Adjusted EBITDA	230,982	73,169	(31,495)	272,656
Adjusted EBITDA %	27.0%	14.5%		

Note: Adjusted operating income (loss) and adjusted EBITDA are a non-GAAP financial measures used by the chief operating decision maker to evaluate segment performance and allocate resources. Adjusted operating income (loss) is reconciled above to the nearest GAAP financial measure, Operating income (loss), and excludes restructuring, currency exchange, product liability expense and strategic transaction costs. Adjusted EBITDA is reconciled above to the nearest GAAP financial measure, Operating income (loss) and excludes depreciation and amortization expense.

Total other expense, net. Other expense for the year ended December 31, 2019 was $2.5 million, a decrease of $8.6 million, or 77.6%, compared to $11.1 million for the year ended December 31, 2018 due to lower interest expense primarily as a result of a favorable adjustment related to a foreign uncertain tax position for which the statute of limitations has expired, higher pension income and the absence of the loss on extinguishment of debt recognized in 2018. Lower discount rates are expected to drive an $8 million unfavorable swing in pension expense in 2020, compared to 2019. The majority of this impact will be reflected in the Other income, net line on our Consolidated Statement of Income. The increase in expense is non-cash. Our U.S. qualified plan remains overfunded and our funding status is expected to improve in 2020 based on higher returns on our investments in 2019.

Income taxes. The reported effective tax rate for the year endedDecember 31, 2019 was 25.1%, which included a benefit of 2.6% for share-based payments, an expense of 1.8% due to non-deductible foreign currency exchange losses on entity closures, an expense of 1.9% due to nondeductible compensation and expense related to an increase in profitability in higher tax jurisdictions. This compared to a reported effective tax rate for the year ended December 31, 2018, of 22.9%, which included a benefit of 1.6% for certain share-based payments and a charge of 1.1% associated with exit taxes related to our U.S., Canadian, and European realignment.

We are subject to regular review and audit by both foreign and domestic tax authorities. While we believe our tax positions will be sustained, the final outcome of tax audits and related litigation may differ materially from the tax amounts recorded in our consolidated financial statements.

During 2018, the Company recorded $1.8 million of foreign income tax reserves related to legal and operational realignment of our U.S., Canadian and European operations.

As of December 31, 2018, the Company had completed its accounting for all of the enactment-date income tax effects of the Tax Cuts and Jobs Act of 2017 (the "Act"). Accordingly, we reduced our estimate for the one-time transition tax by $2.0 million and increased our estimate for the revaluation of U.S. deferred tax assets and liabilities by $2.5 million and a $2.0 million increase associated with prepaid taxes for updated regulations related to the Act.

Net income attributable to MSA Safety Incorporated. Net income was $136.4 million for the year ended December 31, 2019, or $3.48 per diluted share, compared to $124.2 million, or $3.18 per diluted share, for the year ended December 31, 2018, as a result of the factors described above.

Non-GAAP Financial Information

We may provide information regarding financial measures such as organic constant currency changes, financial measures excluding the impact of acquisitions and related strategic transaction costs, adjusted operating income, adjusted operating margin percentage, adjusted EBITDA and adjusted EBITDA margin percentage, which are not recognized terms under U.S. GAAP and do not purport to be alternatives to net sales, selling, general and administrative expense, operating income or net income as a measure of operating performance. We believe that the use of these non-GAAP financial measures provide investors with additional useful information and provide a more complete understanding of the underlying results. Because not all companies use identical calculations, these presentations may not be comparable to similarly titled measures from other companies. For more information about these non-GAAP measures and a reconciliation to the nearest U.S. GAAP measure, please refer to the reconciliations referenced above in Management's Discussion & Analysis section and in Note 7—Segment Information of the consolidated financial statements in Part II Item 8 of this Form 10-K.

We may also provide financial information on a constant currency basis, which is a non-GAAP financial measure. These references to a constant currency basis do not include operational impacts that could result from fluctuations in foreign currency rates, which are outside of management's control. To provide information on a constant currency basis, the applicable financial results are adjusted by translating current and prior period results in local currency to a fixed foreign exchange rate. This approach is used for countries where the functional currency is the local country currency. This information is provided so that certain financial results can be viewed without the impact of fluctuations in foreign currency rates, thereby facilitating period-to-period comparisons of business performance. Constant currency information is not recognized under U.S. GAAP and it is not intended as an alternative to U.S. GAAP measures.

LIQUIDITY AND CAPITAL RESOURCES

Our main source of liquidity is operating cash flows, supplemented by borrowings. Our principal liquidity requirements are for working capital, capital expenditures, principal and interest payments on debt, dividend payments, and acquisitions. At December 31, 2019, approximately 32% of our long-term debt is at fixed interest rates with repayment schedules through 2031. The remainder of our long-term debt is at variable rates on an unsecured revolving credit facility that is due in 2023. At December 31, 2019, approximately 78% of our borrowings are denominated in US dollars, which limits our exposure to currency exchange rate fluctuations.

At December 31, 2019, we had cash, cash equivalents and restricted cash totaling $152.5 million, which included $117.6 million of cash, cash equivalents and restricted cash held by our foreign subsidiaries. Cash, cash equivalents and restricted cash increased $11.9 million during the year ended December 31, 2019 compared to an increase of $2.7 million during 2018. We continue to employ a balanced capital allocation strategy that prioritizes growth investments, funding our dividend and servicing debt obligations.

Our unsecured senior revolving credit facility provides for borrowings up to $600.0 million through 2023 and is subject to certain commitment fees. This credit facility has sub-limits for the issuance of letters of credit, swingline borrowings and foreign currency denominated borrowings; and may be used for general corporate purposes, including working capital, permitted acquisitions, capital expenditures and repayment of existing indebtedness. Loans under the revolving facility will bear interest at a variable rate based on LIBOR or the federal funds rate at the Company's option. Our weighted average interest rate was 2.77% in 2019. At December 31, 2019, $361.3 million of the $600.0 million senior revolving credit facility was unused, including letters of credit.

The Company currently has access to approximately $663.0 million of capital at December 31, 2019. Refer to Note 11—Short and Long-Term Debt to the consolidated financial statements in Part II Item 8 of this Form 10-K.

Operating activities. Operating activities provided cash of $165.0 million in 2019, compared to providing cash of $263.9 million in 2018. The decrease in operating cash flows during the period was primarily attributable lower collections on insurance receivables and a higher use of cash for working capital to support our higher level of sales and backlog. We made product liability payments of $33.5 million, net of collections on insurance receivables, in the year ended December 31, 2019, while we collected $40.1 million from insurance companies, net of product liability settlements paid, in the same period of 2018 largely the result of resolving a long outstanding carrier. Historically, cumulative trauma liability payments were funded with the Company's operating cash flow, pending resolution of disputed insurance coverage. For more than a decade, we have funded product liability settlements from operating cash flow. The vast majority of the insurance receivables and notes receivables - insurance companies balances at December 31, 2019, is attributable to reimbursement believed to be due under the terms of signed agreements with insurers and are not currently subject to litigation. While the timing of cash flows for product liability and insurance receivables can and do vary from quarter to quarter, we have been successful in establishing cash flow streams that have allowed us to fund these liabilities without a material impact on our capital allocation priorities.

Investing activities. Investing activities used cash of $64.2 million for the year ended December 31, 2019, compared to using $84.4 million in 2018. The acquisition of Sierra Monitor Corporation, purchase of short-term investments, net of proceeds from maturities and capital expenditures drove cash outflows from investing activities during the year ended December 31, 2019. Purchases of short-term investments and capital expenditures drove cash outflows from investing in the same period in 2018. During 2019 we spent $36.6 million on capital expenditures including approximately $5.0 million associated with software development, which was a $3.4 million increase compared to 2018. We expect capital expenditures to approximate $45 million in 2020, within the Company’s annual capital expenditure expectations of 2.5% - 3.5% of revenue.

Financing activities. Financing activities used cash of $84.6 million for the year ended December 31, 2019, compared to using cash of $163.3 million in 2018. During 2019, we had net payments on long-term debt of $16.5 million compared to net payments of $107.7 million in the same period in 2018. In August 2018, we repaid our 5.41% 2006 Senior Notes in the amount of $28.0 million, which included $1.5 million related to a make-whole provision and accrued interest through the date of repayment.

We made dividend payments of $63.5 million during 2019, compared to $57.2 million during 2018. Dividends paid on our common stock during 2019 were $1.64 per share. Dividends paid on our common stock in 2018 were $1.49.

Restricted cash balances were $0.3 million at December 31, 2019 compared to $0.5 million at December 31, 2018 and were primarily used to support letter of credit balances.

The MSA Board of Directors has authorized the Company to repurchase up to $100.0 million in shares of MSA common stock. There were $3.3 million in repurchases made in 2019 and no share repurchases in 2018. The program seeks to offset equity dilution associated with employee stock compensation. The Board of Directors did not set a time limitation on the repurchase program.

CUMULATIVE TRANSLATION ADJUSTMENTS

The year-end position of the U.S. dollar relative to international currencies resulted in a translation loss of $1.6 million being recorded to cumulative translation adjustments for the year ended December 31, 2019 compared to a loss of $29.8 million in 2018. The translation loss during 2019 was primarily related to the strengthening of the U.S. dollar relative to the euro. The translation loss in 2018 was primarily related to the strengthening of the U.S. dollar relative to the euro and British pound.

During the year ended December 31, 2019, we recognized approximately $19.8 million of currency exchange losses, net, in our Consolidated Statement of Income of which $15.3 million relates to non-cash currency exchange losses due primarily to an approved plan to close our South Africa affiliates. This charge is related to the historical translation of the elements of the financial statements for the business from the functional currency to the U.S. Dollar. The translation impact has been historically recorded as currency translation adjustment, a separate component of accumulated other comprehensive loss within the shareholders' equity section of the Consolidated Balance Sheet.

Brexit has caused, and may continue to create, volatility in global stock markets and regional and global economic uncertainty particularly in the U.K. financial and banking markets. Weakening of economic conditions or economic uncertainties tend to harm our business, and if such conditions worsen in the U.K. or in the rest of Europe, it may have an adverse effect on our consolidated operations and sales. The Company continues to monitor the economic situation related to Brexit and current analysis indicates that exposure in our supply chain related to additional duties and sourcing costs is not material. We have approximately $45 million of annual sales denominated in the British pound which are subject to exchange rate risk associated with any volatility in the British pound. We have long-term debt of $78.4 million at December 31, 2019 that is denominated in British pounds. Because the debt is denominated in local currency, the value of the debt and local cash flows are aligned with respect to movements in the exchange rate between the British pound and U.S. dollar.

COMMITMENTS AND CONTINGENCIES

We are obligated to make future payments under various contracts, including debt and lease agreements. Our significant cash obligations as of December 31, 2019, are as follows:

(In millions)	Total	2020	2021	2022	2023	2024	Thereafter
Long-term debt	$ 349.9	$ 20.0	$ 20.0	$ —	$ 245.2	$ 8.1	$ 56.6
Operating leases	65.0	11.0	9.1	6.0	4.7	3.6	30.6
Transition tax	6.7	0.1	0.8	1.5	1.9	2.4	—
Totals	$ 421.6	$ 31.1	$ 29.9	$ 7.5	$ 251.8	$ 14.1	$ 87.2

The significant obligations table does not include obligations to taxing authorities due to uncertainty surrounding the ultimate settlement of amounts and timing of these obligations.

We expect to meet our 2020 and 2021 debt service obligations through cash provided by operations. Approximately $237.1 million of debt payable in 2023 relates to our unsecured senior revolving credit facility. We expect to generate sufficient operating cash flow to make payments against this amount each year. To the extent that a balance remains when the facility matures in 2023, we expect to refinance the remaining balance through new borrowing facilities. Interest expense on fixed rate debt over the next five years is expected to be approximately $3.7 million in 2020, $2.9 million in 2021, $2.2 million in 2022, $2.1 million in 2023, and $1.8 million in 2024. We expect total interest expense for 2020 to be between $12 million - $14 million.

The Company had outstanding bank guarantees and standby letters of credit with banks as of December 31, 2019 totaling $8.6 million, of which $1.9 million relate to the senior revolving credit facility. These letters of credit serve to cover customer requirements in connection with certain sales orders and insurance companies. No amounts were drawn on these arrangements at December 31, 2019. The Company is also required to provide cash collateral in connection with certain arrangements. At December 31, 2019, the Company has $0.3 million of restricted cash in support of these arrangements.

We expect to make net contributions of $7.6 million to our pension plans in 2020 which are primarily associated with our International segment. We have not been required to make contributions to our U.S. based qualified defined benefit pension plan in many years.

We have purchase commitments for materials, supplies, services and property, plant and equipment as part of our ordinary conduct of business.

Please refer to Note 19 to the consolidated financial statements in Part II Item 8 of this Form 10-K for further discussion on the Company's product liabilities.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

We prepare our consolidated financial statements in accordance with U.S. generally accepted accounting principles (GAAP). The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and the related disclosures. We evaluate these estimates and judgments on an on-going basis based on historical experience and various assumptions that we believe to be reasonable under the circumstances. However, different amounts could be reported if we had used different assumptions and in light of different facts and circumstances. Actual amounts could differ from the estimates and judgments reflected in our consolidated financial statements. A summary of the Company's significant accounting policies is included in Note 1—Significant Accounting Policies to the consolidated financial statements in Part II, Item 8 of this Form 10-K.

We believe that the following are the more critical judgments and estimates used in the preparation of our consolidated financial statements.

Cumulative trauma product liability. We face an inherent business risk of exposure to product liability claims arising from the alleged failure of our products to prevent the types of personal injury or death against which they are designed to protect. Product liability claims are categorized as either single incident or cumulative trauma.

Single incident product liability claims involve incidents of short duration that are typically known when they occur and involve observable injuries, which provide an objective basis for quantifying damages. The Company estimates its liability for single incident product liability claims based on expected settlement costs for asserted single incident product liability claims and an estimate of costs for single incident product liability claims incurred but not reported ("IBNR"). Single incident product liability exposures are evaluated on an annual basis, or more frequently if changing circumstances warrant. Adjustments are made to the reserve as appropriate.

Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred years ago and may have developed over long periods of time into diseases such as silicosis, asbestosis, mesothelioma, or coal worker’s pneumoconiosis. MSA LLC's combined cumulative trauma product liability reserve is based upon estimates of its liability for asserted cumulative trauma product liability claims not yet resolved and for IBNR cumulative trauma product liability claims. In addition, in connection with finalizing and reporting the Company's results of operations, management works annually (unless significant changes in trends or new developments warrant an earlier review) with an outside valuation consultant and outside legal counsel to review MSA LLC's potential exposure to all cumulative trauma product liability claims, including asserted cumulative trauma product liability claims not yet resolved and IBNR cumulative trauma product liability claims. The process for estimating asserted cumulative trauma product liability claims not yet resolved takes into account available facts for those claims including the number and composition of such claims, outcomes of matters resolved during current and prior periods, and variances associated with different groups of claims, plaintiffs' counsel, and venues, as well as any other relevant information. The process for estimating IBNR claims involves a number of key judgments and assumptions, including as to the number and types of claims that may be asserted, the period in which claims may be asserted and resolved, the percentage of claims that may be dismissed without payment, the average cost to resolve claims on which a payment is made, the manner in which MSA LLC will defend claims, and the medical and legal environments that will be applicable to the assertion, evaluation, and resolution of claims in the future. Each of these factors may increase or decrease significantly within an individual period depending on, among other things, the timing of claims filings or settlements, or litigation outcomes during a particular period that are especially favorable or unfavorable to MSA LLC. We accordingly consider MSA LLC’s claims experience over multiple periods and/or whether there are changes in MSA LLC’s claims experience and trends that are likely to continue for a significant time into the future in determining whether to make an adjustment to the reserve, rather than evaluating such factors solely in the short term.

Income taxes. We recognize deferred tax assets and liabilities using enacted tax rates to record the tax effect of temporary differences between the book and tax basis of recorded assets and liabilities. We record valuation allowances to reduce deferred tax assets to the amounts that we estimate are probable to be realized. When assessing the need for valuation allowances, we consider projected future taxable income and prudent and feasible tax planning strategies. Should a change in circumstances lead to a change in our judgments about the realizability of deferred tax assets in future years, we adjust the related valuation allowances in the period that the change in circumstances occurs.

We record an estimated income tax liability based on our best judgment of the amounts likely to be paid in the various tax jurisdictions in which we operate. We record tax benefits related to uncertain tax positions taken or expected to be taken on a tax return when such benefits meet a more likely than not threshold. We recognize interest related to unrecognized tax benefits in interest expense and penalties in operating expenses. The tax liabilities ultimately paid are dependent on a number of factors, including the resolution of tax audits, and may differ from the amounts recorded. Tax liabilities are adjusted through income when it becomes probable that the actual liability differs from the amount recorded.

Pensions and other post-retirement benefits. We sponsor certain pension and other post-retirement benefit plans. Accounting for the net periodic benefit costs and credits for these plans requires us to estimate the cost of benefits to be provided well into the future and to attribute these costs over the expected work life of the employees participating in these plans. These estimates require our judgment about discount rates used to determine these obligations, expected returns on plan assets, rates of future compensation increases, rates of increase in future health care costs, participant withdrawal and mortality rates and participant retirement ages. Differences between our estimates and actual results may significantly affect the cost of our obligations under these plans and could cause net periodic benefit costs and credits to change materially from year-to-year. Discount rates and plan asset valuations are point-in-time measures. The discount rate assumptions used in determining projected benefit obligations for our U.S. and foreign plans were based on the spot rate method at December 31, 2019.

Expected returns on plan assets are based on our historical returns by asset class.

The following table summarizes the impact of changes in significant actuarial assumptions on ourDecember 31, 2019 actuarial valuations.

	Impact of Changes in Actuarial Assumptions					
	Change in Discount Rate		Change in Expected Return		Change in Market Value of Assets	
(In thousands)	**1%**	**(1)%**	**1%**	**(1)%**	**5%**	**(5)%**
(Decrease) increase in net benefit cost	$ (6,076)	$ 7,656	$ (4,578)	$ 4,578	$ (824)	$ 824
(Decrease) increase in projected benefit obligation	(79,403)	99,473	—	—	—	—
Increase (decrease) in funded status	79,403	(99,473)	—	—	25,793	(25,793)

Revenue Recognition. Revenue from the sale of products is recognized when there is persuasive evidence of an arrangement and control passes to the customer, which generally occurs either when product is shipped to the customer or, in the case of most U.S. distributor customers, when product is delivered to the distributor's delivery site. We establish our shipping terms according to local practice and market characteristics. We do not ship product unless we have an order or other documentation authorizing shipment to our customers. Our payment terms vary by the type and location of our customer and the products offered. The term between invoicing and when payment is due is not significant.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Amounts billed and due from our customers are classified as receivables on the Consolidated Balance Sheet. We make appropriate provisions for uncollectible accounts receivable which have historically been insignificant in relation to our net sales. Certain contracts with customers, primarily distributor customers, have an element of variable consideration that is estimated when revenue is recognized under the contract to the extent that it is material to the individual contract. Variable consideration includes volume incentive rebates, performance guarantees, price concessions and returns. Rebates are based on achieving a certain level of purchases and other performance criteria that are documented in established distributor programs. These rebates are estimated based on projected sales to the customer and accrued as a reduction of net sales as they are earned by the customer. The rebate accrual is reviewed monthly and adjustments are made as the estimate of projected sales changes. Product returns, including an adjustment for restocking fees if it is material, are estimated based on historical return experience and revenue is adjusted. Sales, value add and other taxes collected with revenue-producing activities and remitted to governmental authorities are excluded from revenue.

Depending on the terms of the arrangement, we may defer revenue for which we have a future obligation, including training and extended warranty and technical services, until such time that the obligation has been satisfied. We use an observable price, or a cost plus margin approach when one is not available, to determine the stand-alone selling price for separate performance obligations. We have elected to recognize the cost for shipping and handling as an expense when control of the product has passed to the customer. These costs are included within the Cost of Products Sold line on the Consolidated Statement of Income. Amounts billed to customers for shipping and handling are included in net sales.

We typically receive interim milestone payments under certain contracts, including our fixed gas and flame detection projects, as work progresses. For some of these contracts, we may be entitled to receive an advance payment. Revenue for these contracts is generally recognized as control passes to the customer, which is a point in time upon shipment of the product, and if applicable, acceptance by the customer. We recognize a liability for these advance payments in excess of revenue recognized and present it as contract liabilities on the Consolidated Balance Sheet. The advance payment is typically not considered a significant financing component because it is used to meet working capital demands that can be higher in the early stages of a contract and to protect us from the other party failing to adequately complete some or all of its obligations under the contract. In some cases, the customer retains a small portion of the contract price, typically 10%, until completion of the contract, which we present as contract assets on the Consolidated Balance Sheet. Accordingly, during the period of contract performance, billings and costs are accumulated on the Consolidated Balance Sheet as contract assets or contract liabilities, but no income is recognized until completion of the project and control has passed to the customer. As of December 31, 2019, there were no material contract assets or contract liabilities recorded on the Consolidated Balance Sheet.

Goodwill and Indefinite-lived Intangible Assets. On October 1st of each year, or more frequently if indicators of impairment exist or if a decision is made to sell a business, we evaluate goodwill for impairment. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include a decline in expected cash flows, a significant adverse change in the business climate, unanticipated competition, slower growth rates, or negative developments in equity and credit markets, among others.

