Quad/Graphics, Inc.
Form 10-K
February 21, 2018
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K
T ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2017
or
¨ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to
Commission File Number 001-34806
QUAD/GRAPHICS, INC.
(Exact name of registrant as specified in its charter)

Wisconsin	39-1152983
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
N61 W23044 Harry's Way, Sussex, Wisconsin 53089-3995	(414) 566-6000
(Address of principal executive offices) (Zip Code)	(Registrant's telephone number, including area code)

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

Title of Class	Name of Each Exchange on Which Registered
Class A Common Stock, par value $0.025 per share	The New York Stock Exchange, LLC

Securities registered pursuant to Section 12(g) of the Act: None
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes x 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 x
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No ¨
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes x No ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements 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, smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer x	Accelerated filer o
Non-accelerated filer o	Smaller reporting company o
(Do not check if a smaller reporting company)	Emerging growth company o

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ¨ No x
The aggregate market value of the class A common stock (based on the closing price of $22.92 per share on the New York Stock Exchange, LLC) on June 30, 2017, the last business day of the registrant's most recently completed second fiscal quarter, held by non-affiliates was $702,668,352. The registrant's class B common stock is not listed on a national securities exchange or traded in an organized over-the-counter market, but each share of the registrant's class B common stock is convertible into one share of the registrant's class A common stock.
Indicate the number of shares outstanding of each of the issuer's classes of common stock as of the latest practicable date.

Class	Outstanding as of February 16, 2018
Class A Common Stock	38,866,987
Class B Common Stock	13,841,703
Class C Common Stock	—

DOCUMENTS INCORPORATED BY REFERENCE
Portions of the Proxy Statement for the registrant's 2018 Annual Meeting of Shareholders are incorporated by reference into Part III of this Form 10-K.

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Forward-Looking Statements

To the extent any statements in this Annual Report on Form 10-K contain information that is not historical, these statements are forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements relate to, among other things, the objectives, goals, strategies, beliefs, intentions, plans, estimates, prospects, projections and outlook of Quad/Graphics, Inc. (the "Company" or "Quad/Graphics"), and can generally be identified by the use of words such as "may," "will," "expect," "intend," "estimate," "anticipate," "plan," "foresee," "believe" or "continue" or the negatives of these terms, variations on them and other similar expressions. In addition, any statements that refer to expectations, projections or other characterizations of future events or circumstances are forward-looking statements.

These forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties and other factors, some of which are beyond the control of the Company. These risks, uncertainties and other factors could cause actual results to differ materially from those expressed or implied by those forward-looking statements. Among risks, uncertainties and other factors that may impact Quad/Graphics are those described in Part I, Item 1A, "Risk Factors," of this Annual Report on Form 10-K, as such may be amended or supplemented in Part II, Item 1A, "Risk Factors," of the Company's subsequently filed Quarterly Reports on Form 10-Q, and the following:

- The impact of decreasing demand for printed materials and significant overcapacity in the highly competitive commercial printing industry creates downward pricing pressures and potential under-utilization of assets;
- The impact of electronic media and similar technological changes, including digital substitution by consumers;
- The inability of the Company to reduce costs and improve operating efficiency rapidly enough to meet market conditions;
- The impact of changing future economic conditions;
- The failure of clients to perform under contracts or to renew contracts with clients on favorable terms or at all;
- The impact of increased business complexity as a result of the Company's transformation to a marketing solutions provider;
- The impact of regulatory matters and legislative developments or changes in laws, including changes in cyber-security, privacy and environmental laws;
- The impact of fluctuations in costs (including labor and labor-related costs, energy costs, freight rates and raw materials) and the impact of fluctuations in the availability of raw materials;
- The failure to attract and retain qualified production personnel;
- The impact of changes in postal rates, service levels or regulations;
- The fragility and decline in overall distribution channels, including newspaper distribution channels;
- The failure to successfully identify, manage, complete and integrate acquisitions and investments;
- The impact of risks associated with the operations outside of the United States, including costs incurred or reputational damage suffered due to improper conduct of its employees, contractors or agents;

