

The Value of Safety Innovation

2016 Annual Report



Our Mission

That men and women may work in safety and that they, their families and their communities may live in health throughout the world.

Our Vision

To be the world's leading provider of safety solutions that protect workers when life is on the line. We pursue this vision with an unsurpassed commitment to integrity, customer service and product innovation that creates exceptional value for all MSA stakeholders.

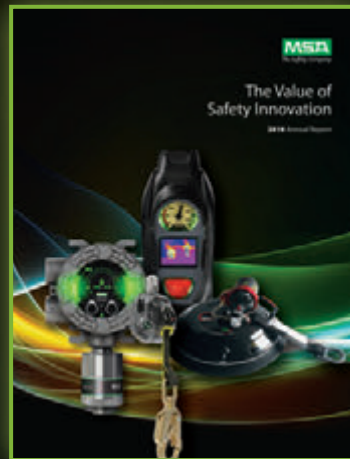
Business of MSA

MSA is in the business of developing, manufacturing and selling innovative products that enhance the safety and health of workers and protect facility infrastructures throughout the world. Critical to MSA's mission is a clear understanding of customer processes and safety needs. MSA dedicates significant resources to research, which allows the company to develop a keen understanding of customer safety requirements for a diverse range of markets, including the oil, gas and petrochemical industry, the fire service, the construction industry, mining and the military. MSA's Core Products, each designed to serve the needs of these target markets, include self-contained breathing apparatus, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, fire and rescue helmets, and fall protection devices.

MSA was founded in 1914 by John T. Ryan and George H. Deike, two mining engineers who had firsthand knowledge of the terrible human loss that was occurring in underground coal mines at that time. Their knowledge of the mining industry provided the foundation for the development of safety equipment to better protect underground miners. While the range of markets served by MSA has expanded greatly over the years, the founding philosophy of understanding customer safety needs and designing innovative safety equipment solutions that address those needs remains unchanged.

MSA is headquartered in Cranberry Township, Pennsylvania, with operations employing 4,300 associates throughout the world.

A publicly held company, MSA's stock is traded on the New York Stock Exchange under the symbol MSA.



About the Cover

In 2016, MSA's success – which included achieving record net income for the year – was fueled by the convergence of industry-leading innovation and a laser-like focus on generating value

for shareholders and customers. Shown on the cover are four of MSA's latest breakthrough innovations. Moving clockwise, from the top, are the Integrated Thermal Imaging Camera for MSA's revolutionary G1 self-contained breathing apparatus for firefighters; the Latchways WinGrip® System designed for the "wing walkers" of aircraft maintenance; the Mini Personal Fall Limiter (PFL), which combines elegant design, smooth operation and high performance to help protect workers at heights; and the Ultima® X5000 Gas Monitor – a true game changer when it comes to reducing maintenance time and the overall cost of ownership for today's multi-point fixed gas detection systems. These and other innovations are solidifying MSA's position and reputation as the technological leader when it comes to developing the most advanced and effective safety solutions for today's workplace.

Financial Highlights

In 2016 we continued to execute our corporate strategy with a sharp focus on capturing market share across our Core Product portfolio while increasing profitability. Through strategic investments in new products, acquisitions, and a focus on productivity, we were able to recognize a 340 basis point improvement in operating margin and a 30% increase in net income. Working capital reductions drove free cash flow conversion to 119% of net income, and allowed us to reduce our debt balance by \$74 million while continuing to fund an increasing dividend.

Advancing the core of MSA through new product development and strategic acquisitions



2016 Core Product revenue growth¹
4% Core Product revenue growth, as reported

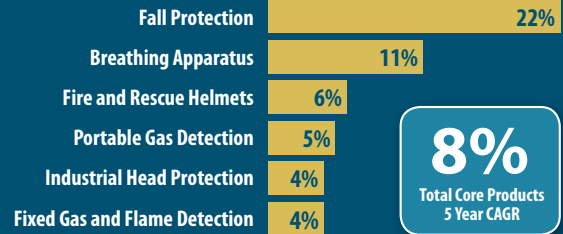


32%
Sales percentage from products developed and launched over past 5 years



24%
Latchways revenue growth¹

5-YEAR REVENUE CAGR¹



8%
Total Core Products
5 Year CAGR

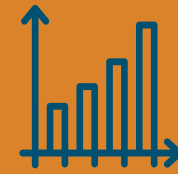
Focus on operational excellence and process excellence driving profitability improvements



+340 BPS
2016 Operating margin expansion



+130 BPS
2016 Gross profit expansion



+30%
2016
Net income growth

Generating free cash flow to continue investing in growth and returning value to shareholders



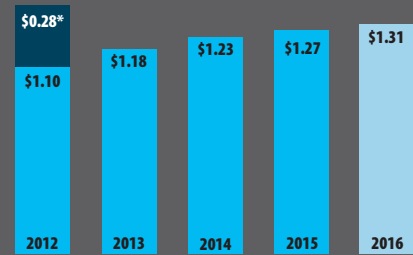
119% 2016 Free Cash Flow Conversion²



\$47M
Invested in R&D

\$26M
Invested in CapEx

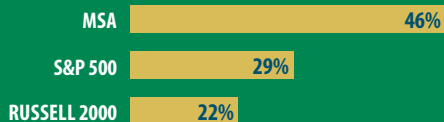
~50 years
of uninterrupted dividend increases



DIVIDENDS PER SHARE

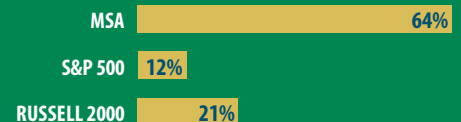
* includes special dividend

3 YEAR TOTAL SHAREHOLDER RETURN



Enhancing shareholder value with innovative new products, strategic acquisitions, and a focus on productivity.

2016 TOTAL SHAREHOLDER RETURN



1. Revenue growth rates are stated in constant currency. Constant currency revenue is a non-GAAP financial measure. For an explanation of this measure, together with a reconciliation to the most directly comparable GAAP measure, visit <http://investors.MSAafety.com> and click on Quarterly Results (Q4 2016) under the Financial Information header.

2. Free cash flow conversion is a non-GAAP financial measure. For an explanation of this measure, together with a reconciliation to the most directly comparable GAAP measure, visit <http://investors.MSAafety.com> and click on Quarterly Highlights (Q4 2016) under the Financial Information header.



MSA Chairman, President and Chief Executive Officer William M. Lambert on the trading floor of the New York Stock Exchange.

TO OUR SHAREHOLDERS, CUSTOMERS, CHANNEL PARTNERS AND ASSOCIATES:

I am pleased to report that MSA delivered record earnings for our shareholders in 2016. Without question, our profitable growth reflected the successful confluence of our strategy to drive industry-leading innovation, invest in acquisitions, and focus on “value creation” activities that strengthen the core of MSA while improving our productivity and profitability.

Driven by this strategy, MSA’s financial results were significantly stronger than the prior year despite a challenging macro-economic environment, especially in the energy market.

MSA’s reported revenue increased 2 percent (4 percent on a constant currency basis) to \$1.15 billion. This increase was driven primarily by the acquisition of Latchways plc, which we acquired in the fourth quarter of 2015 to expand our global footprint and realize new sales opportunities in the rapidly growing fall protection market.

MSA’s gross profit increased by 130 basis points from a year ago, reflecting significantly improved product margins in self-contained breathing apparatus (SCBA) and stronger leverage of indirect costs. In addition, we exceeded our target of reducing operating expenses by \$10 million as we continued to invest in restructuring initiatives aimed at improving productivity and making MSA a more agile and efficient company. In particular, higher gross profit, combined with initiatives to reduce costs and streamline the organization, drove an operating margin

increase of 340 basis points from a year ago on a GAAP basis. Adjusted operating margin was 14.8 percent in 2016, including 20 basis points of dilution related to the acquisition of Senscient (discussed on page 3). Excluding the impact from this acquisition, we achieved our previously discussed operating margin target of 15 percent.

Further, we reported record-high net income of \$92 million, up 30 percent from 2015.

I’m pleased to report that we also exceeded our target of 100 percent free cash flow conversion. In 2016, we converted 119 percent of net income to free cash flow as we focused on working capital improvements, most notably in receivables and inventory. Through these efforts, we reduced our cash conversion cycle by 19 days, or a 20 percent improvement from a year ago. Our success in generating strong free cash flow enabled us to reduce our debt balance by \$74 million and fund a 3 percent dividend increase for our shareholders. As we announced in May 2016, we raised the quarterly dividend to 33 cents per common share, or \$1.32 on an annualized basis.

The investment community has recognized the value of MSA’s strategy and performance, as evidenced by the company’s stock price, which rose 60 percent in 2016, closing at \$69.33 at year end. This performance translated into a total shareholder return of 64 percent for the year, a mark that placed us in the top quartile of our proxy peer group.

Investing in Acquisitions to Grow the Core

Looking more closely at our value drivers in 2016, acquisitions played an important role.

Latchways, which we purchased in 2015, strengthened our business in the fast-growing global fall protection market and delivered double-digit sales growth in its first full year with MSA. Latchways contributed \$0.13 to MSA's earnings per diluted share on a GAAP basis, exceeding the high end of our target EPS range.

Based in the United Kingdom, Latchways quickly proved to be an excellent fit for our organization, from an end market, geographic and product standpoint. With innovative products like the WinGrip vacuum anchor fall protection system – which provides a patented fall protection solution for aircraft maintenance personnel – Latchways helped MSA make significant inroads in the aerospace market. In 2016, this included a \$2 million WinGrip order from Boeing.



MSA's acquisition of Latchways in late 2015 expanded the company's fall protection opportunities in several new industry segments, including aircraft maintenance. The MSA Latchways WinGrip System is an innovative and vacuum-based fall protection solution for aircraft manufacturing and maintenance.

Approximately 80 percent of Latchways' sales were outside the United States in 2016, which expanded the reach of MSA's business in the \$1.5 to \$2 billion global fall protection market – one of the largest segments of the sophisticated global safety market. After a successful integration, Latchways has broadened a key Core Product line for MSA. More importantly, it's positioned us to pursue new and exciting growth opportunities in the utilities, renewable energy and aircraft maintenance segments, while complementing our existing strengths in other key markets.

Our strategic focus on acquisitions took another exciting step forward in September 2016 when MSA acquired Senscient, a leader in laser-based gas detection technology used in a broad



range of industrial, oil and gas production, and petrochemical processing applications.

Senscient, also based in the U.K., strengthens MSA's leading position in the global market for fixed gas and flame detection (FGFD) systems. The company's patented Enhanced Laser Diode Spectroscopy technology detects a wide range of toxic and flammable gases while eliminating false alarms. It also enables faster, more reliable detection of hazardous gases to improve worksite safety and reduce operating costs. We expect Senscient to accelerate MSA's new product development efforts in the area of laser-based, open-path gas detection while complementing our existing FGFD portfolio.

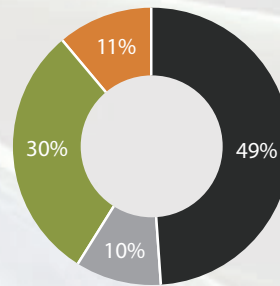
The Value of Safety Innovation

Another important driver in 2016 was MSA's strategic focus on creating products that deliver breakthrough technology and exceptional value and safety for our customers. Most certainly, in 2016, a great example of this was the continued strong demand from the fire service for our G1 SCBA.

With its revolutionary, electronics-free facepiece design and a multitude of patented and ergonomic features, the G1 SCBA demonstrated its value as a true game changer in the fire service market.

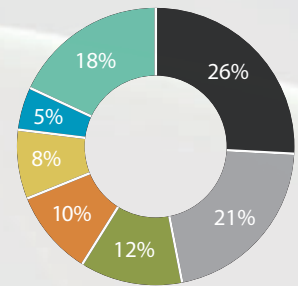
We're excited by the fact that about 50 percent of G1 orders in 2016 came from fire departments that switched from SCBA

ANNUAL SALES BY REGION



- North America
- Latin America
- Europe, Middle East, Africa and India
- Asia and Pacific Rim

ANNUAL SALES BY CORE PRODUCT GROUP



- Breathing Apparatus
- Fixed Gas and Flame Detection
- Portable Gas Detection
- Head Protection
- Fall Protection
- Fire & Rescue Helmets
- Other Products

made by our competitors. That was the case in October when we fulfilled a \$4 million contract to supply G1 SCBA to the Boston Fire Department. In making this change, the department cited the G1's ergonomic design and other features that make it easier and more comfortable for firefighters to wear a breathing apparatus longer, particularly during post-fire overhaul procedures.

Fueled by the G1 platform, breathing apparatus orders increased 10 percent in our Americas segment for the year, while customer conversions to the G1 propelled our U.S. market share in SCBA. As reported by the International Safety Equipment Association, this share increased to 43 percent from 27 percent in 2013 – the year prior to the G1 SCBA launch.

Outside the U.S., another major SCBA order in 2016 came from Fire and Rescue New South Wales in Australia, one of the world's largest urban fire and rescue services. Under a \$4 million multi-year contract, MSA is supplying, servicing and maintaining 3,600 AirGo® eXXtreme SCBA. This innovative MSA product features patented, single-line air hose technology, which reduces weight and snag points for first responders. And like the order from the Boston Fire Department, the New South Wales contract was a competitive SCBA conversion.

To create additional value in our SCBA product line, MSA made investments in 2016 to leverage the versatile G1 SCBA platform. This included the first fully integrated thermal imaging camera, which we previewed in 2016 and fast-tracked into production in 2017. This breakthrough technology puts thermal imaging capability in the hands of individual firefighters in a very cost-effective manner.

An industry first, the G1 integrated thermal imaging camera is patent-pending and takes advantage of the only full-color, SCBA-integrated display and control module available on the market today.

Looking at innovation in fall protection, the MSA Latchways Mini Personal Fall Limiter (PFL) was recognized with three industry awards, including the Industrial Safety and Hygiene News (ISHN) Reader's Choice Award,



The G1 Integrated Thermal Imaging Camera (TIC) features a patent-pending design and is the only unit on the market that is built into a firefighter's self-contained breathing apparatus (SCBA). Compatible with any G1 SCBA, the G1 Integrated TIC can be installed at the factory or via a simple, 10-minute field upgrade.



The MSA Latchways Mini Personal Fall Limiter (PFL) was recognized for its innovative design, earning it three industry awards in 2016.

the American Society of Safety Engineers (ASSE) Attendees Choice Award, and Poland's Zloty Gold Medal.

Compact and elegant in design, the Mini PFL provides an out-of-the-box solution to help protect workers at heights, especially when workspace is limited. It features a self-retracting lanyard and a patented braking system to allow normal worker movement on a job site. In the event of a misstep, the system locks like a seatbelt while simultaneously absorbing energy to break a person's fall, thereby preventing further descent.

I'm proud of these innovative products and many others as they demonstrate our market leadership focus and our commitment to disproportionately fund product development initiatives in our six Core Product areas. In 2016, MSA funded R&D at 4.1 percent of sales, right in our target range of 4 to 4.5 percent of sales. Our previous investments delivered strong returns, with 32 percent of our sales in 2016 generated by products developed and launched over the past five years.

A Focus on Productivity and Creating Value

It was no accident that MSA achieved key financial targets in 2016, as a number of productivity initiatives and cost reduction programs proved to be key value drivers of our performance. In SCBA, for instance, we improved gross margins in the Americas segment by 400 basis points for the full year, driven by value engineering to reduce product costs and strategic pricing reflecting the advanced technologies offered by the G1 SCBA platform. We also realized stronger leverage of indirect product costs, further contributing to the 130 basis point increase in gross profit that we realized for the year.



Overall, I'm pleased to report that our focus on reducing product costs and operating expenses allowed us to leverage our 2 percent annual revenue growth into 10 percent adjusted earnings growth. In addition, we took further restructuring steps – including a voluntary retirement incentive program and other headcount reduction efforts – that are expected to drive an additional \$10 million of cost savings in 2017.

While the restructuring programs that we executed over the past year were not easy decisions, they were appropriate and prudent, and have provided the basis for a more streamlined and efficient global enterprise moving forward.

The start of 2017 showed signs that we are perhaps emerging from an extended period of slow growth and uncertainty in a number of our key market verticals. As an example, we are

gaining momentum in order pace for shorter-cycle personal protection products, such as industrial head protection, portable gas detectors and fall protection equipment. We view these shorter-cycle products as leading indicators of what's to come, and I'm encouraged to see the order book responding to early signs of a stronger macro environment.

We are seeing other positive signs as well, such as increasing rig counts in the U.S. oil and gas market, and indications that U.S. drillers are

ready to increase their capital investment budgets. Demand also remains strong in the fire service market, and utilities are expected to continue investing in capital projects, including grid modernization and upgrading an aging infrastructure – activities that require personal protective equipment.

While it's too early to say that we have officially emerged from a slower growth environment, I believe the recent uptick in order pace and these strengthening macro conditions point to stronger fundamentals for our business in 2017.

Under this environment, and consistent with our long-term growth strategy, you can expect MSA to continue making investments that accelerate profitable growth and improve our cost structure. We've made significant progress in improving profitability in a challenging environment, but our work is far from done. Our transformation into a leaner, more agile and competitive company will continue, without changing our enduring commitment to the core values that have defined MSA for 102 years.

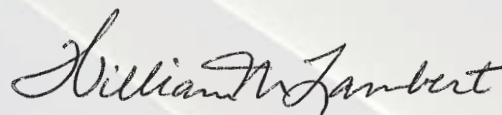
We made great strides in 2016 toward achieving our strategic vision, chiefly through our success in creating value and lowering costs. Because of these efforts, which have been difficult at times, I believe the best is yet to come for MSA.

I want to thank MSA's shareholders, customers and our channel partners for your confidence in our company and our strategy. Finally, I want to thank the people who are at the heart of our success – our dedicated associates around the world.

Our team is unified by the belief that there is nothing more important to MSA's long-term success than growing our business, which we know requires developing great products and providing outstanding customer experiences.

Together, we are making it possible for MSA to build an even brighter future, as we carry on our mission of safety with a focus on innovation and a commitment to creating lasting value for all MSA stakeholders around the world.

Sincerely,



William M. Lambert

Chairman, President and Chief Executive Officer



MSA's values are built on a strong foundation of ethics and integrity, which is why MSA was recognized as a 2017 World's Most Ethical Company® by the Ethisphere Institute – the third consecutive year the company has earned this recognition.

This letter includes certain non-GAAP financial measures. These financial measures include constant currency revenue growth, adjusted operating margin, adjusted earnings and free cash flow conversion. For an explanation of these measures, together with a reconciliation to the most directly comparable GAAP measures, please visit <http://investors.MSAafety.com> and click on Quarterly Results (Q4 2016) under the Financial Information header.

"World's Most Ethical Companies" and "Ethisphere" names and marks are registered trademarks of Ethisphere LLC.



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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, 2016

Commission File No. 1-15579



MSA SAFETY INCORPORATED

(Exact name of registrant as specified in its charter)

Pennsylvania
(State or other jurisdiction of
incorporation or organization)

46-4914539
(IRS Employer Identification No.)

1000 Cranberry Woods Drive
Cranberry Township, Pennsylvania
(Address of principal executive offices)

16066-5207
(Zip code)

(Title of each class)
Common Stock, no par value

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

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

(Name of each exchange on which registered)
New York Stock Exchange

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 and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in the definitive proxy statement incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

(Do not check if a smaller reporting company)

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

As of February 17, 2017, there were outstanding 37,759,187 shares of common stock, no par value. The aggregate market value of voting stock held by non-affiliates as of June 30, 2016 was approximately \$1.7 billion.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the May 17, 2017 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—MSA was founded in Pennsylvania in 1914. We are a global leader in the development, manufacture and supply of safety products that protect people and facility infrastructures. Our safety products typically integrate a combination of electronics, mechanical systems and advanced materials to protect users against hazardous or life threatening situations. Our comprehensive line of safety products is used by workers around the world in a broad range of markets including the oil, gas and petrochemical, fire service, construction, utilities, and mining industries. We also sell products designed for specific industrial and military applications. The company's core products include fixed gas and flame detection systems, breathing apparatus where self-contained breathing apparatus ("SCBA") is the principal product, portable gas detection instruments, industrial head protection products, fire and rescue helmets, and fall protection devices.

We dedicate significant resources to research and development, which allows us to produce innovative safety products that are often first to market and exceed industry standards. Our global product development teams include cross-geographic and cross-functional members from 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 requirements and 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 the note entitled "Segment Information" in Item 8—Financial Statements and Supplementary Data.

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 safety of workers and facility infrastructures around the world in the oil, gas and petrochemical, fire service, construction, utilities, and mining industries. We also sell products designed for specific industrial and military applications. 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, which have leading market positions and a competitive advantage. Core products, as mentioned above, include fixed gas and flame detection systems, breathing apparatus where SCBA is the principal product, portable gas detection instruments, industrial head protection products, fire and rescue helmets, and fall protection devices. These products receive the highest levels of investment and resources as they typically realize a higher gross profit margin and provide higher levels of return on investment than non-core products. Core products comprised approximately 82% of sales in both 2016 and 2015.

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

Fixed gas and flame detection instruments (FGFD). Our permanently installed fixed gas and flame detection instruments are used in oil, gas and petrochemical facilities 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 have a meaningful portion of overall revenue generated from recurring business including replacement components and related service. A portion of business from this product line is project oriented and more associated with upstream exploration and production activity. We sell these instruments in both our Americas and International segments. Key products include:

- *Multi-point permanently installed gas detection 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 petrochemical, pulp and paper, wastewater, refrigerant monitoring, and general industrial applications. These systems utilize a wide array of sensing technologies including electrochemical, catalytic, infrared and ultrasonic.

- *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. First used in the oil and gas industry, our systems now have broad applications in petrochemical facilities, the transportation industry and in pharmaceutical production.
- *The recent acquisition of Senscient, Inc. (Senscient),* a leader in laser-based gas detection technology strengthens MSA's leading position in the global market for FGFD systems, represents a key step in the execution of MSA's Core Product growth strategy and fast tracks MSA's new product development efforts in the area of laser-based, open-path gas detection. Senscient's innovative technology provides a strong complement to our existing fixed gas and flame detection portfolio. The technology provides further technical and competitive differentiation to MSA's fixed gas and flame detection business.

Breathing apparatus products. Breathing apparatus products include SCBA, face masks and respirators, where 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 newest breathing apparatus product, the MSA G1 SCBA, is an entirely redesigned platform that offers many customizable and differentiated features, including the first and only Integrated Thermal Imaging Camera available on the market. We currently have 6 patents issued and an additional 9 patents pending for the MSA G1 SCBA. Our strongest sales of breathing apparatus products have historically been in North America, across Western Europe and in China.

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 industry workers; miners; 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 Single or Two Gas Detectors; ALTAIR[®] 4X and ALTAIR[®] 5X Multigas Detectors with XCell[®] sensor technology, which include internally developed sensors, provide faster response times and unsurpassed durability in a tough, easy-to-operate package. The ALTAIR[®] 2XP provides users with unique and significant cost of ownership advantages over competitive offerings by giving users the ability to perform their own daily bump test to make sure the instrument is functioning properly. We sell these instruments in both our Americas and International segments.

Head protection. We offer a complete line of industrial head protection 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 has 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 comfort for the users of our helmets without sacrificing safety. Our strongest sales of head protection products have historically been in North America and Brazil.

Fire and rescue helmets. 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 used by firefighters across our International segment. Rescue helmets including the F2 X-Trem Brand, are used by military and first responders outside of North America. We sell these products in both our Americas and International segments.

Fall protection. Our broad line of fall protection equipment includes confined space equipment, harnesses, fall arrest equipment, lanyards and lifelines. Fall protection equipment is used by workers in the construction industry, oil, gas and petrochemical market, utilities industry, aerospace industry, and general industrial applications, and anyone working at height. In October 2015, MSA acquired UK-based Latchways plc ("Latchways"). This acquisition - complementary from a product, geographic and end market standpoint - doubled our fall protection revenue, positioning MSA as one of the largest fall protection providers globally.

Non-core products. MSA maintains a portfolio of non-core products which includes both adjacent and peripheral offerings. Adjacent products reinforce and extend the core, 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 adjacent products include respirators, eye and face protection, thermal imaging cameras, ballistic helmets, and gas masks. Gas masks and ballistic helmet sales are the primary purchases from our military customers and were approximately \$55 million globally in 2016 compared to \$56 million in 2015. Peripheral products are primarily sold to the mining industry and reflect a small portion of consolidated sales.

Customers—Our customers generally fall into two categories: distributors and industrial or military end-users. In our Americas segment, the majority of our sales are made to our distributors. In our International segment, sales are made through both indirect and direct sales channels. For the year ended December 31, 2016, 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. In our South Africa and Eastern Europe regions, where distributors are not as well established, our sales associates often work with and sell directly to end-users. 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, Sonepar, Bunzl and Fastenal. In North America, 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. In our International segment, we primarily sell to and service the fire service market directly. Because of our broad and diverse product line and our desire to reach as many markets and market segments as possible, we have over 4,000 authorized distributor locations worldwide. No individual distributor accounts for more than 10% of our sales.

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 personal protection equipment 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 personal protection equipment 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, agency approvals, design and style), brand name recognition, service support and price.

We believe we compete favorably within each of our operating segments as a result of our high quality, our 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. In 2016, 2015 and 2014, on a global basis, we spent \$46.8 million, \$48.6 million and \$48.2 million, respectively, on research and development, reflecting 4.1%, 4.3% and 4.3% of sales respectively. Our primary engineering groups are located in the United States, Germany, China and France. 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 strategy 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-geographic 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. We work with these organizations to develop industry specific product requirements and standards and anticipate their impact on our product lines. 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 standard-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 we acknowledge that the length of the approval process can be unpredictable, we also 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 rubber, high density polyethylene, chemical filter media, eye and face protective lenses, air cylinders, certain metals, electronic components and ballistic 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, 2016 for further information on our conflict minerals analysis. Form SD may be obtained free of charge at www.sec.gov.

Associates—At December 31, 2016, we employed approximately 4,300 associates of which 2,000 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 spike 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 strongly 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.MSAafety.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 Securities and Exchange Commission. 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. You also may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549-0213. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330.

Item 1A. Risk Factors

We 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 materially adverse effect on our business, operating results, financial condition and liquidity.