All goodwill is assigned to and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. For goodwill impairment testing purposes, we consider our operating segments to be our reporting units. The evaluation of impairment involves using either a qualitative or quantitative approach as outlined in Accounting Standards Codification (ASC) Topic 350. The qualitative evaluation is an assessment of factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value, including goodwill. Factors considered as part of the qualitative assessment include entity-specific industry, market and general economic conditions. In 2019, we elected to bypass the qualitative evaluation for all of our reporting units and performed a two-step quantitative test at October 1, 2019. Quantitative testing involves comparing the estimated fair value of each reporting unit to its carrying value. We estimate reporting unit fair value using a weighted average of fair values determined by discounted cash flow (DCF) and market approach methodologies, as we believe both are equally important indicators of fair value. A number of significant assumptions and estimates are involved in the application of the DCF model, including sales volumes and prices, costs to produce, tax rates, capital spending, discount rates, and working capital changes. Cash flow forecasts are generally based on approved business unit operating plans for the early years and historical relationships in later years. The betas used in calculating the individual reporting units' weighted average cost of capital (WACC) rate are estimated for each reporting unit based on peer data. The market approach methodology measures value through an analysis of peer companies. The analysis entails measuring the multiples of EBITDA at which peer companies are trading.

In the event the carrying value is in excess of the estimated fair value of a reporting unit per the weighted average of the DCF and market approach models, an impairment loss equal to such excess would be recognized, which could materially and adversely affect reported consolidated results of operations and shareholders' equity. At October 1, 2019, based on our quantitative test, the fair values of all of our reporting units exceeded their carrying value by at least 93%.

Intangible assets with indefinite lives are also subject to impairment testing on October 1st of each year, or more frequently if indicators of impairment exist. The impairment test compares the fair value of the intangible assets with their carrying amounts. We performed a quantitative assessment of the indefinite lived trade name intangible asset as outlined in ASC 350 by comparing the estimated fair value of the trade name intangible asset to its carrying value. We estimate the fair value using the relief from royalty income approach. A number of significant assumptions and estimates are involved in the application of the relief from royalty model, including sales volumes and prices, royalty rates and tax rates. Forecasts are based on sales generated by the underlying trade name assets and are generally based on approved business unit operating plans for the early years and historical relationships in later years. At October 1, 2019, based on our quantitative test, the fair value of the trade name asset exceeded their carrying value by approximately 25%.

RECENTLY ADOPTED AND RECENTLY ISSUED ACCOUNTING STANDARDS

See Note 1—Significant Accounting Policies of the consolidated financial statements in Part II Item 8 of this Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Market risk represents the risk of adverse changes in the value of a financial instrument caused by changes in currency exchange rates, interest rates and equity prices. We are exposed to market risks related to currency exchange rates and interest rates.

Currency exchange rates. We are subject to the effects of fluctuations in currency exchange rates on various transactions and on the translation of the reported financial position and operating results of our non-U.S. companies from local currencies to U.S. dollars. A hypothetical 10% strengthening or weakening of the U.S. dollar would increase or decrease our reported sales and net income for the year ended December 31, 2019 by approximately $62.8 million and $5.5 million, or 4.5% and 4.2%, respectively.

When appropriate, we may attempt to limit our transactional exposure to changes in currency exchange rates through forward contracts or other actions intended to reduce existing exposures by creating offsetting currency exposures. At December 31, 2019, we had open foreign currency forward contracts with a U.S. dollar notional value of $74.9 million. A hypothetical 10% increase in December 31, 2019 forward exchange rates would result in a $7.5 million increase in the fair value of these contracts.

Interest rates. We are exposed to changes in interest rates primarily as a result of borrowing and investing activities used to maintain liquidity and fund business operations. Because of the relatively short maturities of temporary investments and the variable rate nature of our revolving credit facility, these financial instruments are reported at carrying values which approximate fair values.

At December 31, 2019, we had $112.9 million of fixed rate debt which matures at various dates through 2031. The incremental increase in the fair value of fixed rate long-term debt resulting from a hypothetical 10% decrease in interest rates would be approximately $10 million. However, our sensitivity to interest rate declines and the corresponding increase in the fair value of our debt portfolio would unfavorably affect earnings and cash flows only to the extent that we elected to repurchase or retire all or a portion of our fixed rate debt portfolio at prices above carrying values.

At December 31, 2019, we had $237.1 million of variable rate borrowings under our revolving credit facility. A 100 basis point increase or decrease in interest rates could have an impact on future earnings under our current capital structure.

Item 8. Financial Statements and Supplementary Data

Management's Reports to Shareholders

Management's Report on Responsibility for Financial Reporting

Management of MSA Safety Incorporated (the Company) is responsible for the preparation of the consolidated financial statements included in this annual report. The consolidated financial statements were prepared in accordance with accounting principles generally accepted in the United States of America and include amounts that are based on the best estimates and judgments of management. The other financial information contained in this annual report is consistent with the consolidated financial statements.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. The 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.

The Company's internal control over financial reporting includes policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of assets; (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 are being made only in accordance with authorizations of management and the 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 our 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.

Management assessed the effectiveness of the Company's internal control over financial reporting as ofDecember 31, 2019. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework (2013). Based on our assessment and those criteria, management has concluded that the Company maintained effective internal control over financial reporting as of December 31, 2019.

The Company acquired Sierra Monitor Corporation ("SMC") on May 20, 2019, which represented approximately 2% and 4% of the Company's total assets and net assets as of December 31, 2019 and 1% and (2%) of total sales and net income for the year endedDecember 31, 2019. As the SMC acquisition was completed during the second quarter of 2019, the scope of the Company's 2019 assessment of the effectiveness of its internal control over financial reporting does not include the SMC acquisition. This exclusion is pursuant to the SEC's general guidance that an assessment of a recently acquired business' internal control over financial reporting may be omitted from the scope of the Company's assessment of its internal control over financial reporting for twelve months following the date of acquisition.

The Company's independent registered public accounting firm that audited the consolidated financial statements included in this annual report issued an attestation report on the Company's internal control over financial reporting.

/s/ NISHAN J. VARTANIAN

Nishan J. Vartanian
President and Chief Executive Officer

/s/ KENNETH D. KRAUSE

Kenneth D. Krause
Sr. Vice President, Chief Financial Officer and Treasurer

February 20, 2020

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of MSA Safety Incorporated

Opinion on Internal Control over Financial Reporting

We have audited MSA Safety Incorporated's internal control over financial reporting as of December 31, 2019, 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, MSA Safety Incorporated (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, 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 Sierra Monitor Corporation, which is included in the 2019 consolidated financial statements of the Company and constituted 2% and 4% of total and net assets, respectively, as of December 31, 2019 and 1% and (2%) of revenues and net income, respectively, for the year then ended. 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 Sierra Monitor Corporation.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the related consolidated statements of income, comprehensive income, cash flows, and changes in retained earnings, accumulated other comprehensive loss and noncontrolling interests for each of the three years in the period ended December 31, 2019, and the related notes and financial statement schedule listed in the Index at Item 15(a) 2. and our report dated February 20, 2020 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

Pittsburgh, Pennsylvania
February 20, 2020

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of MSA Safety Incorporated

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of MSA Safety Incorporated (the Company) as of December 31, 2019 and 2018, the related consolidated statements of income, comprehensive income, cash flows, and changes in retained earnings, accumulated other comprehensive loss and noncontrolling interests for each of the three years in the period ended December 31, 2019, and the related notes and financial statement schedule listed in the Index at Item 15(a) 2. (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, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, 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, 2019, 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 20, 2020 expressed an unqualified opinion thereon.

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 Matter

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

Valuation of cumulative trauma product liability claims

Description of the Matter	As more fully described in Note 19 to the consolidated financial statements, MSA LLC is named as a defendant in lawsuits comprised of cumulative trauma product liability claims involving exposures to harmful substances (e.g., silica, asbestos, and coal dust) that occurred years ago and may have developed over long periods of time into diseases such as silicosis, asbestosis, mesothelioma, or coal worker's pneumoconiosis. The Company believes it is probable that it will incur losses related to asserted and incurred but not reported (IBNR) claims and that the amount of loss can be reasonably estimated. At December 31, 2019, the Company's accrual for asserted and IBNR claims was $167.5 million, representing its best estimate of the expected losses related to these claims. Auditing management's accounting for and disclosure of loss contingencies arising from cumulative trauma product liability claims was especially challenging, as the estimate of probable loss is highly subjective. In particular, the estimate was sensitive to significant assumptions, such as the estimated value of settlements paid to claimants, the percentage of cumulative trauma product liability claims asserted against MSA LLC that are dismissed without payment, the future number and type of claims asserted against MSA LLC, and the propensity of claimants and their counsel asserting cumulative trauma claims to name MSA LLC as a defendant.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of relevant internal controls over the Company's assessment and measurement of its estimate of probable loss for cumulative trauma product liability claims. Our audit procedures included testing controls over the Company's assessment and measurement of the best estimate of the expected losses related to cumulative trauma product liability claims. To test the Company's assessment of cumulative trauma product liability claims, we performed audit procedures which included, among others: reading the minutes of the meetings of the committees of the board of directors, requesting and receiving internal and external legal counsel letters, meeting with internal counsel to discuss the claims, meeting with management's valuation consultant, testing the completeness and accuracy of data from underlying systems that are used in the Company's assessment, performing a historical lookback analysis on claims data, performing a search for new or contrary evidence affecting the assessment, and obtaining a representation letter from the Company. Additional audit procedures to test the Company's valuation of the expected losses related to cumulative trauma product liability claims included: evaluating significant assumptions underlying the estimate, such as the estimated value of settlements paid to claimants, the percentage of cumulative trauma product liability claims asserted against MSA LLC that are dismissed without payment, the future number and type of claims asserted against MSA LLC, and the propensity of claimants and their counsel asserting cumulative trauma claims to name MSA LLC as a defendant. We engaged our actuarial specialists to assist in the analysis of the significant assumptions used by management. We assessed the historical accuracy of management's estimates by performing a lookback analysis and performed sensitivity analyses of significant assumptions used in the current year.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2014.
Pittsburgh, Pennsylvania
February 20, 2020

MSA SAFETY INCORPORATED

CONSOLIDATED STATEMENT OF INCOME

	Year ended December 31,		
(In thousands, except per share amounts)	**2019**	**2018**	**2017**
Net sales	$ 1,401,981	$ 1,358,104	$ 1,196,809
Cost of products sold	765,369	746,241	657,918
Gross profit	636,612	611,863	538,891
Selling, general and administrative	330,502	324,784	300,062
Research and development	57,848	52,696	50,061
Restructuring charges (Note 2)	13,846	13,247	17,632
Currency exchange losses, net (Note 5)	19,814	2,330	5,127
Product liability (Note 19) and other operating expense	28,372	45,327	126,432
Operating income	186,230	173,479	39,577
Interest expense	13,589	18,881	15,360
Loss on extinguishment of debt (Note 11)	—	1,494	—
Other income, net (Note 15)	(11,094)	(9,231)	(5,558)
Total other expense, net	2,495	11,144	9,802
Income before income taxes	183,735	162,335	29,775
Provision for income taxes (Note 9)	46,086	37,220	2,819
Net income	137,649	125,115	26,956
Net income attributable to noncontrolling interests	$ (1,209)	$ (965)	$ (929)
Net income attributable to MSA Safety Incorporated	$ 136,440	$ 124,150	$ 26,027
Earnings per share attributable to MSA Safety Incorporated common shareholders (Note 8):			
Basic	$ 3.52	$ 3.23	$ 0.68
Diluted	$ 3.48	$ 3.18	$ 0.67
Dividends per common share	$ 1.64	$ 1.49	$ 1.38

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

MSA SAFETY INCORPORATED

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

	Year ended December 31,		
(In thousands)	**2019**	**2018**	**2017**
Net income	$ 137,649	$ 125,115	$ 26,956
Other comprehensive (loss) income, net of tax:			
Foreign currency translation adjustments (Note 5)	(1,657)	(30,103)	41,129
Pension and post-retirement plan actuarial gains (losses), net of tax (Note 5)	(5,559)	(17,569)	20,120
Unrealized gains (losses) on available-for-sale securities (Note 5)	578	(572)	—
Reclassification from accumulated other comprehensive (loss) into net income (Note 5)	15,261	774	—
Total other comprehensive income (loss), net of tax	8,623	(47,470)	61,249
Comprehensive income	146,272	77,645	88,205
Comprehensive income attributable to noncontrolling interests	(1,136)	(660)	(3,694)
Comprehensive income attributable to MSA Safety Incorporated	145,136	$ 76,985	$ 84,511

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

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MSA SAFETY INCORPORATED

CONSOLIDATED BALANCE SHEET

	December 31,	
(In thousands, except share amounts)	**2019**	**2018**
Assets		
Cash and cash equivalents	$ 152,195	$ 140,095
Trade receivables, less allowance for doubtful accounts of $4,860and $5,369	255,082	245,032
Inventories (Note 3)	185,027	156,602
Investments, short-term (Note 18)	49,892	55,106
Prepaid income taxes	13,072	10,769
Notes receivable, insurance companies (Note 19)	3,676	3,555
Prepaid expenses and other current assets	34,419	45,464
Total current assets	693,363	656,623
Property, plant and equipment, net (Note 4)	167,038	157,940
Operating lease assets, net (Note 16)	51,675	—
Prepaid pension cost (Note 14)	75,066	57,568
Deferred tax assets (Note 9)	32,596	32,522
Goodwill (Note 12)	436,679	413,640
Intangible assets, net (Note 12)	171,326	169,515
Notes receivable, insurance companies, noncurrent (Note 19)	52,336	56,012
Insurance receivable (Note 19) and other noncurrent assets	59,614	64,192
Total assets	$ 1,739,693	$ 1,608,012
Liabilities		
Notes payable and current portion of long-term debt (Note 11)	$ 20,000	$ 20,063
Accounts payable	89,120	78,367
Employees' compensation	41,882	51,386
Insurance and product liability (Note 19)	25,870	48,688
Income taxes payable (Note 9)	6,739	—
Warranty reserve (Note 19) and other current liabilities	93,898	83,556
Total current liabilities	277,509	282,060
Long-term debt, net (Note 11)	328,394	341,311
Pensions and other employee benefits (Note 14)	186,697	166,101
Noncurrent operating lease liabilities (Note 16)	42,632	—
Deferred tax liabilities (Note 9)	9,787	7,164
Product liability (Note 19) and other noncurrent liabilities	162,101	171,857
Total liabilities	$ 1,007,120	$ 968,493
Commitments and contingencies (Note 19)		
Shareholders' Equity		
Preferred stock, 4 1/2% cumulative, $50 par value (Note 6)	3,569	3,569
Common stock, no par value (180,000,000 shares authorized; 62,081,391 shares issued; 38,841,194 and 38,526,523 shares outstanding at December 31, 2019 and 2018, respectively)	229,127	211,806
Treasury shares, at cost (Note 6)	(305,159)	(298,143)
Accumulated other comprehensive loss (Note 5)	(214,003)	(218,927)
Retained earnings	1,012,266	935,577
Total MSA Safety Incorporated shareholders' equity	725,800	633,882
Noncontrolling interests	6,773	5,637
Total shareholders' equity	732,573	639,519
Total liabilities and shareholders' equity	$ 1,739,693	$ 1,608,012

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

MSA SAFETY INCORPORATED

CONSOLIDATED STATEMENT OF CASH FLOWS

	Year ended December 31,		
(In thousands)	**2019**	**2018**	**2017**
Operating Activities			
Net income	$ 137,649	$ 125,115	$ 26,956
Depreciation and amortization	38,020	37,852	37,877
Restructuring charges (Note 2)	—	—	11,384
Stock-based compensation (Note 10)	13,760	12,239	11,758
Pension expense (Note 14) and other charges	3,382	5,901	7,142
Deferred income tax provision (benefit) (Note 9)	1,272	(4,065)	(31,320)
Losses on asset dispositions, net	371	484	557
Pension contributions (Note 14)	(5,537)	(4,718)	(4,094)
Currency exchange losses, net (Note 5)	19,814	2,330	5,127
Product liability expense (Note 19)	26,619	45,327	126,432
Collections on insurance receivable and notes receivable, insurance companies (Note 19)	21,035	101,552	111,969
Product liability payments (Note 19)	(54,504)	(61,500)	(49,381)
Loss on extinguishment of debt (Note 11)	—	1,494	—
Changes in:			
Trade receivables	(8,855)	(10,075)	(6,384)
Inventories (Note 3)	(23,246)	(11,122)	(30,363)
Prepaid expenses and other current assets	(822)	10,866	(13,661)
Accounts payable and accrued liabilities	5,801	17,985	17,870
Other noncurrent assets and liabilities	(9,797)	(5,778)	8,467
Cash Flow From Operating Activities	164,962	263,887	230,336
Investing Activities			
Capital expenditures	(36,604)	(33,960)	(23,725)
Purchase of short-term investments (Note 18)	(169,245)	(73,022)	—
Proceeds from maturities of short-term investments (Note 18)	174,670	18,000	—
Acquisition, net of cash acquired (Note 13)	(33,196)	—	(216,308)
Property disposals and other investing	218	4,587	832
Cash Flow (Used In) Investing Activities	(64,157)	(84,395)	(239,201)
Financing Activities			
(Payments on) proceeds from short-term debt, net (Note 11)	(65)	51	13
Payments on long-term debt (Note 11)	(880,500)	(570,167)	(559,767)
Proceeds from long-term debt (Note 11)	864,000	462,500	637,000
Debt issuance costs	—	(1,216)	—
Cash dividends paid	(63,523)	(57,248)	(52,537)
Company stock purchases (Note 6)	(12,648)	(4,824)	(17,513)
Exercise of stock options (Note 6)	7,471	8,573	18,465
Employee stock purchase plan (Note 6)	641	556	532
Other, net	—	(1,494)	(590)
Cash Flow (Used In) From Financing Activities	(84,624)	(163,269)	25,603
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(4,242)	(13,508)	6,189
Increase in cash, cash equivalents and restricted cash	11,939	2,715	22,927
Beginning cash, cash equivalents and restricted cash	140,604	137,889	114,962
Ending cash, cash equivalents and restricted cash	$ 152,543	$ 140,604	$ 137,889
Supplemental cash flow information:			
Cash and cash equivalents	$ 152,195	140,095	134,244
Restricted cash included in prepaid expenses and other current assets	348	509	3,645
Total cash, cash equivalents and restricted cash	$ 152,543	140,604	137,889
Interest paid in cash	$ 14,490	$ 20,408	$ 15,504
Income tax paid in cash	48,673	40,587	40,376

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

MSA SAFETY INCORPORATED

CONSOLIDATED STATEMENT OF CHANGES IN RETAINED EARNINGS,

ACCUMULATED OTHER COMPREHENSIVE LOSS AND NONCONTROLLING INTERESTS

(In thousands)	Retained Earnings	Accumulated Other Comprehensive (Loss)	Noncontrolling Interests
Balances January 1, 2017	$ 901,415	$ (230,246)	$ 3,047
Net income	26,956	—	—
Foreign currency translation adjustments	—	41,129	—
Pension and post-retirement plan adjustments, net of tax of $10,417	—	20,120	—
(Income) loss attributable to noncontrolling interests	(929)	(2,765)	3,694
Acquisition of noncontrolling interests	—	—	(1,764)
Common dividends	(52,495)	—	—
Preferred dividends ($0.5625 per share)	(42)	—	—
Cumulative effect of the adoption of ASU 2016-16 (Note 1)	(6,230)	—	—
Balances December 31, 2017	868,675	(171,762)	4,977
Net income	125,115	—	—
Foreign currency translation adjustments	—	(30,103)	—
Pension and post-retirement plan adjustments, net of tax of ($6,325)	—	(17,569)	—
Unrecognized net losses on available-for-sale securities (Note 18)	—	(572)	—
Reclassification of currency translation from accumulated other comprehensive (loss) into net income (Note 5)	—	774	—
(Income) loss attributable to noncontrolling interests	(965)	305	660
Common dividends	(57,206)	—	—
Preferred dividends ($0.5625 per share)	(42)	—	—
Balances December 31, 2018	935,577	(218,927)	5,637
Net income	137,649	—	—
Foreign currency translation adjustments	—	(1,657)	—
Pension and post-retirement plan adjustments, net of tax of ($3,072)	—	(5,559)	—
Unrecognized net gains on available-for-sale securities (Note 18)	—	578	—
Reclassification of currency translation from accumulated other comprehensive (loss) into net income (Note 5)	—	15,261	—
(Income) loss attributable to noncontrolling interests	(1,209)	73	1,136
Common dividends	(63,481)	—	—
Preferred dividends ($0.5625 per share)	(42)	—	—
Reclassification due to the adoption of ASU 2018-02 (Note 1)	$ 3,772	$ (3,772)	$ —
Balances December 31, 2019	$ 1,012,266	$ (214,003)	$ 6,773

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

MSA SAFETY INCORPORATED

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1—Significant Accounting Policies

Basis of Presentation—The consolidated financial statements of MSA Safety Incorporated ("MSA" or "the Company") are prepared in conformity with accounting principles generally accepted in the United States of America (GAAP) and require management to make certain judgments, estimates, and assumptions. These may affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the consolidated financial statements. They also may affect the reported amounts of revenues and expenses during the period. Actual results could differ from those estimates upon subsequent resolution of identified matters.

Principles of Consolidation—The consolidated financial statements include the accounts of the Company and all subsidiaries. Intercompany accounts and transactions are eliminated.

Noncontrolling Interests—Noncontrolling interests reflect noncontrolling shareholders' investments in certain consolidated subsidiaries and their proportionate share of the income and accumulated other comprehensive income (loss) of those subsidiaries.

Currency Translation—The functional currency of all significant non-U.S. subsidiaries is the local currency. Assets and liabilities of these operations are translated at year-end exchange rates. Income statement accounts are translated using the average exchange rates for the reporting period. Translation adjustments for these companies are reported as a component of shareholders' equity and are not included in income. Foreign currency transaction gains and losses are included in net income for the reporting period.

Cash Equivalents—Cash equivalents include temporary deposits with financial institutions and highly liquid investments with original maturities of 90 days or less. Other highly liquid investments consist of money market funds and balances were $17.9 million and $11.4 million at December 31, 2019 and 2018, respectively. These funds are valued at net asset value ("NAV"). The money market funds are required to price and transact at a NAV per share that fluctuates based upon the pricing of the underlying portfolio of securities and this requirement may impact the value of those fund shares.