- Significant capital expenditures may be needed to maintain the Company's platform and processes and to remain technologically and economically competitive;
- The impact of the various restrictive covenants in the Company's debt facilities on the Company's ability to operate its business;
- The impact on the holders of Quad/Graphics' class A common stock of a limited active market for such shares and the inability to independently elect directors or control decisions due to the voting power of the class B common stock; and
- The impact of an other than temporary decline in operating results and enterprise value that could lead to non-cash impairment charges due to the impairment of property, plant and equipment and other intangible assets.

Quad/Graphics cautions that the foregoing list of risks, uncertainties and other factors is not exhaustive and you should carefully consider the other factors detailed from time to time in Quad/Graphics' filings with the United States Securities and Exchange Commission ("SEC") and other uncertainties and potential events when reviewing the Company's forward-looking statements.

Because forward-looking statements are subject to assumptions and uncertainties, actual results may differ materially from those expressed or implied by such forward-looking statements. You are cautioned not to place undue reliance on such statements, which speak only as of the date of this Annual Report on Form 10-K. Except to the extent required by the federal securities laws, Quad/Graphics undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

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PART I

Item 1. Business

Overview

Quad/Graphics is a leading marketing solutions provider. The Company leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. With a consultative approach, worldwide capabilities, leading-edge technology and single-source simplicity, the Company believes it has the resources and knowledge to help a wide variety of clients in multiple vertical industries, including retail, publishing and healthcare.

Quad/Graphics was founded in Pewaukee, Wisconsin, as a Wisconsin corporation, in 1971 by the late Harry V. Quadracci. As of December 31, 2017, the Company had approximately 21,100 full-time equivalent employees in North America, South America, Europe and Asia, and served a diverse base of approximately 6,900 clients from 147 facilities located in 17 countries, as well as investments in printing operations in Brazil and India.

The Company is on a transformative journey that it describes in evolutions. Each new evolution expands the Company's offerings and creates enhanced value for its clients. Quad 1.0 covered a period of tremendous organic growth that began with its founding in 1971. During this 40-year period, the Company grew rapidly through greenfield growth, built a premier manufacturing and distribution platform equipped with the latest technology, established its reputation as one of the industry's foremost innovators and created a Company culture based on strong values that remains in place today.

Quad 2.0 began in 2010 and continues today with Quad/Graphics' ongoing role as a disciplined industry consolidator. Quad/Graphics saw an opportunity to participate in industry consolidation in response to economic and industry pressures following the Great Recession of 2008 and 2009, which severely impacted print volumes. Through a series of consolidating acquisitions, the Company was able to enhance and expand its product offerings, while removing inefficient and underutilized capacity, pulling out costs and transitioning work to more efficient facilities.

Quad 3.0 evolved when the seismic shifts in today's multichannel marketing environment provided the opportunity for Quad/Graphics to expand its offering as a marketing solutions provider to create greater value for its clients in two distinct ways:

- The Company will continue to leverage its strong print foundation and expand its integrated marketing platform to help marketers and content creators create, integrate, deploy and measure content more efficiently and effectively.

- To fuel Quad 3.0, the Company is supported by an engaged workforce with the latest in manufacturing technology to drive continued productivity improvements. The Company believes this will strengthen its core manufacturing platform to be the strongest and most sustainable platform in the industry, with the goal of remaining the industry's high-quality, low-cost producer.

More information regarding Quad/Graphics is available on the Company's website at www.QG.com. Quad/Graphics is not including the information contained on or available through its website as part of, or incorporating such information by reference into, this Annual Report on Form 10-K. The Company's Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those reports are made available to the public at no charge through a link appearing on the Company's website. Quad/Graphics provides access to such materials through its website as soon as reasonably practicable after electronically filing such material

with, or furnishing it to, the SEC.