Our subsidiary, Mine Safety Appliances Company, LLC ("MSA LLC") is presently named as a defendant in 1,794 cumulative trauma lawsuits comprised of 3,023 claims. Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred many 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. Although we have reserved against the portion of claims outstanding, the reserve does not take into account all the currently pending coal dust claims against MSA LLC or any incurred but not reported ("IBNR") claims, which losses could have a materially adverse effect on our business, operating results, financial condition and liquidity. Because litigation is subject to inherent uncertainties, 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 with respect to claims included within the existing reserve or related to claims not included in the reserve. We will adjust the reserve for our liability relating to cumulative trauma claims from time to time based on the maturation of claims, developing facts and circumstances, and if actual experience is worse than previously projected. These adjustments may reflect changes in estimates for claims currently covered by the reserve, as well as estimated liabilities for claims not presently covered by the reserve and IBNR claims, in the event we become able to reasonably assess the probability and estimate the magnitude of potential losses. These adjustments may be material and could increase the year over year variability of our financial results.

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 \$159.9 million at December 31, 2016. As described in greater detail in Note 19 of the Consolidated Financial Statements in Part II Item 8 of this Form 10-K, MSA LLC is currently involved in insurance coverage litigation regarding the rights and obligations under numerous insurance policies, and for the payment of amounts recorded as insurance receivables. Various factors could affect the timing and amount of recovery of insurance receivables, including: the outcome of coverage litigation, the outcome of negotiations with insurers, and the extent to which insurers may become insolvent in the future. Failure to recover amounts due from MSA LLC's insurance carriers would result in it being unable to recover amounts already paid to resolve claims (and recorded as insurance receivables) and could have a materially adverse effect on our business, consolidated operating results, financial condition and liquidity.

We have determined that at some point in the next 18 months, even if insurance coverage litigation is generally successful, MSA LLC will become largely self-insured for costs associated with cumulative trauma product liability claims and most of the related costs will be expensed without the expectation such costs will be covered by insurance reimbursement. The exact point when this transition will happen is difficult to predict and subject to a number of variables, including the pace at which future cumulative trauma product liability costs are incurred and the results of litigation and negotiations with insurance carriers. After it becomes largely self-insured, MSA LLC may still obtain some insurance reimbursement from negotiated coverage-in-place agreements (although that coverage may not be immediately triggered or accessible) or from other sources of coverage. However, the precise amount of insurance reimbursement that may be available cannot be determined with specificity at this time.

MSA LLC may experience an increase in newly filed claims or more aggressive settlement demands from plaintiffs at any time, which could accelerate the point at which MSA LLC becomes self-insured. We expect that once we become largely self-insured for cumulative trauma claims, we could experience greater year over year variability in our consolidated financial results.

On February 26, 2016, a Kentucky state court jury in the James Couch claim rendered a verdict against MSA LLC (the "Couch verdict") of \$7.2 million dollars (comprised of \$3.2 million of an apportioned share of compensatory damages and \$4.0 million in punitive damages). The Couch claim is a cumulative trauma product liability lawsuit involving exposure to coal dust. MSA LLC is appealing the Couch verdict. MSA LLC experienced an increase in coal dust related claims filed in 2016. Such claims could result in increased product liability expense in the future, and the impact of such an increase in claims to our results of operations may be worsened to the extent MSA LLC is self-insured. Please refer to Note 19 Contingencies of the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further details on the Couch verdict.

Claims of injuries from our products, product defects or recalls of our products could have a materially 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 adverse publicity against us could have a materially adverse effect on our business, consolidated operating results, financial condition and liquidity, including any successful claim brought against us in excess or outside of available insurance coverage.

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. The global economy remains unstable. For example, we are currently seeing a slowdown in China, recessionary conditions in Brazil and a slowdown in certain regions that are dependent upon the mining of certain commodities. We expect economic conditions will continue to be challenging and uneven for the foreseeable future. Adverse changes in economic conditions 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. These sales expose MSA to the risks of doing business in that global 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 pull back in employment trends across the energy market. Another 5% - 10% of consolidated revenue, primarily in the FGFD product line is more exposed to a pull back in capital equipment spending within the energy market. It is possible that the volatility in upstream, midstream and downstream markets, driven partly by geopolitical factors, could negatively impact our business and our results of operations and financial condition.

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 materially and adversely affect our net sales, earnings and cash flow.

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 may materially and adversely affect our results of operations. 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.

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

We are subject to extensive regulation from U.S. federal, state, and local governments, as well as the governments of the countries in which we conduct business. Failure to comply with these regulations could result in severe civil or criminal penalties, sanctions or significant changes to our operations. These actions could have a materially adverse effect on our business, 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 materially adverse effect on our results of operations.

We benefit from free trade laws and regulations, such as the North American Free Trade 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 North American Free Trade 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 and financial results.

We are subject to various U.S and foreign tax laws and any changes in these laws related to the taxation of businesses 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. Additionally, the Trump administration has announced other proposals for potential reform to the U.S. federal income tax rules for businesses, including reducing the deductibility of interest for corporations, reducing the top marginal rate on corporations and implementing border-adjusted taxation. These proposals for reform, if enacted by the U.S. could adversely impact our effective tax rate.

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, agency approvals, design and style), price, brand name trust and recognition and customer service. 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 materially and adversely affect our business, results of operations and financial condition.

If we fail to introduce successful new products or extend our existing product lines, we may lose our market position and our financial performance may 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 materially 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 adverse publicity or other issues, including concerns about product safety or quality, real or perceived, could negatively impact our business which could have a materially adverse effect on our business, operating results and financial condition.

A failure of our information systems 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 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 and cybercriminals could attempt to gain unauthorized access to our information systems with the intent of harming our company 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, our business, results of operations and financial condition could be materially and adversely affected.

Like many companies, from time to time, we have experienced attacks on our computer systems by unauthorized outside parties; however, we do not believe that such attacks have resulted in any material damage to us or our customers. Because the techniques used by computer hackers and others to access or sabotage networks constantly 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, our technologies and processes may be misappropriated and the impact of any future incident cannot be predicted. Any 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 expect to devote increasing 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 network disruptions.

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

MSA has transitioned parts of its European operating segment to a principal operating company ("European reorganization"). This principal operating company model integrates our historically individually managed entities, into one that is a centrally managed organization. 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 have the positive effects 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 may lead to unintended consequences.

MSA incurred a significant amount of restructuring expense during 2015, primarily related to headcount reduction. In 2016, certain employees in the Americas segment were offered a voluntary retirement incentive package (“VRIP”). Non-cash special termination benefit expense of approximately \$11.5 million is expected to be recorded in the first quarter of 2017 related to these elections. These efforts should contribute to profitability in future periods. Our success will depend on our ability to maintain increased productivity without backfilling certain positions.

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

We have business operations in over 40 foreign countries. In 2016, approximately half of our net sales were made by operations located outside the United States. Our international operations are subject to various political, economic and other risks and uncertainties, which could adversely affect 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;
- changes to the company's legal structure could have unintended tax consequences;
- inability to generate sufficient profit in certain foreign jurisdictions could lead to additional valuation allowances on deferred tax assets;
- intellectual property protection difficulties;
- 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;
- 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, local laws and the Foreign Corrupt Practices Act
- the ability to effectively negotiate with labor unions in foreign countries;
- the need to take extra security precautions for our international operations; and
- costs and difficulties in managing culturally and geographically diverse international operations.

Any one or more of these risks could have a negative impact on the success of our international operations and, thereby, materially and adversely affect our business as a whole.

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 and other factors.

We depend on various components and materials to manufacture our products. Although we have not experienced any 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 materially adverse effect on our business, results of operations and financial condition. We cannot assure you that we will be able to successfully manage price fluctuations due to market demand, currency risks or material shortages, or that future price fluctuations will not have a materially adverse effect on our business, 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 may adversely affect our results of operations and financial condition, and may affect the comparability of our results between financial periods.

For the year ended December 31, 2016, our operations outside of the United States accounted for approximately half of our net sales. The results of our foreign operations are generally reported in the 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. 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. We cannot assure you that we will be able to effectively manage our exchange rate risks or that any volatility in currency exchange rates will not have a materially adverse effect on our consolidated results of operations and financial condition.

If we lose any of our key personnel or are unable to attract, train and retain qualified personnel, our ability to manage our business and continue our growth would 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. Competition for personnel is intense, and we cannot assure you that we will be successful in attracting and retaining qualified personnel. In addition, we do not currently maintain key person life insurance.

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 October 21, 2015, MSA completed the acquisition of Latchways - a leading global provider of innovative fall protection systems and solutions based in the United Kingdom (UK). Additionally on September 19, 2016, MSA completed the acquisition of Senscient, which is also headquartered in the UK and is a leader in laser-based gas detection technology. Please refer to Note 13 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 Latchways and Senscient, or may acquire in the future, we may not realize anticipated cost savings, improved manufacturing efficiencies and increased revenue, which may result in materially 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.

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. If we are unable to maintain the proprietary nature of our technologies, our consolidated results of operations and financial condition could be materially and adversely affected.

We may be required to recognize impairment charges for our long-lived assets or available for sale investments.

At December 31, 2016, the net carrying value of long-lived assets (property, plant and equipment, goodwill and other intangible assets) totaled approximately \$559.0 million. In accordance with generally accepted accounting principles, we periodically assess these assets to determine if they are impaired. Significant negative industry or economic trends, disruptions to our business, unexpected significant changes or planned changes in use of the assets and divestitures may result in impairments to goodwill and other long-lived assets. Future impairment charges could significantly affect our consolidated results of operations in the periods recognized. Impairment charges would also reduce our consolidated shareholders' equity and increase our debt-to-total-capitalization ratio, which could negatively impact our credit rating and access to debt and equity markets.

Risks related to our defined benefit pension and other post-retirement plans may adversely impact 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 Item 8 Financial Statements and Supplementary Data.

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. 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 in our debt agreements as of December 31, 2016.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal executive offices are located at 1000 Cranberry Woods Drive, Cranberry Township, PA 16066 in a 212,000 square-foot building owned by us. We own or lease our primary facilities in the United States and in a number of other countries. 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. The following table sets forth a list of our primary facilities:

| Location | Function | Square Feet | Owned or Leased |
|----------------------------------|--|-------------|-----------------|
| Americas | | | |
| Murrysville, PA | Office and Manufacturing | 295,000 | Owned |
| Cranberry Twp., PA | Office, Research and Development and Manufacturing | 212,000 | Owned |
| New Galilee, PA | Distribution | 120,000 | Leased |
| Jacksonville, NC | Manufacturing | 107,000 | Owned |
| Jacksonville, NC | Manufacturing | 79,000 | Leased |
| Queretaro, Mexico | Office, Manufacturing and Distribution | 77,000 | Leased |
| Sao Paulo, Brazil | Office, Manufacturing and Distribution | 74,000 | Owned |
| Cranberry Twp., PA | Research and Development | 68,000 | Owned |
| Lake Forest, CA | Office, Research and Development and Manufacturing | 62,000 | Leased |
| Lima, Peru | Office and Distribution | 34,000 | Owned |
| Santiago, Chile | Office and Distribution | 32,000 | Leased |
| Corona, CA | Manufacturing | 19,000 | Leased |
| Torreon, Mexico | Office | 15,000 | Leased |
| Buenos Aires, Argentina | Office and Distribution | 9,000 | Owned |
| Houston, TX | Office and Distribution | 9,000 | Leased |
| Lake Forest, CA | Office | 6,000 | Owned |
| International | | | |
| Berlin, Germany | Office, Research and Development, Manufacturing and Distribution | 340,000 | Leased |
| Suzhou, China | Office and Manufacturing | 193,000 | Owned |
| Devizes, UK | Office, Manufacturing and Distribution | 115,000 | Owned |
| Chatillon sur Chalaronne, France | Office, Research and Development, Manufacturing and Distribution | 94,000 | Owned |
| Milan, Italy | Office | 43,000 | Owned |
| Johannesburg, South Africa | Office, Manufacturing and Distribution | 35,000 | Leased |
| Mohammedia, Morocco | Manufacturing | 24,000 | Owned |
| Barcelona, Spain | Office | 23,000 | Leased |
| Galway, Ireland | Office and Manufacturing | 20,000 | Owned |
| Varnamo, Sweden | Office, Manufacturing and Distribution | 18,000 | Leased |
| Warsaw, Poland | Office and Distribution | 18,000 | Leased |
| Sydney, Australia | Office, Manufacturing | 18,000 | Leased |
| Kozina, Slovenia | Office and Manufacturing | 17,000 | Leased |
| Rajarhat, India | Office and Distribution | 10,000 | Leased |
| Rapperswil, Switzerland | Office | 8,000 | Leased |
| Hoorn, Netherlands | Office | 6,000 | Leased |
| Poole, United Kingdom | Office and Manufacturing | 6,000 | Leased |

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.

Executive Officers of the Registrant

The following sets forth the names and ages of our executive officers as of February 28, 2017, indicating all positions held during the past five years:

| <u>Name</u> | <u>Age</u> | <u>Title</u> |
|---------------------------------------|------------|---|
| William M. Lambert ^(a) | 58 | Chairman, President and Chief Executive Officer since May 2015. |
| Joakim Birgersson ^(b) | 52 | Vice President and General Manager, Europe since August 2015. |
| Steven C. Blanco ^(c) | 50 | Vice President, General Manager Northern North America since May 2015. |
| Kerry M. Bove ^(d) | 58 | Senior Vice President and Chief Strategy Officer since May 2015. |
| Gavan C M Duff ^(e) | 51 | Vice President, Chief Operating Officer, Latchways since February 2017. |
| Ronald N. Herring, Jr. ^(f) | 56 | Senior Vice President and President, MSA International segment since May 2015. |
| R. Anne Herman ^(g) | 54 | Vice President of Global Operational Excellence and Chief Customer Officer since August 2016. |
| Kenneth D. Krause ^(h) | 42 | Vice President, Chief Financial Officer and Treasurer since December 2015. |
| Douglas K. McClaine ⁽ⁱ⁾ | 59 | Senior Vice President, Secretary and Chief Legal Officer since March 2016. |
| Paul R. Uhler ^(j) | 58 | Senior Vice President and Chief Human Resource Officer since March 2016. |
| Nishan J. Vartanian ^(k) | 57 | Senior Vice President and President, MSA Americas segment since May 2015. |
| Markus H. Weber ^(l) | 52 | Vice President and Chief Information Officer since April 2010. |

- (a) Prior to his present position, Mr. Lambert was President and Chief Executive Officer.
- (b) Prior to his present position, Mr. Birgersson served as Project Director of Europe 2.0x.
- (c) Prior to his present position, Mr. Blanco served as Vice President of Global Operational Excellence.
- (d) Prior to his present position, Mr. Bove was Vice President and President MSA International Segment. Mr. Bove also served as Acting Chief Financial Officer from September to December 2015.
- (e) Prior to his present position, Mr. Duff was Executive Director Latchways, Chief Operating Officer; Executive Director and Chief Customer Officer; International Director of Distribution Development; and Western European Sales Director.
- (f) Prior to his present position, Mr. Herring was Vice President and President MSA Europe Segment.
- (g) Prior to her present position, Ms. Herman was Chief Customer Officer and Executive Director, Global Quality.
- (h) Prior to his present position, Mr. Krause was Vice President, Strategic Finance and Treasurer.
- (i) Prior to his present position, Mr. McClaine was Vice President, Secretary and General Counsel.
- (j) Prior to his present position, Mr. Uhler was Vice President, Global Human Resources.
- (k) Prior to his present position, Mr. Vartanian was Vice President and President, MSA North America.
- (l) Prior to joining MSA, Mr. Weber served as Chief Information Officer of Berlin-Chemie AG, an international research-based pharmaceutical company.

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.” Stock price ranges and dividends declared were as follows:

| | Price Range of Our Common Stock | | Dividends |
|-------------------------------------|------------------------------------|----------|-----------|
| | High | Low | |
| Year ended December 31, 2015 | | | |
| First Quarter | \$ 53.64 | \$ 43.12 | \$ 0.31 |
| Second Quarter | 52.59 | 43.43 | 0.32 |
| Third Quarter | 54.54 | 38.32 | 0.32 |
| Fourth Quarter | 47.46 | 39.17 | 0.32 |
| Year ended December 31, 2016 | | | |
| First Quarter | \$ 49.77 | \$ 37.68 | \$ 0.32 |
| Second Quarter | 54.70 | 44.16 | 0.33 |
| Third Quarter | 58.62 | 51.25 | 0.33 |
| Fourth Quarter | 71.28 | 55.00 | 0.33 |

On February 17, 2017, there were 371 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, 2016 | — | \$ — | — | 1,593,421 |
| November 1 — November 30, 2016 | 4,159 | 62.82 | — | 1,494,473 |
| December 1 — December 31, 2016 | — | — | — | 1,339,917 |

On May 12, 2015, The Board of Directors adopted a new stock repurchase program to replace the existing program. The new 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 shares that may be purchased is calculated based on the dollars remaining under the program and the respective month-end closing share price.

The above share purchases are related to stock compensation transactions.

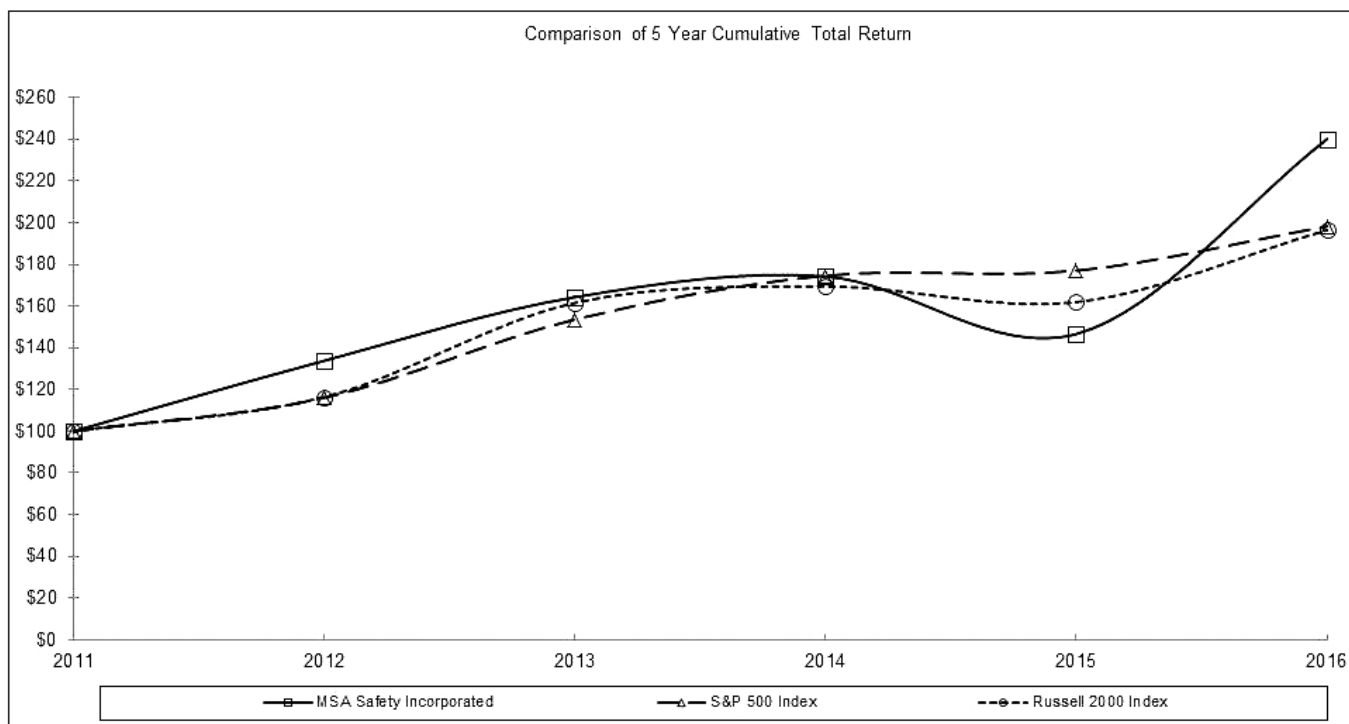
We do not have any other share purchase programs.

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

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



Assumes \$100 invested on December 31, 2011 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

| | Value at December 31, | | | | | |
|-------------------------|-----------------------|-----------|-----------|-----------|-----------|-----------|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| MSA Safety Incorporated | \$ 100.00 | \$ 133.78 | \$ 164.30 | \$ 174.22 | \$ 146.61 | \$ 240.16 |
| S&P 500 Index | 100.00 | 116.00 | 153.57 | 174.60 | 177.01 | 198.18 |
| Russell 2000 Index | 100.00 | 116.35 | 161.52 | 169.42 | 161.95 | 196.45 |

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Index Data: Copyright Russell Investments, Inc. Used with permission. All rights reserved.

Item 6. Selected Financial Data

| (In thousands, except as noted) | 2016 ^(a) | 2015 ^(b) | 2014 | 2013 | 2012 |
|--|---------------------|---------------------|--------------|--------------|--------------|
| Statement of Income Data: | | | | | |
| Net sales | \$ 1,149,530 | \$ 1,130,783 | \$ 1,133,885 | \$ 1,112,058 | \$ 1,110,443 |
| Income from continuing operations | 92,691 | 69,590 | 87,447 | 85,858 | 87,557 |
| (Loss) income from discontinued operations | (755) | 1,217 | 1,059 | 2,389 | 3,080 |
| Net income | 91,936 | 70,807 | 88,506 | 88,247 | 90,637 |
| Earnings per share attributable to MSA common shareholders: | | | | | |
| Basic per common share (in dollars): | | | | | |
| Income from continuing operations | \$ 2.47 | \$ 1.86 | \$ 2.34 | \$ 2.31 | \$ 2.37 |
| (Loss) income from discontinued operations | (0.02) | 0.03 | 0.03 | 0.06 | 0.08 |
| Net income | 2.45 | 1.89 | 2.37 | 2.37 | 2.45 |
| Diluted per common share (in dollars): | | | | | |
| Income from continuing operations | \$ 2.44 | \$ 1.84 | \$ 2.30 | \$ 2.28 | \$ 2.34 |
| (Loss) income from discontinued operations | (0.02) | 0.03 | 0.03 | 0.06 | 0.08 |
| Net income | 2.42 | 1.87 | 2.33 | 2.34 | 2.42 |
| Dividends paid per common share (in dollars) | 1.31 | 1.27 | 1.23 | 1.18 | 1.38 |
| Weighted average common shares outstanding—basic | 37,456 | 37,293 | 37,138 | 36,868 | 36,564 |
| Weighted average common shares outstanding—diluted | 37,986 | 37,710 | 37,728 | 37,450 | 37,042 |
| Balance Sheet Data: | | | | | |
| Total assets ^(c) | \$ 1,353,920 | \$ 1,422,863 | \$ 1,263,412 | \$ 1,233,026 | \$ 1,110,045 |
| Long-term debt ^(c) | 363,836 | 458,022 | 243,620 | 259,423 | 270,632 |
| Total MSA Safety Incorporated shareholders' equity | 558,165 | 516,496 | 533,809 | 566,452 | 462,955 |

^(a) Includes Senscient from the date of acquisition on September 19, 2016.

^(b) Includes Latchways from the date of acquisition on October 21, 2015.

^(c) The Company adopted Accounting Standards Update (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. All prior periods presented in this Annual Report on Form 10-K were recast to reflect the change in accounting principle retrospectively applied as of December 31, 2015.

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."

On October 21, 2015, the Company acquired 100% of the common stock of Latchways plc (Latchways) for \$190.9 million in cash. Latchways, which is headquartered in the United Kingdom, is a leading provider of innovative fall protection systems and solutions. The acquisition of Latchways represents a key step in the execution of our corporate strategy by expanding our investment in one of the largest and fastest growing product segments of the global safety market. This acquisition will double our fall protection business, positioning MSA as one of the largest fall protection providers globally. Within the fall protection space, the Latchways acquisition strengthens our position in permanent engineered systems and our presence in other sectors such as utilities, telecommunications, and aircraft maintenance. 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, which is included in Part II Item 8 of this Form 10-K, for further information.

The Americas and International reportable segments were established on January 1, 2016. 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 now allocated to each segment in a manner consistent with where the benefits from the expenses are derived. The 2015 and 2014 segment results have been recast to conform with current period presentation. Please refer to Note 7 Segment Information, which is included in Part II Item 8 of this Form 10-K, for further information.

MSA's South African personal protective equipment distribution business and MSA's Zambian operations had historically been part of the International reportable segment. On February 29, 2016, the Company sold 100% of the stock associated with these operations. In accordance with generally accepted accounting principles, these operations and related results are excluded from continuing operations and are presented as discontinued operations in all periods presented. Please refer to Note 20 Discontinued Operations, which is included in Part II Item 8 of this Form 10-K, for further commentary on these discontinued operations.

On September 19, 2016, the Company acquired 100% of the common stock of Senscient, Inc. for \$19.1 million in cash. Senscient, which is headquartered in the UK, is a leader in laser-based gas detection technology. The acquisition of Senscient expands and enhances MSA's technology offerings in the global market for fixed gas and flame detection systems, as the Company continues to execute its core product growth strategy. The acquisition 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, which is included in Part II Item 8 of this Form 10-K, for further information.

BUSINESS OVERVIEW

We are a global leader in the development, manufacture and supply of safety products that protect people and facility infrastructures. 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 is used by workers around the world in a broad range of markets, including the oil, gas and petrochemical, fire service, construction, utilities, and mining industries. MSA's core products include fixed gas and flame detection systems, breathing apparatus where SCBA is the principal product, portable gas detection instruments, industrial head protection products, fire and rescue helmets, 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. Each segment includes a number of operating segments. In 2016, 59% and 41% 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, Brazil and Canada. Operations in other Americas segment countries focus primarily on sales and distribution in their respective home country markets.

International. Our International segment includes companies in Europe, Middle East, Africa, and the Asia Pacific region, some of which are in developing regions of the world. In our largest International affiliates (in Germany, France, United Kingdom, Ireland and China), we develop, manufacture and sell a wide variety of products. In China, the products manufactured are sold primarily in the home country 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., United Kingdom, Ireland, Sweden 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 year ended December 31, 2016, corporate general and administrative costs were \$38.9 million, which included \$2.5 million of strategic transaction costs related to mergers and acquisitions. During the year ended December 31, 2015, corporate general and administrative costs were \$38.3 million, which included \$7.5 million of strategic transaction costs related to the Latchways acquisition. During the year ended December 31, 2014, corporate general and administrative costs were \$37.4 million.