Restricted Cash—Restricted cash, which is designated for use other than current operations, is included in prepaid expenses and other current assets in the Consolidated Balance Sheet. Restricted cash balances were $0.3 million and $0.5 million at December 31, 2019 and 2018, respectively. These balances were used to support letter of credit balances.

Inventories—Inventories are stated at the lower of cost or net realizable value. The majority of U.S. inventories are valued on the last-in, first-out (LIFO) cost method which is used since this method provides better matching of costs and revenues. Other inventories are valued at actual costs, at standard costs which approximate actual costs or in very rare occasions, on the average cost method. It is the Company's general policy to write-down any inventory identified as obsolete. Additionally, it will write-down any inventory balance in excess of the last twenty-four months of consumption.

Investment securities—The Company's investment securities, primarily fixed income, are classified as available-for-sale. The securities are recorded at fair market value and reported in "Investments, short-term" in the accompanying Consolidated Balance Sheet with changes in fair market value recorded in other comprehensive income, net of tax. The purchases and sales of these investments are classified as investing activities in the Consolidated Statement of Cash Flows.

Property and Depreciation—Property is recorded at cost. Depreciation is computed using straight-line and accelerated methods over the estimated useful lives of the assets, generally as follows: buildings 20 to 40 years and machinery and equipment 3 to 10 years. Expenditures for significant renewals and improvements are capitalized. Ordinary repairs and maintenance are expensed as incurred. Gains or losses on property dispositions are included in other income and the cost and related depreciation are removed from the accounts. Depreciation expense for the years ended December 31, 2019, 2018 and 2017 was $26.5 million, $26.9 million and $28.0 million, respectively. Properties, plants, and equipment are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is calculated as the excess of the carrying value of the assets over their fair value, with fair value determined using the best information available, which generally is a discounted cash flow model.

Software Development Costs—Software development costs consist primarily of costs incurred in software development and related personnel compensation to create, enhance and deploy the Company's broad range of wireless technology and cloud-based computing safety services. Software development costs, other than software development costs qualifying for capitalization, are expensed as incurred. Costs of computer software developed or obtained for internal use that are incurred in the preliminary project and post implementation stages are expensed as incurred. Certain costs incurred during the application and development stage, which primarily include compensation and related expenses, are capitalized. Additionally, costs of upgrades and enhancements are capitalized when it is probable that the upgrades and enhancements will result in added functionality. The estimated useful life of costs capitalized is three years. Capitalized costs are amortized through cost of products sold using the straight-line method over the estimated useful life, which is normally three years, beginning in the period in which the software is ready for its intended use or when the upgrade or enhancement is deployed. During 2019 and 2018, there was approximately $5.0 million and $1.6 million, respectively, of software development costs capitalized. During 2017, there was no software development costs capitalized.

Goodwill and Other Intangible Assets—Intangible assets with a finite useful life are amortized on a straight-line basis over their useful lives. Indefinite lived intangible assets are assessed for possible impairment annually on October 1st or whenever circumstances change such that the recorded value of the asset may not be recoverable. We performed a quantitative assessment of the indefinite lived trade name intangible asset as outlined in Accounting Standards Codification ("ASC") 350 by comparing the estimated fair value of the trade name intangible asset to their carrying value. We estimate the fair value using the relief from royalty income approach. A number of significant assumptions and estimates are involved in the application of the relief from royalty model, including sales volumes and prices, royalty rates and tax rates. Forecasts are based on sales generated by the underlying trade name assets and are generally based on approved business unit operating plans for the early years and historical relationships in later years. Based on this assessment, there was no indication of impairment for 2019.

Goodwill is not amortized, but is subject to impairment assessments. On October 1st of each year, or more frequently if indicators of impairment exist or if a decision is made to sell a business, we evaluate goodwill for impairment. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include a decline in expected cash flows, a significant adverse change in the business climate, unanticipated competition, slower growth rates, or negative developments in equity and credit markets, among others.

All goodwill is assigned to and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. For goodwill impairment testing purposes, we consider our operating segments to be our reporting units. The evaluation of impairment involves using either a qualitative or quantitative approach as outlined in ASC Topic 350. The qualitative evaluation is an assessment of factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value, including goodwill. Factors considered as part of the qualitative assessment include entity-specific industry, market and general economic conditions. In 2019, we elected to bypass the qualitative evaluation for all of our reporting units, and performed a two-step quantitative test at October 1, 2019. Step 1 of the quantitative testing involves comparing the estimated fair value of each reporting unit to its carrying value. We estimate reporting unit fair value using a weighted average of fair values determined by discounted cash flow (DCF) and market approach methodologies, as we believe both are equally important indicators of fair value. A number of significant assumptions and estimates are involved in the application of the DCF model, including sales volumes and prices, costs to produce, tax rates, capital spending, discount rates, and working capital changes. Cash flow forecasts are generally based on approved reporting unit operating plans for the early years and historical relationships in later years. The betas used in calculating the individual reporting units' weighted average cost of capital (WACC) rate are estimated for each reporting unit based on peer data. The market approach methodology measures value through an analysis of peer companies. The analysis entails measuring the multiples of EBITDA at which peer companies are trading.

In the event the carrying value is in excess of the estimated fair value of a reporting unit per the weighted average of the DCF and market approach models, an impairment loss equal to such excess would be recognized, which could materially and adversely affect reported consolidated results of operations and shareholders' equity. There has been no impairment of our goodwill as of December 31, 2019, 2018 or 2017.

Revenue Recognition—We account for revenue in accordance with ASC Topic 606,*Revenue from Contracts with Customers*, which we adopted on January 1, 2018, using the modified retrospective method. Revenue from the sale of products is recognized when there is persuasive evidence of an arrangement and control passes to the customer, which generally occurs either when product is shipped to the customer or, in the case of most U.S. distributor customers, when product is delivered to the distributor's delivery site. We establish our shipping terms according to local practice and market characteristics. We do not ship product unless we have an order or other documentation authorizing shipment to our customers. Our payment terms vary by the type and location of our customer and the products offered. The term between invoicing and when payment is due is not significant.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Amounts billed and due from our customers are classified as receivables on the Consolidated Balance Sheet. We make appropriate provisions for uncollectible accounts receivable which have historically been insignificant in relation to our net sales. Certain contracts with customers, primarily distributor customers, have an element of variable consideration that is estimated when revenue is recognized under the contract to the extent that it is material to the individual contract. Variable consideration includes volume incentive rebates, performance guarantees, price concessions and returns. Rebates are based on achieving a certain level of purchases and other performance criteria that are documented in established distributor programs. These rebates are estimated based on projected sales to the customer and accrued as a reduction of net sales as they are earned by the customer. The rebate accrual is reviewed monthly and adjustments are made as the estimate of projected sales changes. Product returns, including an adjustment for restocking fees if it is material, are estimated based on historical return experience and revenue is adjusted. Sales, value add and other taxes collected with revenue-producing activities and remitted to governmental authorities are excluded from revenue.

Depending on the terms of the arrangement, we may defer revenue for which we have a future obligation, including training and extended warranty and technical services, until such time that the obligation has been satisfied. We use an observable price, or a cost plus margin approach when one is not available, to determine the stand-alone selling price for separate performance obligations. We have elected to recognize the cost for shipping and handling as an expense when control of the product has passed to the customer. These costs are included within the Cost of Products Sold line on the Consolidated Statement of Income. Amounts billed to customers for shipping and handling are included in net sales.

Product Warranties—Estimated expenses related to product warranties and additional service actions are charged to cost of products sold in the period in which the related revenue is recognized or when significant product quality issues are identified.

Research and Development—Research and development costs are expensed as incurred.

Income Taxes—Deferred income taxes are recognized for temporary differences between financial and tax reporting. Deferred tax assets and liabilities are measured using enacted tax rates in effect for the year in which those temporary differences are expected to be recovered or settled. If it is more likely than not that some portion or all of a deferred tax asset will not be realized, a valuation allowance is recognized. We record tax benefits related to uncertain tax positions taken or expected to be taken on a tax return when such benefits meet a more likely than not threshold. We recognize interest related to unrecognized tax benefits in interest expense and penalties in operating expenses. Deferred taxes are booked for available cash in excess of working capital for non-U.S. subsidiaries as these earnings are no longer considered to be permanently reinvested.

Stock-Based Compensation—We recognize compensation expense for employee and non-employee director stock-based compensation based on the grant date fair value. Except for retirement-eligible participants, for whom there is no requisite service period, this expense is recognized ratably over the requisite service periods following the date of grant. For retirement-eligible participants, this expense is recognized at the grant date.

Derivative Instruments—We may use derivative instruments to minimize the effects of changes in currency exchange rates. We do not enter into derivative transactions for speculative purposes and do not hold derivative instruments for trading purposes. Changes in the fair value of derivative instruments designated as fair value hedges are recorded in the balance sheet as adjustments to the underlying hedged asset or liability. Changes in the fair value of derivative instruments that do not qualify for hedge accounting treatment are recognized in the Consolidated Statement of Income as currency exchange losses, net in the current period.

Commitments and Contingencies—For asserted claims and assessments, liabilities are recorded when a loss is deemed to be probable and the amount of the loss is reasonably estimable. Management assesses the probability of an unfavorable outcome with respect to asserted claims or assessments based on many factors such as the nature of the matter, available defenses and case strategy, progress of the matter, views and opinions of legal counsel and other advisors, applicability and success of appeals processes, and the outcome of similar historical matters, among others. Once an unfavorable outcome is assessed to be probable, management evaluates estimates of the potential loss, and the most reasonable loss estimate is recorded (or, if the estimate of the loss is a range, and no amount within the range is considered to be a better estimate than any other amount, the minimum amount in the range is recorded). If a loss is deemed to be reasonably possible but less than probable and/or such loss cannot be reasonably estimated, then the matter is disclosed and no liability is recorded.

With respect to unasserted claims or assessments, management first determines whether it is probable that a claim or assessment may be asserted and then, if so, the degree of probability of an unfavorable outcome. If an unfavorable outcome is probable, management assesses whether the amount of potential loss can be reasonably estimated and, if so, accrues the most reasonable estimate of the loss (or, if the estimate of the loss is a range, and not amount within the range is considered to be a better estimate than any other amount, the minimum amount in the range is recorded). If an unfavorable outcome is reasonably possible but less than probable, or the amount of loss cannot be reasonably estimated, then the matter is disclosed and no liability is recorded. Legal matters are reviewed on a continuous basis to determine if there has been a change in management’s judgment regarding the likelihood and/or estimate of a potential loss. Please refer to Note 19 for further details on product liability related matters.

Concentration of credit and business risks- We are exposed to credit risk in the event of nonpayment by customers, principally in the oil, gas and petrochemical, fire service, construction, utilities, and mining industries. Changes in these industries may significantly affect our financial performance and management's estimates. We mitigate our exposure to credit risk by performing ongoing credit evaluations and, when deemed necessary, requiring letters of credit, credit insurance, prepayments, guarantees or other collateral. No individual customer represented more than 10% of our sales.

Reclassifications - Certain reclassifications of prior years' data have been made to conform to the current year presentation. These reclassifications relate to (1) additional captions disclosed within the operating section of the Consolidated Statement of Cash Flows but do not change the overall cash flow from operating activities for the prior years as previously reported, and (2) additional captions disclosed for product warranty activity within the table that reconciles the changes in the Company's accrued warranty reserve (Note 19).

Recently Adopted and Recently Issued Accounting Standards—In May 2014, the FASB issued ASU 2014-09,*Revenue with Contracts from Customers.* This ASU establishes a single revenue recognition model for all contracts with customers based on recognizing revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services, eliminates industry specific requirements and expands disclosure requirements. We adopted ASU 2014-09 using the modified retrospective method as of January 1, 2018. The majority of our revenue transactions consist of a single performance obligation to transfer promised goods or services. The adoption of this new standard did not impact the Company's Consolidated Statement of Income or Balance Sheet and there was no cumulative effect of initially applying the standard to the opening balance of retained earnings. See Revenue Recognition section above for further information on our updated revenue recognition policy.

In February 2016, the FASB issued ASU 2016-02,*Leases.* This ASU requires lessees to record a right-of-use asset and a liability for virtually all leases. This ASU was adopted on January 1, 2019, using the modified retrospective transition method at the adoption date. Comparative periods presented in our consolidated financial statements were reported in accordance with ASC 840, *Leases*. In addition, the Company elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed us to carry forward the historical lease classification. The Company also elected the practical expedient to not separate lease and non-lease components for new leases entered into after January 1, 2019, when calculating the lease liability under this ASU. Adoption of this ASU resulted in the recording of lease liabilities of approximately $54 million with the offset to lease right-of-use assets of$54 million. The standard did not materially impact our Consolidated Statement of Income and had no impact on our Consolidated Statement of Cash Flows. The new standard also requires increased disclosures to help financial statement users better understand the amount, timing and uncertainty of cash flows arising from leases.

In June 2016, the FASB issued ASU 2016-13,*Financial Instruments - Credit Losses.* This ASU introduces an approach based on expected losses to estimate credit losses on certain types of financial instruments, including loans, held-to-maturity debt securities, loan commitments, financial guarantees and net investments in leases, as well as reinsurance and trade receivables. This ASU will be effective beginning in 2020. Based on a review of its portfolio of financial instruments, the Company does not believe the adoption of this ASU will have a material impact on the consolidated financial statements, but does expect the adoption to result in additional disclosures.

In January 2017, the FASB issued ASU 2017-04, *Simplifying the Test for Goodwill Impairment*. This ASU simplifies the accounting for goodwill impairments under Step 2 by eliminating the requirement to perform procedures to determine the fair value of the assets and liabilities of the reporting unit, including previously unrecognized assets and liabilities, in order to determine the fair value of the goodwill and any impairment charge to be recognized. Under this ASU, the impairment charge to be recognized should be the amount by which the reporting unit's carrying value exceeds the reporting unit's fair value as calculated under Step 1 provided that the loss recognized should not exceed the total amount of goodwill allocated to the reporting unit. The Company adopted ASU 2017-04 effective January 1, 2019 and this ASU may have a material effect on our consolidated financial statements in the event that we determine that goodwill for any of our reporting units is impaired.

In January 2018, the FASB issued ASU 2018-02, *Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income* ("AOCI"), which gives entities the option to reclassify to retained earnings the tax effects resulting from the new tax reform legislation commonly known as the Tax Cuts and Jobs Act of 2017 (the "Act") related to items in AOCI that the FASB refers to as having been stranded in AOCI. The new guidance may be applied retrospectively to each period in which the effect of the Act is recognized in the period of adoption. ASU2018-02 requires new disclosures regarding the Company's accounting policy for releasing the tax effects in accumulated other comprehensive loss and allows the Company to reclassify the effect of remeasuring deferred tax liabilities and assets related to items within accumulated other comprehensive loss using the then newly enacted 21% federal corporate income tax rate. The Company adopted ASU 2018-02 on January 1, 2019, and this adoption resulted in a reclassification that increased retained earnings by $3.8 million, with an offsetting increase to accumulated other comprehensive loss for the same amount.

In August 2018, the FASB issued ASU 2018-13, *Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement*, which improves fair value disclosure requirements by removing disclosures that are not cost beneficial, clarifying disclosures' specific requirements and adding relevant disclosure requirements. This ASU is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. The amendments on changes in unrealized gains and losses, the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements, and the narrative description of measurement uncertainty should be applied prospectively for only the most recent interim or annual period presented in the initial fiscal year of adoption. All other amendments should be applied retrospectively to all periods presented upon their effective date. Early adoption is permitted and an entity can choose to early adopt any removed or modified disclosures upon issuance of this ASU and delay adoption of the additional disclosures until their effective date. Based on a review of its portfolio of financial instruments, the Company does not believe the adoption of this ASU will have a material impact on the consolidated financial statements but does expect changes to our disclosures.

In August 2018, the FASB issued ASU 2018-14, *Disclosure Framework - Changes to the Disclosure Requirements for Defined Benefit Plans*, which improves defined benefit disclosure requirements by removing disclosures that are not cost beneficial, clarifying disclosures' specific requirements and adding relevant disclosure requirements. This ASU is effective for fiscal years ending after December 15, 2020, and early adoption is permitted. The amendments in this ASU are required to be applied on a retrospective basis to all periods presented. The Company is still evaluating the impact that the adoption of ASU 2018-14 will have on the consolidated financial statements but does expect changes to our disclosures.

Note 2—Restructuring Charges

During the years ended December 31, 2019, 2018 and 2017, we recorded restructuring charges of $13.8 million, $13.2 million and $17.6 million, respectively. These charges were primarily related to our ongoing initiatives to drive profitable growth and right size our operations.

Americas segment restructuring charges of $0.5 million during the year ended December 31, 2019, were related to severance costs for staff reductions in our Latin America Region. International segment restructuring charges of $12.7 million during the year ended December 31, 2019, were primarily related to severance costs for staff reductions associated with our ongoing initiatives to drive profitable growth and a non-cash settlement charge for the termination of our pension plan in the United Kingdom. Corporate segment restructuring charges of $0.6 million during the year ended December 31, 2019, related primarily to the legal and operational realignment of our U.S. and Canadian operations.

A total of 99 positions were eliminated in 2019. There were 12 positions eliminated in the Americas segment and 87 in the International segment.

Americas segment restructuring charges of $2.3 million during the year ended December 31, 2018, were related to severance costs for staff reductions in our Northern North America and Latin America Regions. International segment restructuring charges of $5.6 million during the year ended December 31, 2018, were primarily related to severance costs for staff reductions associated with our ongoing initiatives to drive profitable growth in Europe. Corporate segment restructuring charges of $5.3 million during the year ended December 31, 2018, related primarily to the legal and operational realignment of our U.S. and Canadian operations.

A total of 45 positions were eliminated in 2018. There were 8 positions eliminated in the Americas segment, 34 in the International segment and 3 in the Corporate segment.

Americas segment restructuring charges of $13.0 million during the year ended December 31, 2017, related primarily to a non-cash special termination benefit expense of $11.4 million for a voluntary retirement incentive package ("VRIP") as well as severance from staff reductions in Brazil. All benefits were paid from our over funded North America pension plan. International segment restructuring charges of $4.9 million during the year ended December 31, 2017, related to severance costs for staff reductions associated with our ongoing initiatives to drive profitable growth in Europe and right size our operations in Africa. Favorable adjustments for changes in estimates on employee restructuring reserves of $0.3 million were recorded during the year ended December 31, 2017.

Approximately 155 positions were eliminated in 2017. There were 90 positions were eliminated in the Americas segment and approximately 65 in the International segment.

Activity and reserve balances for restructuring charges by segment were as follows:

(in millions)	Americas	International	Corporate	Total
Reserve balances at January 1, 2017	$ 0.9	$ 2.8	$ 0.3	$ 4.0
Restructuring charges	13.0	4.9	—	17.9
Currency translation and other adjustments	(0.2)	(0.1)	—	(0.3)
Cash payments / utilization	(13.2)	(4.0)	(0.3)	(17.5)
Reserve balances at December 31, 2017	$ 0.5	$ 3.6	$ —	$ 4.1
Restructuring charges	2.3	5.6	5.3	13.2
Currency translation and other adjustments	(0.3)	(0.3)	—	(0.6)
Cash payments	(2.0)	(4.9)	(5.3)	(12.2)
Reserve balances at December 31, 2018	$ 0.5	$ 4.0	$ —	$ 4.5
Restructuring charges	0.5	12.7	0.6	13.8
Currency translation and other adjustments	(0.1)	(0.6)	—	(0.7)
Cash payments / utilization	(0.6)	(10.2)	(0.6)	(11.4)
Reserve balances at December 31, 2019	$ 0.3	$ 5.9	$ —	$ 6.2

Note 3—Inventories

The following table sets forth the components of inventory:

(In thousands)	December 31, 2019	December 31, 2018
Finished products	$ 71,918	$ 65,965
Work in process	4,083	6,169
Raw materials and supplies	151,129	124,554
Inventories at current cost	227,130	196,688
Less: LIFO valuation	(42,103)	(40,086)
Total inventories	$ 185,027	$ 156,602

Inventories stated on the LIFO basis represent 43% and 39% of total inventories at December 31, 2019 and 2018, respectively. We did not have any LIFO liquidations during the years ended December 31, 2019 and 2018.

Note 4—Property, Plant, and Equipment

The following table sets forth the components of property, plant and equipment:

(In thousands)	December 31, 2019	December 31, 2018
Land	$ 4,194	$ 3,188
Buildings	125,223	117,910
Machinery and equipment	397,287	386,690
Construction in progress	24,759	24,044
Total	551,463	531,832
Less accumulated depreciation	(384,425)	(373,892)
Property, plant and equipment, net	$ 167,038	$ 157,940

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Note 5—Reclassifications Out of Accumulated Other Comprehensive Loss

	MSA Safety Incorporated			Noncontrolling Interests		
(In thousands)	**2019**	**2018**	**2017**	**2019**	**2018**	**2017**
Pension and other post-retirement benefits[a]						
Balance at beginning of period	$ (115,517)	$ (97,948)	$ (118,068)	$ —	$ —	$ —
Unrecognized net actuarial (losses) gains	(19,479)	(37,977)	17,659	—	—	—
Tax benefit (expense)	5,847	9,936	(6,124)	—	—	—
Total other comprehensive (loss) income before reclassifications, net of tax	(13,632)	(28,041)	11,535	—	—	—
Amounts reclassified from accumulated other comprehensive loss into net income:						
Amortization of prior service credit (Note 14)	(180)	(424)	(176)	—	—	—
Recognized net actuarial losses (Note 14)	11,028	14,507	13,054	—	—	—
Tax benefit	(2,775)	(3,611)	(4,293)	—	—	—
Total amount reclassified from accumulated other comprehensive loss, net of tax, into net income	8,073	10,472	8,585	—	—	—
Reclassification to retained earnings due to the adoption of ASU 2018-02 (Note 1)	(3,772)	—	—	—	—	—
Total other comprehensive (loss) income	$ (9,331)	$ (17,569)	$ 20,120	$ —	$ —	$ —
Balance at end of period	$ (124,848)	$ (115,517)	$ (97,948)	$ —	$ —	$ —
Available-for-sale securities						
Balance at beginning of period	$ (572)	$ —	$ —	$ —	$ —	$ —
Unrealized gain (loss) on available-for-sale securities (Note 18)	578	(572)	—	—	—	—
Balance at end of period	$ 6	$ (572)	$ —	$ —	$ —	$ —
Foreign currency translation						
Balance at beginning of period	$ (102,838)	$ (73,814)	$ (112,178)	$ 496	$ 801	$ (1,964)
Reclassification from accumulated other comprehensive loss into net income	15,261 [b]	774 [c]	—	—	—	—
Foreign currency translation adjustments	(1,584)	(29,798)	38,364	(73)	(305)	2,765
Balance at end of period	$ (89,161)	$ (102,838)	$ (73,814)	$ 423	$ 496	$ 801

[a] Reclassifications out of accumulated other comprehensive loss and into net income are included in the computation of net periodic pension and other post-retirement benefit costs (refer to Note 14—Pensions and Other Post-retirement Benefits).
[b] Reclassifications out of accumulated other comprehensive loss and into net income relate primarily to the approval of our plan to close our South Africa affiliates as discussed above and are included in Currency exchange losses, net, within the Consolidated Statement of Income.
[c] Included in Currency exchange losses, net, on the Consolidated Statement of Income.