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Industry and Competition

According to a September 2017 Dun & Bradstreet First Research report, the U.S. advertising services industry is forecasted to grow at an annual compounded rate of 4% between 2017 and 2021, as compared to the printing industry which is in secular decline. This opportunity for growth supports Quad/Graphics' 3.0 transformation and a review of both the marketing services and printing industries is set forth below.

The marketing services industry is highly fragmented. According to the September 2017 Dun & Bradstreet First Research report, the top 50 companies in the U.S. advertising and marketing services industry generate less than 40% of industry revenue. Services in this industry include advertising for print, broadcast and online media (about 25% of industry sales); public relations (12%); and direct marketing (10%). Other services include display advertising, media buying (reselling advertising time or space), and media representation (selling advertising time or space on behalf of media outlet owners). The U.S. advertising and marketing services industry includes about 38,000 establishments (single-location companies and units of multi-location companies), with combined annual revenue of about $100 billion.

The commercial print industry is also highly fragmented. According to the June 2017 Printing in the U.S. IBISWorld industry report, the United States commercial printing industry, in the aggregate, generates an estimated $76 billion in annual revenue, employs nearly 400,000 people and is comprised of approximately 46,000 companies. The report also states that the four largest printing companies account for less than 15% of total commercial print industry annual revenue in the United States, with Quad/Graphics being the second largest. Although there has been significant industry consolidation, particularly in the past decade, the largest 400 U.S. printers represent less than half of the total industry revenue in the U.S., according to the December 2017 Printing Impressions PI400 rankings.

In addition to being highly fragmented, competition in the printing industry remains intense, and the Company believes that there are indicators of heightened competitive pressures. The industry has excess manufacturing capacity created by continued declines in industry volumes which, in turn, have created accelerated downward pricing pressures. The Company faces competition due to the increased accessibility and quality of digital alternatives to traditional delivery of printed documents through the online distribution and hosting of media content, and the digital distribution of documents and data. The Company faces competition from print management firms that look to streamline processes and reduce the overall print spend of the Company's clients. The Company believes the commercial print industry has moved toward a demand for shorter print runs, faster product turnaround and increased production efficiency of products with lower page counts and increased complexity. This, combined with increases in postage expenses and the increased use of alternative digital marketing technologies, has led to excess manufacturing capacity in the print industry, and this excess capacity has allowed certain larger printers, like Quad/Graphics, with economies of scale, strong balance sheets and access to capital markets, the ability to install more efficient equipment, take advantage of consolidating acquisition opportunities to remove excess, inefficient and/or underutilized capacity, and reduce overall costs.

Competition in both the marketing services and print industries is affected by real gross domestic product growth, as economic activity and advertising spending are key drivers of consumer demand. In times of economic prosperity, advertisers may increase spending to build brand awareness and to drive sales. Conversely, in times of global economic uncertainty and budget pressures, advertisers may reduce spending or shift their spend to other forms of media. For print specifically, magazine publishers, facing diminished advertising pages, reduce total page counts; catalog marketers reduce page counts, circulation and frequency of print campaigns; retailers curb investments in store inventory and cut back on retail insert newspaper circulation and advertising; and other advertisers reduce their direct mail volume, particularly in the banking, insurance, credit card, real estate and nonprofit industries. It is possible that these customers instead decide to move advertising spend to digital alternatives.

Marketing services providers face pressure to satisfy major clients' needs, as the win or loss of a major client account can impact revenue significantly. Another challenge facing marketing service providers relates to public concern and general annoyance with advertising methods. For example, data collection of personal information for marketing purposes is an issue under scrutiny from federal legislation, and marketing service providers can face restrictions on certain types of data they collect.

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The Company faces competition in the advertising and marketing services industry based on access to a skilled workforce, pricing, adapting quickly to new technology, creating unique and effective campaigns and offering superior customer service. Across Quad/Graphics' range of printed products, competition is based on total price of printing, materials and distribution; quality; distribution capabilities; customer service; access to a highly skilled workforce; availability to schedule work on appropriate equipment; on-time production and delivery; and state-of-the-art technology to meet a client's business objectives, including the ability to adopt new technology quickly.