RESULTS OF OPERATIONS

Year Ended December 31, 2016 Compared to Year Ended December 31, 2015

| Net Sales (In millions) | 2016 | 2015 | Dollar Increase (Decrease) | Percent Increase (Decrease) |
|---|------------------|------------------|----------------------------------|-----------------------------------|
| Consolidated Continuing Operations | \$1,149.5 | \$1,130.8 | \$18.7 | 1.7% |
| Americas | 678.4 | 704.8 | (26.4) | (3.7)% |
| International | 471.1 | 426.0 | 45.1 | 10.6% |

Net Sales from continuing operations. Net sales for the year ended December 31, 2016 were \$1,149.5 million, an increase of \$18.7 million, from \$1,130.8 million for the year ended December 31, 2015. Organic constant currency sales decreased by 1% for the year ended December 31, 2016. Please refer to the Net Sales from Continuing Operations table below for a reconciliation of the year over year sales change.

| Net Sales from Continuing Operations | Year Ended December 31, 2016 versus December 31, 2015 | | |
|--------------------------------------|---|---------------|------------------------------------|
| | Americas | International | Consolidated Continuing Operations |
| (Percent Change) | | | |
| GAAP reported sales change | (3.7)% | 10.6% | 1.7% |
| Currency translation effects | (1.9)% | (2.4)% | (2.1)% |
| Constant currency sales change | (1.8)% | 13.0% | 3.8% |
| Acquisitions | 1.3% | 10.3% | 4.8% |
| Organic constant currency change | (3.1)% | 2.7% | (1.0)% |

Note: Organic 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. Organic constant currency sales change is calculated by removing the percentage impact from acquisitions and currency translation effects from the overall percentage change in net sales.

Net sales for the Americas segment were \$678.4 million for the year ended December 31, 2016, a decrease of \$26.4 million, or 4% compared to \$704.8 million for the year ended December 31, 2015. Currency translation effects decreased Americas segment sales by 2%, reflecting weaker currencies across Latin America. Acquisitions, primarily Latchways, increased sales in the Americas segment by 1%. In 2016, organic constant currency sales in the Americas segment decreased 3% compared to the prior year. This decrease was primarily related to a lower level of shipments of the G1 self-contained breathing apparatus ("SCBA"). Our sales in 2015 benefited from a higher backlog at December 31, 2014 of approximately \$35 million. We shipped these additional units in 2015 and had a more normalized backlog to start 2016. Furthermore, industrial head protection sales decreased, there was a lower level of fixed gas and flame detection sales stemming from reduced project spending in the energy market, and sales of other non-core products decreased. These declines were partially offset by an improvement in portable gas detection as well as fire and rescue helmet sales.

Net sales for the International segment were \$471.1 million for the year ended December 31, 2016, an increase of \$45.1 million, or 11%, compared to \$426.0 million for the year ended December 31, 2015. Currency translation effects decreased International segment net sales by 2%, reflecting a weaker British pound and euro. Acquisitions, primarily Latchways, increased sales in the International segment by 10%. Organic constant currency sales in the International segment increased 3% in 2016, driven by growth in breathing apparatus in both developed and emerging markets, fixed gas and flame detection projects in the Middle East, and portable gas detection in Europe. These increases were partially offset by a decline in fire and rescue helmet sales and other non-core product sales.

Gross profit. Gross profit for the year ended December 31, 2016 was \$523.6 million, an increase of \$22.5 million, or 4%, compared to \$501.1 million for the year ended December 31, 2015. The ratio of gross profit to net sales was 45.6% in 2016 compared to 44.3% in 2015. The higher gross profit ratio during 2016 is primarily attributable to improved margins on our G1 SCBA associated with our value engineering initiatives and improvements in our warranty expense and inventory and obsolescence expense.

Selling, general and administrative expenses. Selling, general and administrative expenses were \$306.1 million for the year ended December 31, 2016, a decrease of \$9.2 million, compared to \$315.3 million for the year ended December 31, 2015. Selling, general and administrative expenses were 26.6% of net sales in 2016, compared to 27.9% of net sales in 2015. Organic constant currency selling, general, and administrative expense decreased 3% during 2016 driven by headcount reductions and implementation of discretionary spending controls related to our global cost reduction program. 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, 2016 versus December 31, 2015 Consolidated Continuing Operations |
|---|--|
| GAAP reported change | (2.9)% |
| Currency translation effects | (2.2)% |
| Constant currency change | (0.7)% |
| Acquisitions and related strategic transaction costs | 2.4% |
| Organic constant currency change | (3.1)% |

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 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 expenses. Research and development expense was \$46.8 million for the year ended December 31, 2016, a decrease of \$1.8 million, or 3.7%, compared to \$48.6 million for the year ended December 31, 2015. Research and development expense was 4.1% of net sales in 2016, compared to 4.3% of net sales in 2015 and we expect research and development expense to range from 4.0% to 4.5% of sales for the year ending December 31, 2017 as we continue to develop new products for global safety markets.

Restructuring and other charges. During the year ended December 31, 2016, the Company recorded restructuring charges, net of adjustments, of \$5.7 million, primarily related to severance costs for staff reductions associated with ongoing initiatives to right size our operations in Europe, Brazil, and Japan. This compared to charges of \$12.3 million during the year ended December 31, 2015, primarily related to severance costs associated with our global cost reduction program.

In September 2016, certain employees in the Americas segment were offered a voluntary retirement incentive package ("VRIP"). The election window for participation closed on October 17, 2016. The employees were required to render service through January 31, 2017 to receive the VRIP and had until February 6, 2017 to revoke their election. None of the 83 employees who accepted the VRIP revoked their election to retire under the terms of the plan. Non-cash special termination benefit expense of approximately \$11.5 million is expected to be recorded in the first quarter of 2017 related to these elections. All benefits will be paid from our over funded North America pension plan. Including our non-cash special termination benefit expense and additional initiatives across our International segment, we expect to incur between \$13 million and \$15 million in restructuring expense over the next several quarters as we continue to evaluate additional restructuring activities, and anticipate savings in 2017 of approximately \$10.0 million related to these programs.

Currency exchange. Currency exchange losses were \$0.8 million during the year ended December 31, 2016, compared to \$2.2 million during the year ended December 31, 2015. Currency exchange losses in both years were mostly unrealized and related primarily to the effect of the strengthening U.S. dollar on intercompany balances. Refer to Note 17 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K, for information regarding our currency exchange rate risk management strategy.

GAAP operating income. Consolidated operating income for the year ended December 31, 2016 was \$164.2 million, an increase of \$41.5 million, or 34%, compared to \$122.7 million for the year ended December 31, 2015. Improved operating income for 2016 was driven by higher gross profit margins associated with our value engineering initiatives; lower selling, general and administrative costs stemming from our cost reduction programs; lower restructuring costs and lower currency exchange losses.

Adjusted operating income. Americas adjusted operating income for the year ended December 31, 2016 was \$162.8 million, an increase of \$20.8 million, or 15%, compared to \$142.0 million for the year ended December 31, 2015. Improved margins for our G1 SCBA associated with our value engineering initiatives and lower selling, general and administrative expense stemming from our cost reduction programs contributed to adjusted operating income growth during 2016.

International adjusted operating income for the year ended December 31, 2016 was \$46.5 million, an increase of \$13.0 million, or 39%, compared to \$33.5 million for the year ended December 31, 2015. Increased revenues from the acquisition of Latchways combined with organic growth in both developed and emerging international markets contributed to improved adjusted operating income as compared to 2015. Lower selling, general and administrative expense as a result of our global cost reduction program also contributed to improvements in operating income.

Corporate segment adjusted operating loss for the year ended December 31, 2016 was \$38.6 million, an increase of \$0.3 million, or 1%, compared to an operating loss of \$38.3 million for the year ended December 31, 2015, reflecting higher stock compensation, bonus, and legal expenses.

The following table provides a reconciliation from GAAP operating income to adjusted operating income. Adjusted operating margin % is calculated as adjusted operating income divided by net sales.

| Adjusted operating income (In thousands) | Year Ended December 31, 2016 | | | Consolidated Continuing Operations |
|---|------------------------------|---------------|------------|--|
| | Americas | International | Corporate | |
| Net sales | \$678,433 | \$471,097 | \$— | \$1,149,530 |
| GAAP operating income | | | | 164,192 |
| Restructuring and other charges | | | | 5,694 |
| Currency exchange losses, net | | | | 766 |
| Adjusted operating income | \$162,788 | \$46,491 | \$(38,627) | \$170,652 |
| Adjusted operating margin % | 24.0% | 9.9% | | |

Note: Adjusted operating income is a non-GAAP financial measure used by the chief operating decision maker to evaluate segment performance and allocate resources. Adjusted operating income is reconciled above to the nearest GAAP financial measure, Operating income.

Total other expense, net. Other expense for the year ended December 31, 2016 was \$12.3 million, an increase of \$0.6 million, or 5%, compared to \$11.7 million for the year ended December 31, 2015. The increase reflects higher interest expense associated with the Latchways and Senscient acquisitions.

Income taxes. The effective tax rate for the year ended December 31, 2016 was 38.1%, compared to 40.0% for the year ended December 31, 2015. The decrease was primarily due to less exit taxes partially offset by higher U.S. profitability. The effective tax rate for the year is inclusive of exit taxes related to our European reorganization of 4.3% compared to 6.9% for the same period last year.

MSA finalized its European reorganization during 2016. The reorganization is designed to drive optimal performance by aligning certain strategic planning and decision making into a single location enabled by a common IT platform. During 2016, the Company incurred \$6.5 million of charges associated with exit taxes related to our European reorganization compared to \$7.7 million in 2015.

Net income from continuing operations attributable to MSA Safety Incorporated. Net income from continuing operations was \$92.7 million for the year ended December 31, 2016, or \$2.44 per diluted share, an increase of \$23.1 million, or 33%, compared to \$69.6 million, or \$1.84 per diluted share, for the year ended December 31, 2015 as a result of the factors described above.

Net (loss) income from discontinued operations attributable to MSA Safety Incorporated. Net loss from discontinued operations was \$0.8 million for the year ended December 31, 2016, or \$0.02 per diluted share compared to net income of \$1.2 million, or \$0.03 per diluted share, for the year ended December 31, 2015. Please refer to Note 20 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Year Ended December 31, 2015 Compared to Year Ended December 31, 2014

Net Sales from continuing operations. Net sales for the year ended December 31, 2015 were \$1,130.8 million, a decrease of \$3.1 million, from \$1,133.9 million for the year ended December 31, 2014. Organic constant currency sales increased by 7% for the year ended December 31, 2015. Please refer to the Net Sales from Continuing Operations table below for a reconciliation of the year over year sales change.

| Net Sales (In millions) | 2015 | 2014 | Dollar Increase (Decrease) | Percent Increase (Decrease) |
|---|------------------|------------------|----------------------------------|-----------------------------------|
| Consolidated Continuing Operations | \$1,130.8 | \$1,133.9 | \$(3.1) | (0.3)% |
| Americas | 704.8 | 663.7 | 41.1 | 6.2% |
| International | 426.0 | 470.2 | (44.2) | (9.4)% |

| Net Sales from Continuing Operations (Percent Change) | Year Ended December 31, 2015 versus December 31, 2014 | | |
|--|---|---------------|------------------------------------|
| | Americas | International | Consolidated Continuing Operations |
| GAAP reported sales change | 6.2% | (9.4)% | (0.3)% |
| Currency translation effects | (4.3)% | (12.8)% | (7.8)% |
| Constant currency sales change | 10.5% | 3.4% | 7.5% |
| Acquisitions | 0.2% | 1.9% | 0.9% |
| Organic constant currency change | 10.3% | 1.5% | 6.6% |

Note: Organic 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. Organic constant currency sales change is calculated by removing the percentage impact from acquisitions and currency translation effects from the overall percentage change in net sales.

Net sales for the Americas segment were \$704.8 million for the year ended December 31, 2015, an increase of \$41.1 million, or 6%, compared to \$663.7 million for the year ended December 31, 2014. Currency translation effects decreased Americas segment sales by 4%, reflecting weaker currencies in Latin America. In 2015, organic constant currency sales in the Americas segment increased 10% over the prior year on strong G1 self-contained breathing apparatus ("SCBA") sales across the segment. Strength in the fire service market was partially offset by decreased demand in the gas, petroleum, & chemical markets, reflecting decreased shipments of portable gas detection, industrial head protection, and fixed gas and flame detection.

Net sales for the International segment were \$426.0 million for the year ended December 31, 2015, a decrease of \$44.2 million, or 9%, compared to \$470.2 million for the year ended December 31, 2014. Currency translation effects decreased International segment net sales by 13%, reflecting weakened currencies across several International geographies, notably in Europe and Australia. Organic constant currency sales in the International segment provided 2% growth in 2015, driven by increased shipments of industrial head protection, portable gas detection, and fixed gas and flame detection in the Middle East and Europe, and higher fire helmets sales in Pacific Asia.

Gross profit. Gross profit for the year ended December 31, 2015 was \$501.1 million, a decrease of \$14.2 million, or 3%, from \$515.3 million for the year ended December 31, 2014. The ratio of gross profit to net sales was 44.3% for 2015 compared to 45.4% in 2014. The lower gross profit ratio in 2015 was primarily related to a less favorable product mix, increased indirect costs, and increased amortization related to the Latchways acquisition.

Selling, general and administrative expenses. Selling, general and administrative expenses were \$315.3 million for the year ended December 31, 2015, a decrease of \$7.5 million, or 2%, from \$322.8 million for the year ended December 31, 2014. Selling, general and administrative expenses were 27.9% of net sales in 2015 compared to 28.5% of net sales in 2014. Local currency selling, general and administrative expenses increased 6% in the current period, primarily reflecting Latchways acquisition related costs of \$7.5 million and Latchways operating selling, general and administrative costs of \$3.2 million. Please refer to the Selling, general and administrative expenses table for a reconciliation of the year over year expense change.

| Selling, general, and administrative expenses (Percent Change) | Year Ended |
|---|--|
| | December 31, 2015 versus December 31, 2014 Consolidated Continuing Operations |
| GAAP reported change | (2.3)% |
| Currency translation effects | (8.3)% |
| Constant currency change | 6.0% |
| Acquisitions and related strategic transaction costs | 3.4% |
| Organic constant currency change | 2.6% |

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 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 expenses. Research and development expense was \$48.6 million for the year ended December 31, 2015, increase of \$0.4 million, or 1%, compared to \$48.2 million for the year ended December 31, 2014. Research and development expenses were 4.3% of net sales in both 2015 and 2014, which is in line with our target ratio of 4.0% - 4.5% of net sales. The Company continues to focus on developing new and innovative technologies, closely aligned with our strategic goals.

Restructuring and other charges. During the year ended December 31, 2015, the Company recorded charges of \$12.3 million, an increase of \$3.8 million, or 45%, compared to charges of \$8.5 million for the year ended December 31, 2014. At December 31, 2015, the Company had accrued restructuring costs of \$8.1 million, primarily related to severance costs associated with our global cost reduction program.

Currency exchange. Currency exchange losses were \$2.2 million during the year ended December 31, 2015, compared to losses of \$1.5 million during the year ended December 31, 2014. Currency exchange losses in both periods were mostly unrealized and related primarily to the effect of the strengthening US dollar on inter-company balances. Refer to Note 17 to the Consolidated Financial Statements in Part I Item I of this Form 10-Q, for information regarding our currency exchange rate risk management strategy.

GAAP operating income. Consolidated operating income for the year ended December 31, 2015 was \$122.7 million, a decrease of \$11.6 million, or 9%, compared to \$134.3 million for the year ended December 31, 2014.

Adjusted operating income. Americas adjusted operating income for the year ended December 31, 2015 was \$142.0 million, an increase of \$7.2 million, or 5%, compared to \$134.8 million for the year ended December 31, 2014. The increase in Americas adjusted operating income reflects higher sales, notably in the fire sector, and controlled selling, general, and administrative spending.

International adjusted operating income for the year ended December 31, 2015 was \$33.5 million, a decrease of \$13.3 million, or 28%, compared to \$46.8 million for the year ended December 31, 2014. The decrease in International adjusted operating income reflects a lower level of sales, higher pension costs, and higher restructuring costs associated with initiatives to right-size our operations in accordance with our global cost reduction program.

Corporate segment adjusted operating loss for the year ended December 31, 2015 was \$38.3 million, an increase of \$0.9 million, or 2%, compared to an operating loss of \$37.4 million for the year ended December 31, 2014, reflecting higher costs associated with our acquisition and integration of Latchways as well as higher restructuring costs associated with our global cost reduction efforts.

The following table represents a reconciliation from GAAP operating income to adjusted operating income. Adjusted operating margin % is calculated as adjusted operating income divided by net sales.

| Adjusted operating income (In thousands) | Year Ended December 31, 2015 | | | Consolidated Continuing Operations |
|---|------------------------------|---------------|------------|--|
| | Americas | International | Corporate | |
| Net sales | \$704,754 | \$426,029 | \$— | \$1,130,783 |
| GAAP operating income | | | | 122,741 |
| Restructuring and other charges | | | | 12,258 |
| Currency exchange losses, net | | | | 2,204 |
| Adjusted operating income | \$141,971 | \$33,501 | \$(38,269) | \$137,203 |
| Adjusted operating margin % | 20.1% | 7.9% | | |

Note: Adjusted operating income is a non-GAAP financial measure used by the chief operating decision maker to evaluate segment performance and allocate resources. Adjusted operating income is reconciled above to the nearest GAAP financial measure, Operating income.

Total other expense, net. Other expense for the year ended December 31, 2015 was \$11.7 million, compared to \$7.1 million for the year ended December 31, 2014. The increase in other expense is primarily the result of the disposal of net assets which resulted in a net loss of \$0.9 million in 2015 versus a \$2.2 million gain in 2014. Refer to Note 15 of the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information.

Income taxes. Our effective tax rate from continuing operations for the year ended December 31, 2015 was 40.0% compared to 32.3% for the year ended December 31, 2014. The effective tax rate for December 31, 2015 included 6.9% associated with exit taxes related to our European reorganization. The remaining effective tax rate increase was primarily due to non-deductible losses in certain foreign jurisdictions.

Net income from continuing operations attributable to MSA Safety Incorporated. Net income from continuing operations was \$69.6 million for the year ended December 31, 2015, or \$1.84 per diluted share, a decrease of \$17.8 million, or 20%, compared to \$87.4 million, or \$2.30 per diluted share, for the year ended December 31, 2014 as a result of the factors described above.

Net income from discontinued operations attributable to MSA Safety Incorporated. Net income from discontinued operations was \$1.2 million for the year ended December 31, 2015, or \$0.03 per diluted share, compared to net income of \$1.1 million, or \$0.03 per diluted share, for the year ended December 31, 2014. Please refer to Note 20 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Non-GAAP Financial Information

We may provide information regarding organic constant currency changes, financial measures excluding the impact of acquisitions, and adjusted operating income, 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 GAAP measure, please refer to the reconciliations referenced above in Management's Discussion & Analysis section and in Note 7 to the consolidated financial statements in Part II Item 8 of this Form 10-K.

We also refer to certain financial measures 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, 2016, approximately 51% 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 2020. Approximately 80% of our borrowings are denominated in US dollars, which limits our exposure to currency exchange rate fluctuations.

At December 31, 2016, we had cash and cash equivalents totaling \$113.8 million, of which \$106.9 million was held by our foreign subsidiaries. The \$106.9 million of cash and cash equivalents are held by our foreign subsidiaries whose earnings are considered indefinitely reinvested at December 31, 2016. These funds could be subject to additional income taxes if repatriated. It is not practical to determine the potential income tax liability that we would incur if these funds were repatriated to the U.S. because the time and manner of repatriation is uncertain. We believe that domestic cash and cash equivalents, domestic cash flows from operations, annual repatriation of a portion of the current period's foreign earnings, and the availability of our domestic line of credit are sufficient to fund our domestic liquidity requirements. Cash and cash equivalents increased \$7.8 million during the year ended December 31, 2016, compared to an decrease of \$0.1 million during 2015 and an increase of \$9.7 million during 2014.

Our unsecured senior revolving credit facility provides for borrowings up to \$575.0 million through 2020 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 2.27% in 2016. At December 31, 2016, \$377.2 million of the \$575.0 million senior revolving credit facility was unused, including letters of credit.

The Company currently has access to approximately \$572.2 million of capital at December 31, 2016. 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 \$134.9 million in 2016, compared to providing cash of \$55.3 million in 2015. The increase in operating cash flow during 2016 was primarily attributable to higher net income and lower working capital driven by collections of accounts receivable and our ongoing focus on inventory management. Working capital as a percentage of sales improved by 400 bps to 21.7% in 2016 as compared to 25.7% in 2015. At December 31, 2016, working capital included trade receivables, inventory and accounts payable of \$1.1 million, \$3.3 million and \$0.9 million, respectively related to the acquisition of Senscient.

Operating activities provided cash of \$55.3 million in 2015, compared to providing cash of \$107.0 million in 2014. Lower operating cash flow in 2015 is primarily related to lower profitability in 2015 and changes in working capital. Trade receivables were \$232.9 million at December 31, 2015 compared to \$211.4 million at December 31, 2014, reflecting strong G1 SCBA sales results in the 2015 fourth quarter partially offset by a decrease due to currency translation effects. Inventories were \$125.8 million at December 31, 2015 increased \$2.8 million as compared to \$123.0 million at December 31, 2014 due to the acquisition of Latchways and continued demand planning for our G1 SCBA. Currency translation effects of \$16.4 million decreased inventories. Accounts payable were \$68.2 million at December 31, 2015 compared to \$70.2 million at December 31, 2014 primarily due to a decrease for currency translation effects. The December 31, 2015 trade receivables and inventory balances included Latchways trade receivables and inventory of \$11.8 million and \$9.1 million, respectively.

Investing activities. Investing activities used cash of \$25.8 million for the year ended December 31, 2016, compared to using \$208.5 million in 2015. The acquisition of Senscient drove cash outflows from investing activities during 2016 while the acquisition of Latchways drove cash outflows from investing activities during 2015. Capital expenditures were \$25.5 million in 2016 compared to \$36.2 million in 2015. Capital expenditures in 2015 included spending related to initiatives such as the G1 SCBA and our European reorganization. We plan to invest approximately \$30.0 million in capital expenditures in 2017.

Investing activities used cash of \$208.5 million for the year ended December 31, 2015, compared to using \$30.7 million in 2014. The increased use of cash for investing activities in 2015 was related to the acquisition of Latchways. Cash generated from property disposals was \$8.0 million in 2015 compared to \$3.4 million in 2014. The cash received from property disposals in 2015 include proceeds from the sale of property in Australia. Capital expenditures were \$36.2 million compared to \$33.6 million in 2014.

Financing activities. Financing activities used cash of \$97.8 million for the year ended December 31, 2016, compared to providing cash of \$164.9 million in 2015. During 2016, we had net payments on debt of \$60.9 million. This compared to net proceeds from borrowings of \$218.9 million in the same period in 2015 primarily related to the financing of the Latchways acquisition.

We made dividend payments of \$49.1 million during 2016, compared to \$47.4 million during 2015. Dividends paid on our common stock during 2016 were \$1.31 per share. Dividends paid on our common stock in 2015 and 2014 were \$1.27 and \$1.23 per share, respectively.

Restricted cash balances were \$1.2 million at December 31, 2016 compared to \$2.4 million at December 31, 2015 and were primarily used to support letter of credit balances.

During 2015, the MSA Board of Directors authorized the Company to repurchase up to \$100.0 million in shares of MSA common stock and we executed share repurchases of \$7.1 million. There were no share repurchases in 2016. 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.

Financing activities provided cash of \$164.9 million for the year ended December 31, 2015, compared to using cash of \$58.1 million in 2014. The change was primarily related to borrowings made to finance the acquisition of Latchways in 2015.

CUMULATIVE TRANSLATION ADJUSTMENTS

The year-end position of the U.S. dollar relative to international currencies resulted in a translation loss of \$25.9 million being recorded to cumulative translation adjustments for the year ended December 31, 2016. This compares to losses of \$47.7 million in 2015 and \$40.0 million in 2014. The translation loss in 2016 was primarily related to the strengthening of the U.S. dollar against the British pound, Mexican peso, Argentine peso, euro, and Brazilian real. The translation loss in 2015 was primarily related to the strengthening of the U.S. dollar against the euro, British pound, Brazilian real, and South African rand. The translation loss in 2014 was primarily related to the weakening of the euro, Mexican peso, Argentine peso, and the South African rand.

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, 2016 are as follows:

| (In millions) | Total | 2017 | 2018 | 2019 | 2020 | 2021 | Thereafter |
|------------------|----------|---------|---------|---------|----------|---------|------------|
| Long-term debt | \$ 392.3 | \$ 26.7 | \$ 26.7 | \$ 26.7 | \$ 217.7 | \$ 26.7 | \$ 67.8 |
| Operating leases | 50.2 | 12.2 | 11.0 | 10.6 | 5.2 | 4.2 | 7.0 |
| Totals | 442.5 | 38.9 | 37.7 | 37.3 | 222.9 | 30.9 | 74.8 |

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 2017, 2018 and 2019 debt service obligations through cash provided by operations. Approximately \$191.0 million of debt payable in 2020 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 2020, 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 \$8.1 million in 2017, \$6.9 million in 2018, \$5.8 million in 2019, \$4.6 million in 2020, and \$3.6 million in 2021.

The Company had outstanding bank guarantees and standby letters of credit with banks as of December 31, 2016 totaling \$13.1 million, of which \$6.9 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, 2016. The Company is also required to provide cash collateral in connection with certain arrangements. At December 31, 2016, the Company has \$1.2 million of restricted cash in support of these arrangements.

We expect to make net contributions of \$5.9 million to our pension plans in 2017 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 Contingencies 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 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.

Accounting for contingencies. We accrue for contingencies when we believe that it is probable that a liability or loss has been incurred and the amount can be reasonably estimated. Contingencies relate to uncertainties that require our judgment both in assessing whether or not a liability or loss has been incurred and in estimating the amount of the probable loss. Significant contingencies affecting our consolidated financial statements include pending or threatened litigation, including product liability claims and product warranties.

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. The Company categorizes the product liability losses of its subsidiary MSA LLC into two main categories: single incident and cumulative trauma.