Note 6—Capital Stock

Preferred Stock - The Company has authorized 100,000 shares of $50 par value 4.5% cumulative preferred nonvoting stock which is callable at $52.50. There are 71,340 shares issued and 52,878 shares held in treasury at December 31, 2019. The Treasury shares at cost line of the Consolidated Balance Sheet includes $1.8 million related to preferred stock. There were no treasury purchases of preferred stock during the years ended December 31,2019, 2018 or 2017. The Company has also authorized 1,000,000 shares of $10 par value second cumulative preferred voting stock. No shares have been issued as of December 31, 2019 or 2018.

Common Stock - The Company has authorized 180,000,000 shares of no par value common stock. There were 62,081,391 shares issued as of both December 31, 2019 and December 31, 2018. There were 38,841,194 and 38,526,523 shares outstanding at December 31, 2019 and 2018, respectively.

Treasury Shares - The Company's stock repurchase program authorizes up to $100.0 million to repurchase MSA common stock in the open market and in private transactions. The share repurchase program has no expiration date. The maximum number of shares that may be purchased is calculated based on the dollars remaining under the program and the respective month-end closing share price. There were 33,465 shares repurchased during 2019 and 168,941 shares repurchased during 2017. No shares were repurchased during 2018. We do not have any other share repurchase programs. There were 23,240,197 and 23,554,868 Treasury Shares at December 31, 2019 and 2018, respectively.

The Company issues Treasury Shares for all share based benefit plans. Shares are issued from Treasury at the average Treasury Share cost on the date of the transaction. There were 436,549 and 357,510 Treasury Shares issued for these purposes during the years ended December 31, 2019 and 2018, respectively.

Common stock activity is summarized as follows:

	Shares		Dollars	
(Dollars in thousands)	**Issued**	**Treasury**	**Common Stock**	**Treasury Cost**
Balances January 1, 2017	62,081,391	(24,344,813)	$ 172,681	$ (287,501)
Restricted stock awards	—	34,798	(422)	422
Restricted stock expense	—	—	4,746	—
Restricted stock forfeitures	—	(690)	(49)	(6)
Stock options exercised	—	620,646	10,901	7,564
Stock option expense		—	380	—
Performance stock issued	—	72,504	(866)	866
Performance stock expense	—	—	6,687	—
Employee stock purchase plan	—	7,127	445	87
Treasury shares purchased for stock compensation programs	—	(79,094)	—	(5,732)
Share repurchase program	—	(168,941)	—	(11,781)
Acquisition of noncontrolling interest	—	—	450	—
Balances December 31, 2017	62,081,391	(23,858,463)	$ 194,953	$ (296,081)
Restricted stock awards	—	92,401	(1,079)	1,079
Restricted stock expense	—	—	6,504	—
Restricted stock forfeitures	—	—	(283)	—
Stock options exercised	—	215,724	5,738	2,835
Stock option expense	—	—	272	—
Stock option forfeitures	—	—	(55)	—
Performance stock issued	—	41,660	(523)	523
Performance stock expense	—	—	6,186	—
Performance stock forfeitures	—	—	(385)	—
Employee stock purchase plan	—	7,725	478	78
Treasury shares purchased for stock compensation programs	—	(53,915)	—	(4,824)
Balances December 31, 2018	62,081,391	(23,554,868)	$ 211,806	$ (296,390)
Restricted stock awards	—	96,893	(1,253)	1,253
Restricted stock expense	—	—	7,397	—
Restricted stock forfeitures	—	—	(483)	—
Stock options exercised	—	193,681	5,107	2,364
Stock option expense	—	—	492	—
Stock option forfeitures	—	—	(5)	—
Performance stock issued	—	139,478	(1,778)	1,778
Performance stock expense	—	—	6,574	—
Performance stock forfeitures	—	—	(215)	—
Stock consideration in acquisition (Note 13)	—	—	921	—
Employee stock purchase plan	—	5,895	564	77
Treasury shares purchased for stock compensation programs	—	(87,811)	—	(9,301)
Share repurchase program	—	(33,465)	—	(3,347)
Balances December 31, 2019	62,081,391	(23,240,197)	$ 229,127	$ (303,566)

Note 7—Segment Information

We are organized into six geographic operating segments based on management responsibilities. The operating segments have been aggregated (based on economic similarities, the nature of their products, end-user markets and methods of distribution) into three reportable segments: Americas, International and Corporate.

The Americas segment is comprised of our operations in North America and Latin America geographies. The International segment is comprised of our operations in all geographies outside of the Americas. Certain global expenses are allocated to each segment in a manner consistent with where the benefits from the expenses are derived.

The Company's sales are allocated to each country based primarily on the destination of the end-customer.

Adjusted operating income (loss), adjusted operating margin, adjusted earnings before interest, taxes, depreciation and amortization (EBITDA) and adjusted EBITDA margin are the measures used by the chief operating decision maker to evaluate segment performance and allocate resources. Adjusted operating income (loss) is defined as operating income excluding restructuring charges, currency exchange gains (losses), product liability expense and strategic transaction costs and adjusted operating margin is defined as adjusted operating income (loss) divided by segment sales to external customers. Adjusted EBITDA is defined as adjusted operating income (loss) plus depreciation and amortization and adjusted EBITDA margin is defined as adjusted EBITDA divided by segment sales to external customers. Adjusted operating income (loss), adjusted operating margin, adjusted EBITDA and adjusted EBITDA margin are not recognized terms under U.S. GAAP, and therefore, do not purport to be alternatives to operating income or operating margin as a measure of operating performance. Further, the Company's measure of adjusted operating income (loss), adjusted operating margin, adjusted EBITDA and adjusted EBITDA margin may not be comparable to similarly titled measures of other companies. Adjusted operating income (loss) and adjusted EBITDA on a consolidated basis is presented in the following table to reconcile the segment operating performance measure to operating income as presented on the Consolidated Statement of Income.

The accounting principles applied at the operating segment level in determining operating income (loss) are generally the same as those applied at the consolidated financial statement level. Sales and transfers between operating segments are accounted for at market-based transaction prices and are eliminated in consolidation.

Reportable segment information is presented in the following table:

(In thousands)	Americas	International	Corporate	Reconciling Items[(1)]	Consolidated Totals
2019					
Sales to external customers	$ 915,118	$ 486,863	$ —	$ —	$ 1,401,981
Operating income					186,230
Restructuring charges (Note 2)					13,846
Currency exchange losses, net					19,814
Product liability expense (Note 19)					26,619
Strategic transaction costs (Note 13)					4,400
Adjusted operating income (loss)	226,596	59,910	(35,597)	—	250,909
Adjusted operating margin %	24.8%	12.3%			
Depreciation and amortization	24,691	12,938	391	—	38,020
Adjusted EBITDA	251,287	72,848	(35,206)	—	288,929
Adjusted EBITDA %	27.5%	15.0%			
Noncash items:					
Pension (income) expense	(6,111)	7,044	—	—	933
Total Assets	1,131,911	584,195	22,367	1,220	1,739,693
Capital expenditures	26,823	9,781	—	—	36,604
2018					
Sales to external customers	$ 854,287	$ 503,817	$ —	$ —	$ 1,358,104
Operating income					173,479
Restructuring charges (Note 2)					13,247
Currency exchange losses, net					2,330
Product liability expense (Note 19)					45,327
Strategic transaction costs (Note 13)					421
Adjusted operating income (loss)	206,839	59,866	(31,901)	—	234,804
Adjusted operating margin %	24.2%	11.9%			
Depreciation and amortization	24,143	13,303	406	—	37,852
Adjusted EBITDA	230,982	73,169	(31,495)	—	272,656
Adjusted EBITDA %	27.0%	14.5%			
Noncash items:					
Pension (income) expense	(1,201)	7,102	—	—	5,901
Total Assets	1,077,938	522,042	10,842	(2,810)	1,608,012
Capital expenditures	25,001	8,959	—	—	33,960
2017					
Sales to external customers	$ 736,847	$ 459,962	$ —	$ —	$ 1,196,809
Operating income					39,577
Restructuring charges (Note 2)					17,632
Currency exchange losses, net					5,127
Product liability expense (Note 19)					126,432
Strategic transaction costs (Note 13)					4,225
Adjusted operating income (loss)	175,589	50,391	(32,987)	—	192,993
Adjusted operating margin %	23.8%	11.0%			
Depreciation and amortization	23,207	14,265	405	—	37,877
Adjusted EBITDA	198,796	64,656	(32,582)	—	230,870
Adjusted EBITDA %	27.0%	14.1%			
Noncash items:					
Pension expense	246	6,896	—	—	7,142
Total Assets	1,110,698	563,480	12,099	(1,451)	1,684,826
Capital expenditures	16,910	6,815	—	—	23,725

[(1)]Reconciling items consist primarily of intercompany eliminations and items not directly attributable to operating segments.

Geographic information on sales to external customers, based on country of origin:

(In thousands)	2019	2018	2017
United States	$ 785,155	$ 734,033	$ 622,276
Other	616,826	624,071	574,533
Total	$ 1,401,981	$ 1,358,104	$ 1,196,809

Geographic information on tangible long-lived assets, net based on country of origin:

(In thousands)	2019	2018	2017
United States	$ 113,528	$ 92,511	$ 91,730
Other	105,185	65,429	65,284
Total	$ 218,713	$ 157,940	$ 157,014

Total sales by product group was as follows:

2019	Consolidated		Americas		International	
(In thousands)	Dollars	Percent	Dollars	Percent	Dollars	Percent
Breathing Apparatus	$ 317,678	23%	$ 212,463	23%	$ 105,215	22%
Fixed Gas & Flame Detection	292,988	21%	159,892	17%	133,096	27%
Firefighter Helmets & Protective Apparel	178,012	13%	142,043	16%	35,969	7%
Portable Gas Detection	169,479	12%	113,914	12%	55,565	11%
Industrial Head Protection	145,403	10%	112,673	12%	32,730	7%
Fall Protection	125,869	9%	78,054	9%	47,815	10%
Other	172,552	12%	96,079	11%	76,473	16%
Total	$ 1,401,981	100%	$ 915,118	100%	$ 486,863	100%

2018	Consolidated		Americas		International	
(In thousands)	Dollars	Percent	Dollars	Percent	Dollars	Percent
Breathing Apparatus	$ 324,672	24%	$ 205,100	24%	$ 119,572	24%
Fixed Gas & Flame Detection	262,432	19%	135,922	16%	126,510	25%
Firefighter Helmets & Protective Apparel	169,679	13%	136,794	16%	32,885	6%
Portable Gas Detection	163,716	12%	109,401	13%	54,315	11%
Industrial Head Protection	146,388	11%	114,465	13%	31,923	6%
Fall Protection	109,472	8%	61,289	7%	48,183	10%
Other	181,745	13%	91,316	11%	90,429	18%
Total	$ 1,358,104	100%	$ 854,287	100%	$ 503,817	100%

2017	Consolidated		Americas		International	
(In thousands)	Dollars	Percent	Dollars	Percent	Dollars	Percent
Breathing Apparatus	$ 292,448	24%	$ 191,457	26%	$ 100,991	22%
Fixed Gas & Flame Detection	248,047	21%	123,414	17%	124,633	27%
Firefighter Helmets & Protective Apparel	103,441	9%	69,767	9%	33,674	7%
Portable Gas Detection	149,063	12%	98,580	13%	50,483	11%
Industrial Head Protection	133,180	11%	105,514	14%	27,666	6%
Fall Protection	98,929	8%	54,468	7%	44,461	10%
Other	171,701	15%	93,647	14%	78,054	17%
Total	$ 1,196,809	100%	$ 736,847	100%	$ 459,962	100%

Note 8—Earnings per Share

Basic earnings per share is computed by dividing net income, after the deduction of preferred stock dividends and undistributed earnings allocated to participating securities, by the weighted average number of common shares outstanding during the period. Diluted earnings per share assumes the issuance of common stock for all potentially dilutive share equivalents outstanding not classified as participating securities. Participating securities are defined as unvested stock-based payment awards that contain nonforfeitable rights to dividends.

Amounts attributable to MSA Safety Incorporated common shareholders: (In thousands, except per share amounts)	2019	2018	2017
Net income	$ 136,440	$ 124,150	$ 26,027
Preferred stock dividends	(42)	(42)	(42)
Net income available to common equity	136,398	124,108	25,985
Dividends and undistributed earnings allocated to participating securities	$ (183)	$ (117)	$ (62)
Net income available to common shareholders	$ 136,215	$ 123,991	$ 25,923
Basic weighted-average shares outstanding	38,653	38,362	37,997
Stock options and other stock compensation	536	599	700
Diluted weighted-average shares outstanding	39,189	38,961	38,697
Antidilutive stock options	—	—	—
Earnings per share:			
Basic	$ 3.52	$ 3.23	$ 0.68
Diluted	$ 3.48	$ 3.18	$ 0.67

Note 9—Income Taxes

(In thousands)	2019	2018	2017
Components of income (loss) before income taxes			
U.S. income (loss)	$ 126,552	$ 85,234	$ (20,555)
Non-U.S. income	57,183	77,101	50,330
Income before income taxes	183,735	162,335	29,775
Provision for income taxes			
Current			
Federal	$ 13,770	$ 13,574	$ 22,272
State	5,436	4,265	813
Non-U.S.	25,608	23,446	11,054
Total current provision	44,814	41,285	34,139
Deferred			
Federal	$ 5,744	$ 291	$ (26,931)
State	1,346	(1,604)	(3,630)
Non-U.S.	(5,818)	(2,752)	(759)
Total deferred provision (benefit)	1,272	(4,065)	(31,320)
Provision for income taxes	$ 46,086	$ 37,220	$ 2,819

The Company elected to treat Global Intangible Low Taxed Income, which was effective in 2018 for the Company, as a period cost.

The Tax Cuts and Jobs Act of 2017 ("the Act"), which was signed into law on December 22, 2017, has resulted in significant changes to the U.S. corporate income tax system including reducing the U.S. corporate rate to 21% starting in 2018. The Act also creates a territorial tax system with a one-time mandatory tax on previously deferred foreign earnings of U.S. subsidiaries.

On December 22, 2017, SAB 118 was issued to address the application of US GAAP in situations when a registrant does not have the necessary information available, prepared or analyzed in reasonable detail to complete the accounting for certain income tax effects of the Act. In accordance with SAB 118, the Company calculated its best estimate of the impact of the Act and recorded income tax expense of $19.8 million during the fourth quarter of 2017, the period in which the legislation was enacted. Of this amount, $18.0 million related to the one-time transition tax and the remaining $1.8 million was related to the revaluation of U.S. deferred tax assets and liabilities. The Company previously considered the earnings in non-U.S. subsidiaries to be indefinitely reinvested and, accordingly, recorded no deferred income taxes. As as result of the Act, among other things, the Company determined it will repatriate earnings for all non-U.S. subsidiaries with cash in excess of working capital needs. The Company has estimated the associated tax to be $1.9 million, offset partially by $0.7 million of foreign tax credits. As of December 31, 2018, the Company had completed its accounting for all of the enactment-date income tax effects of the Act. Accordingly, we reduced our estimate for the one-time transition tax by $2.0 million and increased our estimate for the revaluation of U.S. deferred tax assets and liabilities by $2.5 million and a $2.0 million increase associated with prepaid taxes for updated regulations related to the Act.

During 2017, the Company recognized a benefit of $2.5 million associated with the reduction of exit taxes related to our European reorganization.

During 2018, the Company recorded $1.8 million of foreign income tax reserves related to the legal and operational realignment of our U.S., Canadian and European operations.

Reconciliation of the U.S. federal income tax rates to our effective tax rate:

	2019	2018	2017
U.S. federal income tax rate	21.0 %	21.0 %	35.0 %
State income taxes—U.S.	2.9 %	1.3 %	(6.2)%
Nondeductible Compensation	1.9 %	1.0 %	— %
Foreign exchange on entity closures	1.8 %	— %	— %
Valuation allowances	0.4 %	0.5 %	(3.3)%
Taxes on non-U.S. income - U.S., Canadian & European reorganization	0.3 %	1.1 %	(8.4)%
U.S. tax reform	— %	1.6 %	66.6 %
Manufacturing deduction credit	— %	(1.0)%	(15.3)%
Employee share-based payments	(2.6)%	(1.6)%	(28.0)%
Research and development credit	(0.6)%	(0.9)%	(4.7)%
Taxes on non-U.S. income	(0.5)%	0.4 %	(24.6)%
Other	0.5 %	(0.5)%	(1.6)%
Effective income tax rate	25.1 %	22.9 %	9.5 %

Components of deferred tax assets and liabilities:

	December 31,	
(In thousands)	2019	2018
Deferred tax assets		
Product liability	$ 29,405	$ 31,169
Capitalized research and development	17,886	10,938
Employee benefits	12,009	9,641
Net operating losses and tax credit carryforwards	6,026	7,845
Share-based compensation	5,396	5,561
Accrued expenses and other reserves	4,384	4,385
Other	3,828	4,056
Total deferred tax assets	78,934	73,595
Valuation allowances	(5,937)	(5,039)
Net deferred tax assets	72,997	68,556
Deferred tax liabilities		
Goodwill and intangibles	(35,999)	(31,290)
Property, plant and equipment	(11,714)	(9,555)
Other	(2,475)	(2,353)
Total deferred tax liabilities	(50,188)	(43,198)
Net deferred taxes	$ 22,809	$ 25,358

At December 31, 2019, we had net operating loss carryforwards of approximately$30.2 million, all of which are in non-U.S. tax jurisdictions. All net operating loss carryforwards without a valuation allowance may be carried forward for a period of at least six years. The change in valuation allowance for the year of $0.8 million is primarily due to our inability to recognize deferred tax assets on certain foreign entities that continue to generate losses partially offset by the release of a valuation allowance on certain losses.

A reconciliation of the change in the tax liability for unrecognized tax benefits for the years ended December 31, 2019 and 2018 is as follows:

(In thousands)	2019	2018
Beginning balance	$ 16,155	$ 15,055
Adjustments for tax positions related to the current year	—	1,869
Adjustments for tax positions related to prior years	(7,740)	(32)
Statute expiration	(3,296)	(737)
Ending balance	$ 5,119	$ 16,155

The total amount of unrecognized tax benefits, if recognized, would reduce our future effective tax rate. We have recognized tax benefits associated with these liabilities in the amount of $2.2 million and $5.2 million at December 31, 2019 and 2018, respectively.

We recognize interest related to unrecognized tax benefits in interest expense and penalties in operating expenses. Our liability for accrued interest and penalties related to uncertain tax positions was $0.5 million and $3.3 million at December 31, 2019 and 2018, respectively.

We are subject to regular review and audit by both foreign and domestic tax authorities. While we believe our tax positions will be sustained, the final outcome of tax audits and related litigation may differ materially from the tax amounts recorded in our consolidated financial statements.

We file a U.S. federal income tax return along with various state and foreign income tax returns. Examinations of our U.S. federal returns have been completed through 2013, with the 2014 and 2015 tax years closed by statute. Various state and foreign income tax returns may be subject to tax audits for periods after 2013.

Note 10—Stock Plans

The 2016 Management Equity Incentive Plan provides for various forms of stock-based compensation for eligible key employees through May 2026. Management stock-based compensation includes stock options, restricted stock, restricted stock units and performance stock units. Additionally, 2019 amounts granted include outstanding Sierra Monitor Corporation awards converted into MSA awards after the merger and acquisition. See Note 13—Acquisitions for more information. The 2017 Non-Employee Directors' Equity Incentive Plan provides for grants of stock options and restricted stock to non-employee directors through May 2027. Stock options are granted at market prices and expire after ten years. Stock options are exercisable beginning three years after the grant date. Restricted stock and restricted stock units are granted without payment to the Company and generally vest three years after the grant date. Restricted stock and restricted stock units are valued at the market value of the stock on the grant date. Performance stock units with a market condition are valued at an estimated fair value using the Monte Carlo model. The final number of shares to be issued for performance stock units may range from zero to 200% of the target award based on achieving the specified performance targets over the performance period. In general, unvested stock options, restricted stock and performance stock units are forfeited if the participant's employment with the Company terminates for any reason other than retirement, death or disability. We issue Treasury shares for stock option exercises and grants of restricted stock and performance stock. Please refer to Note 6 for further information regarding stock compensation share issuance. As of December 31, 2019, there were 903,802 and 103,098 shares, respectively, reserved for future grants under the management and non-employee directors' equity incentive plans.