As consumer media consumption habits change, marketing services providers face increased demand to offer complete marketing services across both traditional and digital channels. As new advertising channels emerge, marketing services providers must offer not only traditional marketing services, such as for television, newspapers, print publications and radio, but they must also offer services for digital channels, such as mobile, internet search, internet display and video, to create effective multichannel campaigns for their clients.

Quad/Graphics believes that traditional business users of print and print-related services are focused on generating and tracking the highest returns on their marketing spend. The Company believes that its clients receive the greatest return on their marketing and advertising dollars when they effectively use data to go after the appropriate customers and integrate digital alternatives with customized print products in a targeted, multichannel marketing campaign driven by an overall marketing strategy. Quad/Graphics believes it is well positioned to help its clients navigate through this changing media landscape and create innovative ways to connect online and offline channels.

Seasonality

The Company is subject to seasonality in its quarterly results as net sales and operating income are higher in the third and fourth quarters of the calendar year as compared to the first and second quarters. The fourth quarter is typically the highest seasonal quarter for cash flows from operating activities and Free Cash Flow due to the reduction of working capital requirements that reach peak levels during the third quarter. Seasonality is driven by increased magazine advertising page counts, retail inserts, catalogs and books primarily due to back-to-school and holiday-related advertising and promotions. The Company expects this seasonality impact to continue.

Strategy

Quad/Graphics believes employee pride, combined with a relentless quest to create a better way, builds the opportunity to invent new ideas that drive improved performance and shared success for all. To accomplish this vision, Quad/Graphics remains focused on its consistent mission to achieve the following:

Walk in the Shoes of Clients

The Company reinforces that all employees, regardless of job title, are part of Quad/Graphics' client experience team. As such, all employees are responsible for meeting the needs of its clients every day, making it easy to work with Quad/Graphics, and making the client experience enjoyable at every touchpoint. In Quad 3.0, the Company is focused on supplementing client print-execution conversations with consultative solutions that will improve a client's business through process efficiencies and marketing spend effectiveness. To accomplish this, a key component of Quad/Graphics' client-facing strategy is to strengthen relationships at different levels inside a client's organization so the Company can better understand, anticipate and satisfy a client's needs. In Quad 3.0, Quad/Graphics seeks to become an invaluable strategic partner for its clients, helping them successfully navigate today's constantly changing multichannel media landscape through innovative data-driven solutions, created and executed across multiple channels. The Company also believes its proactive thought leadership in key issues facing its clients, such as integrating marketing services and postal reform, will foster loyalty to the Quad/Graphics brand.

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Grow the Business Profitably

Key components of this strategy center on Quad/Graphics' ability to grow in Quad 3.0, at a time when industry headwinds continue, and are as follows:

- Ongoing innovation and investment to integrate offline and online media, in support of the Company's Quad 3.0 value proposition of helping clients create, integrate, deploy and measure content more efficiently and market more effectively. This includes process investments to help clients optimize workflows through audit and discovery services; streamlined content creation to help reduce overall production and distribution costs and improve speed-to-market; and platform investments in variable printing and data management to bridge the traditional analog and digital marketing worlds to help clients precisely segment, execute and measure more personal, one-on-one relevant brand experiences via multichannel campaigns that engage consumers at the right place and time to generate greater market penetration and lift in response.

- Organic growth, in which the Company leverages knowledge from existing client relationships in key growth vertical industries to develop complementary products and services that help brand owners market more efficiently and effectively across media channels. Quad/Graphics is also focused on ensuring it has the right talent in the best positions to have strategic marketing conversations with its clients that facilitate understanding their needs, developing tailored solutions and growing market share.