Single incident claims. Single incident product liability claims involve incidents of short duration that are typically known to us when they occur and involve observable injuries, which provide an objective basis for quantifying damages. MSA LLC estimates its liability for single incident product liability claims based on expected settlement costs for reported claims and an estimate of costs for unreported claims (claims incurred but not reported or 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 reported and IBNR claims, was \$3.4 million at December 31, 2016 and \$3.5 million at December 31, 2015. Single incident product liability expense during the year ended December 31, 2016 was \$0.8 million and was \$0.9 million for the year ended December 31, 2015. 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 claims. Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred many 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 is presently named as a defendant in 1,794 lawsuits comprised of 3,023 claims. 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. Although there is year over year variability in the number and quality of claims defended and resolved, MSA LLC's aggregate spend for cumulative trauma product liability claims (inclusive of settlements and defense costs) for the three years ended December 31, 2016, totaled approximately \$150.9 million, substantially all of which was recorded as insurance receivables because the amounts are believed to be recoverable under insurance.

More than half of the open lawsuits at December 31, 2016 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.

Management works with its outside valuation consultant and outside legal counsel to review its cumulative trauma product liability exposure on an annual basis, or more frequently if changing circumstances or developments in existing cases make an interim review appropriate. The review process takes into account the number and composition of pending claims, outcomes of matters resolved during current and prior periods, and variances associated with different plaintiffs' counsel and venues, as well as other information known about the current docket.

Cumulative trauma product liability litigation is inherently unpredictable. Factors that can limit our ability to estimate potential liability include the lack of claims experience with applicable plaintiffs' counsel, as claims experience can vary significantly among different counsel, low volume of resolution, lack of confidence with the consistency of claims composition, or other factors. With respect to the risk associated with any particular case, it has typically not been until very late in the legal process that it can be reasonably determined whether it is probable that any such case will ultimately result in a liability. This uncertainty is caused by many factors, including consideration of the applicable statute of limitations, the sufficiency of product

identification and other defenses. Complaints generally do not provide information sufficient to determine if a lawsuit will develop into an actively litigated case. Even when a case is actively litigated, it is often difficult to determine if the lawsuit will be dismissed or otherwise resolved until late in the lawsuit. Moreover, even if it is probable that such a lawsuit will result in a loss, it is often difficult to estimate the amount of actual loss that will be incurred. These actual loss amounts are highly variable and turn on a case by case analysis of the relevant facts, including the nature of the injury, the jurisdiction in which the claim is filed, the plaintiffs' counsel and the number of parties in the lawsuit. In addition, there are uncertainties concerning the impact of bankruptcies of other companies that are co-defendants in claims, uncertainties surrounding the litigation process from jurisdiction to jurisdiction and case to case. Consequently, MSA LLC is unable to comprehensively estimate its cumulative trauma product liability exposure.

Currently, management, in consultation with its outside valuation consultant and outside legal counsel, has been unable to estimate, and therefore has not recorded any liability, for MSA LLC's incurred but not reported claims ("IBNR claims") as well as for certain of its existing coal dust claims, including those coal dust claims that arose subsequent to the Couch verdict. (Please refer to Note 19 Contingencies of the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further details on the Couch verdict.)

MSA LLC recorded a liability of \$7.5 million and \$7.1 million as of December 31, 2016 and 2015, respectively, pertaining to certain reported claims where MSA LLC's claims experience allowed it to make an estimate of potential liability. To arrive at the estimate, it was necessary to employ significant assumptions. The reserve does not include amounts which will be spent to defend the claims covered by the reserve. These costs are recognized as incurred.

As noted above, the liability recorded does not take into account any IBNR claims and certain of the currently pending coal dust claims against MSA LLC. These claims have not been included in the reserve due to a lack of claims experience with the applicable plaintiffs' counsel, low volume of resolution, or lack of confidence in the consistency of claims composition, or other factors, which have rendered us unable to reasonably assess the probability and estimate the magnitude of potential losses.

Because litigation is subject to inherent uncertainties, 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 with respect to claims included within the existing reserve or related to claims not included in the reserve. We will adjust the reserve for our liability relating to cumulative trauma claims from time to time based on the maturation of claims, developing facts and circumstances, and if actual experience is worse than previously projected. These adjustments may reflect changes in estimates for claims currently covered by the reserve, as well as estimated liabilities for claims not presently covered by the reserve and IBNR claims, in the event we become able to reasonably assess the probability and estimate the magnitude of potential losses. These adjustments may be material and could increase the year over year variability of our financial results.

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 had valuation allowances of \$5.3 million and \$5.2 million at December 31, 2016 and 2015, respectively.

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.

No deferred U.S. income taxes have been provided on undistributed earnings of non-U.S. subsidiaries, which amounted to \$422.3 million as of December 31, 2016. These earnings are considered to be reinvested for an indefinite period of time. Because we currently do not have any plans to repatriate these funds, we cannot determine the impact of local taxes, withholding taxes and foreign tax credits associated with the future repatriation of such earnings and, therefore, cannot reasonably estimate the associated tax liability. In cases where we intend to repatriate a portion of the undistributed earnings of our foreign subsidiaries, we provide U.S. income taxes on such earnings.

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 are based on published long-term bond indices or a company-specific yield curve model. Expected returns on plan assets are based on our historical returns by asset class.

Please refer to Note 14 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further details on the funded status of our pension and post-retirement benefit plans.

The following table summarizes the impact of changes in significant actuarial assumptions on our December 31, 2016 actuarial valuations.

| (In thousands) | Impact of Changes in Actuarial Assumptions | | | | | |
|---|--|----------|---------------------------|----------|----------------------------------|----------|
| | Change in Discount Rate | | Change in Expected Return | | Change in Market Value of Assets | |
| | 1% | (1)% | 1% | (1)% | 5% | (5)% |
| (Decrease) increase in net benefit cost | \$ (5,906) | \$ 7,189 | \$ (4,336) | \$ 4,340 | \$ (936) | \$ 901 |
| (Decrease) increase in projected benefit obligation | (65,405) | 78,832 | — | — | — | — |
| Increase (decrease) in funded status | 65,405 | (78,832) | — | — | 21,663 | (21,663) |

Stock Compensation. We sponsor both a Management and a Non-Employee Directors' Equity Incentive plan which provide for grants of stock options, restricted stock and other equity-based vehicles such as restricted stock units and performance stock units; all of which are recognized as compensation expense based on grant date fair value. Stock options are valued using the Black-Scholes option pricing model. Performance stock units that have a market condition are valued on the grant date using a Monte Carlo simulation valuation model. We believe these valuation models are appropriate for use based and are consistent with models used by our peer companies. Please refer to Note 10 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further details on the assumptions used in these valuation models.

Revenue Recognition. Revenue from the sale of products is recognized when title, ownership and the risk of loss have transferred 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. We make appropriate provisions for uncollectible accounts receivable and product returns, both of which have historically been insignificant in relation to our net sales. Certain distributor customers receive price rebates based on their level of purchases and other performance criteria that are documented in established distributor programs. These rebates are accrued as a reduction of net sales as they are earned by the customer.

Goodwill. In the fourth quarter 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 2016, we elected to bypass the qualitative evaluation for all of our reporting units and performed a two-step quantitative test at October 1, 2016. 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 estimated fair value of a reporting unit per the weighted average of the DCF and market approach models is less than the carrying value, additional analysis would be required. The additional analysis would compare the carrying amount of the reporting unit's goodwill with the implied fair value of that goodwill, which may involve the use of valuation experts. The implied fair value of goodwill is the excess of the fair value of the reporting unit over the fair value amounts assigned to all of the assets and liabilities of that unit as if the reporting unit had been acquired in a business combination and the fair value of the reporting unit represented the purchase price. If the carrying value of goodwill exceeds its implied fair value, an impairment loss equal to such excess would be recognized, which could significantly and adversely impact reported consolidated results of operations and shareholders' equity. At October 1, 2016, based on our quantitative test, the fair values of all of our reporting units exceeded their carrying value by at least 40%.

Foreign currency. 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 which have the impact of partially offsetting certain foreign currency exposures. We account for these forward contracts on a full mark-to-market basis and report the related gains or losses in currency exchange losses (gains) in the consolidated statement of income. Please refer to Note 17 to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further details on our current positions.

RECENTLY ADOPTED AND RECENTLY ISSUED ACCOUNTING STANDARDS

In April 2014, the FASB issued ASU 2014-08, *Reporting Discontinued Operations and Disclosures of Disposals of an Entity*. This ASU amends the definition of a discontinued operation to include a disposal of a component or group of components that is disposed of or is classified as held for sale and represents a strategic shift that has (or will have) a major effect on an entity's operations and financial results. This ASU was adopted on January 1, 2015. The adoption of this ASU may have a material effect on our consolidated financial statements in the event that we were to divest of a component that meets the definition of discontinued operations.

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. This ASU is required to be adopted beginning January 1, 2018. Our revenue streams include agreements with distributors, agreements with end users and agreements with governmental entities. The Company continues to evaluate the impact that the adoption of this ASU will have on the consolidated financial statements, including the timing of revenue recognition associated with certain customized products. We have conducted a risk assessment and have worked with outside consultants to develop a transition plan that will enable us to meet the implementation requirement. We are currently in the process of reviewing and analyzing contracts. We anticipate using the modified retrospective method of adoption and having enhanced disclosures surrounding revenue recognition.

In June 2014, the FASB issued ASU 2014-12, *Accounting for Share-Based Payments When the Terms of an Award Provide That a Performance Target Could be Achieved after the Requisite Service Period*. This ASU clarifies the accounting treatment for share based payment awards that contain performance targets. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In August 2014, the FASB issued ASU 2014-15, *Presentation of Financial Statements - Going Concern*. This ASU clarifies management's responsibility to evaluate whether there is a substantial doubt about the entity's ability to continue as a going concern and provides guidance for related footnote disclosures. This ASU is effective for the annual period ending December 31, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In January 2015, the FASB issued ASU 2015-01, *Income Statement - Extraordinary and Unusual Items*. This ASU eliminates the requirement to separately present and disclose extraordinary and unusual items in the financial statements. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In February 2015, the FASB issued ASU 2015-02, *Amendments to the Consolidation Analysis*. This ASU changes the analysis that an entity must perform to determine whether it should consolidate certain types of legal entities. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In April 2015, the FASB issued ASU 2015-03, *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs*. This ASU simplifies the presentation of debt issuance costs and requires that debt issuance costs related to a recognized debt liability be presented in the balance sheet as a direct deduction from the carrying amount of that debt liability. In August 2015, the FASB issued ASU 2015-15, *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs*. This ASU simplifies the presentation of debt issuance costs for line of credit arrangements. These ASUs were adopted on January 1, 2016. The Consolidated Balance Sheet as of December 31, 2015 has been adjusted to apply the change in accounting principle retrospectively, which resulted in a decrease in Prepaid expenses and other current assets of \$0.4 million, a decrease in Other noncurrent assets of \$1.5 million, a decrease in the current portion of long-term debt, net of \$17 thousand, and a decrease in long-term debt of \$1.9 million as of December 31, 2015. There was no impact to the Statements of Consolidated Income as a result of the change in accounting principle. Prior year balances in Note 11 were also adjusted to conform with current year presentation.

In April 2015, the FASB issued ASU 2015-04, *Retirement Benefits - Practical Expedient for the Measurement Date of an Employer's Defined Benefit Obligation and Plan Assets*. This ASU allows entities with a fiscal year end that does not coincide with a month end to use the closest month end for measurement purposes. This ASU also allows entities that have a significant event in an interim period that calls for a remeasurement of defined benefit plan assets and obligations to use the month end date that is closest to the date of the significant event. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In April 2015, the FASB issued ASU 2015-05, *Goodwill and Other Internal Use Software - Customer's Accounting for Fees Paid in a Cloud Computing Arrangement*. This ASU clarifies when entities should account for fees paid in a cloud computing arrangement as a software license or service contract. This ASU was adopted on January 1, 2016 and was implemented on a prospective basis. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-11, *Simplifying the Measurement of Inventory*. This ASU requires inventory to be measured at the lower of cost and net realizable value. This ASU applies to inventory measured using the first-in, first-out (FIFO) or average cost methods only. This ASU will be effective beginning in 2017. The adoption of this ASU is not expected to have a material effect on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-12, *Plan Accounting: Defined Benefit Pension Plans (Topic 960), Defined Contribution Pension Plans (Topic 962), Health and Welfare Benefit Plans (Topic 965)*. This ASU simplifies complexities within employee benefit plan accounting including Fully Benefit-Responsive Investment Contracts, Plan Investment Disclosures, and the Measurement Date Practical Expedient. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In September 2015, the FASB issued ASU 2015-16, *Simplifying the Accounting for Measurement-Period Adjustments*. This ASU simplifies the accounting for adjustments made to provisional amounts recognized in a business combination. The amendments in this Update eliminate the requirement to retrospectively account for those adjustments. MSA elected to early adopt this standard for the period ended December 31, 2015. The adoption of this ASU could have a material effect on our consolidated financial statements to the extent that measurement-period adjustments for business combinations are identified.

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 will be effective beginning in 2019. The Company continues to evaluate the impact that the adoption of this ASU will have on the consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09, *Improvements to Employee Share-Based Payment Accounting*. This ASU simplifies the accounting for many aspects associated with share-based payment accounting including income taxes and the use of forfeiture rates. This ASU will be effective beginning in 2017. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, *Allowance for Loan and Lease 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. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements and expects that adoption will result in increased disclosure.

In August 2016, the FASB issued ASU 2016-15, *Classification of Certain Cash Payments and Cash Receipts*. This ASU clarifies how certain cash receipts and cash payments are presented and classified in the statement of cash flows. This ASU will be effective beginning in 2018. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16, *Intra-entity Transfers of Assets Other than Inventory*. This ASU states that an entity should recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. This ASU is effective beginning in 2018 to be adopted on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings and early adoption is permitted. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In November 2016, the FASB issued ASU 2016-18, *Restricted Cash*. This ASU requires that amounts generally described as restricted cash and restricted cash equivalents are included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. This ASU is effective beginning in 2018 to be adopted on a retrospective basis and early adoption is permitted. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In January 2017, the FASB issued ASU 2017-01, *Business Combinations - Clarifying the Definition of a Business*. This ASU provides further guidance for identifying whether a set of assets and activities is a business by providing a screen outlining that when substantially all of the fair value of the gross assets acquired (or disposed of) is concentrated in a single identifiable asset or a group of similar identifiable assets, the set is not a business. This ASU is effective beginning in 2018 and will be applied prospectively. The adoption of this ASU may have a material effect on our consolidated financial statements in the event that we have an acquisition or disposal that falls within this screen.

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. This ASU is effective beginning in 2019 for public entities and early adoption is permitted for interim or annual goodwill impairment tests performed after January 1, 2017. The adoption of 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.

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, 2016 by approximately \$53.5 million and \$6.1 million, or 4.7% and 6.6%, 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, 2016, we had open foreign currency forward contracts with a U.S. dollar notional value of \$75.3 million. A hypothetical 10% increase in December 31, 2016 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, 2016, we had \$201.2 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 \$14.4 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, 2016, we had \$191.0 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 of December 31, 2016. 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, 2016.

Management has excluded Senscient, Inc. (Senscient) from its assessment of internal controls over financial reporting as of December 31, 2016 because the Company acquired Senscient effective September 19, 2016 (Acquisition Date), whose total assets represents 3%, and net loss represents 1%, and whose customer revenues represents less than 0.5% of the related consolidated financial statement amounts as of December 31, 2016 and from the period from the acquisition date through December 31, 2016.

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/ WILLIAM M. LAMBERT

William M. Lambert
Chief Executive Officer

/s/ KENNETH D. KRAUSE

Kenneth D. Krause
Vice President of Finance and Chief Financial Officer

February 28, 2017

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders of MSA Safety Incorporated:

We have audited MSA Safety Incorporated's internal control over financial reporting as of December 31, 2016, 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). MSA Safety Incorporated'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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). 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.

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.

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 Senscient, Inc., which is included in the 2016 consolidated financial statements of MSA Safety Incorporated and constituted 3% and 6% of total and net assets, respectively, as of December 31, 2016, and less than 1% of revenues and net income, respectively, for the year then ended. Our audit of internal control over financial reporting of MSA Safety Incorporated also did not include an evaluation of the internal control over financial reporting of Senscient, Inc.

In our opinion, MSA Safety Incorporated maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of MSA Safety Incorporated as of December 31, 2016 and 2015, and the related consolidated statements of income, comprehensive income, cash flows, changes in retained earnings and accumulated other comprehensive loss for each of the two years in the period ended December 31, 2016 of MSA Safety Incorporated and our report dated February 28, 2017, expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Pittsburgh, Pennsylvania
February 28, 2017

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders of MSA Safety Incorporated:

We have audited the accompanying consolidated balance sheets of MSA Safety Incorporated as of December 31, 2016 and 2015, and the related consolidated statements of income, comprehensive income, cash flows, and changes in retained earnings and accumulated other comprehensive loss for each of the two years in the period ended December 31, 2016. Our audit also included the financial statement schedule listed in the Index at Item 15(a). These financial statements and schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and schedule based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of MSA Safety Incorporated at December 31, 2016 and 2015, and the consolidated results of its operations and its cash flows for each of the two years in the period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles. Also, in our opinion, the related financial statement schedule, when considered in relation to the basic financial statements taken as a whole, presents fairly in all material respects the information set forth therein.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), MSA Safety Incorporated's internal control over financial reporting as of December 31, 2016, 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 28, 2017 expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Pittsburgh, Pennsylvania
February 28, 2017

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of MSA Safety Incorporated

In our opinion, the consolidated statements of income, of comprehensive income, of changes in retained earnings and accumulated other comprehensive loss and of cash flows for the year ended December 31, 2014 present fairly, in all material respects, the results of operations and cash flows of MSA Safety Incorporated and its subsidiaries for the year ended December 31, 2014, in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statement schedule for the year ended December 31, 2014 listed in the index appearing under Item 15(a)(2) presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. These financial statements and financial statement schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and financial statement schedule based on our audit. We conducted our audit of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

Pittsburgh, Pennsylvania

February 25, 2015, except for the change in the composition of reportable segments discussed in Note 7 to the consolidated financial statements and the summary of cumulative trauma product liability pending claims activity discussed in Note 19 to the consolidated financial statements, as to which the date is February 28, 2017

MSA SAFETY INCORPORATED
CONSOLIDATED STATEMENT OF INCOME

| (In thousands, except per share amounts) | Year ended December 31, | | |
|--|-------------------------|--------------|--------------|
| | 2016 | 2015 | 2014 |
| Net sales | \$ 1,149,530 | \$ 1,130,783 | \$ 1,133,885 |
| Cost of products sold | 625,887 | 629,680 | 618,536 |
| Gross profit | 523,643 | 501,103 | 515,349 |
| Selling, general and administrative | 306,144 | 315,270 | 322,797 |
| Research and development | 46,847 | 48,630 | 48,247 |
| Restructuring charges (Note 2) | 5,694 | 12,258 | 8,515 |
| Currency exchange losses, net | 766 | 2,204 | 1,509 |
| Operating income | 164,192 | 122,741 | 134,281 |
| Interest expense | 16,411 | 10,854 | 9,851 |
| Other (income) loss, net (Note 15) | (4,130) | 861 | (2,765) |
| Total other expense, net | 12,281 | 11,715 | 7,086 |
| Income from continuing operations before income taxes | 151,911 | 111,026 | 127,195 |
| Provision for income taxes (Note 9) | 57,804 | 44,407 | 41,044 |
| Income from continuing operations | 94,107 | 66,619 | 86,151 |
| (Loss) income from discontinued operations (Note 20) | (245) | 1,325 | 1,776 |
| Net income | 93,862 | 67,944 | 87,927 |
| Net (income) loss attributable to noncontrolling interests | \$ (1,926) | \$ 2,863 | \$ 579 |
| Net income attributable to MSA Safety Incorporated | \$ 91,936 | \$ 70,807 | \$ 88,506 |
| Amounts attributable to MSA Safety Incorporated common shareholders: | | | |
| Income from continuing operations | 92,691 | 69,590 | 87,447 |
| (Loss) income from discontinued operations (Note 20) | (755) | 1,217 | 1,059 |
| Net income | \$ 91,936 | \$ 70,807 | \$ 88,506 |
| Earnings per share attributable to MSA Safety Incorporated common shareholders: | | | |
| Basic | | | |
| Income from continuing operations | \$ 2.47 | \$ 1.86 | \$ 2.34 |
| (Loss) income from discontinued operations (Note 20) | \$ (0.02) | \$ 0.03 | \$ 0.03 |
| Net income | \$ 2.45 | \$ 1.89 | \$ 2.37 |
| Diluted | | | |
| Income from continuing operations | \$ 2.44 | \$ 1.84 | \$ 2.30 |
| (Loss) income from discontinued operations (Note 20) | \$ (0.02) | \$ 0.03 | \$ 0.03 |
| Net income | \$ 2.42 | \$ 1.87 | \$ 2.33 |
| Dividends per common share | \$ 1.31 | \$ 1.27 | \$ 1.23 |

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

MSA SAFETY INCORPORATED
CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

| (In thousands) | Year ended December 31, | | |
|---|-------------------------|-----------|-----------|
| | 2016 | 2015 | 2014 |
| Net income | \$ 93,862 | \$ 67,944 | \$ 87,927 |
| Other comprehensive income (loss), net of tax: | | | |
| Foreign currency translation adjustments (Note 5) | (24,986) | (49,067) | (40,568) |
| Pension and post-retirement plan actuarial gains (losses), net of tax (Note 5) | 1,321 | 6,181 | (48,490) |
| Reclassification from accumulated other comprehensive (loss) into net income (Note 5) | 3,270 | — | — |
| Total other comprehensive loss, net of tax | (20,395) | (42,886) | (89,058) |
| Comprehensive income (loss) | 73,467 | 25,058 | (1,131) |
| Comprehensive (income) loss attributable to noncontrolling interests | (3,578) | 4,280 | 1,176 |
| Comprehensive income attributable to MSA Safety Incorporated | \$ 69,889 | \$ 29,338 | \$ 45 |

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

MSA SAFETY INCORPORATED
CONSOLIDATED BALANCE SHEET

| (In thousands, except share amounts) | December 31, | |
|--|--------------|--------------|
| | 2016 | 2015 |
| Assets | | |
| Cash and cash equivalents | \$ 113,759 | \$ 105,925 |
| Trade receivables, less allowance for doubtful accounts of \$5,610 and \$8,189 | 209,514 | 232,862 |
| Inventories (Note 3) | 103,066 | 125,849 |
| Prepaid income taxes | 16,378 | 8,745 |
| Notes receivable, insurance companies (Note 19) | 4,180 | 6,746 |
| Prepaid expenses and other current assets | 25,909 | 24,485 |
| Total current assets | 472,806 | 504,612 |
| Property, plant, and equipment, net (Note 4) | 148,678 | 155,839 |
| Prepaid pension cost (Note 14) | 62,916 | 62,072 |
| Deferred tax assets (Note 9) | 23,240 | 26,455 |
| Goodwill (Note 12) | 333,276 | 340,338 |
| Intangible assets, net (Note 12) | 77,015 | 90,068 |
| Notes receivable, insurance companies, noncurrent (Note 19) | 63,147 | 1,944 |
| Insurance receivable (Note 19) and other noncurrent assets | 172,842 | 241,535 |
| Total assets | \$ 1,353,920 | \$ 1,422,863 |
| Liabilities | | |
| Notes payable and current portion of long-term debt (Note 11) | \$ 26,666 | \$ 6,650 |
| Accounts payable | 62,734 | 68,206 |
| Employees' compensation | 39,880 | 37,642 |
| Insurance and product liability (Note 19) | 19,438 | 57,718 |
| Taxes on income (Note 9) | 3,889 | 11,658 |
| Other current liabilities | 68,803 | 70,013 |
| Total current liabilities | 221,410 | 251,887 |
| Long-term debt, net (Note 11) | 363,836 | 458,022 |
| Pensions and other employee benefits (Note 14) | 157,927 | 156,160 |
| Deferred tax liabilities (Note 9) | 34,044 | 24,872 |
| Other noncurrent liabilities (Note 19) | 15,491 | 14,794 |
| Total liabilities | \$ 792,708 | \$ 905,735 |
| 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; 37,736,578 and 37,372,474 shares outstanding at December 31, 2016 and 2015, respectively) | 172,681 | 157,643 |
| Treasury shares, at cost (Note 6) | (289,254) | (295,070) |
| Accumulated other comprehensive loss | (230,246) | (208,199) |
| Retained earnings | 901,415 | 858,553 |
| Total MSA Safety Incorporated shareholders' equity | 558,165 | 516,496 |
| Noncontrolling interests | 3,047 | 632 |
| Total shareholders' equity | 561,212 | 517,128 |
| Total liabilities and shareholders' equity | \$ 1,353,920 | \$ 1,422,863 |

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

MSA SAFETY INCORPORATED
CONSOLIDATED STATEMENT OF CASH FLOWS

| (In thousands) | Year ended December 31, | | |
|--|-------------------------|-------------------|-------------------|
| | 2016 | 2015 | 2014 |
| Operating Activities | | | |
| Net income | \$ 93,862 | \$ 67,944 | \$ 87,927 |
| Depreciation and amortization | 35,273 | 31,684 | 29,921 |
| Pension expense (Note 14) | 6,332 | 11,955 | 4,836 |
| Gain on asset dispositions, net | (1,453) | (1,745) | (2,094) |
| Stock-based compensation (Note 10) | 9,211 | 7,599 | 9,053 |
| Asset Impairment Charges (Note 15) | — | 4,946 | — |
| Deferred income tax provision (Note 9) | 14,393 | (1,699) | (5,388) |
| Other noncurrent assets and liabilities | 12,546 | (41,801) | (49,405) |
| Currency exchange losses, net | 785 | 2,471 | 1,393 |
| Excess tax benefit related to stock plans (Note 6) | (478) | (596) | (2,573) |
| Pension contributions (Note 14) | (3,878) | (4,058) | (4,077) |
| Other, net | — | (2,786) | (5,168) |
| Operating cash flow before changes in certain working capital items | 166,593 | 73,914 | 64,425 |
| Change in trade receivables | 13,239 | (21,959) | (23,480) |
| Change in inventories | 14,394 | (9,403) | (600) |
| Change in accounts payable and accrued liabilities | (46,479) | 20,286 | 56,988 |
| Change in income taxes receivable, prepaid expenses and other current assets | (12,853) | (7,584) | 9,698 |
| Changes in certain working capital items | (31,699) | (18,660) | 42,606 |
| Cash Flow From Operating Activities | 134,894 | 55,254 | 107,031 |
| Investing Activities | | | |
| Capital expenditures | (25,523) | (36,241) | (33,583) |
| Property disposals | 18,214 | 8,022 | 3,385 |
| Acquisition, net of cash acquired (Note 13) | (18,449) | (180,271) | — |
| Other investing | — | — | (500) |
| Cash Flow (Used In) Investing Activities | (25,758) | (208,490) | (30,698) |
| Financing Activities | | | |
| Proceeds from (payments on) short-term debt, net (Note 11) | — | 5 | (796) |
| Payments on long-term debt (Note 11) | (443,572) | (291,525) | (421,667) |
| Proceeds from long-term debt (Note 11) | 382,664 | 510,456 | 406,000 |
| Restricted cash | 1,505 | 264 | 86 |
| Cash dividends paid | (49,074) | (47,380) | (45,586) |
| Distributions to noncontrolling interests | (1,008) | — | — |
| Company stock purchases (Note 6) | (1,881) | (9,885) | (5,654) |
| Exercise of stock options (Note 6) | 12,476 | 1,930 | 6,926 |
| Employee stock purchase plan (Note 6) | 571 | 488 | — |
| Excess tax benefit related to stock plans (Note 6) | 478 | 596 | 2,573 |
| Cash Flow (Used In) From Financing Activities | (97,841) | 164,949 | (58,118) |
| Effect of exchange rate changes on cash and cash equivalents | (3,461) | (11,786) | (8,482) |
| Increase (decrease) in cash and cash equivalents | 7,834 | (73) | 9,733 |
| Beginning cash and cash equivalents | 105,925 | 105,998 | 96,265 |
| Ending cash and cash equivalents | \$ 113,759 | \$ 105,925 | \$ 105,998 |
| Supplemental cash flow information: | | | |
| Interest payments | \$ 15,861 | \$ 10,818 | \$ 9,663 |
| Income tax payments | 57,551 | 50,001 | 31,679 |

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

MSA SAFETY INCORPORATED
CONSOLIDATED STATEMENT OF CHANGES IN RETAINED EARNINGS AND
ACCUMULATED OTHER COMPREHENSIVE LOSS

| (In thousands) | Retained Earnings | Accumulated Other Comprehensive (Loss) |
|--|----------------------|---|
| Balances January 1, 2014 | \$ 792,206 | \$ (78,269) |
| Net income | 87,927 | — |
| Foreign currency translation adjustments | — | (40,568) |
| Pension and post-retirement plan adjustments, net of tax of \$26,840 | — | (48,490) |
| Loss attributable to noncontrolling interests | 579 | 597 |
| Common dividends | (45,544) | — |
| Preferred dividends | (42) | — |
| Balances December 31, 2014 | 835,126 | (166,730) |
| Net income | 67,944 | — |
| Foreign currency translation adjustments | — | (49,067) |
| Pension and post-retirement plan adjustments, net of tax of \$1,160 | — | 6,181 |
| Loss attributable to noncontrolling interests | 2,863 | 1,417 |
| Common dividends | (47,338) | — |
| Preferred dividends | (42) | — |
| Balances December 31, 2015 | 858,553 | (208,199) |
| Net income | 93,862 | — |
| Foreign currency translation adjustments | — | (24,986) |
| Pension and post-retirement plan adjustments, net of tax of \$1,146 | — | 1,321 |
| Reclassification from accumulated other comprehensive (loss) into net income | — | 3,270 |
| Gain attributable to noncontrolling interests | (1,926) | (1,652) |
| Common dividends | (49,032) | — |
| Preferred dividends | (42) | — |
| Balances December 31, 2016 | \$ 901,415 | \$ (230,246) |

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.