Stock-based compensation expense was as follows:

(In thousands)	2019	2018	2017
Restricted stock	$ 6,914	$ 6,221	$ 4,691
Stock options	487	217	380
Performance stock	6,359	5,801	6,687
Total compensation expense before income taxes	13,760	12,239	11,758
Income tax benefit	3,357	2,974	4,440
Total compensation expense, net of income tax benefit	$ 10,403	$ 9,265	$ 7,318

We did not capitalize any stock-based compensation expense, and all expense is recorded in selling, general and administrative expense in 2019, 2018, and 2017.

Stock option expense is based on the fair value of stock option grants estimated on the grant dates using the Black-Scholes option pricing model and the following weighted average assumptions for options granted in 2019. There were no stock options granted in 2018 or 2017.

	2019
Fair value per option	$ 59.07
Risk-free interest rate	2.3%
Expected dividend yield	1.7%
Expected volatility	31%
Expected life (years)	6.4

The risk-free interest rate is based on the U.S. Treasury yield curve. Expected dividend yield is based on the most recent annualized dividend divided by the one year average closing share price. Expected volatility is based on the historical volatility using daily stock prices. Expected life is based on historical stock option exercise data.

A summary of option activity follows:

	Shares	Weighted Average Exercise Price	Exercisable at Year-end
Outstanding January 1, 2017	1,576,092	$ 37.63	
Exercised	(620,646)	29.75	
Outstanding December 31, 2017	955,446	42.75	614,414
Exercised	(215,724)	39.25	
Forfeited	(4,721)	44.50	
Outstanding December 31, 2018	735,001	43.79	638,673
Granted (Note 13)	23,285	43.54	
Exercised	(198,535)	38.16	
Forfeited	(95)	49.19	
Outstanding December 31, 2019	559,656	$ 45.78	552,682

For various exercise price ranges, characteristics of outstanding and exercisable stock options at December 31, 2019 were as follows:

	Stock Options Outstanding		
		Weighted-Average	
Range of Exercise Prices	Shares	Exercise Price	Remaining Life
$17.83 – $33.00	10,732	$ 27.88	0.30
$33.01 – $45.00	258,806	42.19	3.92
$45.01 – $57.93	290,118	49.63	3.74
$17.83 – $57.93	559,656	$ 45.78	3.76

	Stock Options Exercisable		
		Weighted-Average	
Range of Exercise Prices	Shares	Exercise Price	Remaining Life
$17.83 – $33.00	10,732	$ 27.88	0.30
$33.01 – $45.00	255,573	42.21	3.87
$45.01 – $57.93	286,377	49.64	3.69
$17.83 – $57.93	552,682	$ 45.78	3.71

Cash received from the exercise of stock options was $7.5 million, $8.6 million and $18.5 million for the years ended December 31, 2019, 2018 and 2017, respectively. The tax benefit we realized from these exercises was $4.8 million, $2.5 million and $7.4 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Stock options become exercisable when they are vested. The aggregate intrinsic value of stock options exercisable at December 31, 2019 was $44.5 million. The aggregate intrinsic value of all stock options outstanding at December 31, 2019 was $45.1 million.

A summary of restricted stock and unit activity follows:

	Shares	Weighted Average Grant Date Fair Value
Unvested January 1, 2017	234,592	$ 49.76
Granted	72,878	75.27
Vested	(76,834)	52.74
Forfeited	(3,475)	50.46
Unvested at December 31, 2017	227,161	57.50
Granted	75,430	87.36
Vested	(92,401)	58.10
Forfeited	(4,741)	59.61
Unvested at December 31, 2018	205,449	68.97
Granted	70,160	104.53
Vested	(97,253)	56.47
Forfeited	(5,655)	85.48
Unvested at December 31, 2019	172,701	$ 90.38

A summary of performance stock unit activity follows:

	Shares	Weighted Average Grant Date Fair Value
Unvested at January 1, 2017	186,621	$ 46.18
Granted	98,886	72.73
Vested	(72,504)	57.19
Performance adjustments	29,183	57.27
Unvested at December 31, 2017	242,186	55.06
Granted	62,775	84.79
Vested	(41,660)	40.23
Performance adjustments	(35,756)	45.21
Forfeited	(8,659)	44.53
Unvested at December 31, 2018	218,886	68.43
Granted	83,819	101.03
Vested	(139,478)	44.75
Performance adjustments	76,960	44.24
Forfeited	(2,152)	99.82
Unvested at December 31, 2019	238,035	$ 85.39

The 2019 performance adjustments above relate to adjustments made relative to awards that exceeded the performance targets when vested during 2019 including the final number of shares issued for the 2016 Management Performance Units, which were 237.6% of the target award based on Total Shareholder Return during the three year performance period, and vested in the first quarter of 2019.

During the years ended December 31, 2019, 2018 and 2017, the total intrinsic value of stock options exercised (the difference between the market price on the date of exercise and the option price paid to exercise the option) was $14.6 million, $12.2 million and $29.3 million, respectively. The fair values of restricted stock vested during the years ended December 31, 2019, 2018 and 2017 were $5.5 million, $5.4 million and $4.1 million, respectively. The fair value of performance stock units vested during the years ended December 31, 2019, 2018 and 2017 was $6.2 million, $1.7 million and $4.1 million, respectively.

On December 31, 2019, there was $11.6 million of unrecognized stock-based compensation expense. The weighted average period over which this expense is expected to be recognized was approximately 1.53 years.

Note 11—Short and Long-Term Debt

Short-Term Debt

Short-term borrowings with banks, which excludes the current portion of long-term debt, was insignificant at December 31, 2019 and 2018, respectively. The average month-end balance of total short-term borrowings during 2019 was $0.2 million. The maximum month-end balance of $0.6 million occurred in October 2019.

Long-Term Debt

	December 31,	
(In thousands)	**2019**	**2018**
2010 Senior Notes payable through 2021, 4.00%, net of debt issuance costs	$ 40,000	$ 60,000
2016 Senior Notes payable through 2031, 3.40%, net of debt issuance costs	72,708	69,604
Senior revolving credit facility maturing in 2023, net of debt issuance costs	235,686	231,707
Total	348,394	361,311
Amounts due within one year	20,000	20,000
Long-term debt	$ 328,394	$ 341,311

On September 7, 2018, the Company entered into a Third Amended and Restated Credit Agreement associated with our senior revolving credit facility which extended the term of the revolving credit facility through September 2023 and increased the capacity to $600.0 million. Under this 2018 Amended and Restated Credit Agreement, the Company may elect either a Base rate of interest (“BASE”) or an interest rate based on the London Interbank Offered Rate (“LIBOR”). The BASE is a daily fluctuating per annum rate equal to the highest of (i) 0.00%, (ii) the Prime Rate, (ii) the Federal Funds Open Rate plus one half of one percent (0.5%), (iii) the Overnight Bank Funding Rate, plus one half of one percent (0.5%), or (iv) the Daily Libor Rate plus one percent (1.00%). The Company pays a credit spread of 0 to 175 basis points based on the Company’s net EBITDA leverage ratio and the elected rate (BASE or LIBOR). The facility contemplates the discontinuance of LIBOR and includes an option to replace LIBOR with a comparable rate or if a comparable rate cannot be found the base rate would be utilized. The Company has a weighted average revolver interest rate of 2.77% as of December 31, 2019. At December 31, 2019, $361.3 million of the existing $600.0 million senior revolving credit facility was unused, including letters of credit.

On January 22, 2016, the Company entered into a Second Amended and Restated Multi-Currency Note Purchase and Private Shelf Agreement (the "Notes"), pursuant to which MSA issued notes in an aggregate original principal amount of £54.9 million (approximately $72.9 million at December 31, 2019). The Notes are repayable in annual installments of £6.1 million (approximately $8.1 million at December 31, 2019), commencing January 22, 2023, with a final payment of any remaining amount outstanding on January 22, 2031. The interest rate on these Notes is fixed at 3.4%. On September 7, 2018, the Company entered into a first amendment of such amended and restated agreement associated with these Notes. Under the Second Amended and Restated Multi-Currency Note Purchase and Private Shelf Agreement, as amended ("Amended Note Purchase Agreement"), the Company may request from time to time during a three-year period ending September 7, 2021, the issuance of up to $150 million of additional senior notes.

On January 4, 2019, the Company entered into an amended and restated agreement associated with the New York Life master note facility dated June 2, 2014. Under this Amended and Restated Master Note Facility ("Amended Note Facility"), the Company may request from time to time during a three-year period ending January 4, 2022, the issuance of up to $150 million of additional senior promissory notes. As of the Form 10-K filing date, there are no promissory notes outstanding.

Both the Amended Note Purchase Agreement and Amended Note Facility require MSA to comply with specified financial covenants, including a requirement to maintain a minimum fixed charges coverage ratio of not less than 1.50 to 1.00 and a consolidated net leverage ratio not to exceed 3.50 to 1.00, except during an acquisition period in which case the consolidated net leverage ratio shall not exceed 4.00 to 1.00; in each case calculated on the basis of the trailing four fiscal quarters. In addition, the Amended Note Purchase Agreement and Amended Note Facility both contain negative covenants limiting the ability of MSA and its subsidiaries to incur additional indebtedness or issue guarantees, create or incur liens, make loans and investments, make acquisitions, transfer or sell assets, enter into transactions with affiliated parties, make changes in its organizational documents that are materially adverse to lenders or modify the nature of MSA's or its subsidiaries' business. However, the covenants contained in the Amended Note Facility do not apply until promissory notes are issued.

On August 24, 2018, we repaid our 5.41% 2006 Senior Notes. In connection with the payoff of these notes, MSA recognized a loss on extinguishment of debt of $1.5 million which was recorded in loss on extinguishment of debt on our Consolidated Statement of Income.

Approximate maturities on our long-term debt over the next five years are $20.0 million in 2020, $20.0 million in 2021, none in 2022, $245.2 million in 2023, $8.1 million in 2024 and $56.6 million thereafter. The revolving credit facilities require the Company to comply with specified financial covenants. In addition, the revolving credit facilities contain negative covenants limiting the ability of the Company and its subsidiaries to enter into specified transactions. The Company was in compliance with all covenants at December 31, 2019.

The Company had outstanding bank guarantees and standby letters of credit with banks as of December 31, 2019, totaling $8.6 million, of which $1.9 million relate to the senior revolving credit facility. The letters of credit serve to cover customer requirements in connection with certain sales orders and insurance companies. The full amount of the letters of credit remains unused and available at December 31, 2019. The Company is also required to provide cash collateral in connection with certain arrangements. At December 31, 2019, the Company has $0.3 million of restricted cash in support of these arrangements.

Note 12—Goodwill and Intangible Assets

Changes in goodwill during the years ended December 31, 2019 and 2018, were as follows:

(In thousands)	2019	2018
Net balance at January 1	$ 413,640	$ 422,185
Additions (Note 13)	19,917	—
Disposals	—	(525)
Currency translation	3,122	(8,020)
Net balance at December 31	$ 436,679	$ 413,640

At December 31, 2019, goodwill of $293.2 million and $143.5 million related to the Americas and International reporting segments, respectively.

Changes in intangible assets, net of accumulated amortization, during the years ended December 31, 2019 and 2018, were as follows:

(In thousands)	2019	2018
Net balance at January 1	$ 169,515	$ 183,088
Additions (Note 13)	11,100	—
Amortization expense	(11,119)	(10,509)
Currency translation	1,830	(3,064)
Net balance at December 31	$ 171,326	$ 169,515

(In millions)		December 31, 2019			December 31, 2018		
Intangible Assets:	Weighted Average Useful Life (years)	Gross Carrying Amount	Accumulated Amortization and Reserves	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization and Reserves	Net Carrying Amount
Customer relationships	14	$ 58.3	$ (15.3)	$ 43.0	$ 46.7	$ (10.6)	$ 36.1
Distribution agreements	20	66.0	(17.3)	48.7	66.1	(14.1)	52.0
Technology related assets	8	30.0	(18.3)	11.7	28.3	(15.5)	12.8
Patents, trademarks and copyrights	12	19.0	(11.3)	7.7	18.7	(10.4)	8.3
License agreements	5	5.3	(5.3)	—	5.3	(5.3)	—
Other	2	3.0	(2.8)	0.2	2.9	(2.6)	0.3
Total	14	$ 181.6	$ (70.3)	$ 111.3	$ 168.0	$ (58.5)	$ 109.5

During 2017, we acquired a trade name with an indefinite life totaling$60.0 million. This intangible asset is tested for impairment on October 1st of each year, or more frequently if indicators of impairment exist.

Intangible asset amortization expense over the next five years is expected to be approximately$12 million in 2020 and 2021, $10 million in 2022 and $9 million in 2023 and 2024.

Note 13—Acquisitions

Acquisition of Sierra Monitor Corporation

On May 20, 2019, we acquired 100% of the common stock in Sierra Monitor Corporation ("SMC") in an all-cash transaction valued at$33.2 million, net of cash acquired. Additionally, we converted outstanding stock options and restricted stock units into MSA stock options and restricted stock units which resulted in additional goodwill of approximately $0.9 million based on the fair value of the awards identified as transaction consideration.

Based in Milpitas, California, in the heart of Silicon Valley, SMC is a leading provider of fixed gas and flame detection instruments and Industrial Internet of Things solutions that connect and help protect high-value infrastructure assets. The acquisition enables MSA to accelerate its strategy to enhance worker safety and accountability through the use of cloud technology and wireless connectivity. This acquisition enhances a key focus of the Company's recently established Safety io subsidiary, launched in 2018 primarily to leverage the capabilities of its portable gas detection portfolio as it relates to cloud connectivity. The transaction was funded through borrowings on our unsecured senior revolving credit facility.

SMC operating results are included in our consolidated financial statements from the acquisition date as part of the Americas reportable segment. The acquisition qualifies as a business combination and was accounted for using the acquisition method of accounting.

We finalized the purchase price allocation as of December 31, 2019. The following table summarizes the fair values of the SMC assets acquired and liabilities assumed at the date of acquisition:

(In millions)	May 20, 2019
Current assets (including cash of $2.1 million)	$ 10.5
Property, plant and equipment and other noncurrent assets	1.3
Customer relationships	9.6
Acquired technology	1.4
Goodwill	19.9
Total assets acquired	42.7
Total liabilities assumed	6.5
Net assets acquired	$ 36.2

Assets acquired and liabilities assumed in connection with the acquisition have been recorded at their fair values. Fair values were determined by management, based, in part on an independent valuation performed by a third-party valuation specialist. The valuation methods used to determine the fair value of intangible assets included the relief from royalty method for technology related intangible assets; the excess earnings approach for customer relationships using customer inputs and contributory charges; and the cost method for assembled workforce which is included in goodwill. A number of significant assumptions and estimates were involved in the application of these valuation methods, including sales volumes and prices, royalty rates, costs to produce, tax rates, capital spending, discount rates, and working capital changes. Cash flow forecasts were generally based on SMC pre-acquisition forecasts coupled with estimated MSA sales synergies. Identifiable intangible assets with finite lives are subject to amortization over their estimated useful lives. The customer relationships acquired in the SMC transaction will be amortized over a period of 10 years and the technology will be amortized over 5 years. Estimated future amortization expense related to the identifiable intangible assets is approximately $1 million in each of the next five years. The step up to fair value of acquired inventory as part of the purchase price allocation totaled $1.6 million which was fully recognized as amortization expense during the year ended December 31, 2019.

Acquisition of Globe Holding Company, LLC

On July 31, 2017, we acquired 100% of the common stock in Globe Holding Company, LLC ("Globe") in an all-cash transaction valued at $215 million plus a working capital adjustment of $1.4 million. There is no contingent consideration.

Based in Pittsfield, NH, Globe is a leading innovator and provider of firefighter protective clothing and boots. This acquisition aligns with our corporate strategy in that it strengthens our leading position in the North American fire service market. The transaction was funded through borrowings on our unsecured senior revolving credit facility.

Globe operating results are included in our consolidated financial statements from the acquisition date as part of the Americas reportable segment. The acquisition qualifies as a business combination and was accounted for using the acquisition method of accounting.

We finalized the purchase price allocation as of June 30, 2018. The following table summarizes the fair values of the Globe assets acquired and liabilities assumed at the date of acquisition:

(In millions)	July 31, 2017
Current assets (including cash of $58 thousand)	$ 28.6
Property, plant and equipment	8.3
Trade name	60.0
Distributor relationships	40.2
Acquired technology and other intangible assets	10.5
Goodwill	74.5
Total assets acquired	222.1
Total liabilities assumed	5.7
Net assets acquired	$ 216.4

Assets acquired and liabilities assumed in connection with the acquisition were recorded at their fair values. Fair values were determined by management, based, in part on an independent valuation performed by a third party valuation specialist. The valuation methods used to determine the fair value of intangible assets included the relief from royalty method for trade name and technology related intangible assets; the excess earnings approach for distributor relationships using distributor inputs and contributory charges; and the cost method for assembled workforce which is included in goodwill. A number of significant assumptions and estimates were involved in the application of these valuation methods, including sales volumes and prices, royalty rates, costs to produce, tax rates, capital spending, discount rates, and working capital changes. Cash flow forecasts were generally based on Globe pre-acquisition forecasts coupled with estimated MSA sales synergies. Identifiable intangible assets with finite lives are subject to amortization over their estimated useful lives. The distributor relationships acquired in the Globe transaction will be amortized over a period of 20 years and the remaining identifiable assets will be amortized over 5 years. The trade name was determined to have an indefinite useful life. We perform an impairment assessment annually on October 1st on the trade name, or sooner if there is a triggering event. Additionally, as part of each impairment assessment, we will reassess whether the asset continues to have an indefinite life or whether it should be reassessed with a finite life. Estimated future amortization expense related to the identifiable intangible assets is approximately $4 million in each of the next two years 2020 and 2021, $3 million in 2022 and $2 million in 2023 and 2024. Estimated future depreciation expense related to Globe property, plant and equipment is approximately $1 million in each of the next five years.

Goodwill is calculated as the excess of the purchase price over the fair value of net assets acquired and represents the future economic benefits arising from other assets acquired that could not be individually identified and separately recognized. Among the factors that contributed to a purchase price in excess of the fair value of the net tangible and intangible assets acquired were the acquisition of an assembled workforce, the expected synergies and other benefits that we believe will result from combining the operations of Globe and SMC with our operations. Goodwill of $74.5 million related to the Globe acquisition has been recorded in the Americas reportable segment and is expected to be tax deductible. Goodwill of $19.9 million related to the SMC acquisition has been recorded in the Americas reportable segment and is non-deductible for tax purposes.

Our results for the year ended December 31, 2019 include strategic transaction costs of $4.4 million, including costs related to the acquisition of SMC. Our results for the year ended December 31, 2018 include strategic transaction costs of $0.4 million. Our results for the year ended December 31, 2017, include strategic transaction costs of $4.2 million, including costs related to the acquisition of Globe. These costs are all reported in selling, general and administrative expenses.

The operating results of both acquisitions have been included in our consolidated financial statements from the acquisition date. Our results for the year ended December 31, 2019, include SMC sales and net loss of $13.5 million and $3.3 million, respectively. Excluding purchase accounting amortization for intangible assets and inventory step up of $2.6 million, transaction costs of $2.2 million, and stock compensation cost related to converted options and excess performance on PSUs related to the acquisition of $1.5 million, adjusted earnings for SMC for the year ended December 31, 2019 was $1.5 million. Our results for the year ended December 31, 2018 include Globe sales of $113.9 million and net income of $13.3 million. These results include depreciation expense of $1.0 million and amortization expense of $4.1 million. Excluding transaction and integration costs, Globe provided $13.6 million of net income for the year ended December 31, 2018. Our results for the year ended December 31, 2017 include Globe sales of $46.1 million and net income of 3.7 million. These results include depreciation expense of $0.5 million and amortization expense of $1.7 million. Excluding transaction and integration costs, Globe provided $4.9 million of net income for the year ended December 31, 2017.

The following unaudited pro forma information presents our combined results as if both acquisitions had occurred at the beginning of 2017. The unaudited pro forma financial information was prepared to give effect to events that are (1) directly attributable to the acquisition; (2) factually supportable; and (3) expected to have a continuing impact on the combined company's results. There were no material transactions between MSA and Globe or SMC during the periods presented that are required to be eliminated. Intercompany transactions between Globe companies and SMC companies during the periods presented have been eliminated in the unaudited pro forma combined financial information. The unaudited pro forma financial information does not reflect any cost savings, operating synergies or revenue enhancements that the combined companies may achieve as a result of the acquisitions or the costs to integrate the operations or the costs necessary to achieve cost savings, operating synergies or revenue enhancements.

Pro forma financial information (Unaudited)

(In millions, except per share amounts)	2019	2018	2017
Net sales	$ 1,410	$ 1,380	$ 1,281
Net Income	131	124	36
Basic earnings per share	3.40	3.24	0.94
Diluted earnings per share	3.35	3.19	0.93

The unaudited pro forma combined financial information is presented for information purposes only and is not intended to represent or be indicative of the combined results of operations or financial position that we would have reported had the acquisitions been completed as of the date and for the periods presented, and should not be taken as representative of our consolidated results of operations or financial condition following the acquisitions. In addition, the unaudited pro forma combined financial information is not intended to project the future financial position or results of operations of the combined company.

The unaudited pro forma financial information was prepared using the acquisition method of accounting for both acquisitions under existing U.S. GAAP. MSA has been treated as the acquirer.

Note 14—Pensions and Other Post-retirement Benefits

We maintain various defined benefit and defined contribution plans covering the majority of our employees. Our principal U.S. plan is funded in compliance with the Employee Retirement Income Security Act (ERISA). It is our general policy to fund current costs for the international plans, except in Germany and Mexico, where it is common practice and permissible under tax laws to accrue book reserves.

We provide health care benefits and limited life insurance for certain retired employees who are covered by our principal U.S. defined benefit pension plan until they become Medicare-eligible.

Information pertaining to defined benefit pension plans and other post-retirement benefits plans is provided in the following tables:

	Pension Benefits		Other Benefits	
(In thousands)	2019	2018	2019	2018
Change in Benefit Obligations				
Benefit obligations at January 1	$ 525,520	$ 560,385	$ 28,477	$ 22,027
Service cost	10,342	11,125	354	369
Interest cost	18,803	17,214	996	793
Participant contributions	470	97	380	302
Actuarial losses (gains)	81,132	(29,181)	1,319	7,841
Benefits paid	(24,452)	(23,724)	(3,375)	(2,855)
Curtailments	—	(2,151)	—	—
Settlements	(7,265)	(726)	—	—
Currency translation	(999)	(7,519)	—	—
Benefit obligations at December 31	603,551	525,520	28,151	28,477
Change in Plan Assets				
Fair value of plan assets at January 1	443,112	492,677	—	—
Actual return on plan assets	98,210	(26,804)	—	—
Employer contributions	5,537	4,718	2,995	2,553
Participant contributions	470	97	380	302
Settlements	(7,265)	(726)	—	—
Benefits paid	(24,452)	(23,724)	(3,375)	(2,855)
Administrative Expenses Paid	(297)	(704)	—	—
Currency translation	543	(2,422)	—	—
Fair value of plan assets at December 31	515,858	443,112	—	—
Funded Status				
Funded status at December 31	(87,693)	(82,408)	(28,151)	(28,477)
Unrecognized transition losses	4	5	—	—
Unrecognized prior service credit	1,572	(687)	(1,519)	(1,924)
Unrecognized net actuarial losses	183,733	178,640	12,547	12,096
Net amount recognized	97,616	95,550	(17,123)	(18,305)
Amounts Recognized in the Balance Sheet				
Noncurrent assets	75,066	57,568	—	—
Current liabilities	(5,944)	(5,741)	(2,406)	(2,736)
Noncurrent liabilities	(156,815)	(134,231)	(25,745)	(25,741)
Net amount recognized	(87,693)	(82,404)	(28,151)	(28,477)
Amounts Recognized in Accumulated Other Comprehensive Loss				
Net actuarial losses	183,733	178,640	12,547	12,096
Prior service credit	1,572	(687)	(1,519)	(1,924)
Unrecognized net initial obligation	4	5	—	—
Total (before tax effects)	185,309	177,958	11,028	10,172
Accumulated Benefit Obligations for all Defined Benefit Plans	558,183	489,159	—	—

(In thousands)	Pension Benefits 2019		Pension Benefits 2018	Pension Benefits 2017		Other Benefits 2019	Other Benefits 2018	Other Benefits 2017
Components of Net Periodic Benefit Cost								
Service cost	$ 10,342		$ 11,125	$ 11,023		$ 354	$ 369	$ 403
Interest cost	18,803		17,214	18,450		996	793	882
Expected return on plan assets	(38,644)		(36,352)	(35,417)		—	—	—
Amortization of transition amounts	2		1	2		—	—	—
Amortization of prior service cost (credit)	223		(21)	(19)		(405)	(405)	(307)
Recognized net actuarial losses	10,159		13,755	12,955		869	752	100
Settlement/curtailment loss (credit)	2,497	(c)	179	148		—	—	(562)
Special termination charge	—		—	11,384	(b)	—	—	—
Net periodic benefit cost(a)	$ 3,382		$ 5,901	$ 18,526		$ 1,814	$ 1,509	$ 516

(a) Components of net periodic benefit cost other than service cost are included in the line item "Other income, net" in the income statement.
(b) Represents the charge for special termination benefits related to the VRIP which were paid from our overfunded North America pension plan and recorded as restructuring charges on the Consolidated Statement of Income. See further details in Note 2—Restructuring Charges.
(c) Related to a non-cash charge associated with the termination of our pension plan in the U.K. and included in "Restructuring charges" on the Consolidated Statement of Income.

Effective December 31, 2017, the Company changed the method it uses to estimate the service and interest cost components of net periodic benefit cost for pension and other post-retirement benefits for a majority of its U.S. and foreign plans. Historically, the service and interest cost components for these plans were estimated using a single weighted-average discount rate derived from the yield curve used to measure the projected benefit obligation at the beginning of the period. The Company has elected to utilize a spot rate approach, which discounts the individual plan specific expected cash flows underlying the service and interest cost using the applicable spot rates derived from a yield curve used in the determination of the benefit obligation to the relevant projected cash flows. The Company made this change to improve the correlation between projected benefit cash flows and the corresponding yield curve spot rates and to provide a more precise measurement of service and interest costs. This change does not affect the measurement of total benefit obligations. Service and interest cost for the pension and OPEB plans were reduced by an estimated $1.8 million in 2018 as a result of this change. The Company has accounted for this change to the spot rate approach as a change in accounting estimate that is inseparable from a change in accounting principle, pursuant to Accounting Standards Codification (ASC) 250, *Accounting Changes and Error Corrections*, and accordingly, has accounted for it prospectively. For plans where the discount rate is not derived from plan specific expected cash flows, the Company will continue to employ the current approaches for measuring both the projected benefit obligations and the service and interest cost components of net periodic benefit cost for pension and other post-retirement benefits.

Amounts included in accumulated other comprehensive loss expected to be recognized in 2020 net periodic benefit costs:

(In thousands)	Pension Benefits	Other Benefits
Loss recognition	$ 15,740	$ 1,145
Prior service cost (credit) recognition	184	(394)
Transition obligation recognition	—	—

Information for pension plans with an accumulated benefit obligation in excess of plan assets:

(In thousands)	2019	2018
Aggregate accumulated benefit obligations (ABO)	$ 185,747	$ 159,545
Aggregate projected benefit obligations (PBO)	198,633	168,819
Aggregate fair value of plan assets	35,882	28,876

	Pension Benefits		Other Benefits	
	2019	2018	2019	2018
Assumptions used to determine benefit obligations				
Average discount rate	2.86%	3.79%	3.05%	4.21%
Rate of compensation increase	2.93%	3.00%	—	—
Assumptions used to determine net periodic benefit cost				
Average discount rate - Service cost	3.10%	3.34%	3.15%	3.57%
Average discount rate - Interest cost	2.52%	3.34%	2.61%	3.57%
Expected return on plan assets	7.09%	7.99%	—	—
Rate of compensation increase	2.93%	3.00%	—	—

Discount rates for a majority of our U.S. and foreign plans were determined using the aforementioned spot rate methodology for2019 and 2018. All remaining plans' discount rates were determined using various corporate bond indexes as indicators of interest rate levels and movements and by matching our projected benefit obligation payment stream to current yields on high quality bonds.

The expected return on assets for the2019 net periodic pension cost was determined by multiplying the expected returns of each asset class (based on historical returns) by the expected percentage of the total portfolio invested in that asset class. A total return was determined by summing the expected returns over all asset classes.

	Pension Plan Assets at December 31,	
	2019	2018
Equity securities	46%	58%
Fixed income securities	30	25
Pooled investment funds	19	11
Insurance contracts	4	4
Cash and cash equivalents	1	2
Total	100%	100%

The overall objective of our pension investment strategy is to earn a rate of return over time to satisfy the benefit obligations of the pension plans and to maintain sufficient liquidity to pay benefits and meet other cash requirements of our pension funds. Investment policies for our primary U.S. pension plan are determined by the plan’s Investment Committee and set forth in the plan’s investment policy. Asset managers are granted discretion for determining sector mix, selecting securities and timing transactions, subject to the guidelines of the investment policy. An aggressive, flexible management of the portfolio is permitted and encouraged, with shifts of emphasis among equities, fixed income securities and cash equivalents at the discretion of each manager. No target asset allocations are set forth in the investment policy. For our non-U.S. pension plans, our investment objective is generally met through the use of pooled investment funds and insurance contracts.

The fair values of the Company's pension plan assets are determined using net asset value (NAV) as a practical expedient, or by information categorized in the fair value hierarchy level based on the inputs used to determine fair value, as further discussed in Note 18—Fair Value Measurements. The fair values at December 31, 2019, were as follows:

			Fair Value		
(In thousands)	Total	NAV	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Equity securities	$ 235,491	$ 56,449	$ 179,042	$ —	$ —
Fixed income securities	154,640	—	73,874	80,766	—
Pooled investment funds	97,373	97,373	—	—	—
Insurance contracts	21,502	—	—	—	21,502
Cash and cash equivalents	6,852	5,792	1,060	—	—
Total	$ 515,858	$ 159,614	$ 253,976	$ 80,766	$ 21,502

The fair values of the Company's pension plan assets atDecember 31, 2018, were as follows:

			Fair Value		
(In thousands)	Total	NAV	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Equity securities	$ 259,014	$ 62,027	$ 196,987	$ —	$ —
Fixed income securities	109,876	—	28,312	81,564	—
Pooled investment funds	49,823	49,823	—	—	—
Insurance contracts	17,033	—	—	—	17,033
Cash and cash equivalents	7,366	6,259	1,107	—	—
Total	$ 443,112	$ 118,109	$ 226,406	$ 81,564	$ 17,033

Equity securities consist primarily of publicly traded U.S. and non-U.S. common stocks. Equities are valued at closing prices reported on the listing stock exchange.

Fixed income securities consist primarily of U.S. government and agency bonds and U.S. corporate bonds. Fixed income securities are valued at closing prices reported in active markets or based on yields currently available on comparable securities of issuers with similar credit ratings. When quoted prices are not available for identical or similar bonds, the bond is valued under a discounted cash flow approach that maximizes observable inputs, such as current yields of similar instruments, and may include adjustments, for certain risks that may not be observable, such as credit and liquidity risks.

A financial instrument's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement. Pooled investment funds consist of mutual and collective investment funds that invest primarily in publicly traded equity and fixed income securities. Pooled investment funds are valued using the net asset value (NAV) provided by the administrator of the fund. The NAV is based on the value of the underlying assets owned by the fund, minus its liabilities, divided by the number of shares outstanding. The underlying securities are generally valued at closing prices reported in active markets, quoted prices of similar securities, or discounted cash flows approach that maximizes observable inputs such as current value measurement at the reporting date. These investments are not classified in the fair value hierarchy in accordance with guidance in ASU 2015-07.

Insurance contracts are valued in accordance with the terms of the applicable collective pension contract. The fair value of the plan assets equals the discounted value of the expected cash flows of the accrued pensions which are guaranteed by the counterparty insurer.

Cash equivalents consist primarily of money market and similar temporary investment funds. Cash equivalents are valued at closing prices reported in active markets.

The preceding methods may produce fair value measurements that are not indicative of net realizable value or reflective of future fair values. Although we believe the valuation methods are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The following table presents a reconciliation of Level 3 assets:

(In thousands)		Insurance Contracts
Balance January 1, 2018	$	17,834
Net realized and unrealized losses		(957)
Net purchases, issuances and settlements		156
Balance December 31, 2018		17,033
Net realized and unrealized gains		5,602
Net purchases, issuances and settlements		(1,133)
Balance December 31, 2019	$	21,502

We expect to make net contributions of $7.6 million to our pension plans in 2020, which are primarily associated with our International segment.

For the 2019 beginning of the year measurement purposes (net periodic benefit expense), a 6.5% increase in the costs of covered health care benefits was assumed, decreasing by 0.5% for each successive year to 4.5% in 2023 and thereafter. For the 2019 end of the year measurement purposes (benefit obligation), a 6.5% increase in the costs of covered health care benefits was assumed, decreasing by 0.5% for each successive year to 4.5% in 2024 and thereafter. A one-percentage-point change in assumed health care cost trend rates would have increased or decreased the other post-retirement benefit obligations and current year plan expense by approximately $1.0 million and $0.1 million, respectively.

Expense for defined contribution pension plans was $8.3 million in 2019, $9.0 million in 2018 and $8.1 million in 2017.

Estimated pension benefits to be paid under our defined benefit pension plans during the next five years are $25.0 million in 2020, $25.6 million in 2021, $26.5 million in 2022, $27.6 million in 2023 and $28.1 million in 2024, and an aggregated $151.0 million for the five years thereafter. Estimated other post-retirement benefits to be paid during the next five years are $2.4 million in 2020, $2.5 million in 2021, $2.3 million in 2022, $2.0 million in 2023, $2.1 million in 2024, and an aggregated $8.9 million for the five years thereafter.

Note 15—Other Income, Net

(In thousands)		2019		2018		2017
Interest income	$	4,411	$	4,588	$	3,596
Components of net periodic benefit cost other than service cost (Note 14)		7,997		4,641		3,768
(Loss) Gain on asset dispositions, net		(371)		646		(557)
Other, net		(943)		(644)		(1,249)
Total other income, net	$	11,094	$	9,231	$	5,558

During the years ended December 31, 2019, 2018 and 2017, we recognized $4.4 million, $4.6 million and $3.6 million of income, respectively, related to interest earned on cash balances, short-term investments and notes receivables from insurance companies. Please refer to Note 19—Contingencies for further discussion on the Company's notes receivables from insurance companies.

Note 16—Leases

Effective January 1, 2019, we implemented ASU 2016-02, *Leases*, which amended authoritative guidance on leases and is codified in ASC Topic 842. The amended guidance requires lessees to recognize most leases on their balance sheets as right-of-use assets along with corresponding lease liabilities. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification determines whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease. The FASB's authoritative guidance provides companies with the option to apply this ASU to new and existing leases within the scope of the guidance as of the beginning of the period of adoption. We elected this transition method of applying the new standard and have recognized right-of-use assets and lease liabilities as of January 1, 2019. Prior period amounts were not adjusted and will continue to be reported under the accounting standards in effect for those periods. The adoption of this standard had a material impact on our Consolidated Balance Sheet as of December 31, 2019 due to the capitalization of right-of-use assets and lease liabilities associated with our current operating leases in which we are the lessee. Adoption of the new standard resulted in the recording of additional right-of-use assets and lease liabilities of approximately $54 million and $54 million, respectively, as of January 1, 2019.

Upon adoption of the new standard on January 1, 2019, we elected the package of practical expedients provided under the guidance. The practical expedient package applies to leases that commenced prior to adoption of the new standard and permits companies not to reassess whether existing or expired contracts are or contain a lease, the lease classification and any initial direct costs for existing leases. We have elected to not separate the lease and non-lease components within our lease contracts. Therefore, all fixed costs associated with the lease are included in the right-of-use asset and the lease liability. These costs often relate to the payments for a proportionate share of real estate taxes, insurance, common area maintenance and other operating costs in addition to base rent. We did not elect the hindsight practical expedient.

At the inception of our contracts we determine if the contract is or contains a lease. A contract is or contains a lease if it conveys the right to control the use of an identified asset for a period of time in exchange for consideration. Right-of-use assets and operating lease liabilities are recognized based on the present value of lease payments over the lease term at commencement. We use our incremental borrowing rate ("IBR") at the recognition date in determining the present value of future payments for leases that do not have a readily determinable implicit rate. Our IBR reflects a fully secured rate based on our credit rating, taking into consideration the repayment timing of the lease and any impacts due to the economic environment in which the lease operates.

Lease right-of-use assets and liabilities are recognized based on the present value of the fixed future lease payments over the lease term. Lease expense for all operating leases is classified in cost of products sold or selling, general and administrative expense in the Consolidated Statement of Income. For finance leases, the amortization of the right-of-use asset is included in depreciation and amortization, and the interest is included in interest expense.

As a lessee, we have various operating lease agreements primarily related to real estate, vehicles and office and plant equipment. Our lease payments are largely fixed. Variable lease payments that depend on an index or a rate are included in the lease payments and are measured using the prevailing index or rate at the measurement date, with differences between the calculated lease payment and the actual lease payment being expensed in the period of the change. Other variable lease payments, including utilities, consumption and common area maintenance as well as repairs, maintenance and mileage overages on vehicles, are expensed during the period incurred. Variable lease costs were immaterial for the twelve months ended December 31, 2019. A majority of our real estate leases include options to extend the lease and options to early terminate the lease. Leases with an early termination option generally involve a termination payment. If we are reasonably certain to exercise an option to extend a lease, the extension period is included as part of the right-of-use asset and the lease liability. Some of our leases contain residual value guarantees. These are guarantees made to the lessor that the value of an underlying asset returned to the lessor at the end of a lease will be at least a specified amount. Our leases do not contain restrictions or covenants that restrict us from incurring other financial obligations. We do not have any significant leases not yet commenced.

For our leases, we have elected to not apply the recognition requirements to leases of less than twelve months. These leases are expensed on a straight-line basis and are not included within the Company's operating lease asset or liability. Lease costs associated with leases of less than twelve months were immaterial for the three and twelve months ended December 31, 2019. We did not have any lease transactions with related parties.

(In thousands, except percentage amounts)		Other Information Twelve Months Ended December 31, 2019
Lease cost:		
Operating lease cost recognized as rent expense	$	13,364
Total lease cost		13,364
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows related to operating leases	$	13,346
Non-cash other information:		
Right-of-use assets obtained in exchange for new operating lease liabilities	$	6,637
		December 31, 2019
Weighted-average remaining lease term (in years):		
Operating leases		11
Weighted-average discount rate:		
Operating leases		4.28%

Rent expense was approximately $13.4 million in 2019, $12.5 million in 2018 and $13.7 million in 2017. At December 31, 2019, future lease payments under operating leases were as follows:

(In thousands)		Operating Leases
2020	$	11,047
2021		9,064
2022		5,956
2023		4,724
2024		3,647
After 2024		30,587
Total future minimum operating lease payments	$	65,025
Less: Imputed interest		13,231
Present value of operating lease liabilities		51,794
Less: Current portion operating lease liabilities[a]		9,162
Noncurrent operating lease liabilities	$	42,632

[a] Included in "Warranty reserve and other current liabilities" on the Consolidated Balance Sheet.

Note 17—Derivative Financial Instruments

As part of our currency exchange rate risk management strategy, we enter into certain derivative foreign currency forward contracts that do not meet the U.S. GAAP criteria for hedge accounting, but have the impact of partially offsetting certain foreign currency exposures. We account for these forward contracts at fair value and report the related gains or losses in currency exchange losses, net, in the Consolidated Statement of Income. At December 31, 2019, the notional amount of open forward contracts was $74.9 million and the unrealized gain on these contracts was $0.6 million. All open forward contracts will mature during the first quarter of 2020.

The following table presents the Consolidated Balance Sheet location and fair value of assets and liabilities associated with derivative financial instruments:

	December 31,	
(In thousands)	**2019**	**2018**
Derivatives not designated as hedging instruments:		
Foreign exchange contracts: other current liabilities	$ 125	$ 12
Foreign exchange contracts: other current assets	687	488

The following table presents the Consolidated Statement of Income location and impact of derivative financial instruments:

		Loss Recognized in Income Year ended December 31,	
(In thousands)	**Income Statement Location**	**2019**	**2018**
Derivatives not designated as hedging instruments:			
Foreign exchange contracts	Currency exchange losses, net	$ 3,015	$ 2,428

Note 18—Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy are:

Level 1—Observable inputs that reflect unadjusted quoted prices for identical assets or liabilities in active markets.

Level 2—Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.

Level 3—Unobservable inputs for the asset or liability.

The valuation methodologies we used to measure financial assets and liabilities were limited to the pension plan assets described in Note 14—Pensions and Other Post-retirement Benefits and the derivative financial instruments described in Note 17—Derivative Financial Instruments. See Note 14 for the fair value hierarchy classification of pension plan assets. We estimate the fair value of the derivative financial instruments, consisting of foreign currency forward contracts, based upon valuation models with inputs that generally can be verified by observable market conditions and do not involve significant management judgment. Accordingly, the fair values of the derivative financial instruments are classified within Level 2 of the fair value hierarchy. With the exception of our investments in marketable securities and fixed rate long-term debt both as disclosed below, we believe that the reported carrying amounts of our remaining financial assets and liabilities approximate their fair values.

We value our investments in available-for-sale marketable securities, primarily fixed income, at fair value using quoted market prices for similar securities or pricing models. Accordingly, the fair values of the investments are classified within Level 2 of the fair value hierarchy. The amortized cost basis of our investments was $49.7 million and $55.4 million as of December 31, 2019, and 2018, respectively. The fair value of our investments was $49.9 million and $55.1 million as of December 31, 2019, and 2018, respectively, which was reported in "Investments, short-term" in the accompanying Consolidated Balance Sheet. The change in fair value is recorded in other comprehensive income, net of tax. The Company does not intend to sell, nor is it more likely than not that we will be required to sell, these securities prior to recovery of their cost, as such, management believes that any unrealized gains or losses are temporary; therefore, no impairment gains or losses relating to these securities have been recognized. All investments in marketable securities have maturities of one year or less and are currently in an unrealized loss position as of December 31, 2019.

The reported carrying amount of fixed rate long-term debt (including the current portion) was $113 million and $130 million at December 31, 2019, and 2018, respectively. The fair value of this debt was $129 million and $139 million at December 31, 2019, and 2018, respectively. The fair value of this debt was determined using Level 2 inputs by evaluating like rated companies with publicly traded bonds where available or current borrowing rates available for financings with similar terms and maturities.

Note 19—Contingencies

Product liability

We face an inherent business risk of exposure to product liability claims arising from the alleged failure of our products to prevent the types of personal injury or death against which they are designed to protect. Product liability claims are categorized as either single incident or cumulative trauma.

Single incident product liability claims. Single incident product liability claims involve incidents of short duration that are typically known when they occur and involve observable injuries, which provide an objective basis for quantifying damages. The Company estimates its liability for single incident product liability claims based on expected settlement costs for asserted single incident product liability claims, and an estimate of costs for single incident product liability claims incurred but not reported ("IBNR"). The estimate for IBNR claims is based on experience, sales volumes, and other relevant information. The reserve for single incident product liability claims, which includes asserted single incident product liability claims and IBNR single incident product liability claims, was $3.1 million at December 31, 2019 and $3.6 million at December 31, 2018. Single incident product liability expense was a benefit of $0.5 million for the year ended December 31, 2019 compared to expense of $2.0 million and $2.4 million for the years ended December 31, 2018 and 2017, respectively. Single incident product liability exposures are evaluated on an annual basis, or more frequently if changing circumstances warrant. Adjustments are made to the reserve as appropriate.