Certain segment results in previously issued consolidated financial statements were recast to conform to the current period presentation. Refer to Note 7 for further information regarding MSA's segment allocation methodology.

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.

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 \$1.2 million and \$2.4 million at December 31, 2016 and December 31, 2015, respectively. These balances were used to support letter of credit balances.

Inventories—Inventories are stated at the lower of cost or market. The majority of U.S. inventories are valued on the last-in, first-out (LIFO) cost method. Other inventories are valued on the average cost method or at standard costs which approximate actual costs. It is the Company's general policy to write-down any inventory that is identified as obsolete and any inventory that has aged or has not moved in more than twenty-four months.

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, 2016, 2015 and 2014 was \$27.0 million, \$26.9 million and \$26.2 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.

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 or whenever circumstances change such that the recorded value of the asset may not be recoverable. Goodwill is not amortized, but is subject to impairment assessments. In the fourth quarter 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 2016, we elected to bypass the qualitative evaluation for all of our reporting units and performed a two-step quantitative test at October 1, 2016. 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 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 estimated fair value of a reporting unit per the weighted average of the DCF and market approach models is less than the carrying value, Step 2 of the analysis would be required. The additional analysis would compare the carrying amount of the reporting unit's goodwill with the implied fair value of that goodwill, which may involve the use of valuation specialist. The implied fair value of goodwill is the excess of the fair value of the reporting unit over the fair value amounts assigned to all of the assets and liabilities of that unit as if the reporting unit had been acquired in a business combination and the fair value of the reporting unit represented the purchase price. If the carrying value of goodwill exceeds its implied fair value, an impairment loss equal to such excess would be recognized, which could significantly and adversely impact reported consolidated results of operations and shareholders' equity. There has been no impairment of our goodwill as of December 31, 2016, 2015 or 2014.

Revenue Recognition—Revenue from the sale of products is recognized when title, ownership and the risk of loss have transferred 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. We make appropriate provisions for uncollectible accounts receivable and product returns, both of which have historically been insignificant in relation to our net sales. Certain distributor customers receive price rebates based on their level of purchases and other performance criteria that are documented in established distributor programs. These rebates are accrued as a reduction of net sales as they are earned by the customer.

Shipping and Handling—Shipping and handling expenses for products sold to customers are charged to cost of products sold as incurred. 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 provided 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. No provision is made for possible U.S. taxes on the undistributed earnings of foreign subsidiaries that are considered to be reinvested indefinitely.

Stock-Based Compensation—We account for stock-based compensation in accordance with the FASB guidance on share-based payment, which requires that 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 statements of income as currency exchange (income) loss in the current period.

Commitments and Contingencies—For asserted claims and assessments, liabilities are recorded when an unfavorable outcome of a matter is deemed to be probable and the loss is reasonably estimable. Management determines the likelihood of an unfavorable outcome 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 deemed probable, management weighs the probability of estimated losses, and the most reasonable loss estimate is recorded. If an unfavorable outcome of a matter is deemed to be reasonably possible, then the matter is disclosed and no liability is recorded. With respect to unasserted claims or assessments, management must first determine that the probability that an assertion will be made is likely, then, a determination as to the likelihood of an unfavorable outcome and the ability to reasonably estimate the potential loss is made. Legal matters are reviewed on a continuous basis to determine if there has been a change in management's judgment regarding the likelihood of an unfavorable outcome or the estimate of a potential loss. Please refer to Note 19 Contingencies for further details on product liability related matters.

Discontinued Operations and Assets Held For Sale—For those businesses where management has committed to a plan to divest, each business is valued at the lower of its carrying amount or estimated fair value less cost to sell. If the carrying amount of the business exceeds its estimated fair value, an impairment loss is recognized. Fair value is estimated using accepted valuation techniques such as a discounted cash flow model, valuations performed by third parties, earnings multiples, or indicative bids, when available. A number of significant estimates and assumptions are involved in the application of these techniques, including the forecasting of markets and market share, sales volumes and prices, costs and expenses, and multiple other factors. Management considers historical experience and all available information at the time the estimates are made; however, the fair value that is ultimately realized upon the divestiture of a business may differ from the estimated fair value reflected in the Consolidated Financial Statements. Depreciation and amortization expense is not recorded on assets of a business to be divested once they are classified as held for sale.

For businesses classified as discontinued operations, the results of operations are reclassified from their historical presentation to discontinued operations on the Consolidated Statement of Income, for all periods presented. The gains or losses associated with these divested businesses are recorded in discontinued operations on the Consolidated Statement of Income. Additionally, segment information does not include the operating results of businesses classified as discontinued operations for all periods presented. Management does not expect any continuing involvement with these businesses following their divestiture, and these businesses are expected to be disposed of within one year.

Concentration of credit and business risks - We are exposed to credit risk in the event of nonpayment by customers, principally in the oil and gas, fire service, construction, utilities, chemicals 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.

Recently Adopted and Recently Issued Accounting Standards—In April 2014, the FASB issued ASU 2014-08, *Reporting Discontinued Operations and Disclosures of Disposals of an Entity*. This ASU amends the definition of a discontinued operation to include a disposal of a component or group of components that is disposed of or is classified as held for sale and represents a strategic shift that has (or will have) a major effect on an entity's operations and financial results. This

ASU was adopted on January 1, 2015. The adoption of this ASU may have a material effect on our consolidated financial statements in the event that we were to divest of a component that meets the definition of discontinued operations.

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. This ASU is required to be adopted beginning January 1, 2018. Our revenue streams include agreements with distributors, agreements with end users and agreements with governmental entities. The Company continues to evaluate the impact that the adoption of this ASU will have on the consolidated financial statements, including the timing of revenue recognition associated with certain customized products. We have conducted a risk assessment and have worked with outside consultants to develop a transition plan that will enable us to meet the implementation requirement. We are currently in the process of reviewing and analyzing contracts. We anticipate using the modified retrospective method of adoption and having enhanced disclosures surrounding revenue recognition.

In June 2014, the FASB issued ASU 2014-12, *Accounting for Share-Based Payments When the Terms of an Award Provide That a Performance Target Could be Achieved after the Requisite Service Period*. This ASU clarifies the accounting treatment for share based payment awards that contain performance targets. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In August 2014, the FASB issued ASU 2014-15, *Presentation of Financial Statements - Going Concern*. This ASU clarifies management's responsibility to evaluate whether there is a substantial doubt about the entity's ability to continue as a going concern and provides guidance for related footnote disclosures. This ASU is effective for the annual period ending December 31, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In January 2015, the FASB issued ASU 2015-01, *Income Statement - Extraordinary and Unusual Items*. This ASU eliminates the requirement to separately present and disclose extraordinary and unusual items in the financial statements. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In February 2015, the FASB issued ASU 2015-02, *Amendments to the Consolidation Analysis*. This ASU changes the analysis that an entity must perform to determine whether it should consolidate certain types of legal entities. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In April 2015, the FASB issued ASU 2015-03, *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs*. This ASU simplifies the presentation of debt issuance costs and requires that debt issuance costs related to a recognized debt liability be presented in the balance sheet as a direct deduction from the carrying amount of that debt liability. In August 2015, the FASB issued ASU 2015-15, *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs*. This ASU simplifies the presentation of debt issuance costs for line of credit arrangements. These ASUs were adopted on January 1, 2016. The Consolidated Balance Sheet as of December 31, 2015 has been adjusted to apply the change in accounting principle retrospectively, which resulted in a decrease in Prepaid expenses and other current assets of \$0.4 million, a decrease in Other noncurrent assets of \$1.5 million, a decrease in the current portion of long-term debt, net of \$17 thousand, and a decrease in long-term debt of \$1.9 million as of December 31, 2015. There was no impact to the Statements of Consolidated Income as a result of the change in accounting principle. Prior year balances in Note 11 were also adjusted to conform with current year presentation.

In April 2015, the FASB issued ASU 2015-04, *Retirement Benefits - Practical Expedient for the Measurement Date of an Employer's Defined Benefit Obligation and Plan Assets*. This ASU allows entities with a fiscal year end that does not coincide with a month end to use the closest month end for measurement purposes. This ASU also allows entities that have a significant event in an interim period that calls for a remeasurement of defined benefit plan assets and obligations to use the month end date that is closest to the date of the significant event. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In April 2015, the FASB issued ASU 2015-05, *Goodwill and Other Internal Use Software - Customer's Accounting for Fees Paid in a Cloud Computing Arrangement*. This ASU clarifies when entities should account for fees paid in a cloud computing arrangement as a software license or service contract. This ASU was adopted on January 1, 2016 and was implemented on a prospective basis. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-11, *Simplifying the Measurement of Inventory*. This ASU requires inventory to be measured at the lower of cost and net realizable value. This ASU applies to inventory measured using the first-in, first-out (FIFO) or average cost methods only. This ASU will be effective beginning in 2017. The adoption of this ASU is not expected to have a material effect on our consolidated financial statements.

In July 2015, the FASB issued ASU 2015-12, *Plan Accounting: Defined Benefit Pension Plans (Topic 960), Defined Contribution Pension Plans (Topic 962), Health and Welfare Benefit Plans (Topic 965)*. This ASU simplifies complexities within employee benefit plan accounting including Fully Benefit-Responsive Investment Contracts, Plan Investment Disclosures, and the Measurement Date Practical Expedient. This ASU was adopted on January 1, 2016. The adoption of this ASU did not have a material effect on our consolidated financial statements.

In September 2015, the FASB issued ASU 2015-16, *Simplifying the Accounting for Measurement-Period Adjustments*. This ASU simplifies the accounting for adjustments made to provisional amounts recognized in a business combination. The amendments in this Update eliminate the requirement to retrospectively account for those adjustments. MSA elected to early adopt this standard for the period ended December 31, 2015. The adoption of this ASU could have a material effect on our consolidated financial statements to the extent that measurement-period adjustments for business combinations are identified.

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 will be effective beginning in 2019. The Company continues to evaluate the impact that the adoption of this ASU will have on the consolidated financial statements.

In March 2016, the FASB issued ASU 2016-09, *Improvements to Employee Share-Based Payment Accounting*. This ASU simplifies the accounting for many aspects associated with share-based payment accounting including income taxes and the use of forfeiture rates. This ASU will be effective beginning in 2017. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, *Allowance for Loan and Lease 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. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements and expects that adoption will result in increased disclosure.

In August 2016, the FASB issued ASU 2016-15, *Classification of Certain Cash Payments and Cash Receipts*. This ASU clarifies how certain cash receipts and cash payments are presented and classified in the statement of cash flows. This ASU will be effective beginning in 2018. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16, *Intra-entity Transfers of Assets Other than Inventory*. This ASU states that an entity should recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. This ASU is effective beginning in 2018 to be adopted on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings and early adoption is permitted. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In November 2016, the FASB issued ASU 2016-18, *Restricted Cash*. This ASU requires that amounts generally described as restricted cash and restricted cash equivalents are included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. This ASU is effective beginning in 2018 to be adopted on a retrospective basis and early adoption is permitted. The Company is currently evaluating the impact that the adoption of these ASU will have on the consolidated financial statements.

In January 2017, the FASB issued ASU 2017-01, *Business Combinations - Clarifying the Definition of a Business*. This ASU provides further guidance for identifying whether a set of assets and activities is a business by providing a screen outlining that when substantially all of the fair value of the gross assets acquired (or disposed of) is concentrated in a single identifiable asset or a group of similar identifiable assets, the set is not a business. This ASU is effective beginning in 2018 and will be applied prospectively. The adoption of this ASU may have a material effect on our consolidated financial statements in the event that we have an acquisition or disposal that falls within this screen.

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. This ASU is effective beginning in 2019 for public entities and early adoption is permitted for interim or annual goodwill impairment tests performed after January 1, 2017. The adoption of 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.

Note 2—Restructuring Charges

During the years ended December 31, 2016, 2015 and 2014, we recorded restructuring charges, net of adjustments, of \$5.7 million, \$12.3 million, and \$8.5 million, respectively. These charges were primarily related to reorganization activities.

In September 2016, certain employees in the Americas segment were offered a voluntary retirement incentive package (“VRIP”). The election window for participation closed on October 17, 2016. The employees were required to render service through January 31, 2017 to receive the VRIP and had until February 6, 2017 to revoke their election. None of the 83 employees who accepted the VRIP revoked their election to retire under the terms of the plan. Non-cash special termination benefit expense of approximately \$11.5 million is expected to be incurred in the first quarter of 2017 related to these elections. All benefits will be paid from our over funded North America pension plan.

During the year ended December 31, 2016, we recorded restructuring charges, net of adjustments, of \$5.7 million. International segment charges of \$5.3 million during the year ended December 31, 2016 were related to severance costs for staff reductions associated with ongoing initiatives to right size our operations in Europe and Japan. Americas segment restructuring charges of \$1.8 million during the year ended December 31, 2016 related primarily to severance from staff reductions in Brazil and North America. Corporate segment charges were \$0.2 million during the year ended December 31, 2016. Favorable adjustments for changes in estimates on employee restructuring reserves of \$1.6 million were recorded during the year ended December 31, 2016.

Headcount was reduced by 179 in 2016. Headcount was reduced by 103 in the Americas segment, 75 in the International segment, and 1 in the Corporate segment.

For the year ended December 31, 2015, International segment charges of \$7.4 million were primarily related to staff reductions in Europe, Australia, Japan, and China and a one-time benefit for employees impacted by our European Principal Operating Company. Americas charges of \$3.3 million and Corporate segment charges of \$1.6 million were primarily related to staff reductions in North America.

Headcount was reduced by 216 in 2015. Headcount was reduced by 70 in the Americas segment, 134 in the International segment, and 12 in the Corporate segment.

For the year ended December 31, 2014, International segment charges of \$8.0 million were primarily related to severance from staff reductions in Europe, South Africa, and Australia as the Company continued to focus manufacturing efforts in line with our core products and to respond to changing economic conditions.

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

| (in millions) | Americas | International | Corporate | Total |
|--|----------|---------------|-----------|--------|
| Reserve balances at January 1, 2014 | \$ — | \$ 1.7 | \$ — | \$ 1.7 |
| Restructuring charges | 0.5 | 8.0 | — | 8.5 |
| Asset disposals | — | (2.1) | — | (2.1) |
| Cash payments | (0.3) | (5.0) | — | (5.3) |
| Reserve balances at December 31, 2014 | \$ 0.2 | \$ 2.6 | \$ — | \$ 2.8 |
| Restructuring charges | 3.3 | 7.4 | 1.6 | 12.3 |
| Cash payments | (1.9) | (4.6) | (0.5) | (7.0) |
| Reserve balances at December 31, 2015 | \$ 1.6 | \$ 5.4 | \$ 1.1 | \$ 8.1 |
| Restructuring charges | 1.8 | 5.3 | 0.2 | 7.3 |
| Adjustments to estimates on restructuring reserves | (0.5) | (0.6) | (0.5) | (1.6) |
| Cash payments | (2.0) | (7.3) | (0.5) | (9.8) |
| Reserve balances at December 31, 2016 | \$ 0.9 | \$ 2.8 | \$ 0.3 | \$ 4.0 |

Note 3—Inventories

The following table sets forth the components of inventory:

| (In thousands) | December 31, | |
|-----------------------------|--------------|------------|
| | 2016 | 2015 |
| Finished products | \$ 54,348 | \$ 74,929 |
| Work in process | 6,542 | 8,979 |
| Raw materials and supplies | 84,069 | 85,643 |
| Inventories at current cost | 144,959 | 169,551 |
| Less: LIFO valuation | (41,893) | (43,702) |
| Total inventories | \$ 103,066 | \$ 125,849 |

Inventories stated on the LIFO basis represent 25% and 23% of total inventories at December 31, 2016 and 2015, respectively.

Reductions in certain inventory quantities during the years ended December 31, 2016 and 2015 resulted in liquidations of LIFO inventories carried at lower costs prevailing in prior years. The effect of LIFO liquidations during 2016 reduced cost of sales by \$0.3 million and increased net income by \$0.2 million. The effect of LIFO liquidations during 2015 reduced cost of sales by \$1.4 million and increased net income by \$0.9 million.

Note 4—Property, Plant, and Equipment

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

| (In thousands) | December 31, | |
|-------------------------------------|--------------|------------|
| | 2016 | 2015 |
| Land | \$ 2,684 | \$ 2,929 |
| Buildings | 111,762 | 114,324 |
| Machinery and equipment | 361,010 | 345,064 |
| Construction in progress | 10,714 | 12,451 |
| Total | 486,170 | 474,768 |
| Less accumulated depreciation | (337,492) | (318,929) |
| Property, plant, and equipment, net | \$ 148,678 | \$ 155,839 |

Note 5—Reclassifications Out of Accumulated Other Comprehensive Loss

| (In thousands) | MSA Safety Incorporated | | | Noncontrolling Interests | | |
|---|-------------------------|--------------|--------------|--------------------------|------------|------------|
| | 2016 | 2015 | 2014 | 2016 | 2015 | 2014 |
| Pension and other post-retirement benefits | | | | | | |
| Balance at beginning of period | \$ (119,389) | \$ (125,570) | \$ (77,080) | \$ — | \$ — | \$ — |
| Unrecognized net actuarial losses | (12,473) | (8,002) | (84,495) | — | — | — |
| Unrecognized prior service credit (cost) | 1,092 | (604) | 302 | — | — | — |
| Tax benefit | 5,033 | 4,173 | 29,832 | — | — | — |
| Total other comprehensive loss before reclassifications, net of tax | (6,348) | (4,433) | (54,361) | — | — | — |
| Amounts reclassified from accumulated other comprehensive loss: | | | | | | |
| Amortization of prior service cost ^(a) | (427) | (268) | (251) | — | — | — |
| Recognized net actuarial losses ^(a) | 11,989 | 16,215 | 9,114 | — | — | — |
| Tax benefit | (3,893) | (5,333) | (2,992) | — | — | — |
| Total amount reclassified from accumulated other comprehensive loss, net of tax | 7,669 | 10,614 | 5,871 | — | — | — |
| Total other comprehensive income (loss) | 1,321 | 6,181 | (48,490) | — | — | — |
| Balance at end of period | \$ (118,068) | \$ (119,389) | \$ (125,570) | \$ — | \$ — | \$ — |
| Foreign currency translation | | | | | | |
| Balance at beginning of period | \$ (88,810) | \$ (41,160) | \$ (1,189) | \$ (3,616) | \$ (2,199) | \$ (1,602) |
| Reclassification into net income | 2,500 ^(b) | — | — | 770 ^(c) | — | — |
| Foreign currency translation adjustments | (25,868) | (47,650) | (39,971) | 882 | (1,417) | (597) |
| Balance at end of period | \$ (112,178) | \$ (88,810) | \$ (41,160) | \$ (1,964) | \$ (3,616) | \$ (2,199) |

^(a)Included in the computation of net periodic pension and other post-retirement benefit costs (see Note 14 - Pensions and Other Post-Retirement Benefits).

^(b)Of the \$2.5 million reclassified into net income, \$3.4 million is included in (Loss) income from discontinued operations (see Note 20 - Discontinued Operations) on the Consolidated Statement of Income offset by a gain of \$0.9 million included in Currency exchange losses, net.

^(c)Included in (Loss) income from discontinued operations (See Note 20 - Discontinued Operations) and Net (income) loss attributable to noncontrolling interests 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, 2016. There were 33 shares of preferred stock repurchased and subsequently canceled during 2015. 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, 2016 or 2014. 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, 2016 or 2015.

Common Stock - The Company has authorized 180,000,000 shares of no par value common stock. There were 37,736,578 and 37,372,474 shares outstanding at December 31, 2016 and December 31, 2015, respectively.

Common stock activity is summarized as follows:

| (Dollars in thousands) | Shares | | | Dollars | | |
|---|------------|--------------------------|--------------|--------------|--------------------------|---------------|
| | Issued | Stock Compensation Trust | Treasury | Common Stock | Stock Compensation Trust | Treasury Cost |
| Balances January 1, 2014 | 62,081,391 | (303,668) | (24,575,624) | \$ 132,055 | \$ (1,585) | \$ (279,772) |
| Restricted stock awards | — | 72,291 | 13,936 | (538) | 377 | 161 |
| Restricted stock expense | — | — | — | 4,372 | — | — |
| Restricted stock forfeitures | — | — | (4,078) | (346) | — | — |
| Stock options exercised | — | 150,962 | 39,781 | 5,678 | 788 | 460 |
| Stock option expense | — | — | — | 2,355 | — | — |
| Performance stock issued | — | 80,415 | — | (420) | 420 | — |
| Performance stock expense | — | — | — | 2,705 | — | — |
| Performance stock forfeitures | — | — | — | (33) | — | — |
| Tax benefit related to stock plans | — | — | — | 2,573 | — | — |
| Treasury shares purchased for stock compensation programs | — | — | (107,096) | — | — | (5,654) |
| Balances December 31, 2014 | 62,081,391 | — | (24,633,081) | \$ 148,401 | \$ — | \$ (284,805) |
| Restricted stock awards | — | — | 34,624 | (404) | — | 404 |
| Restricted stock expense | — | — | — | 3,461 | — | — |
| Restricted stock forfeitures | — | — | (18,468) | (426) | — | — |
| Stock options exercised | — | — | 52,708 | 1,714 | — | 216 |
| Stock option expense | — | — | — | 2,572 | — | — |
| Stock option forfeitures | — | — | — | (118) | — | — |
| Performance stock issued | — | — | 52,839 | (616) | — | 616 |
| Performance stock expense | — | — | — | 2,265 | — | — |
| Performance stock forfeitures | — | — | — | (155) | — | — |
| Employee stock purchase plan | — | — | 11,517 | 352 | — | 136 |
| Tax benefit related to stock plans | — | — | — | 597 | — | — |
| Treasury shares purchased for stock compensation programs | — | — | (59,056) | — | — | (2,781) |
| Share repurchase program | — | — | (150,000) | — | — | (7,104) |
| Balances December 31, 2015 | 62,081,391 | — | (24,708,917) | \$ 157,643 | \$ — | \$ (293,318) |
| Restricted stock awards | — | — | 29,836 | (355) | — | 355 |
| Restricted stock expense | — | — | — | 3,604 | — | — |
| Restricted stock forfeitures | — | — | (2,800) | (148) | — | — |
| Stock options exercised | — | — | 336,904 | 5,617 | — | 6,859 |
| Stock option expense | — | — | — | 2,484 | — | — |
| Stock option forfeitures | — | — | — | (25) | — | — |
| Performance stock issued | — | — | 31,093 | (371) | — | 371 |
| Performance stock expense | — | — | — | 3,324 | — | — |
| Performance stock forfeitures | — | — | — | (28) | — | — |
| Employee stock purchase plan | — | — | 9,500 | 458 | — | 113 |
| Tax benefit related to stock plans | — | — | — | 478 | — | — |
| Treasury shares purchased for stock compensation programs | — | — | (40,429) | — | — | (1,881) |
| Balances December 31, 2016 | 62,081,391 | — | (24,344,813) | \$ 172,681 | \$ — | \$ (287,501) |

The Mine Safety Appliances Company Stock Compensation Trust was established to provide shares for certain benefit plans, including the management and non-employee directors' equity incentive plans. Shares held by the Stock Compensation Trust, and the corresponding cost of those shares, are reported as a reduction of common shares issued. Differences between the cost of the shares held by the Stock Compensation Trust and the market value of shares released for stock-related benefits are reflected in common stock issued. The Company began issuing Treasury Shares for all Board of Director share based benefit plans in April 2014. The Company subsequently began issuing Treasury Shares for all share based benefit plans when the stock compensation trust was depleted in September 2014. Shares are issued from Treasury at the average Treasury Share cost on the date of the transaction.