Cumulative trauma product liability claims. Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred years ago and may have developed over long periods of time into diseases such as silicosis, asbestosis, mesothelioma, or coal worker’s pneumoconiosis. One of the Company's affiliates, Mine Safety Appliances Company, LLC ("MSA LLC"), was named as a defendant in 1,605 lawsuits comprised of 2,456 claims as of December 31, 2019. These lawsuits mainly involve respiratory protection products allegedly manufactured and sold by MSA LLC or its predecessors. The products at issue were manufactured many years ago and are not currently offered by MSA LLC.

A summary of cumulative trauma product liability lawsuits and asserted cumulative trauma product liability claims activity is as follows:

	2019	2018	2017
Open lawsuits, beginning of period	1,481	1,420	1,794
New lawsuits	346	369	398
Settled and dismissed lawsuits	(222)	(308)	(772)
Open lawsuits, end of period	1,605	1,481	1,420

	2019	2018	2017
Asserted claims, beginning of period	2,355	2,242	3,023
New claims	486	479	455
Settled and dismissed claims	(385)	(366)	(1,236)
Asserted claims, end of period	2,456	2,355	2,242

More than half of the open lawsuits at December 31, 2019 have had a de minimis level of activity over the last 5 years. It is possible that these cases could become active again at any time due to changes in circumstances.

Total cumulative trauma product liability reserve was $167.5 million, including $3.0 million for claims settled but not yet paid and related defense costs, as of December 31, 2019 and $187.3 million, including $24.5 million for claims settled but not yet paid and related defense costs, as of December 31, 2018. This reserve includes estimated amounts for asserted claims and IBNR claims. Those estimated amounts reflect asbestos, silica, and coal dust claims expected to be resolved through the year 2069 and are not discounted to present value. The Company revised its estimates of MSA LLC's potential liability for cumulative trauma product liability claims for the year ended December 31, 2019 as a result of its annual review process described below. The reserve does not include amounts which will be spent to defend the claims covered by the reserve. Defense costs are recognized in the Consolidated Statement of Income as incurred.

At December 31, 2019, $17.4 million of the total reserve for cumulative trauma product liability claims is recorded in the Insurance and product liability line within other current liabilities in the Consolidated Balance Sheet and the remainder, $150.1 million, is recorded in the Product liability and other noncurrent liabilities line. At December 31, 2018, $38.8 million of the total reserve for cumulative trauma product liability claims was recorded in the Insurance and product liability line within other current liabilities in the Consolidated Balance Sheet and the remainder, $148.5 million, was recorded in the Product liability and other noncurrent liabilities line.

Total cumulative trauma liability losses were $36.1 million, $63.8 million, and $219.0 million for the years ended December 31, 2019, 2018 and 2017, respectively. Uninsured cumulative trauma product liability losses which were included in Product liability and other operating expense on the Consolidated Statement of Income during the years ended December 31, 2019, 2018 and 2017, were $27.1 million, $43.8 million and $124.5 million, respectively, and represent the total cumulative trauma liability losses net of any estimated insurance receivables as discussed below.

To develop a reasonable estimate of MSA LLC's potential exposure to cumulative trauma product liability claims, Management performs an annual review of MSA LLC's cumulative trauma product liability claims, in consultation with an outside valuation consultant and outside legal counsel. The review process takes into account developments in MSA LLC's claims experience over the past year, developments in the tort system generally, and any other relevant information. Quarterly, management and outside legal counsel review whether significant new developments have occurred which could materially impact recorded amounts.

Certain significant assumptions underlying the material components of the reserve for cumulative trauma product liability claims have been made based on MSA LLC's experience related to the following:

- The types and severity, of illnesses alleged by claimants to give rise to their claims;
- The venues in which claims are asserted;
- The number of claims asserted against MSA LLC and the counsel asserting those claims; and
- The percentage of claims resolved through settlement and the values of settlements paid to claimants.

Additional assumptions include the following:

- MSA LLC will continue to evaluate and handle cumulative trauma product liability claims in accordance with its existing defense strategy;
- The number and effect of co-defendant bankruptcies will not materially change in the future;
- No material changes in medical science occur with respect to cumulative trauma product liability claims; and
- No material changes in law occur with respect to cumulative trauma product liability claims including no material state or federal tort reform actions.

Cumulative trauma product liability litigation is inherently unpredictable and MSA LLC's expense with respect to cumulative trauma product liability claims could vary significantly in future periods. With respect to asserted claims, this is because it is unclear at the time of filing whether a claim will be actively litigated. Even when a case is actively litigated, it is often difficult to determine if the lawsuit will be dismissed without payment or settled, because of sufficiency of product identification, statute of limitations challenges, or other defenses. As a result, it is typically unclear until late into a lawsuit whether any particular claim will result in a loss and, if so, to what extent. Actual loss amounts for settled claims are highly variable and turn on a case-by-case analysis of the relevant facts.

With respect to asserted or IBNR cumulative trauma product liability claims, MSA LLC’s expense in future periods may vary from the reserve currently established for several reasons. In particular, MSA LLC’s actual claims experience may differ in one or more respects from the significant assumptions listed above that were used by in establishing the reserve. Other factors that make MSA LLC's asserted and IBNR claims difficult to reasonably estimate include low volumes in the number of claims asserted and resolved (both in general and with respect to particular plaintiffs' counsel, as claims experience can vary significantly among different counsel), inconsistency of claims composition, uncertainty as to if and over what time periods claims might be asserted in the future, and other factors. Numerous uncertainties also exist with respect to factors not specific to MSA LLC, including potential legislative or judicial changes at the federal level or in key states concerning claims adjudication, future bankruptcy proceedings involving key co-defendants, payments from trusts established to compensate claimants, and/or changes in medical science relating to the diagnosis and treatment of claims.

Because cumulative trauma product liability litigation is subject to the significant modeling assumptions and inherent uncertainties described above, and unfavorable rulings or developments could occur, there can be no certainty that MSA LLC may not ultimately incur charges in excess of presently recorded liabilities. The reserve for cumulative trauma product liability claims may be adjusted from time to time based on changes to the factors and assumptions described above. If future estimates of cumulative trauma product liability claims are materially different than the accrued liability, we will record an appropriate adjustment to the Consolidated Statement of Income. These adjustments could materially impact our consolidated financial statements in future periods.

Insurance Receivable and Notes Receivable, Insurance Companies

Many years ago, MSA LLC purchased insurance policies from various insurance carriers that, subject to common contract exclusions, provided coverage for cumulative trauma product liability losses (the "Occurrence-Based Policies"). While we continue to pursue reimbursement under certain remaining Occurrence-Based Policies, the vast majority of these policies have been exhausted, settled or converted into either (1) negotiated Coverage-in-Place Agreements, or (2) negotiated settlement agreements, with scheduled payment streams. As a result, MSA LLC is largely self-insured for cumulative trauma product liability claims, and additional amounts recorded as insurance receivables or notes receivables will be limited.

When adjustments are made to amounts recorded in the cumulative trauma product liability reserve, we calculate amounts due to be reimbursed pursuant to the terms of the negotiated Coverage-In-Place Agreements, including cumulative trauma product liability losses and related defense costs, and we record the reimbursable amounts as insurance receivables.

Insurance receivables at December 31, 2019, totaled $63.8 million, of which $7.6 million is reported in Prepaid expenses and other current assets in the Consolidated Balance Sheet and $56.2 million is reported in Insurance receivable and other noncurrent assets. Insurance receivables at December 31, 2018, totaled $71.7 million, of which $14.8 million was reported in Prepaid expenses and other current assets in the Consolidated Balance Sheet and$56.9 million was reported in Insurance receivable and other noncurrent assets. The vast majority of the $63.8 million insurance receivables balance at December 31, 2019, is attributable to reimbursement believed to be due under the terms of signed Coverage-In-Place Agreements and a portion of this amount represents the estimated recovery of IBNR amounts not yet incurred.

A summary of insurance receivables balance and activity related to cumulative trauma product liability losses is as follows:

(In millions)	2019	2018
Balance beginning of period	$ 71.7	$ 134.7
Additions	9.1	19.6
Collections and other adjustments	(17.0)	(82.6)
Balance end of period	$ 63.8	$ 71.7

In other cases, we have recorded formal notes receivables due from scheduled payment streams according to negotiated settlement agreements. The notes receivables were recorded as a transfer from the insurance receivables balance to Notes receivable, insurance companies (current and noncurrent) in the Consolidated Balance Sheet. In cases where the payment stream covers multiple years and there were no contingencies, the present value of the payments was recorded as a transfer from the insurance receivable balance to Notes receivable, insurance companies (current and long-term) in the Consolidated Balance Sheet. Provided the remaining insurance receivable was recoverable through the insurance carriers, no gain or loss was recognized at the time of transfer from insurance receivables to Notes receivable, insurance companies.

Notes receivable from insurance companies at December 31, 2019, totaled $56.0 million, of which $3.7 million is reported in Notes receivable, insurance companies, current on the Consolidated Balance Sheet and $52.3 million is reported in Notes receivable, insurance companies, noncurrent. Notes receivable from insurance companies at December 31, 2018, totaled $59.6 million, of which $3.6 million was reported in Notes receivable, insurance companies, current on the Consolidated Balance Sheet and $56.0 million was reported in Notes receivable, insurance companies, noncurrent.

A summary of notes receivables from insurance companies balance is as follows:

	December 31,	
(In millions)	2019	2018
Balance beginning of period	$ 59.6	$ 76.9
Additions	1.5	1.7
Collections	(5.1)	(19.0)
Balance end of period	$ 56.0	$ 59.6

The collectibility of MSA LLC's insurance receivables and notes receivables is regularly evaluated and we believe that the amounts recorded are probable of collection. The determination that the recorded insurance receivables are probable of collection is based on the terms of the settlement agreements reached with the insurers, our history of collection, and the advice of MSA LLC's outside legal counsel. Various factors could affect the timing and amount of recovery of the insurance and notes receivables, including assumptions regarding various aspects of the composition and characteristics of future claims (which are relevant to calculating reimbursement under the terms of certain Coverage-In-Place Agreements) and the extent to which the issuing insurers may become insolvent in the future.

Product Warranty

The Company provides warranties on certain product sales. Product warranty reserves are established in the same period that revenue from the sale of the related products is recognized, or in the period that a specific issue arises as to the functionality of the Company's product. The determination of such reserves requires the Company to make estimates of product return rates and expected costs to repair or to replace the products under warranty.

The amounts of the reserves are based on established terms and the Company's best estimate of the amounts necessary to settle future and existing claims on products sold as of the balance sheet date. If actual return rates and/or repair and replacement costs differ significantly from estimates, adjustments to recognize additional cost of sales may be required in future periods.

The following table reconciles the changes in the Company's accrued warranty reserve:

	December 31,		
(In thousands)	2019	2018	2017
Beginning warranty reserve	$ 14,214	$ 14,753	$ 11,821
Warranty payments	(12,664)	(9,955)	(10,905)
Warranty claims	12,033	10,585	12,471
Provision for product warranties and other adjustments	(868)	(1,169)	1,366
Ending warranty reserve	$ 12,715	$ 14,214	$ 14,753

Warranty expense for the years ended December 31,2019, 2018 and 2017 was $11.2 million, $9.4 million and $13.8 million, respectively and is included in "Costs of products sold" on the Consolidated Statement of Income.

Note 20—Quarterly Financial Information (Unaudited)

	2019				
	Quarters				
(In thousands, except earnings per share)	1st	2nd	3rd	4th	Year
Net sales	$ 326,038	$ 349,675	$ 351,014	$ 375,254	$ 1,401,981
Gross profit	149,982	161,084	158,701	166,845	636,612
Net income attributable to MSA Safety Incorporated	23,232	39,806	42,239	31,163	136,440
Earnings per share[(1)]					
Basic	$ 0.60	$ 1.03	$ 1.09	$ 0.80	$ 3.52
Diluted	0.59	1.01	1.08	0.79	3.48

	2018				
	Quarters				
(In thousands, except earnings per share)	1st	2nd	3rd	4th	Year
Net sales	$ 325,894	$ 339,331	$ 331,096	$ 361,783	$ 1,358,104
Gross profit	147,339	153,836	148,302	162,386	611,863
Net income attributable to MSA Safety Incorporated	32,371	33,179	33,717	24,883	124,150
Earnings per share[(1)]					
Basic	$ 0.85	$ 0.86	$ 0.88	$ 0.65	$ 3.23
Diluted	0.83	0.85	0.86	0.64	3.18

[(1)] Per share amounts are calculated independently for each period presented; therefore, the sum of the quarterly per share amounts may not equal the per share amounts for the year.

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*. Based on their evaluation as of the end of the period covered by this Form 10-K, the Company's principal executive officer and principal financial officer have concluded that the Company's disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934 (the "Exchange Act")) are effective to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is (i) recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and (ii) accumulated and communicated to our management, including the principal executive officer and principle financial officer, as appropriate to allow timely decisions regarding required disclosure.

Management has excluded Sierra Monitor Corporation ("SMC") from its assessment of internal control over financial reporting as ofDecember 31, 2019 because it was acquired by the Company in a purchase business combination in the second quarter of 2019. SMC is wholly-owned by MSA.

(b) *Changes in internal control*. There were no changes in the Company's internal control over financial reporting that occurred during the Company's most recent fiscal quarter, that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

See Item 8. Financial Statements and Supplementary Data—"Management's Report on Internal Control Over Financial Reporting" and "Report of Independent Registered Public Accounting Firm."

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Item 11. Executive Compensation

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

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

Item 14. Principal Accountant Fees and Services

With respect to this Part III, incorporated by reference herein pursuant to Rule 12b—23 are (1) "Election of Directors," (2) "Executive Compensation," (3) "Other Information Concerning the Board of Directors," (4) "Stock Ownership," and (5) "Selection of Independent Registered Public Accounting Firm," appearing in the Proxy Statement filed pursuant to Regulation 14A in connection with the registrant's Annual Meeting of Shareholders to be held on May 12, 2020. The information appearing in such Proxy Statement under the caption "Audit Committee Report" and the other information appearing in such Proxy Statement and not specifically incorporated by reference herein is not incorporated herein. As to Item 10 above, also see the information reported in Part I of this Form 10-K, under the caption "Information about our Executive Officers," which is incorporated herein by reference. As to Item 10 above, the Company has adopted a Code of Ethics applicable to its principal executive officer, principal financial officer and principal accounting officer and other Company officials. The text of the Code of Ethics is available on the Company's website at *www.MSAsafety.com*. Any amendment to, or waiver of, a required provision of the Code of Ethics that applies to the Company's principal executive, financial or accounting officer will also be posted on the Company's Internet site at that address.

As to Item 12 above, the following table sets forth information as ofDecember 31, 2019 concerning common stock issuable under the Company's equity compensation plans.

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	559,656	$ 45.78	1,006,900 *
Equity compensation plans not approved by security holders	None	—	None
Total	559,656	45.78	1,006,900

* *Includes 903,802 shares available for issuance under the Amended and Restated 2016 Management Equity Incentive Plan and103,098 shares available for issuance under the 2017 Non-Employee Directors' Equity Incentive Plan.*

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) 1. Financial Statements and Report of Independent Registered Public Accounting Firm (see Part II, Item 8 of this Form 10-K).

The following information is filed as part of this Form 10-K.

(a) 2. The following additional financial information for the three years endedDecember 31, 2019 is filed with the report and should be read in conjunction with the above financial statements:

Schedule II—Valuation and Qualifying Accounts

All other schedules are omitted because they are not applicable, not material or the required information is shown in the consolidated financial statements and consolidated notes to the financial statements listed above.

(a) 3. Exhibits

Several of the following exhibits are incorporated herein by reference under Rule 12b-32 of the Securities Exchange Act of 1934, as amended, as indicated next to the name of the exhibit. Several other instruments, which would otherwise be required to be listed below, have not been so listed because those instruments do not authorize securities in an amount that exceeds 10% of the total assets of the registrant and its subsidiaries on a consolidated basis. The registrant agrees to furnish a copy of any instrument that was so omitted on that basis to the Commission upon request.

3(i)	Amended and restated Articles of Incorporation, filed as Exhibit 3.1 to Form 8-K on March 7, 2014, is incorporated herein by reference.
3(ii)	Amended and restated By-laws of the registrant, filed as Exhibit 3.2 to Form 8-K on March 7, 2014, is incorporated herein by reference.
4(a)	First Amendment dated September 7, 2018 to the Second Amended and Restated Multi-Currency Note Purchase and Private Shelf Agreement dated January 22, 2016 by and among MSA Safety Incorporated, various Company subsidiaries, as guarantors, and the noteholders named therein, including forms of Note Guarantee and Intercompany Subordination Agreement, filed as Exhibit 4.1 to Form 8-K on September 10, 2018, is incorporated herein by reference.
4(b)	Form of Amended and Restated Guarantee Agreement entered into as of March 7, 2014 by each of General Monitors, Inc., General Monitors Transnational, LLC and MSA International, Inc., in favor of the Note Purchasers under the Amended and Restated Note Purchase and Private Shelf Agreement dated as of March 7, 2014 (as confirmed and reaffirmed by such guarantors as of September 7, 2018), filed as Exhibit 4(b) to Form 10-K on February 25, 2015, is incorporated herein by reference.
4(c)	Form of Guarantee Agreement entered into as of March 7, 2014 by each of Mine Safety Appliances Company, LLC, MSA Worldwide, LLC, MSA Advanced Detection, LLC, MSA Safety Development, LLC, MSA Technology, LLC, and MSA Innovation, LLC, in favor of the Note Purchasers under the Amended and Restated Note Purchase and Private Shelf Agreement dated as of March 7, 2014 (as confirmed and reaffirmed by certain of such guarantors as of September 7, 2018), filed as Exhibit 4(c) to Form 10-K on February 25, 2015, is incorporated herein by reference.

4(d)	Description of MSA Safety Incorporated Securities Registered under Section 12 of the Securities Exchange Act of 1934, as amended, is filed herewith.
10(a)*	MSA Safety Incorporated Amended and Restated 2016 Management Equity Incentive Plan, filed as Appendix A to the registrant's definitive proxy statement dated March 31, 2016, is incorporated herein by reference.
10(b)*	Retirement Plan for Directors, as amended effective April 1, 2001, filed as Exhibit 10(a) to Form 10-Q on May 10, 2006, is incorporated herein by reference.
10(c)*	Supplemental Pension Plan as of May 5, 1998, filed as Exhibit 10(d) to Form 10-Q on August 12, 2003, is incorporated herein by reference.
10(d)*	Supplemental Pension Plan as amended and restated effective January 1, 2005, filed as Exhibit 10.3 to Form 10-Q on April 30, 2009, is incorporated herein by reference.
10(e)*	2017 Non-Employee Directors' Equity Incentive Plan, filed as Exhibit A to the registrant's definitive proxy statement dated April 7, 2017, is incorporated herein by reference.
10(f)*	Executive Insurance Program as Amended and Restated as of January 1, 2006, filed as Exhibit 10(a) to Form 10-Q on August 7, 2007, is incorporated herein by reference.
10(g)*	Annual Incentive Bonus Plan as of May 5, 1998, filed as Exhibit 10(g) to Form 10-Q on August 12, 2003, is incorporated herein by reference.
10(h)*	Supplemental Executive Retirement Plan, effective January 1, 2008, filed as Exhibit 10.2 to Form 10-Q on April 30, 2009, is incorporated herein by reference.
10(i)*	Form of Change-in-Control Severance Agreement between the registrant and its executive officers, filed as Exhibit 10.1 to Form 10-Q on April 30, 2009, is incorporated herein by reference.
10(j)*	2003 Supplemental Savings Plan, effective January 1, 2003, filed as Exhibit 10(k) to Form 10-K on February 24, 2014, is incorporated herein by reference.
10(k)*	2005 Supplemental Savings Plan, effective January 1, 2005, filed as Exhibit 10.4 to Form 10-Q on April 30, 2009, is incorporated herein by reference.
10(l)*	Amended and Restated CEO Annual Incentive Award Plan filed as Appendix B to the registrant's definitive proxy statement dated March 31, 2016, is incorporated herein by reference.
10(m)	Third Amended and Restated Credit Agreement dated September 7, 2018 by and among MSA Safety Incorporated, MSA UK Holdings, Limited and MSA International Holdings, B.V., as borrowers, various Company subsidiaries, as guarantors, various financial institutions, as lenders, and PNC Bank, National Association, as administrative agent, including forms of Guaranty and Suretyship Agreement and Intercompany Subordination Agreement, filed as Exhibit 10.1 to Form 8-K on September 10, 2018, is incorporated herein by reference.
21	Affiliates of the registrant is filed herewith.
23	Consent of Ernst & Young LLP, independent registered public accounting firm is filed herewith.
31.1	Certification of Nishan J. Vartanian pursuant to Rule 13a-14(a) is filed herewith.
31.2	Certification of Kenneth D. Krause pursuant to Rule 13a-14(a) is filed herewith.
32	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C.§1350 is filed herewith.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

**The exhibits marked by an asterisk are management contracts or compensatory plans or arrangements.*

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.

MSA SAFETY INCORPORATED

February 20, 2020	By	/s/ NISHAN J. VARTANIAN
(Date)		**Nishan J. Vartanian** **President and Chief Executive Officer**

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

Signature	Title	Date
/S/ NISHAN J. VARTANIAN **Nishan J. Vartanian**	President and Chief Executive Officer (Principal Executive Officer)	February 20, 2020
/S/ KENNETH D. KRAUSE **Kenneth D. Krause**	Sr. Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	February 20, 2020
/S/ ROBERT A. BRUGGEWORTH **Robert A. Bruggeworth**	Director	February 20, 2020
/S/ THOMAS W. GIACOMINI **Thomas W. Giacomini**	Director	February 20, 2020
/S/ GREGORY B. JORDAN **Gregory B. Jordan**	Director	February 20, 2020
/S/ WILLIAM M. LAMBERT **William M. Lambert**	Director	February 20, 2020
/S/ DIANE M. PEARSE **Diane M. Pearse**	Director	February 20, 2020
/S/ REBECCA B. ROBERTS **Rebecca B. Roberts**	Director	February 20, 2020
/S/ SANDRA PHILLIPS ROGERS **Sandra Phillips Rogers**	Director	February 20, 2020
/S/ JOHN T. RYAN III **John T. Ryan III**	Director	February 20, 2020
/S/ WILLIAM R. SPERRY **William R. Sperry**	Director	February 20, 2020

SCHEDULE II

MSA SAFETY INCORPORATED AND AFFILIATES

VALUATION AND QUALIFYING ACCOUNTS

THREE YEARS ENDED DECEMBER 31, 2019

	2019	2018	2017
		(In thousands)	
Allowance for doubtful accounts:			
Balance at beginning of year	$ 5,369	$ 5,540	$ 5,610
Additions—			
Charged to costs and expenses (2)	2,015	375	1,649
Deductions—			
Deductions from reserves, net (1)(2)	2,524	546	1,719
Balance at end of year	4,860	5,369	5,540
Income tax valuation allowance:			
Balance at beginning of year	$ 5,039	$ 4,559	$ 5,303
Additions—			
Charged to costs and expenses (3)	1,138	859	906
Deductions—			
Deductions from reserves (3)	241	379	1,650
Balance at end of year	$ 5,936	$ 5,039	$ 4,559

(1) Bad debts written off, net of recoveries.

(2) Activity for 2019, 2018 and 2017 includes currency translation (losses) gains of$(1,058), $(291) and $285, respectively.

(3) Activity for 2019, 2018 and 2017 includes currency translation (losses) gains of$104, $(367) and $248, respectively.

EXHIBIT 4(d)

**Description of Securities Registered Under Section 12
of the Securities Exchange Act of 1934, as amended**

As of December 31, 2019, the only class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act") by MSA Safety Incorporated (the "Company," "MSA," "we," "us," and "our") was our common stock, without par value.

Description of Capital Stock

The following description of our capital stock is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to our Amended and Restated Articles of Incorporation, and our Amended and Restated By-laws, each of which is an exhibit to our Current Report on Form 8-K filed with the Securities and Exchange Commission on March 7, 2014 and incorporated by reference herein. We encourage you to read our articles, our by-laws and the applicable provisions of Chapter 25 of the Pennsylvania Business Corporation Law of 1988, as amended (the "PBCL") for additional information.

Authorized Capital Stock. We have an authorized capital stock of 181,100,000 shares consisting of: (1) 100,000 shares of $4^1/_2$% cumulative preferred stock, par value $50.00 per share, referred to as the $4\ ^1/_2$% preferred stock; (2) 1,000,000 shares of second cumulative preferred stock, par value $10.00 per share, referred to as the second preferred stock and, together with the $4\ ^1/_2$% preferred stock, referred to as the preferred stock; and (3) 180,000,000 shares of common stock without par value. The authorized shares of second preferred stock are issuable in one or more series on the terms set by the resolution or resolutions of our board of directors providing for the issuance thereof. Each series of second preferred stock would have such dividend rate, which might or might not be cumulative, such voting rights, which might be general or special, and such liquidation preferences, redemption and sinking fund provisions, conversion rights or other rights and preferences, if any, as our board may determine.

As of February 12, 2020, we had outstanding 18,462 shares of $4^1/_2$% preferred stock, 38,858,321 shares of common stock, and no shares of second preferred stock. As of February 12, 2020, we had 20 holders of record of our $4\ ^1/_2$% preferred stock and 177 holders of record of our common stock.

Voting Rights. Except for such voting rights as are granted to the holders of the preferred stock in the articles or in the resolutions of our board establishing any series of second preferred stock, or as otherwise required by law, all voting power of our shares belongs exclusively to the holders of common stock. The holders of common stock are generally entitled to one vote for each share held of record on all matters submitted to a shareholder vote and do not have cumulative voting rights in the election of directors. The absence of cumulative voting means that a nominee for director must receive the votes of a plurality of the shares voted in order to be elected. The articles provide for certain special vote requirements on certain matters as set forth in "Antitakeover Provisions" and "Board of Directors," below.

Dividend Rights. Subject to the rights of the holders of the preferred stock, the holders of common stock are entitled to dividends when, as and if declared by our board out of funds which are legally available. The articles provide that the holders of the $4\ ^1/_2$% preferred stock are entitled to quarterly dividends at the rate of $4\ ^1/_2$% per annum, when and as declared by our board, and that no dividends may be paid, or distribution ordered or made, on the common stock or the second preferred stock (junior stock) in any year while dividends are accumulated and unpaid upon the $4\ ^1/_2$% preferred stock, unless and until dividends for the current year are declared and paid or set apart for the $4\ ^1/_2$% preferred stock. The articles further provide that so long as any $4\ ^1/_2$% preferred stock is outstanding, we may not declare or pay any dividend (except dividends payable in shares of junior stock) on any shares of junior stock which would reduce our earned surplus below an amount equal to 50% of the aggregate par value of the then outstanding shares of $4\ ^1/_2$% preferred stock.

If second preferred stock is issued, our board may also grant to the holders of such stock preferential dividend rights which would prohibit payment of dividends on the common stock unless and until specified dividends on the second preferred stock had been paid or in other circumstances and/or rights to share ratably in any dividends payable on the common stock.

Redemption Rights. MSA has the right at any time to redeem the $4^1/_2$% preferred stock at the redemption price of $52.50 per share plus all accrued and unpaid dividends on such shares at the date fixed for redemption. In case less than all of shares of the $4\ ^1/_2$% preferred stock are redeemed, the shares to be redeemed are selected by lot or pro rata as the board may determine.

Liquidation Rights. Upon liquidation, dissolution or winding up of MSA, whether voluntary or involuntary, the holders of our common stock are entitled to share ratably in our assets available for distribution after all of our liabilities have been satisfied and all preferential amounts payable to the holders of preferred stock have been paid.

The articles provide that in the event of liquidation, dissolution or winding up of MSA, the holders of the $4^1/_2$% preferred stock receive, before any distribution may be paid to the holders of junior stock, the sum of $50.00 per share if the liquidation, dissolution or winding up is involuntary, or $52.50 per share if it is voluntary, together in either case with all accrued and unpaid dividends to the date fixed for payment of such preferential amounts.

If second preferred stock is issued, our board may also grant to the holders of such stock preferential liquidation rights, which would entitle them to be paid out of our assets available for distribution before any distribution is made to the holders of common stock or rights to participate ratably with the common stock in any such distribution.

Preferred Stock Restriction on Corporate Action. The articles provide that the holders of at least 60% of the outstanding shares of each of the $4^1/_2$% preferred stock and any second preferred stock have to approve any transaction, accomplished by amendment of the articles, by sale of all or substantially all the Company's assets or business, or by merger or consolidation, or otherwise, which amends, alters or repeals provisions of the articles so as to adversely affect the relative rights, preferences or powers of such stock, or authorizes, or the increases of the number of authorized shares of, such stock or any other stock ranking senior to or on parity with such stock as to the payment of dividends or the preferential distribution of assets. Certain exceptions to such preferred stock restriction are set forth in the articles.

Antitakeover Provisions

General. Certain provisions of our articles and by-laws concern matters of corporate governance and the rights of shareholders. Some of these provisions, including those described in this section and in "Board of Directors" below, and provisions allowing the board to issue shares of preferred stock and to set the voting rights, preferences and other terms thereof without further shareholder action, may be deemed to have an antitakeover effect and may discourage takeover attempts not first approved by the board. If takeover attempts are discouraged, temporary fluctuations in the market price of shares of our common stock, which may result from actual or rumored takeover attempts, may be inhibited. These provisions could also delay or frustrate the removal of incumbent directors or discourage or inhibit a merger, tender offer or proxy contest, even if economically favorable to the interests of shareholders. The board believes these provisions are appropriate to protect our interests and the overall interests of our shareholders.

Special Votes for Transactions with 20% Shareholders. The articles contain provisions requiring special shareholder votes to approve certain types of transactions which involve shareholders that own shares representing voting power of 20% or more of our voting stock. Those provisions are described below. In the absence of those provisions, transactions would either require approval by a majority of the shares voted at a meeting or no shareholder vote would be required.

Transactions with an interested person. The articles require that certain transactions between us and an "interested person" be approved by the affirmative votes of the holders of 75% of the outstanding common stock. An "interested person" is generally defined by the articles to mean a person or a group acting in concert that beneficially owns 20% or more of our outstanding common stock.

The transactions subject to this special vote requirement include (1) any merger or consolidation to which we and an interested person are parties, (2) any sale, lease, exchange or other disposition of 20% or more of our consolidated assets to an interested person or (3) any transaction of a character described in (1) or (2) involving an "affiliate" or "associate" of an interested person or an associate of any such affiliate or an affiliate of any such associate. For purposes of this provision, an (a) "affiliate" of a person is another person that controls, is controlled by or is under common control with such person and (b) an "associate" of a person is (i) any corporation or organization of which such person is an officer, partner or the beneficial owner of 10% or more of any class of securities, (ii) any trust or estate in which such person has a 10% or greater beneficial interest or for which such person serves as trustee or in a similar capacity; or (iii) any relative or spouse of such person, or relative of such spouse, who has the same residence as such person.

This special shareholder vote requirement does not apply to any transaction which is (a) approved by the vote of not less than a majority of our board prior to the time the interested person involved in the transaction became an interested person or (b) approved prior to consummation by the vote of not less than a majority of our board disregarding the vote of any director who is the interested person involved in the transaction, an affiliate, associate or agent of such interested person or an associate or agent of any such affiliate.

Transactions with an acquiring person. The articles require that certain transactions between us and an "acquiring person" be approved by the affirmative votes of the holders of a majority of the voting power of our voting stock not beneficially owned by an acquiring person. An "acquiring person" is generally defined by the articles to mean any person which (1) beneficially owns or is a member of a group acting in concert which beneficially owns 20% or more of the voting power of our outstanding voting stock, (2) is a director of MSA and at any time within the preceding two years beneficially owned 20% or more of such voting power or (3) has succeeded to the beneficial ownership of any shares of our voting stock which were at any time during the preceding two years beneficially owned by an acquiring person, if such succession occurred through a transaction not involving a public offering under the Securities Act of 1933, as amended. The term "acquiring person" does not include MSA, a subsidiary, a trustee for an MSA employee benefit plan or a person or group which on February 14, 1986 beneficially owned 20% or more of the voting power of our outstanding voting stock.

The transactions subject to this special vote requirement include (1) a merger, consolidation or share exchange of MSA or a subsidiary with an acquiring person or with another person which is or after the transaction would be an "affiliate" or "associate" of an acquiring person, (2) a sale, lease, exchange or other disposition of 10% or more of the book or market value of MSA's or a subsidiary's consolidated assets to an acquiring person or of 10% or more of the book or market value of an acquiring person's consolidated assets to MSA or a subsidiary, (3) the issuance, transfer or delivery, other than on a pro rata basis to all shareholders, of any securities of MSA or a subsidiary by MSA or a subsidiary to an acquiring person or of any securities of an acquiring person by the acquiring person to MSA or a subsidiary, (4) a recapitalization, reorganization, reclassification of securities or other transaction involving MSA that would have the effect of increasing an acquiring person's voting power or (5) the adoption of a plan for the liquidation or dissolution of MSA in which an acquiring person is treated differently from other shareholders of the same class.

With respect to any particular transaction, the term "acquiring person" includes any "affiliate" or "associate" of an acquiring person or any other person acting in concert with such person. For purposes of this provision, an (a) "affiliate" of a person is another person, other than MSA or a subsidiary, that controls, is controlled by or is under common control with such person and (b) an "associate" of a person is (i) a director, officer or partner of, or the beneficial owner of 10% or more of any class of equity securities of, such person or any of its affiliates, (ii) a corporation or organization, other than MSA or a subsidiary, of which such person is a director, officer, partner or the beneficial owner of 10% or more of any class of equity securities, (iii) a trust or estate in which such person has a substantial beneficial interest or as to which such person serves as trustee or similar fiduciary, (iv) any relative or spouse of such person, or relative of such spouse, who has the same home as such person or is a director or officer of MSA or any subsidiary or (v) any registered investment company for which such person or any of its affiliates or associates serves as investment advisor.

This special shareholder vote requirement does not apply to any transaction approved by our board upon the vote of not less than a majority of the "disinterested directors." A "disinterested director" is any director of MSA who is unaffiliated with and not a representative of any acquiring person and either (1) was a director immediately before the acquiring person became an acquiring person or (2) was recommended for election by a majority of the disinterested directors then on our board. If at any time there are no disinterested directors in office, then any provision in the articles calling for a determination, recommendation or approval by a majority of the disinterested directors is deemed satisfied if our board takes such action by a two-thirds vote of all directors in office.

Shareholder Action—Meetings and Special Meetings. The articles require that any action required or permitted to be taken by our shareholders must be taken at a duly called annual or special meeting and may not be taken by written consent without a meeting. Subject to the rights of the holders of any class or series of preferred stock with respect to any separate class or series vote of such holders, special meetings of our shareholders may be called only by our board pursuant to a resolution approved by a majority vote of the disinterested directors.

Amendment of Articles and Bylaws. The articles require the affirmative votes of the holders of a majority of the voting power of the voting stock not beneficially owned by an acquiring person to approve any amendment to the articles or any shareholder amendment to the bylaws. This special voting requirement does not apply to an amendment previously approved by a majority vote of the disinterested directors.

In addition, any amendment to the provisions in the articles described under "Transactions with an interested person" above would require approval by the affirmative votes of the holders of 75% of the outstanding shares of common stock. Pursuant to the PBCL, any amendment to any provision of the articles other than the one set forth in the preceding sentence, or any amendment of the bylaws by the shareholders, would also require approval by a majority of the votes cast on the proposed amendment at a meeting of shareholders at which a quorum of a majority of the voting power of the voting stock was present.

Except as to matters for which a shareholder vote is required by the PBCL, our board may also amend the bylaws without shareholder approval by a vote of a majority of the disinterested directors.

Board of Directors

Classified board. The articles divide our board into three classes, each consisting of one-third, or as near as may be, of the whole number of our board. One class of directors is elected at each annual meeting of shareholders, and each class serves for a term of three years.

The number of directors which constitute the full board may be not be less than 5 nor more than 15, with the exact number to be determined from time to time by our board by a majority vote of the disinterested directors then in office. Except as otherwise required by law, vacancies on our board, including vacancies resulting from an increase in the number of directors, may be filled only by a majority vote of the disinterested directors then in office, even if less than a quorum of our board.

Directors elected by our board to fill vacancies serve for the full remainder of the term of the class to which they have been elected.

Removal of Directors. The articles provide that a director, any class of directors or the entire board may be removed from office by shareholder vote only for cause and only if, in addition to any other vote required by law, such removal is approved by a majority of the voting power of the outstanding voting stock which is not beneficially owned by an acquiring person.

Nomination of Director Candidates. The articles require that any shareholder intending to nominate a candidate for election as a director must give written notice of the nomination, containing certain specified information, to our secretary not later than 90 days in advance of the meeting at which the election is to be held.

Preferred Stock Directors. The articles provide that if at any time dividends payable on the $4^1/_2$% preferred stock or the second preferred stock is accrued and unpaid in an amount equal to or exceeding six quarterly dividends, then the holders of such class of preferred stock, voting as a separate class without regard to series, are entitled to elect two directors, in addition to the directors elected by the holders of common stock and any directors elected by any other class of preferred stock. In the case of the $4\ ^1/_2$% preferred stock, such voting power and the terms of office of any directors so elected ceases when all accrued and unpaid dividends on such stock to the beginning of the then current dividend period is paid or funds for the payment thereof are set apart. In the case of the second preferred stock, such voting power ceases when all accrued and unpaid dividends on all series of such stock is paid to the end of the last preceding quarterly dividend, but any such director previously elected continues to serve until the next annual meeting of shareholders.

The provisions of the articles described above under “Classified Board,” “Removal of Directors” and “Nomination of Director Candidates” do not apply to any directors elected by a separate class vote of the holders of preferred stock.

Miscellaneous

There are no preemptive rights, sinking fund provisions, conversion rights or redemption provisions applicable to the common stock. Holders of fully paid shares of common stock are not subject to any liability for further calls or assessments.

Exchange Listing

Our common stock is listed on the New York Stock Exchange under the trading symbol “MSA.”

Transfer Agent

Our transfer agent is Broadridge Corporate Issuer Solutions.

EXHIBIT 21

MSA SAFETY INCORPORATED
SUBSIDIARIES OF THE REGISTRANT
DECEMBER 31, 2019

Name	State or Other Jurisdiction of Incorporation
Compañia MSA de Argentina S.A.	Argentina
General Monitors Ireland Limited	Ireland
General Monitors, Inc.	California
Globe Holding Company, LLC	New Hampshire
Latchways plc	United Kingdom
Mine Safety Appliances Company, LLC	Pennsylvania
MSA (China) Safety Equipment Co. Ltd.	China
MSA (Suzhou) Safety Equipment R&D Co., Ltd	China
MSA Advanced Detection, LLC	Pennsylvania
MSA Belgium bvba	Belgium
MSA Canada Inc.	Canada
MSA de Chile Ltda.	Chile
MSA de Mexico, S.A. de C.V.	Mexico
MSA do Brasil Ltda.	Brazil
MSA Europe GmbH	Switzerland
MSA Europe Holdings GmbH	Germany
MSA Gallet Holdings SAS	France
MSA Innovation, LLC	Pennsylvania
MSA International, LLC	Delaware
MSA Italia S.R.L.	Italy
MSA Nederland B.V.	Netherlands
MSA Österreich GmbH	Austria
MSA Polska Sp. z o.o.	Poland
MSA Production France SAS	France
MSA Produktion Deutschland GmbH	Germany
MSA S.E. Asia Pte. Ltd.	Singapore
MSA Safety Development, LLC	Pennsylvania
MSA Safety Malaysia Sdn. Bhd.	Malaysia
MSA Safety Pittsburgh Manufacturing, LLC	Pennsylvania
MSA Safety Sales, LLC	Pennsylvania
MSA Safety Services GmbH	Germany
MSA Spain S.L.U.	Spain
MSA Technologies and Enterprise Services GmbH	Germany
MSA Technologies and Enterprise Services SAS	France
MSA Technology, LLC	Pennsylvania
MSA Worldwide, LLC	Pennsylvania
Samsac Holdings (Pty.) Limited	South Africa
Senscient, Inc.	Delaware
Senscient, Ltd.	United Kingdom

The above-mentioned subsidiary companies are included in the consolidated financial statements of the registrant filed as part of this annual report. The names of certain other subsidiaries, which considered in the aggregate as a single affiliate would not constitute a significant subsidiary, have been omitted.

EXHIBIT 23

Consent of Independent Registered Public Accounting Firm

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

(1) Registration Statement (Form S-8 No. 033-43696) pertaining to the 1990 Non-Employee Directors' Stock Option Plan,
(2) Registration Statement (Form S-8 No. 333-51983) pertaining to the 1998 Management Share Incentive Plan,
(3) Registration Statement (Form S-8 No. 333-121196) pertaining to the MSA Retirement Savings Plan,
(4) Registration Statement (Form S-8 No. 333-157683) pertaining to the 2005 MSA Supplemental Savings Plan,
(5) Registration Statement (Form S-8 No. 333-157681) pertaining to the Mine Safety Appliances Company 2008 Non-Employee Directors' Equity Incentive Plan,
(6) Registration Statement (Form S-8 Nos. 333-174601 and 333-157682) pertaining to the Mine Safety Appliances Company 2008 Management Equity Incentive Plan,
(7) Registration Statement (Form S-8 No. 333-199880) pertaining to the Employee Stock Purchase Plan,
(8) Registration Statement (Form S-8 No. 333-214397) pertaining to the MSA Safety Incorporated 2016 Management Equity Incentive Plan,
(9) Registration Statement (Form S-8 No. 333-218078) pertaining to the MSA Safety Incorporated 2017 Non-Employee Directors' Equity Incentive Plan, and
(10) Registration Statement (Form S-8 No. 333-231996) pertaining to the Sierra Monitor Corporation 2006 Equity Incentive Plan;

of our reports dated February 20, 2020, with respect to the consolidated financial statements and schedule of MSA Safety Incorporated and the effectiveness of internal control over financial reporting of MSA Safety Incorporated included in this Annual Report (Form 10-K) of MSA Safety Incorporated for the year ended December 31, 2019.

/s/ Ernst & Young LLP

Pittsburgh, Pennsylvania
February 20, 2020

EXHIBIT 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO RULE 13a-14(a)

I, Nishan J. Vartanian, certify that:

1. I have reviewed this annual report on Form 10-K of MSA Safety Incorporated;

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.

February 20, 2020

/s/ NISHAN J. VARTANIAN

Nishan J. Vartanian

President and Chief Executive Officer

EXHIBIT 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO RULE 13a-14(a)

I, Kenneth D. Krause, certify that:

1. I have reviewed this annual report on Form 10-K of MSA Safety Incorporated;

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.

February 20, 2020

/s/ KENNETH D. KRAUSE

Kenneth D. Krause

Sr. Vice President, Chief Financial Officer and Treasurer

EXHIBIT 32

CERTIFICATION

Pursuant to 18 U.S.C. (S) 1350, the undersigned officers of MSA Safety Incorporated (the “Company”), hereby certify, to the best of their knowledge, that the Company’s Annual Report on Form 10-K for the year ended December 31, 2019 (the “Report”) fully complies with the requirements of Section 13 (a) or 15 (d), as applicable, of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

February 20, 2020

/s/ NISHAN J. VARTANIAN

Nishan J. Vartanian

President and Chief Executive Officer

/s/ KENNETH D. KRAUSE

Kenneth D. Krause

Sr. Vice President, Chief Financial Officer and Treasurer