On May 12, 2015, the Board of Directors adopted a new stock repurchase program replacing the existing program. The new program authorizes up to \$100 million to repurchase MSA common stock in the open market and in private transactions. The share purchase program has no expiration date. The maximum shares that may be purchased is calculated based on the dollars remaining under the program and the respective month-end closing share price. We repurchased 150,000 shares during 2015. There were no shares repurchased during 2016. We do not have any other share purchase programs.

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 and International segments were established on January 1, 2016. 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 now allocated to each segment in a manner consistent with where the benefits from the expenses are derived. The 2015 and 2014 segment results have been recast to conform with current period presentation.

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

Adjusted operating income (loss) and adjusted operating 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 from continuing operations excluding restructuring charges and currency exchange gains (losses). Adjusted operating margin is defined as adjusted operating income (loss) divided by segment sales to external customers. Adjusted operating income (loss) and adjusted operating margin are not recognized terms under GAAP and therefore do not purport to be alternatives to operating income or operating margin from continuing operations as a measure of operating performance. Further, the Company's measure of adjusted operating income and adjusted operating margin may not be comparable to similarly titled measures of other companies. Adjusted operating income 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 |
|----------------------------------|------------|---------------|-----------|-------------------------------------|------------------------|
| 2016 | | | | | |
| Sales to external customers | \$ 678,433 | \$ 471,097 | \$ — | \$ — | \$ 1,149,530 |
| Intercompany sales | 113,273 | 275,640 | — | (388,913) | — |
| Operating income | | | | | 164,192 |
| Restructuring and other charges | | | | | 5,694 |
| Currency exchange losses, net | | | | | 766 |
| Adjusted operating income (loss) | 162,788 | 46,491 | (38,627) | — | 170,652 |
| Adjusted operating margin % | 24.0% | 9.9% | | | |
| Interest income | 1,914 | 903 | 10 | — | 2,827 |
| Interest expense | — | — | 16,411 | — | 16,411 |
| Noncash items: | | | | | |
| Depreciation and amortization | 21,046 | 13,767 | — | — | 34,813 |
| Pension (income) expense | (544) | 6,876 | — | — | 6,332 |
| Income tax provision | 37,838 | 12,830 | 8,778 | (1,642) | 57,804 |
| Total Assets | 836,243 | 505,278 | 10,903 | 1,496 | 1,353,920 |
| Capital expenditures | 16,306 | 9,217 | — | — | 25,523 |
| Net property | 95,904 | 52,773 | 1 | — | 148,678 |
| 2015 | | | | | |
| Sales to external customers | \$ 704,754 | \$ 426,029 | \$ — | \$ — | \$ 1,130,783 |
| Intercompany sales | 134,185 | 225,358 | — | (359,543) | — |
| Operating income | | | | | 122,741 |
| Restructuring and other charges | | | | | 12,258 |
| Currency exchange losses, net | | | | | 2,204 |
| Adjusted operating income (loss) | 141,971 | 33,501 | (38,269) | — | 137,203 |
| Adjusted operating margin % | 20.1% | 7.9% | | | |
| Interest income | 1,183 | 336 | 6 | — | 1,525 |
| Interest expense | — | — | 10,854 | — | 10,854 |
| Noncash items: | | | | | |
| Depreciation and amortization | 21,180 | 11,500 | — | — | 32,680 |
| Pension expense | 3,759 | 8,196 | — | — | 11,955 |
| Income tax provision | 50,751 | 13,706 | (20,108) | 58 | 44,407 |
| Total Assets | 873,045 | 532,960 | 16,362 | 496 | 1,422,863 |
| Capital expenditures | 22,568 | 13,673 | — | — | 36,241 |
| Net property | 97,021 | 58,817 | 1 | — | 155,839 |
| 2014 | | | | | |
| Sales to external customers | \$ 663,655 | \$ 470,230 | \$ — | \$ — | \$ 1,133,885 |
| Intercompany sales | 117,681 | 131,477 | — | (249,158) | — |
| Operating income | | | | | 134,281 |
| Restructuring and other charges | | | | | 8,515 |
| Currency exchange losses, net | | | | | 1,509 |
| Adjusted operating income (loss) | 134,819 | 46,847 | (37,361) | — | 144,305 |
| Adjusted operating margin % | 20.3% | 10.0% | | | |
| Interest income | 1,450 | 367 | 5 | — | 1,822 |
| Interest expense | — | — | 9,851 | — | 9,851 |
| Noncash items: | | | | | |
| Depreciation and amortization | 20,145 | 9,617 | — | — | 29,762 |
| Pension (income) expense | (1,977) | 6,813 | — | — | 4,836 |
| Income tax provision | 49,014 | 8,633 | (15,972) | (631) | 41,044 |
| Total Assets | 883,131 | 359,557 | 20,867 | (143) | 1,263,412 |
| Capital expenditures | 20,268 | 13,315 | — | — | 33,583 |
| Net property | 95,933 | 55,418 | 1 | — | 151,352 |

⁽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) | 2016 | 2015 | 2014 |
|----------------|---------------------|---------------------|---------------------|
| United States | \$ 580,724 | \$ 593,539 | \$ 530,845 |
| Other | 568,806 | 537,244 | 603,040 |
| Total | \$ 1,149,530 | \$ 1,130,783 | \$ 1,133,885 |

Geographic information on net property, based on country of origin:

| (In thousands) | 2016 | 2015 | 2014 |
|----------------|-------------------|-------------------|-------------------|
| United States | \$ 84,675 | \$ 88,368 | \$ 85,247 |
| China | 11,732 | 13,504 | 15,128 |
| Germany | 7,919 | 7,596 | 17,654 |
| Other | 44,352 | 46,371 | 33,323 |
| Total | \$ 148,678 | \$ 155,839 | \$ 151,352 |

The percentage of total sales by product group were as follows:

| | 2016 | 2015 | 2014 |
|-------------------------------|------|------|------|
| Breathing Apparatus | 26% | 27% | 19% |
| Fixed Gas and Flame Detection | 21% | 21% | 23% |
| Portable Gas Detection | 12% | 13% | 15% |
| Head Protection | 10% | 11% | 13% |
| Fall Protection | 8% | 5% | 4% |
| Fire & Rescue Helmets | 5% | 5% | 5% |
| Other | 18% | 18% | 21% |

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.

| (In thousands, except per share amounts) | 2016 | 2015 | 2014 |
|---|-----------|-----------|-----------|
| Net income attributable to continuing operations | \$ 92,691 | \$ 69,590 | \$ 87,447 |
| Preferred stock dividends | (42) | (41) | (41) |
| Income from continuing operations available to common equity | 92,649 | 69,549 | 87,406 |
| Dividends and undistributed earnings allocated to participating securities | (144) | (192) | (546) |
| Income from continuing operations available to common shareholders | 92,505 | 69,357 | 86,860 |
| Net (loss) income attributable to discontinued operations | \$ (755) | \$ 1,217 | \$ 1,059 |
| Preferred stock dividends | — | (1) | (1) |
| (Loss) income from discontinued operations available to common equity | (755) | 1,216 | 1,058 |
| Dividends and undistributed earnings allocated to participating securities | 1 | (3) | (7) |
| (Loss) income from discontinued operations available to common shareholders | (754) | 1,213 | 1,051 |
| Basic weighted-average shares outstanding | 37,456 | 37,293 | 37,138 |
| Stock options and other stock compensation | 530 | 417 | 590 |
| Diluted weighted-average shares outstanding | 37,986 | 37,710 | 37,728 |
| Antidilutive stock options | — | 658 | — |
| Earnings per share attributable to continuing operations: | | | |
| Basic | \$2.47 | \$1.86 | \$2.34 |
| Diluted | \$2.44 | \$1.84 | \$2.30 |
| (Loss) earnings per share attributable to discontinued operations: | | | |
| Basic | \$(0.02) | \$0.03 | \$0.03 |
| Diluted | \$(0.02) | \$0.03 | \$0.03 |

Note 9—Income Taxes

| (In thousands) | 2016 | 2015 | 2014 |
|---|------------|-----------|------------|
| Components of income before income taxes* | | | |
| U.S. income | \$ 100,382 | \$ 71,547 | \$ 58,209 |
| Non-U.S. income | 51,529 | 39,479 | 68,986 |
| Income before income taxes | 151,911 | 111,026 | 127,195 |
| Provision for income taxes* | | | |
| Current | | | |
| Federal | \$ 19,968 | \$ 21,253 | \$ 23,659 |
| State | 2,231 | 2,389 | 1,349 |
| Non-U.S. | 21,188 | 22,979 | 21,101 |
| Total current provision | 43,387 | 46,621 | 46,109 |
| Deferred | | | |
| Federal | \$ 11,580 | \$ 3,813 | \$ (3,650) |
| State | 1,977 | (213) | 317 |
| Non-U.S. | 860 | (5,814) | (1,732) |
| Total deferred provision | 14,417 | (2,214) | (5,065) |
| Provision for income taxes | \$ 57,804 | \$ 44,407 | \$ 41,044 |

*The components of income before income taxes and the provision for income taxes relate to continuing operations.

MSA finalized its European reorganization during 2016. The reorganization is designed to drive optimal performance by aligning certain strategic planning and decision making into a single location enabled by a common IT platform. During 2016, the Company incurred \$6.5 million of charges associated with exit taxes related to our European reorganization compared to \$7.7 million in 2015.

Included in discontinued operations is tax expense of \$0.3 million in 2016, \$0.6 million in 2015 and \$0.6 million in 2014.

Cash flows from operations in the Consolidated Statement of Cash Flows includes an insignificant deferred income tax provision (benefit) from discontinued operations for 2016, compared to \$0.5 million and \$(0.3) million in 2015 and 2014, respectively.

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

| | 2016 | 2015 | 2014 |
|--|-------|-------|-------|
| U.S. federal income tax rate | 35.0% | 35.0% | 35.0% |
| Taxes on non-U.S. income - European reorganization | 4.3 | 6.9 | — |
| State income taxes—U.S. | 1.8 | 1.3 | 0.8 |
| Valuation allowances | 1.5 | 1.7 | (0.6) |
| Taxes on non-U.S. income | (2.5) | (2.1) | (2.2) |
| Manufacturing deduction credit | (1.3) | (1.6) | (1.0) |
| Research and development credit | (0.6) | (1.1) | (0.7) |
| Other | (0.1) | (0.1) | 1.0 |
| Effective income tax rate | 38.1% | 40.0% | 32.3% |

Components of deferred tax assets and liabilities:

| (In thousands) | December 31, | |
|---|--------------|----------|
| | 2016 | 2015 |
| Deferred tax assets | | |
| Accrued expenses and other reserves | \$ 5,381 | \$ 4,412 |
| Product liability | 1,303 | 6,116 |
| Employee benefits | 9,538 | 9,387 |
| Share-based compensation | 10,462 | 10,323 |
| Reserve for doubtful accounts | 1,178 | 2,279 |
| Inventory | 1,218 | 2,496 |
| Capitalized research and development | 4,654 | 5,339 |
| Net operating losses and tax credit carryforwards | 16,218 | 15,310 |
| Other | 1,316 | 2,892 |
| Total deferred tax assets | 51,268 | 58,554 |
| Valuation allowances | (5,303) | (5,153) |
| Net deferred tax assets | 45,965 | 53,401 |
| Deferred tax liabilities | | |
| Goodwill and intangibles | (42,007) | (42,867) |
| Property, plant and equipment | (11,394) | (8,920) |
| Other | (3,368) | (31) |
| Total deferred tax liabilities | (56,769) | (51,818) |
| Net deferred taxes | \$ (10,804) | \$ 1,583 |

At December 31, 2016, we had net operating loss carryforwards of approximately \$37.2 million, all of which are in non-U.S. tax jurisdictions. Net operating loss carryforwards without a valuation allowance of \$0.1 million will expire in 2017. The remainder either have a valuation allowance or may be carried forward for a period of at least six years. The change in valuation allowance for the year of \$0.2 million is primarily due to our inability to recognize deferred tax assets on certain foreign entities that continue to generate losses.

No deferred U.S. income taxes have been provided on undistributed earnings of non-U.S. subsidiaries, which amounted to \$422.3 million as of December 31, 2016. These earnings are considered to be reinvested for an indefinite period of time. Because we currently do not have any plans to repatriate these funds, we cannot determine the impact of local taxes, withholding taxes and foreign tax credits associated with the future repatriation of such earnings and, therefore, cannot reasonably estimate the associated tax liability. In cases where we intend to repatriate a portion of the undistributed earnings of our foreign subsidiaries, we provide U.S. income taxes on such earnings.

A reconciliation of the change in the tax liability for unrecognized tax benefits for the years ended December 31, 2016 and 2015 is as follows:

| (In thousands) | 2016 | 2015 |
|---|-----------|-----------|
| Beginning balance | \$ 13,070 | \$ 9,857 |
| Adjustments for tax positions related to the current year | 2,359 | 8,203 |
| Adjustments for tax positions related to prior years | (856) | (4,887) |
| Statute expiration | (180) | (103) |
| Ending balance | \$ 14,393 | \$ 13,070 |

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 \$4.3 million and \$2.1 million at December 31, 2016 and 2015, 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 \$0.9 million at December 31, 2015. During 2016, we increased interest related to uncertain tax positions by \$0.6 million. Our liability for accrued interest and penalties related to uncertain tax positions was \$1.5 million at December 31, 2016.

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 2012 tax year closed by statute. Various state and foreign income tax returns may be subject to tax audits for periods after 2010.

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. The 2008 Non-Employee Directors' Equity Incentive Plan provides for grants of stock options and restricted stock to non-employee directors through May 2018. 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, 2016, there were 1,368,638 and 139,657 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) | 2016 | 2015 | 2014 |
|---|----------|----------|----------|
| Restricted stock | \$ 3,456 | \$ 3,035 | \$ 4,026 |
| Stock options | 2,459 | 2,454 | 2,355 |
| Performance stock | 3,296 | 2,110 | 2,672 |
| Total compensation expense before income taxes | 9,211 | 7,599 | 9,053 |
| Income tax benefit | 3,375 | 2,896 | 3,293 |
| Total compensation expense, net of income tax benefit | \$ 5,836 | \$ 4,703 | \$ 5,760 |

We did not capitalize any stock-based compensation expense, and all expense is recorded in SG&A expense in 2016, 2015, or 2014.

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 2016, 2015 and 2014.

| | 2016 | 2015 | 2014 |
|-------------------------|----------|----------|----------|
| Fair value per option | \$ 11.69 | \$ 15.63 | \$ 17.26 |
| Risk-free interest rate | 1.6% | 1.8% | 2.1% |
| Expected dividend yield | 2.8% | 2.3% | 2.4% |
| Expected volatility | 34% | 39% | 41% |
| Expected life (years) | 7.0 | 6.7 | 6.6 |

The risk-free interest rate is based on the U.S. Treasury Constant Maturity rates as of the grant date converted into an implied spot rate 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 ten year 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, 2014 | 1,695,380 | \$ 34.55 | |
| Granted | 138,519 | 51.69 | |
| Exercised | (190,743) | 36.31 | |
| Expired | (1,071) | 45.68 | |
| Forfeited | (23,524) | 38.82 | |
| Outstanding December 31, 2014 | 1,618,561 | 35.74 | 1,147,712 |
| Granted | 170,683 | 48.64 | |
| Exercised | (64,752) | 38.59 | |
| Expired | (1,109) | 44.36 | |
| Forfeited | (28,708) | 49.71 | |
| Outstanding December 31, 2015 | 1,694,675 | 36.69 | 1,280,665 |
| Granted | 235,233 | 44.50 | |
| Exercised | (341,063) | 37.34 | |
| Forfeited | (12,753) | 46.11 | |
| Outstanding December 31, 2016 | 1,576,092 | \$ 37.63 | 1,098,615 |

For various exercise price ranges, characteristics of outstanding and exercisable stock options at December 31, 2016 were as follows:

| Range of Exercise Prices | Stock Options Outstanding | | |
|--------------------------|---------------------------|------------------|----------------|
| | Shares | Weighted-Average | |
| | | Exercise Price | Remaining Life |
| \$17.83 – \$33.00 | 456,938 | \$ 21.66 | 2.64 |
| \$33.01 – \$45.00 | 566,173 | 39.60 | 6.06 |
| \$45.01 – \$51.69 | 552,981 | 48.82 | 5.69 |
| \$17.83 – \$51.69 | 1,576,092 | \$ 37.63 | 4.94 |

| Range of Exercise Prices | Stock Options Exercisable | | |
|--------------------------|---------------------------|------------------|----------------|
| | Shares | Weighted-Average | |
| | | Exercise Price | Remaining Life |
| \$17.83 – \$33.00 | 456,938 | \$ 21.66 | 2.64 |
| \$33.01 – \$45.00 | 346,157 | 36.49 | 4.09 |
| \$45.01 – \$51.69 | 295,520 | 47.84 | 3.91 |
| \$17.83 – \$51.69 | 1,098,615 | \$ 33.37 | 3.44 |

Cash received from the exercise of stock options was \$12.5 million, \$1.9 million and \$6.9 million for the years ended December 31, 2016, 2015 and 2014, respectively. The tax benefit (provision) we realized from these exercises was \$0.6 million, \$(0.1) million and \$1.0 million for the years ended December 31, 2016, 2015 and 2014, respectively.

Stock options become exercisable when they are vested. The aggregate intrinsic value of stock options exercisable at December 31, 2016 was \$39.5 million. The aggregate intrinsic value of all stock options outstanding at December 31, 2016 was \$50.0 million.

A summary of restricted stock and unit activity follows:

| | Shares | Weighted Average Grant Date Fair Value |
|-------------------------------|-----------|--|
| Unvested at January 1, 2014 | 303,419 | \$ 39.79 |
| Granted | 83,543 | 51.91 |
| Vested | (108,245) | 34.94 |
| Forfeited | (9,974) | 44.42 |
| Unvested at December 31, 2014 | 268,743 | 45.34 |
| Granted | 83,725 | 48.06 |
| Vested | (111,834) | 39.01 |
| Forfeited | (22,925) | 45.84 |
| Unvested at December 31, 2015 | 217,709 | 49.70 |
| Granted | 107,465 | 50.65 |
| Vested | (76,568) | 49.12 |
| Forfeited | (14,014) | 48.23 |
| Unvested at December 31, 2016 | 234,592 | \$ 49.76 |

A summary of performance stock unit activity follows:

| | Shares | Weighted Average Grant Date Fair Value |
|-------------------------------|----------|--|
| Unvested at January 1, 2014 | 149,389 | \$ 46.32 |
| Granted | 46,242 | 57.42 |
| Vested | (91,696) | 39.19 |
| Performance adjustments | 41,428 | 39.42 |
| Forfeited | (1,402) | 48.85 |
| Unvested at December 31, 2014 | 143,961 | 52.42 |
| Granted | 87,256 | 41.99 |
| Vested | (66,200) | 41.75 |
| Performance adjustments | 16,447 | 41.45 |
| Forfeited | (9,820) | 51.51 |
| Unvested at December 31, 2015 | 171,644 | 50.24 |
| Granted | 65,355 | 44.28 |
| Vested | (31,181) | 58.54 |
| Performance adjustments | (15,594) | 58.54 |
| Forfeited | (3,603) | 44.47 |
| Unvested at December 31, 2016 | 186,621 | \$ 46.18 |

The 2016 performance adjustments above relate to the final number of shares issued for the 2013 Management Performance Units, which were 66.6% of the target award based on Total Shareholder Return during the three year performance period, and vested in the first quarter of 2016.

During the years ended December 31, 2016, 2015 and 2014, 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 \$6.4 million, \$0.5 million and \$3.7 million, respectively. The fair values of restricted stock vested during the years ended December 31, 2016, 2015 and 2014 were \$3.7 million, \$5.3 million and \$5.8 million, respectively. The fair value of performance stock units vested during the year ended December 31, 2016 was \$1.8 million.

On December 31, 2016, there was \$6.7 million of unrecognized stock-based compensation expense. The weighted average period over which this expense is expected to be recognized was approximately two 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, 2016 and 2015, respectively. The average month-end balance of total short-term borrowings during 2016 was \$0.1 million. The maximum month-end balance of \$0.2 million occurred in May, 2016.

Long-Term Debt

On January 1, 2016, the Company adopted ASU 2015-03 *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs* and ASU 2015-15 *Imputation of Interest - Simplifying the Presentation of Debt Issuance Costs*. As a result of the adoption of these ASUs, our debt balances are now reported net of debt issuance costs. December 31, 2015 debt balances have been adjusted to conform with current year presentation.

| (In thousands) | December 31, | |
|---|-------------------|-------------------|
| | 2016 | 2015 |
| 2006 Senior Notes payable through 2021, 5.41%, net of debt issuance costs | \$ 33,333 | \$ 39,999 |
| 2010 Senior Notes payable through 2021, 4.00%, net of debt issuance costs | 100,000 | 100,000 |
| 2016 Senior Notes payable through 2031, 3.40%, net of debt issuance costs | 67,713 | — |
| Senior revolving credit facility maturing in 2020, net of debt issuance costs | 189,456 | 324,673 |
| Total | 390,502 | 464,672 |
| Amounts due within one year | 26,666 | 6,650 |
| Long-term debt | \$ 363,836 | \$ 458,022 |

Under the 2015 Amended and Restated Credit Agreement associated with our senior revolving credit facility, 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) the Prime Rate, (ii) the Federal Funds Open Rate plus one half of one percent (0.5%) or (iii) 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 elected rate (BASE or LIBOR). The Company has a weighted average revolver interest rate of 2.27% as of December 31, 2016. At December 31, 2016, \$377.2 million of the existing \$575.0 million senior revolving credit facility was unused, including letters of credit.

On January 22, 2016, the Company entered into multi-currency note purchase and private shelf agreement, pursuant to which MSA issued notes in an aggregate original principal amount of £54.9 million (approximately \$67.8 million at December 31, 2016). The Notes are repayable in annual installments of £6.1 million (approximately \$7.5 million at December 31, 2016), 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%. The note purchase agreement requires 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 leverage ration not to exceed 3.25 to 1.00; in each case calculated on the basis of the trailing four fiscal quarters. In addition, the note purchase agreement contains 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.

Approximate maturities on our long-term debt over the next five years are \$26.7 million in 2017, \$26.7 million in 2018, \$26.7 million in 2019, \$217.7 million in 2020, \$26.7 million in 2021, and \$67.8 million thereafter. The revolving credit facilities require the Company to comply with specified financial covenants. In addition, the 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, 2016.

The Company had outstanding bank guarantees and standby letters of credit with banks as of December 31, 2016, totaling \$13.1 million, of which \$6.9 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 were unused and available at December 31, 2016. The Company is also required to provide cash collateral in connection with certain arrangements. At December 31, 2016, the Company has \$1.2 million of restricted cash in support of these arrangements.

Note 12—Goodwill and Intangible Assets

Changes in goodwill during the years ended December 31, 2016 and 2015 were as follows:

| (In thousands) | 2016 | 2015 |
|----------------------------|------------|------------|
| Net balance at January 1 | \$ 340,338 | \$ 252,520 |
| Additions (Note 13) | 10,485 | 97,959 |
| Disposal | (338) | — |
| Currency translation | (17,209) | (10,141) |
| Net balance at December 31 | \$ 333,276 | \$ 340,338 |

At December 31, 2016, goodwill of \$198.8 million and \$134.5 million related to the Americas and International reporting segments, respectively.

During the 2016 first quarter, we sold 100% of the stock of associated with our South African personal protective equipment distribution business and our Zambian operations, as disclosed in Note 20. This transaction resulted in a \$0.2 million disposal of goodwill.

Changes in intangible assets, net of accumulated amortization, during the years ended December 31, 2016 and 2015 were as follows:

| (In thousands) | 2016 | 2015 |
|-----------------------------|-----------|-----------|
| Net balance at January 1 | \$ 90,068 | \$ 31,323 |
| Additions (Note 13) | 4,420 | 67,645 |
| Amortization expense | (7,885) | (4,811) |
| Impairment losses (Note 15) | — | (723) |
| Currency translation | (9,588) | (3,366) |
| Net balance at December 31 | \$ 77,015 | \$ 90,068 |

| (In millions) | Weighted Average Useful Life (years) | December 31, 2016 | | | December 31, 2015 | | |
|------------------------------------|--------------------------------------|-----------------------|---------------------------------------|---------------------|-----------------------|---------------------------------------|---------------------|
| | | Gross Carrying Amount | Accumulated Amortization and Reserves | Net Carrying Amount | Gross Carrying Amount | Accumulated Amortization and Reserves | Net Carrying Amount |
| Intangible Assets: | | | | | | | |
| Customer relationships | 14 | \$ 45.5 | \$ (3.6) | \$ 41.9 | \$ 50.5 | \$ (0.7) | \$ 49.8 |
| Distribution agreements | 20 | 25.2 | (8.0) | 17.2 | 24.6 | (6.2) | 18.4 |
| Technology related assets | 10 | 18.0 | (10.3) | 7.7 | 17.5 | (8.3) | 9.2 |
| Patents, trademarks and copyrights | 14 | 17.0 | (7.1) | 9.9 | 16.5 | (4.6) | 11.9 |
| License agreements | 5 | 5.3 | (5.3) | — | 5.4 | (5.3) | 0.1 |
| Other | 2 | 2.6 | (2.3) | 0.3 | 3.9 | (3.2) | 0.7 |
| Total | 14 | \$ 113.6 | \$ (36.6) | \$ 77.0 | \$ 118.4 | \$ (28.3) | \$ 90.1 |

Intangible asset amortization expense over the next five years is expected to be approximately \$7.5 million in 2017, \$6.1 million in 2018, \$6.1 million in 2019, \$6.1 million in 2020, and \$5.9 million in 2021.

Note 13—Acquisitions

Acquisition of Senscient, Inc.

On September 19, 2016, we acquired 100% of the common stock of Senscient, Inc. ("Senscient") for \$19.1 million in cash. There is no contingent consideration. Senscient, which is headquartered in the UK, is a leader in laser-based gas detection technology. The acquisition of Senscient expands and enhances MSA's technology offerings in the global market for fixed gas and flame detection systems, as the Company continues to execute its core product growth strategy. The acquisition was funded through borrowings on our unsecured senior revolving credit facility.

The following table summarizes the preliminary fair values of the Senscient assets acquired and liabilities assumed at the date of acquisition:

| (In millions) | September 19, 2016 |
|---|-----------------------|
| Current assets (including cash of \$0.7 million) | \$ 5.9 |
| Property, plant and equipment and other noncurrent assets | 0.3 |
| Acquired technology | 1.6 |
| Customer-related intangibles | 2.8 |
| Goodwill | 10.5 |
| Total assets acquired | 21.1 |
| Total liabilities assumed | 2.0 |
| Net assets acquired | \$ 19.1 |

The amounts in the table above are subject to change as we complete our valuation of the assets acquired and liabilities assumed. This valuation is expected to be completed by mid-2017.

Acquisition of Latchways

On October 21, 2015, MSA Safety Incorporated acquired Latchways plc and its affiliated companies, Latchways Australia Pty Limited ("LA"), Latchways Inc. ("LI"), HCL Group Plc ("HCL"), Height Solutions Limited ("HSL"), and Sigma 6 d.o.o. ("Sigma 6"), collectively referred to as ("Latchways"), for \$190.9 million. There is no contingent consideration.

The acquisition was funded through cash on hand and borrowings on our \$125.0 million unsecured senior revolving credit facility.

Latchways is a global provider of innovative fall protection systems based in the United Kingdom. Latchways solutions are found throughout the aerospace, power transmission, utility and telecommunication sectors, and Latchways products are integrated with major roofing and tower systems. In addition to providing us with greater access to the fall protection market, we believe that the acquisition significantly enhances our long-term corporate strategy in fall protection by providing us with world-class research and development talent and an industry-leading product line. While Latchways products will be sold globally, its operations will most significantly impact our International reportable segment.

The following table summarizes the preliminary fair values of the Latchways assets acquired and liabilities assumed at the date of acquisition:

| (In millions) | October 21, 2015 |
|---|---------------------|
| Current assets (including cash of \$10.6 million) | \$ 35.7 |
| Property, plant and equipment | 9.5 |
| Trade name and acquired technology | 14.6 |
| Customer-related intangibles | 53.0 |
| Goodwill | 98.0 |
| Total assets acquired | 210.8 |
| Total liabilities assumed | 19.9 |
| Net assets acquired | \$ 190.9 |

The purchase price allocation was finalized in the 2016 third quarter and did not result in any adjustments to the preliminary fair values.

Assets acquired and liabilities assumed in connection with both acquisitions 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 excess earnings approach for all customer relationships and Latchways technology related intangible assets; the relief from royalty method for the Latchways trade name and Senscient technology related intangible assets; and the cost method for assembled workforce which is included in goodwill for both acquisitions. A number of significant assumptions and estimates were involved in the application of these valuation methods, including sales volumes and prices, costs to produce, tax rates, capital spending, discount rates, and working capital changes. Cash flow forecasts were generally based on Latchways and Senscient 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 identifiable intangible assets acquired in the Latchways transaction will be amortized over an estimated amortization period of 15 years. The identifiable intangible assets for Senscient include technology and customer-related intangibles which will be amortized over ten and five years, respectively. Estimated future amortization expense related to Latchways and Senscient identifiable intangible assets is approximately \$4.5 million and \$0.7 million, respectively, in each of the next five years. A step up to fair value of acquired inventory of \$1.6 million was recorded as part of the Latchways purchase price allocation. Amortization expense for inventory step up was \$1.4 million in 2016 and the remaining \$0.2 million is expected to be amortized in 2017. Estimated future depreciation expense related to Latchways property, plant and equipment is approximately \$0.9 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 Latchways and Senscient with our operations. Goodwill related to the Latchways acquisition has been recorded in our reportable segments as follows: \$96.6 million in the International segment and \$1.4 million in the Americas segment. Goodwill for Latchways is not expected to be tax deductible. Goodwill of \$10.5 million related to the Senscient acquisition is included in the International operating segment and is deductible for tax purposes.

Our results for the year ended December 31, 2016, include transaction and integration costs of \$0.8 million related to the Senscient acquisition as well as integration costs of \$0.5 million (\$0.4 million after tax) related to the Latchways acquisition. Our results for the year ended December 31, 2015, include transaction costs related to the Latchways acquisition of \$5.0 million, of which \$2.8 million is expected to be non-deductible for tax purposes. Integration costs related to the Latchways acquisition totaled \$2.5 million (\$1.6 million after tax). These costs are all reported in selling, general and administrative expenses.

The operating results of Latchways and Senscient have been included in our consolidated financial statements from the acquisition date through December 31, 2016. Our results for the year ended December 31, 2016 include Senscient sales of \$2.7 million and a net loss of \$(1.1) million. These results include amortization, primarily related to intangible assets, of \$0.2 million. Our results for the year ended December 31, 2015 include Latchways sales and net loss of \$10.1 million and \$(0.7) million, respectively.

The following unaudited pro forma information presents our combined results as if both acquisitions had occurred at the beginning of 2015. 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 either Latchways or Senscient during the periods presented that are required to be eliminated. Intercompany transactions between Latchways companies as well as Senscient companies during the periods presented have been eliminated in the unaudited pro forma condensed 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) | 2016 | 2015 |
|---|----------|----------|
| Net sales | \$ 1,153 | \$ 1,175 |
| Income from continuing operations | 93 | 75 |
| Basic earnings per share from continuing operations | 2.48 | 2.00 |
| Diluted earnings per share from continuing operations | 2.44 | 1.98 |

The unaudited pro forma condensed 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 condensed 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 table:

| (In thousands) | Pension Benefits | | Other Benefits | |
|--|------------------|----------------|----------------|-----------|
| | 2016 | 2015 | 2016 | 2015 |
| Change in Benefit Obligations | | | | |
| Benefit obligations at January 1 | \$ 491,180 | \$ 519,194 | \$ 22,974 | \$ 26,851 |
| Service cost | 10,417 | 11,517 | 426 | 444 |
| Interest cost | 18,752 | 18,314 | 946 | 863 |
| Participant contributions | 100 | 105 | 222 | 255 |
| Plan amendments | (1,092) | 604 | (400) | — |
| Actuarial (gains) losses | 9,123 | (21,073) | 1,285 | (3,998) |
| Benefits paid | (19,550) | (19,261) | (1,773) | (1,441) |
| Curtailments | (163) | — | — | — |
| Settlements | (381) | (2,094) | — | — |
| Currency translation | (4,389) | (16,126) | — | — |
| Benefit obligations at December 31 | 503,997 | 491,180 | 23,680 | 22,974 |
| Change in Plan Assets | | | | |
| Fair value of plan assets at January 1 | 419,088 | 445,299 | — | — |
| Actual return on plan assets | 31,418 | (4,754) | — | — |
| Employer contributions | 3,878 | 4,058 | 1,551 | 1,186 |
| Participant contributions | 100 | 105 | 222 | 255 |
| Settlements | (381) | (2,094) | — | — |
| Benefits paid | (19,550) | (16,979) | (1,773) | (1,441) |
| Reimbursement of German benefits | — | (2,282) | — | — |
| Administrative Expenses Paid | — | 6 | — | — |
| Currency translation | (1,291) | (4,271) | — | — |
| Fair value of plan assets at December 31 | 433,262 | 419,088 | — | — |
| Funded Status | | | | |
| Funded status at December 31 | (70,735) | (72,092) | (23,680) | (22,974) |
| Unrecognized transition losses | 8 | 12 | — | — |
| Unrecognized prior service (credit) cost | (646) | 525 | (1,505) | (1,524) |
| Unrecognized net actuarial losses | 187,738 | 188,531 | 3,643 | 2,117 |
| Net amount recognized | 116,365 | 116,976 | (21,542) | (22,381) |
| Amounts Recognized in the Balance Sheet | | | | |
| Noncurrent assets | 62,916 | 62,072 | — | — |
| Current liabilities | (4,620) | (5,033) | (1,638) | (1,382) |
| Noncurrent liabilities | (129,031) | (129,131) | (22,042) | (21,592) |
| Net amount recognized | (70,735) | (72,092) | (23,680) | (22,974) |
| Amounts Recognized in Accumulated Other Comprehensive Loss | | | | |
| Net actuarial losses | 187,738 | 188,531 | 3,643 | 2,425 |
| Prior service (credit) cost | (646) | 525 | (1,505) | (1,523) |
| Unrecognized net initial obligation | 8 | 12 | — | — |
| Total (before tax effects) | 187,100 | 189,068 | 2,138 | 902 |
| Accumulated Benefit Obligations for all Defined Benefit Plans | 465,448 | 453,382 | — | — |

| (In thousands) | Pension Benefits | | | Other Benefits | | |
|--|------------------|-----------|----------|----------------|--------|----------|
| | 2016 | 2015 | 2014 | 2016 | 2015 | 2014 |
| Components of Net Periodic Benefit Cost | | | | | | |
| Service cost | \$ 10,417 | \$ 11,517 | \$ 9,425 | \$ 426 | \$ 444 | \$ 538 |
| Interest cost | 18,752 | 18,314 | 19,340 | 946 | 863 | 1,107 |
| Expected return on plan assets | (34,751) | (34,130) | (32,944) | — | — | — |
| Amortization of transition amounts | 2 | 2 | 2 | — | — | — |
| Amortization of prior service (credit) cost | (14) | 66 | 84 | (419) | (335) | (335) |
| Recognized net actuarial losses | 11,921 | 15,545 | 8,639 | 68 | 27 | 182 |
| Settlement loss | 5 | 641 | 290 | — | — | — |
| Termination benefits | — | — | — | — | — | — |
| Net periodic benefit cost | \$ 6,332 | \$ 11,955 | \$ 4,836 | \$ 1,021 | \$ 999 | \$ 1,492 |

Actuarial gains and losses are amortized over the average future working lifetime of the active population in the plan using the projected unit credit method. This approximates 11 years.

Amounts included in accumulated other comprehensive income expected to be recognized in 2017 net periodic benefit costs.

| (In thousands) | Pension Benefits | Other Benefits |
|-----------------------------------|------------------|----------------|
| Loss recognition | \$ 12,255 | \$ 103 |
| Prior service credit recognition | (15) | (288) |
| Transition obligation recognition | 1 | — |

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

| (In thousands) | 2016 | 2015 |
|---|------------|------------|
| Aggregate accumulated benefit obligations (ABO) | \$ 147,531 | \$ 147,864 |
| Aggregate projected benefit obligations (PBO) | 160,543 | 161,009 |
| Aggregate fair value of plan assets | 26,986 | 26,844 |

| | Pension Benefits | | Other Benefits | |
|---|------------------|-------|----------------|-------|
| | 2016 | 2015 | 2016 | 2015 |
| Assumptions used to determine benefit obligations | | | | |
| Average discount rate | 3.67% | 3.92% | 4.05% | 4.20% |
| Rate of compensation increase | 2.99% | 3.06% | — | — |
| Assumptions used to determine net periodic benefit cost | | | | |
| Average discount rate | 3.92% | 3.63% | 4.20% | 3.85% |
| Expected return on plan assets | 8.18% | 8.17% | — | — |
| Rate of compensation increase | 3.06% | 3.03% | — | — |

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 the 2016 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, | |
|---------------------------|--|------|
| | 2016 | 2015 |
| Equity securities | 70% | 67% |
| Fixed income securities | 20 | 24 |
| Pooled investment funds | 5 | 5 |
| Insurance contracts | 4 | 3 |
| Cash and cash equivalents | 1 | 1 |
| 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 following table summarizes our pension plan assets measured at fair value on a recurring basis by fair value hierarchy level (See Note 18):

| (In thousands) | December 31, 2016 | | | |
|---------------------------|---|--|--|------------------------|
| | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) | Total Fair Value |
| Equity securities | \$ 242,161 | \$ 62,299 | \$ — | \$ 304,460 |
| Fixed income securities | 25,109 | 62,667 | — | 87,776 |
| Pooled investment funds | — | 20,156 | — | 20,156 |
| Insurance contracts | — | — | 14,948 | 14,948 |
| Cash and cash equivalents | 5,922 | — | — | 5,922 |
| Total | \$ 273,192 | \$ 145,122 | \$ 14,948 | \$ 433,262 |

| (In thousands) | December 31, 2015 | | | |
|---------------------------|---|--|--|------------------------|
| | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) | Total Fair Value |
| Equity securities | \$ 225,191 | \$ 55,428 | \$ — | \$ 280,619 |
| Fixed income securities | 29,903 | 70,164 | — | 100,067 |
| Pooled investment funds | — | 19,345 | — | 19,345 |
| Insurance contracts | — | — | 13,681 | 13,681 |
| Cash and cash equivalents | 5,376 | — | — | 5,376 |
| Total | \$ 260,470 | \$ 144,937 | \$ 13,681 | \$ 419,088 |

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.

Pooled investment funds consist of mutual and collective investment funds that invest primarily in publicly traded non-U.S. equity and fixed income securities. Pooled investment funds are valued at net asset values calculated by the fund manager based on fair value of the underlying securities. 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.

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 | Other |
|---|------------------------|--------|
| Balance January 1, 2015 | \$ 15,069 | \$ 753 |
| Net realized and unrealized losses included in earnings | (1,526) | (64) |
| Net purchases, issuances and settlements | 138 | (184) |
| Transfers out of Level 3 | — | (505) |
| Balance December 31, 2015 | 13,681 | — |
| Net realized and unrealized gains included in earnings | 975 | — |
| Net purchases, issuances and settlements | 292 | — |
| Transfers out of Level 3 | — | — |
| Balance December 31, 2016 | \$ 14,948 | \$ — |

We expect to make net contributions of \$5.9 million to our pension plans in 2017 which are primarily associated with our International segment.

For the 2016 beginning of the year measurement purposes (net periodic benefit expense), 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 2020 and thereafter. For the 2016 end of the year measurement purposes (benefit obligation), 6.0% increase in the costs of covered health care benefits was assumed decreasing by 0.5% for each successive year to 4.5% in 2021 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 plan expense by approximately \$810 thousand and \$55 thousand, respectively.

Expense for defined contribution pension plans was \$5.1 million in 2016, \$6.8 million in 2015 and \$6.5 million in 2014 .

Estimated pension benefits to be paid under our defined benefit pension plans during the next five years are \$20.9 million in 2017, \$21.6 million in 2018, \$22.2 million in 2019, \$23.7 million in 2020, \$24.6 million in 2021, and are expected to aggregate \$138.5 million for the five years thereafter. Estimated other post-retirement benefits to be paid during the next five years are \$1.7 million in 2017, \$1.7 million in 2018, \$1.9 million in 2019, \$1.8 million in 2020, \$1.9 million in 2021, and are expected to aggregate \$8.1 million for the five years thereafter.

Note 15—Other Income (Loss), Net

| (In thousands) | December 31, | | |
|------------------------------------|--------------|----------|----------|
| | 2016 | 2015 | 2014 |
| Interest income | \$ 2,827 | \$ 1,525 | \$ 1,822 |
| Gain on asset dispositions, net | 593 | 1,724 | 2,094 |
| Other, net | 710 | 836 | (1,101) |
| Disposal of non-core product lines | — | (4,223) | — |
| Impairment of intangible assets | — | (723) | — |
| Land impairment loss | — | — | (50) |
| Total other income (loss), net | \$ 4,130 | \$ (861) | \$ 2,765 |

During the year ended December 31, 2016, we recognized \$2.8 million of income related to interest earned on cash balances and notes receivable from insurance companies. Please refer to Note 19 Contingencies to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for further discussion on the Company's notes receivable from insurance companies.

During the year ended December 31, 2015, we recorded \$4.2 million of losses associated with the disposal of net assets related to the Safety Works business in our Americas segment. A discounted cash flow valuation was also performed and showed that the book value of intangible assets used to support certain non-core product sales exceeded their fair value by \$0.7 million in our Americas segment. Additionally, we recognized a \$2.0 million gain on the sale of property in Australia, which is part of our International segment, as the Company continues to right-size operations and optimize its global footprint.

During the year ended December 31, 2014, we recognized a \$2.2 million gain on the sale of detector tube assets in our International segment. All proceeds associated with this transaction were collected in 2014. Under the terms of the transitional agreements, we continued to manufacture and sell detector tubes on behalf of the buyer until mid-2014.

Note 16—Leases

We lease office space, manufacturing and warehouse facilities, automobiles and other equipment under operating lease arrangements. Rent expense was \$12.6 million in 2016, \$10.8 million in 2015 and \$11.7 million in 2014. Minimum rent commitments under noncancellable leases are \$12.2 million in 2017, \$11.0 million in 2018, \$10.6 million in 2019, \$5.2 million in 2020, \$4.2 million in 2021 and \$7.0 million thereafter.

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 which have the impact of partially offsetting certain foreign currency exposures. We account for these forward contracts on a full mark-to-market basis and report the related gains or losses in currency exchange losses (gains) in the consolidated statement of income. At December 31, 2016, the notional amount of open forward contracts was \$75.3 million and the unrealized gain on these contracts was \$0.3 million. All open forward contracts will mature during the first quarter of 2017.

The following table presents the balance sheet location and fair value of assets and liabilities associated with derivative financial instruments.

| (In thousands) | December 31, | |
|---|--------------|--------|
| | 2016 | 2015 |
| Derivatives not designated as hedging instruments: | | |
| Foreign exchange contracts: other current liabilities | \$ 258 | \$ 581 |
| Foreign exchange contracts: other current assets | 566 | 401 |

The following table presents the income statement location and impact of derivative financial instruments:

| (In thousands) | Income Statement Location | Loss Recognized in Income | |
|--|---------------------------|---------------------------|----------|
| | | Year ended December 31, | |
| | | 2016 | 2015 |
| Derivatives not designated as hedging instruments: | | | |
| Foreign exchange contracts | Currency exchange loss | \$ 6,675 | \$ 2,187 |

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 and the derivative financial instruments described in Note 17. 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 fixed rate long-term debt, we believe that the reported carrying amounts of our financial assets and liabilities approximate their fair values. The reported carrying amount of long-term debt (including the current portion) was \$175 million and \$140 million at December 31, 2016 and 2015, respectively. The fair value of this debt was \$194 million and \$145 million at December 31, 2016 and 2015, 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

The Company categorizes the product liability losses of its subsidiary MSA LLC into two main categories: single incident and cumulative trauma.

Single incident claims. Single incident product liability claims involve incidents of short duration that are typically known to us when they occur and involve observable injuries, which provide an objective basis for quantifying damages. MSA LLC estimates its liability for single incident product liability claims based on expected settlement costs for reported claims and an estimate of costs for unreported claims (claims incurred but not reported or 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 reported and IBNR claims, was \$3.4 million at December 31, 2016 and \$3.5 million at December 31, 2015. Single incident product liability expense during the year ended December 31, 2016 was \$0.8 million and was \$0.9 million for the year ended December 31, 2015. 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 claims. Cumulative trauma product liability claims involve exposures to harmful substances (e.g., silica, asbestos and coal dust) that occurred many 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 is presently named as a defendant in 1,794 lawsuits comprised of 3,023 claims. 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. Although there is year over year variability in the number and quality of claims defended and resolved, MSA LLC’s aggregate spend for cumulative trauma product liability claims (inclusive of settlements and defense costs) for the three years ended December 31, 2016, totaled approximately \$150.9 million, substantially all of which was recorded as insurance receivables because the amounts are believed to be recoverable under insurance.

A summary of cumulative trauma product liability lawsuit and pending claims activity follows:

| | 2016 | 2015 | 2014 |
|--------------------------------|-------|-------|---------|
| Open lawsuits, January 1 | 1,988 | 2,326 | 2,840 |
| New lawsuits | 379 | 340 | 542 |
| Settled and dismissed lawsuits | (573) | (678) | (1,056) |
| Open lawsuits, December 31 | 1,794 | 1,988 | 2,326 |

| | 2016 | 2015 | 2014 |
|------------------------------|---------|---------|---------|
| Pending claims, January 1 | 3,779 | 5,539 | 8,941 |
| New claims | 843 | 465 | 542 |
| Settled and dismissed claims | (1,599) | (2,225) | (3,944) |
| Pending claims, December 31 | 3,023 | 3,779 | 5,539 |

More than half of the open lawsuits at December 31, 2016 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.

Management works with its outside valuation consultant and outside legal counsel to review its cumulative trauma product liability exposure on an annual basis, or more frequently if changing circumstances or developments in existing cases make an interim review appropriate. The review process takes into account the number and composition of pending claims, outcomes of matters resolved during current and prior periods, and variances associated with different plaintiffs’ counsel and venues as well as other information known about the current docket.

Cumulative trauma product liability litigation is inherently unpredictable. Factors that can limit our ability to estimate potential liability include the lack of claims experience with applicable plaintiffs’ counsel, as claims experience can vary significantly among different counsel, low volume of resolution, lack of confidence with the consistency of claims composition, or other factors. With respect to the risk associated with any particular case, it has typically not been until very late in the legal process that it can be reasonably determined whether it is probable that any such case will ultimately result in a liability. This uncertainty is caused by many factors, including consideration of the applicable statute of limitations, the sufficiency of product identification and other defenses. Complaints generally do not provide information sufficient to determine if a lawsuit will develop into an actively litigated case. Even when a case is actively litigated, it is often difficult to determine if the lawsuit will be dismissed or otherwise resolved until late in the lawsuit. Moreover, even if it is probable that such a lawsuit will result in a loss, it is often difficult to estimate the amount of actual loss that will be incurred. These actual loss amounts are highly variable and turn on a case by case analysis of the relevant facts, including the nature of the injury, the jurisdiction in which the claim is filed, the plaintiffs’ counsel and the number of parties in the lawsuit. In addition, there are uncertainties concerning the impact of bankruptcies of other companies that are co-defendants in claims, uncertainties surrounding the litigation process from jurisdiction to jurisdiction and case to case. Consequently, MSA LLC is unable to comprehensively estimate its cumulative trauma product liability exposure.

Currently management, in consultation with its outside valuation consultant and outside legal counsel, has been unable to estimate, and therefore has not recorded any liability, for MSA LLC’s IBNR claims as well as for certain of its existing coal dust claims, including those coal dust claims that arose subsequent to the Couch verdict described below.

At December 31, 2015, MSA LLC established a \$7.1 million cumulative trauma product liability reserve for reported claims. During 2016, we increased this reserve by \$0.4 million to \$7.5 million as of December 31, 2016. The total cumulative trauma product liability reserve, including the estimated reserve for reported claims and settlements that have not yet been paid, totaled \$11.1 million at December 31, 2016. This reserve is recorded in the insurance and product liability line within other current liabilities section of the Consolidated Balance Sheet. To arrive at the estimated reserve, it was necessary to employ significant assumptions. In addition, the reserve does not include amounts which will be spent to defend the claims covered by the reserve. These costs are recognized as incurred.

As noted above, the liability recorded does not take into account any IBNR claims and certain of the currently pending coal dust claims against MSA LLC. These claims have not been included in the reserve due to a lack of claims experience with the applicable plaintiffs' counsel, low volume of resolution, or lack of confidence in the consistency of claims composition, or other factors, which have rendered us unable to reasonably assess the probability and estimate the magnitude of potential losses.

Because litigation is subject to inherent uncertainties, 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 with respect to claims included within the existing reserve or related to claims not included in the reserve. We will adjust the reserve for our liability relating to cumulative trauma claims from time to time based on the maturation of claims, developing facts and circumstances, and if actual experience is worse than previously projected. These adjustments may reflect changes in estimates for claims currently covered by the reserve, as well as estimated liabilities for claims not presently covered by the reserve and IBNR claims, in the event we become able to reasonably assess the probability and estimate the magnitude of potential losses. These adjustments may be material and could increase the year over year variability of our financial results.

On February 26, 2016, a Kentucky state court jury in the James Couch claim rendered a verdict against MSA LLC of \$7.2 million dollars (comprised of \$3.2 million of an apportioned share of compensatory damages and \$4.0 million in punitive damages). The Couch claim is a cumulative trauma product liability lawsuit involving exposure to coal dust. Management believes that the verdict against MSA LLC is inconsistent with Kentucky law and many issues have been raised on appeal, including the statute of limitations, failure to meet the standard of causation and the appropriate application of punitive damages. The Company and its outside legal counsel have concluded that, based on their assessment of the appellate issues, a reversal of the adverse judgment is reasonably possible and, consequently, a loss contingency is not probable at this time and is not included in the \$7.5 million product liability reserve as of December 31, 2016. In the future, if the Company determines that losses with respect to this matter are probable, MSA LLC, consistent with its existing practices, will record an accrual and provide appropriate disclosures as required by ASC 450-20-50, Contingencies. In the event that MSA LLC's appeal of the adverse verdict is unsuccessful or not fully successful, the loss could total the full amount of the verdict, plus additional amounts for post-judgment interest. If so, the \$3.2 million compensatory portion of the verdict (and associated interest) would be added to the product liability reserve and the insurance receivable, to the extent insurance is available. The \$4.0 million punitive portion of the verdict (and associated interest) would be expensed because we do not have insurance to cover punitive damages in this case.

Insurance Receivable

MSA LLC purchased insurance policies for the policy years from 1952-1986 from over 20 different insurance carriers that, subject to some common contract exclusions, provide coverage for cumulative trauma product liability losses and, in many instances, related defense costs (the "Occurrence-Based Policies"). After 1986, MSA LLC's insurance policies have significant per claim deductibles. Based on this, the Company does not expect to be materially reimbursed for any claims alleging exposures that occurred entirely after this date.

In the normal course of business, MSA LLC makes payments to settle product liability claims and for related defense costs and records receivables for the amounts that are covered by insurance. The available limits of the applicable Occurrence-Based Policies exceed the recorded insurance receivable balance. Various factors could affect the timing and amount of recovery of the insurance receivable, including the outcome of negotiations with insurers and the outcome of the coverage litigation with respect to the Occurrence-Based Policies, and the extent to which the issuing insurers may become insolvent in the future.

Insurance receivables at December 31, 2016 totaled \$159.9 million, of which \$2.0 million is reported in prepaid expenses and other current assets and \$157.9 million is reported in insurance receivable and other non-current assets. Insurance receivables at December 31, 2015 totaled \$229.5 million, of which \$2.0 million is reported in prepaid expenses and other current assets and \$227.5 million in insurance receivable and other non-current assets.

A summary of insurance receivable balances and activity related to cumulative trauma product liability losses follows:

| (In millions) | 2016 | 2015 | 2014 |
|---|----------|----------|----------|
| Balance beginning of period | \$ 229.5 | \$ 220.5 | \$ 124.8 |
| Additions | 29.2 | 17.3 | 98.2 |
| Collections and settlements converted to notes receivable | (98.8) | (8.3) | (2.5) |
| Balance end of period | \$ 159.9 | \$ 229.5 | \$ 220.5 |

Additions to insurance receivables in the above table represent insured cumulative trauma product liability losses and related defense costs. Collections and settlements primarily represent agreements with insurance companies to pay amounts due that are applicable to cumulative trauma claims. When there are contingencies embedded in these agreements, we apply payments to the undiscounted receivable in the period when the contingency is met.

In some cases, settlements are converted to formal notes receivable from insurance companies. The notes receivable are recorded as a transfer from the insurance receivable balance to the note receivable, insurance companies (current and noncurrent) in the Consolidated Balance Sheet. In cases where the payment stream covers multiple years and there are no contingencies, the present value of the payments is recorded as a transfer from the insurance receivable balance to the note receivable, insurance companies (current and long-term) in the Consolidated Balance Sheet. Provided the remaining insurance receivable is recoverable through the insurance carriers, no gain or loss is recognized at the time of transfer from insurance receivable to notes receivable from insurance companies.

Notes receivable from insurance companies at December 31, 2016 totaled \$67.3 million, of which \$4.2 million is reported in Notes receivable, insurance companies, current and \$63.1 million is reported in Notes receivable, insurance companies, noncurrent. Notes receivable from insurance companies at December 31, 2015 totaled \$8.7 million, of which \$6.7 million is reported in Notes receivable, insurance companies, current and \$2 million is reported in Notes receivable, insurance companies, noncurrent.

A summary of notes receivable balances from insurance companies is as follows:

| (In millions) | Year Ended December 31, 2016 | Year Ended December 31, 2015 |
|-----------------------------|---------------------------------|---------------------------------|
| Balance beginning of period | \$ 8.7 | \$ 16.2 |
| Additions | 95.6 | 0.5 |
| Collections | (37.0) | (8.0) |
| Balance end of period | \$ 67.3 | \$ 8.7 |

The collectibility of MSA LLC's insurance receivables is regularly evaluated and we believe that the amounts recorded are probable of collection. These determinations are based on analysis of the terms of the underlying insurance policies, experience in successfully recovering cumulative trauma product liability claims from our insurers under other policies, the financial ability of the insurance carriers to pay the claims, understanding and interpretation of the relevant facts and applicable law and the advice of MSA LLC's outside legal counsel. We believe that successful resolution of insurance litigation with various insurance carriers over the years, as well as the recent trial verdict against North River, which resulted in a favorable outcome, demonstrate that we have strong legal positions concerning MSA LLC's rights to coverage. The trial verdict is described below.

Uninsured cumulative trauma product liability losses during the year ended December 31, 2016, 2015, and 2014 were \$0.3 million, \$1.0 million and \$3.9 million, respectively.

Insurance Litigation

MSA LLC is currently involved in insurance coverage litigation with a number of its insurance carriers regarding its Occurrence-Based Policies.

In 2009, MSA LLC (as Mine Safety Appliances Company) sued The North River Insurance Company (North River) in the United States District Court for the Western District of Pennsylvania, alleging that North River breached one of its insurance policies by failing to pay amounts owed to MSA LLC and that it engaged in bad-faith claims handling. MSA LLC believes that North River's refusal to indemnify it under the policy for product liability losses and legal fees paid by MSA LLC is wholly

contrary to Pennsylvania law and MSA LLC is vigorously pursuing the legal actions necessary to collect all due amounts. A trial date has not yet been scheduled.

In 2010, North River sued MSA LLC (as Mine Safety Appliances Company) in the Court of Common Pleas of Allegheny County, Pennsylvania seeking a declaratory judgment concerning their responsibilities under three additional policies. MSA LLC asserted claims against North River for breaches of contract for failures to pay amounts owed to MSA LLC. MSA LLC also alleged that North River engaged in bad-faith claims handling.

On October 6, 2016, a Pennsylvania state court jury found that North River breached the three contracts at issue in the case, and that North River also violated common law standards of bad faith in handling MSA LLC's claims. As a result of the jury's findings, the court entered a verdict in favor of MSA LLC and against North River for \$10.9 million, the full amount of the contractual damages at issue in the case. The \$10.9 million, which is comprised of previously recorded payments to settle product liability claims and related defense costs, is part of MSA LLC's insurance receivable. In addition to the claims decided by the jury, MSA LLC also presented a claim under Pennsylvania's bad faith statute, which is decided by the court. Following the jury verdict, the court also issued a verdict finding that North River had acted in bad faith. In December 2016 and January 2017, the Pennsylvania state court heard evidence regarding the extent of damages awardable as a result of the statutory bad faith claim. In an order dated February 9, 2017, the Court of Common Pleas of Allegheny County awarded MSA LLC an additional \$46.9 million in damages related to this statutory bad faith claim. The \$46.9 million award was comprised of \$30.0 million in punitive damages, \$11.8 million in attorneys' fees, and \$5.1 million in pre-judgment interest, each of which is authorized by a Pennsylvania statute covering bad faith claims handling matters. The court will hear post-trial motions through mid-second quarter.

In July 2010, MSA LLC (as Mine Safety Appliances Company) filed a lawsuit in the Superior Court of the State of Delaware seeking declaratory and other relief from the majority of its excess insurance carriers concerning the future rights and obligations of MSA LLC and its excess insurance carriers under various insurance policies. The reason for this insurance coverage action is to secure a comprehensive resolution of its rights under the insurance policies issued by the insurers. Trial is scheduled for April 2017.

Through negotiated settlements, MSA LLC has resolved claims against certain of its insurance carriers on certain policies. When a settlement is reached, MSA LLC dismisses the settling carrier from the relevant above noted lawsuit(s). Assuming satisfactory resolution, once disputes are resolved with each of the remaining carriers, MSA LLC anticipates having commitments to provide future payment streams which should be sufficient to satisfy its presently recorded insurance receivables due from insurance carriers.

We have determined that at some point in the next 18 months, even if insurance coverage litigation is generally successful, MSA LLC will become largely self-insured for costs associated with cumulative trauma product liability claims. The exact point when this transition will happen is difficult to predict and subject to a number of variables, including the pace at which future cumulative trauma product liability costs are incurred and the results of litigation and negotiations with insurance carriers. After it becomes largely self-insured, MSA LLC may still obtain some insurance reimbursement from negotiated coverage-in-place agreements (although that coverage may not be immediately triggered or accessible) or from other sources of coverage. The precise amount of insurance reimbursement available at that time cannot be determined with specificity at this time.

Note 20—Discontinued Operations

On February 29, 2016, the Company sold 100% of the stock associated with its South African personal protective equipment distribution business and its Zambian operations, which were reported in the International segment.

The Company received \$15.9 million from the closing of this transaction and recorded a loss of approximately \$0.3 million during the first quarter of 2016.

During the second quarter of 2016, the Company corrected its gain calculation on the disposition of the South African personal protective equipment distribution business and its Zambian operations. This resulted in a gain of approximately \$2.5 million being recorded during the second quarter in discontinued operations that should have been recorded in the first quarter of 2016. The Company evaluated materiality in accordance with SEC Staff Accounting Bulletins Topics 1.M and 1.N and considered relevant qualitative and quantitative factors. The Company concluded that this modification was not material to the first quarter of 2016 or the trend in earnings over the affected periods. The modification had no effect on cash flows or debt covenant compliance.

The operations of this business qualify as a component of an entity under FASB ASC 205-20 "Presentation of Financial Statements - Discontinued Operations", and thus the operations have been reclassified as discontinued operations and prior periods have been reclassified to conform to this presentation.

Summarized financial information for discontinued operations is as follows:

| (In thousands) | Year ended December 31, | | |
|---|-------------------------|-----------|-----------|
| | 2016 | 2015 | 2014 |
| Discontinued Operations | | | |
| Net sales | \$ 5,261 | \$ 43,043 | \$ 47,516 |
| Other income, net | 596 | 580 | 660 |
| Cost and expenses: | | | |
| Cost of products sold | 4,819 | 34,764 | 38,259 |
| Selling, general and administrative | 937 | 6,680 | 7,650 |
| Restructuring and other charges | — | 14 | — |
| Currency exchange losses (gains), net | 18 | 266 | (116) |
| Income from discontinued operations before income taxes | 83 | 1,899 | 2,383 |
| Provision for income taxes | 328 | 574 | 607 |
| (Loss) income from discontinued operations, net of tax | \$ (245) | \$ 1,325 | \$ 1,776 |

The following assets and liabilities are included in the balance sheet line items noted below and are included in the International Segment detail in Note 7.

| (In thousands) | December 31, | |
|---|--------------|-----------|
| | 2016 | 2015 |
| Discontinued Operations assets and liabilities | | |
| Trade receivables, less allowance for doubtful accounts | \$ — | \$ 4,832 |
| Inventories | — | 8,499 |
| Net property | — | 449 |
| Other assets | — | 791 |
| Total assets | — | 14,571 |
| Accounts payable | — | 2,745 |
| Accrued and other liabilities | 686 | 748 |
| Total liabilities | 686 | 3,493 |
| Net (liabilities) assets | \$ (686) | \$ 11,078 |

The following summary provides financial information for discontinued operations related to net (income) loss related to noncontrolling interests:

| (In thousands) | Year ended December 31, | | |
|---|-------------------------|----------|----------|
| | 2016 | 2015 | 2014 |
| Net (income) loss attributable to noncontrolling interests | | | |
| (Income) loss from continuing operations | \$ (1,416) | \$ 2,971 | \$ 1,296 |
| Income from discontinued operations | (510) | (108) | (717) |
| Net (income) loss | \$ (1,926) | \$ 2,863 | \$ 579 |

Note 21—Quarterly Financial Information (Unaudited)

| (In thousands, except earnings per share) | 2016 | | | | |
|---|-------------------------------|--------------------|------------|------------|--------------|
| | Quarters | | | | Year |
| | 1st ⁽¹⁾ | 2nd ⁽¹⁾ | 3rd | 4th | |
| Continuing Operations: | | | | | |
| Net sales | \$ 279,268 | \$ 295,998 | \$ 278,233 | \$ 296,031 | \$ 1,149,530 |
| Gross profit | 120,705 | 135,855 | 128,762 | 138,321 | 523,643 |
| Net income attributable to MSA Safety Incorporated | 12,683 | 29,306 | 25,486 | 25,216 | 92,691 |
| Earnings per share ⁽²⁾ | | | | | |
| Basic | 0.34 | 0.78 | 0.68 | 0.67 | 2.47 |
| Diluted | 0.34 | 0.77 | 0.67 | 0.66 | 2.44 |
| Discontinued Operations: | | | | | |
| Net sales | 5,261 | — | — | — | 5,261 |
| Gross profit | 442 | — | — | — | 442 |
| Net (loss) income attributable to MSA Safety Incorporated | (932) | 1,777 | (1,300) | (300) | (755) |
| (Loss) earnings per share ⁽²⁾ | | | | | |
| Basic | (0.03) | 0.05 | (0.04) | (0.01) | (0.02) |
| Diluted | (0.03) | 0.05 | (0.04) | (0.01) | (0.02) |
| 2015 | | | | | |
| (In thousands, except earnings per share) | Quarters | | | | Year |
| | 1st | 2nd | 3rd | 4th | |
| | Continuing Operations: | | | | |
| Net sales | \$ 256,708 | \$ 287,011 | \$ 273,746 | \$ 313,318 | \$ 1,130,783 |
| Gross profit | 116,823 | 130,489 | 119,781 | 134,010 | 501,103 |
| Net income attributable to MSA Safety Incorporated | 9,316 | 23,722 | 15,712 | 20,840 | 69,590 |
| Earnings per share ⁽²⁾ | | | | | |
| Basic | 0.25 | 0.63 | 0.42 | 0.56 | 1.86 |
| Diluted | 0.25 | 0.62 | 0.41 | 0.55 | 1.84 |
| Discontinued Operations: | | | | | |
| Net sales | 11,157 | 11,384 | 11,648 | 8,854 | 43,043 |
| Gross profit | 2,167 | 2,326 | 2,170 | 1,616 | 8,279 |
| Net income attributable to MSA Safety Incorporated | 366 | 576 | 264 | 11 | 1,217 |
| Earnings per share ⁽²⁾ | | | | | |
| Basic | 0.01 | 0.02 | 0.01 | — | 0.03 |
| Diluted | 0.01 | 0.01 | 0.01 | — | 0.03 |

⁽¹⁾ During the second quarter of 2016, the Company corrected its gain calculation on the disposition of the South African personal protective equipment distribution business and its Zambian operations. This resulted in a gain of approximately \$2.5 million being recorded during the second quarter in discontinued operations that should have been recorded in the first quarter of 2016. The Company evaluated materiality in accordance with SEC Staff Accounting Bulletins Topics 1.M and 1.N and considered relevant qualitative and quantitative factors. The Company concluded that this modification was not material to the first quarter of 2016 or the trend in earnings over the affected periods. The modification had no effect on cash flows or debt covenant compliance.

⁽²⁾ 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 Senscient from its assessment of internal control over financial reporting as of December 31, 2016 because it was acquired by the Company in a purchase business combination late in the third quarter of 2016. Senscient 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 17, 2017. 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 “Executive Officers of the Registrant,” 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 of December 31, 2016 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 | 1,576,092 | \$ 37.63 | 1,508,295 * |
| Equity compensation plans not approved by security holders | None | — | None |
| Total | 1,576,092 | 37.63 | 1,508,295 |

*Includes 1,368,638 shares available for issuance under the Amended and Restated 2016 Management Equity Incentive Plan and 139,657 shares available for issuance under the 2008 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.

| | <u>Page</u> |
|---|-------------|
| Management's Report on Responsibility for Financial Reporting and Management's Report on Internal Control Over Financial Reporting | 37 |
| Report of Independent Registered Public Accounting Firm | 38 |
| Consolidated Statement of Income—three years ended December 31, 2016 | 41 |
| Consolidated Statement of Comprehensive Income—three years ended December 31, 2016 | 42 |
| Consolidated Balance Sheet—December 31, 2016 and 2015 | 43 |
| Consolidated Statement of Cash Flows—three years ended December 31, 2016 | 44 |
| Consolidated Statement of Changes in Retained Earnings and Accumulated Other Comprehensive Income—three years ended December 31, 2016 | 45 |
| Notes to Consolidated Financial Statements | 46 |

(a) 2. The following additional financial information for the three years ended December 31, 2016 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) Second Amended and Restated Note Purchase and Private Shelf Agreement dated January 22, 2016 by and among MSA Safety Incorporated, Mine Safety Appliances Company, LLC, and the Purchasers named therein, filed as Exhibit 4.1 to the January 28, 2016 Form 8-K, 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 January 22, 2016), filed as Exhibit 4(b) to Form 10-K on February 25, 2015, is incorporated herein by reference.
- 4(c) 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 January 22, 2016), filed as Exhibit 4(c) to Form 10-K on February 25, 2015, is incorporated herein by reference.
- 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 November 27, 2013, is incorporated herein by reference.
- 10(e)* 2008 Non-Employee Directors' Equity Incentive Plan, as amended through November 27, 2013, filed as Exhibit 10(e) to Form 10-K on February 24, 2014, 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) Second Amended and Restated Credit Agreement dated as of December 9, 2015 by and among MSA Safety Incorporated, the guarantors party thereto, the lenders party thereto, and PNC Bank, National Association, as administrative agent for the lenders, filed as Exhibit 10.1 to Form 8-K on December 11, 2015, is incorporated herein by reference.
- 16 Letter of PricewaterhouseCoopers LLP, dated November 24, 2014, regarding change in independent registered public accounting firm, filed as of Exhibit 16.1 to Form 8-K filed on November 24, 2014, is incorporated herein by reference.
- 21 Affiliates of the registrant is filed herewith.
- 23.1 Consent of Ernst & Young LLP, independent registered public accounting firm is filed herewith.
- 23.2 Consent of PricewaterhouseCoopers LLP, independent registered public accounting firm is filed herewith.
- 31.1 Certification of William M. Lambert 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.(S)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 28, 2017 (Date) | By | /s/ WILLIAM M. LAMBERT William M. Lambert Chairman, 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/ WILLIAM M. LAMBERT William M. Lambert | Chairman, President and Chief Executive Officer | February 28, 2017 |
| /s/ KENNETH D. KRAUSE Kenneth D. Krause | Vice President, Chief Financial Officer and Treasurer | February 28, 2017 |
| /s/ ROBERT A. BRUGGEWORTH Robert A. Bruggeworth | Director | February 28, 2017 |
| /s/ ALVARO GARCIA-TUNON Alvaro Garcia-Tunon | Director | February 28, 2017 |
| /s/ DIANE M. PEARSE Diane M. Pearse | Director | February 28, 2017 |
| /s/ REBECCA B. ROBERTS Rebecca B. Roberts | Director | February 28, 2017 |
| /s/ JOHN T. RYAN III John T. Ryan III | Director | February 28, 2017 |
| /s/ L. EDWARD SHAW, JR. L. Edward Shaw, Jr. | Director | February 28, 2017 |
| /s/ THOMAS H. WITMER Thomas H. Witmer | Director | February 28, 2017 |

MSA SAFETY INCORPORATED AND AFFILIATES
VALUATION AND QUALIFYING ACCOUNTS
THREE YEARS ENDED DECEMBER 31, 2016

| | 2016 | 2015 | 2014 |
|--------------------------------------|-----------------------|----------|----------|
| | <i>(In thousands)</i> | | |
| Allowance for doubtful accounts: | | | |
| Balance at beginning of year | \$ 8,189 | \$ 7,821 | \$ 7,306 |
| Additions— | | | |
| Charged to costs and expenses | 1,471 | 1,676 | 1,249 |
| Deductions— | | | |
| Deductions from reserves, net (1)(2) | 4,050 | 1,308 | 734 |
| Balance at end of year | 5,610 | 8,189 | 7,821 |
| Income tax valuation allowance: | | | |
| Balance at beginning of year | \$ 5,153 | \$ 3,763 | \$ 4,938 |
| Additions— | | | |
| Charged to costs and expenses (3) | 150 | 1,390 | — |
| Deductions— | | | |
| Deductions from reserves (3) | — | — | 1,175 |
| Balance at end of year | \$ 5,303 | \$ 5,153 | \$ 3,763 |

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

(2) Activity for 2016, 2015 and 2014 includes currency translation (losses) of \$(203), \$(535) and \$(332), respectively.

(3) Activity for 2016, 2015 and 2014 includes currency translation gains (losses) of \$113, \$392 and \$(643), respectively.

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Directors and Corporate Officers

Board of Directors

John T. Ryan III (3) (4) (5) (6)

Retired (2008); formerly Chief Executive Officer and Chairman of the Company (Retired, as Chairman, May 2015)

Robert A. Bruggeworth (1) (2)

President and Chief Executive Officer, Qorvo, Inc. (high-performance RF components and compound semiconductors manufacturer); Director, Qorvo, Inc.

Alvaro Garcia-Tunon (1) (4) (6)

Retired (2012); formerly Executive Vice President and Chief Financial Officer, Wabtec Corporation (supplier of technology-based products and services for rail, transit and other global industries); Director, Matthews International Corp.; Director, Allison Transmission Holdings, Inc.

William M. Lambert (3)

Chairman (as of May 2015), President and Chief Executive Officer of the Company; Director, Kennametal Inc.

Diane M. Pearse (1) (2) (4) (6)

Chief Executive Officer and President, Hickory Farms, LLC (a specialty foods company)

Rebecca B. Roberts (2) (5)

Retired (2011); formerly President of Chevron Pipe Line Company; Director, Black Hills Corporation; Director, Enbridge Inc.

L. Edward Shaw, Jr. (4) (5) (6)

Retired (2010); formerly Senior Managing Director, Breeden Capital Management LLC (investment management and multidisciplinary professional services firm); Director, HealthSouth Corporation

Thomas H. Witmer (1) (2) (3) (5)

Lead Director; Retired (1998); formerly President and Chief Executive Officer, Medrad, Inc. (manufacturer of medical devices)

(1) Member of the Audit Committee

(2) Member of the Compensation Committee

(3) Member of the Executive Committee

(4) Member of the Finance Committee

(5) Member of the Nominating and Corporate Governance Committee

(6) Member of the Law Committee

Officers

William M. Lambert

Chairman, President and Chief Executive Officer

Kenneth D. Krause

Vice President, Chief Financial Officer and Treasurer

Joakim Birgersson

Corporate Vice President and General Manager, Europe

Steven C. Blanco

Corporate Vice President and General Manager, Northern North America

Kerry M. Bove

Senior Vice President and Chief Strategy Officer

Gavan C. M. Duff

Vice President, Chief Operating Officer, Latchways

R. Anne Herman

Vice President of Global Operational Excellence and Chief Customer Officer

Ronald N. Herring, Jr.

Senior Vice President and President, MSA International

Douglas K. McClaine

Senior Vice President, Secretary and Chief Legal Officer

Paul R. Uhler

Senior Vice President and Chief Human Resource Officer

Nishan J. Vartanian

Senior Vice President and President, MSA Americas

Markus H. Weber

Vice President; Chief Information Officer

Organization



Anne Herman



Gavan Duff

In 2016 **Anne Herman** was elected Chief Customer Officer and Vice President of Global Operational Excellence, responsible for MSA's global manufacturing operations and customer satisfaction. A 32-year veteran of MSA, Ms. Herman most recently served as Chief Customer Officer and Executive Director of Global Quality, where she led the implementation of several new global processes focused on quality and enhancing the overall MSA customer experience. In 2013, Ms. Herman was recognized by The Manufacturing Institute, Deloitte, the University of Phoenix, and the Society of Manufacturing Engineers as one of 122 women in the United States who are making meaningful contributions to the manufacturing industry.

In her role as Chief Customer Officer, Ms. Herman succeeds **Gavan Duff**, who was promoted to Vice President and Chief Operating Officer of Latchways plc. Latchways is a leading innovator in fall protection systems and solutions, which MSA acquired in 2015. As Vice President and COO of Latchways, Mr. Duff is responsible for developing and leading MSA's global business strategy for fall protection. A 20-year veteran of MSA, Mr. Duff led MSA's integration of Latchways, which achieved annual sales of \$58 million in 2016, reflecting a 24 percent increase over the prior year.

Honoring the 15th Anniversary of 9/11

Immediately following the terrorist attacks on 9/11, MSA worked around the clock to provide on-site expertise and more than \$3 million worth of safety equipment to New York City firefighters and first responders tasked with rescue and recovery efforts at the World Trade Center disaster site.

To honor the 15th anniversary of 9/11 and the 2,996 individuals who lost their lives on that horrific day, MSA rang the Closing Bell® of the New York Stock Exchange on September 7, 2016. *(Right photo)* Shown in front, from left to right, are Chief Ronald Siarnicki, Executive Director of the National Fallen Firefighters Foundation (NFFF); Ronald N. Herring, Jr., Senior Vice President and President of MSA International; Judy Colfer, Manager of Transportation for MSA Americas, who escaped the 55th floor of the World Trade Center's North Tower that morning; William M. Lambert, Chairman, President and CEO; Jim Byrne, Head of U.S. Listings at the New York Stock Exchange; Commissioner Joseph Finn of the Boston Fire Department; Lee Ielpi, Board President of the September 11th Families' Association; and Kenneth D. Krause, Vice President, Chief Financial Officer and Treasurer.

Shown in back, from left to right, are Dave McArthur, Executive Director of Marketing for MSA Americas; Tom Jeramaz, MSA First Responder Sales Manager for the New York metropolitan area; and Nishan J. Vartanian, Senior Vice President and President of MSA Americas. Dave and Tom led MSA's on-site support mission at Ground Zero on 9/11 and for several months thereafter.



(Left photo) MSA's visit to the New York Stock Exchange showcased the company's deep and long-standing commitment to the fire service. As a symbol of the strength of that commitment, members of MSA's executive team hold commemorative Cairns® Helmets that were presented to the company's special guests in attendance that day.

Section 302 Certifications and NYSE CEO Certification

In June 2016, the Company's Chief Executive Officer submitted to the New York Stock Exchange the annual certification as to compliance with the Exchange's Corporate Governance Listing Standards required by Section 303A.12(a) of the Exchange's Listed Company Manual. The certification was unqualified.

The Company's reports filed with the Securities and Exchange Commission during the past year, including the Annual Report on Form 10-K for the year ended December 31, 2016, have contained the certifications of the Company's Chief Executive Officer and Chief Financial Officer regarding the quality of the Company's public disclosure required by Section 302 of the Sarbanes-Oxley Act.

Shareholders' Inquiries

Additional copies of the company's 2016 Annual Report, including Form 10-K, as filed with the Securities and Exchange Commission, may be obtained by shareholders after April 7, 2017. Printed and electronic versions are available. Requests should be directed to the Chief Financial Officer, who can be reached at one of the following:

Phone: 724-741-8270
Internet: www.MSAafety.com
U.S. Mail: MSA
Chief Financial Officer
1000 Cranberry Woods Drive
Cranberry Township, PA 16066



1000 Cranberry Woods Drive
Cranberry Township, PA 16066

724-776-8600

www.MSAafety.com