- Disciplined acquisitions, that take many different forms. For example, the Company intends to continue to transform its existing product lines while expanding into higher growth product and service categories that help bolster the Company's ability to create value for its clients, as well as pursue value-driven industry consolidating acquisitions and/or acquisitions that help accelerate the Company's transformation in Quad 3.0.

Strengthen the Core

Quad/Graphics uses a disciplined return on capital framework and historically has made significant investments in its print manufacturing platform and data management capabilities that have resulted in what it believes is the most integrated, automated, efficient, innovative and modern manufacturing platform and distribution network in the industry. The Company's continued focus to strengthen its core manufacturing platform through investments to streamline, automate and improve efficiencies and throughput, while reducing labor costs, promotes sustainable cash flow and continued value creation. Further, a commitment to Lean Enterprise and a disciplined culture of continuous improvement is a high priority throughout the Company and supports its goal of strengthening the production and distribution functions for core product lines to remain the industry's high-quality, low-cost producer.

Engage Employees

Quad/Graphics' strategy to engage employees builds upon its mission to attract, retain and develop employees throughout their entire career journey with the Company. All three elements combine to support Quad/Graphics' ongoing Quad 3.0 transformation, and build on key aspects of its distinct and transparent corporate culture. This includes strong and lasting Company values, an organization-wide entrepreneurial spirit and opportunity-seeking mentality where employees are encouraged to take pride and ownership in their work, take advantage of continuous learning programs to advance in their careers, share knowledge by mentoring others and innovate solutions to drive performance. With the encouragement to do things differently, be something greater and create a better way, the Company believes its employees are more fully engaged in producing better results for clients and advancing the Company's strategic goals, while supporting community activities, initiatives and organizations that impact the quality of life near Quad/Graphics facilities. As Quad/Graphics continues to expand its integrated marketing platform in Quad 3.0, the Company believes this creates possibilities for each employee that are advantageously distinct from

other employers.

Enhance Financial Strength and Create Shareholder Value

Quad/Graphics follows a disciplined approach to maintaining and enhancing financial strength to create shareholder value, which is essential given ongoing printing industry challenges. This key strategic goal is centered on the Company's ability to maximize net earnings, Free Cash Flow and operating margins; maintain consistent financial policies to ensure a strong balance sheet, liquidity level and access to capital; and retain the financial flexibility needed to strategically allocate and deploy capital as circumstances change. The priorities for capital allocation and deployment are adjusted based on prevailing circumstances and what the Company thinks is best for shareholder value creation at any particular point in time. Those priorities currently include the following: (1) deleveraging the Company's balance sheet through debt and pension liability reductions; (2) making compelling investments that drive profitable organic growth and productivity in the Company's current business, as well as executing on acquisitions through a disciplined approach that includes expansion into higher-growth products and services that help accelerate the Company's transformation in Quad 3.0, and pursuing value-driven industry consolidation; and (3) returning capital to shareholders through dividends and share repurchases.

Competitive Advantages

Quad/Graphics' primary strategic goals are powered by three key competitive advantages that the Company believes distinguishes itself from its competitors: a commitment to ongoing innovation, a commitment to platform excellence, and a commitment to its people and lasting culture.

Commitment to Ongoing Innovation

At the forefront of innovation for more than 46 years, Quad/Graphics believes its commitment to ongoing innovation drives its vision to create a better way.

In Quad 3.0, the Company will continue to innovate through an expanded integrated marketing platform to help clients create, integrate and measure offline and online media more efficiently and effectively. One of the ways the Company will achieve this vision is through continued expansion of its BlueSoHo business, which offers multichannel marketing services with an emphasis on helping brands work smarter, produce faster and be more agile. As an independent brand, BlueSoHo also enables Quad/Graphics to capture new business among brand owners who understand the benefits of fully orchestrated cross-media programs. Specifically, BlueSoHo helps plan, produce and activate marketing campaigns in the channels most likely to drive engagement and response with the goal of turning shoppers into buyers and buyers into loyal brand advocates. To strengthen its integrated marketing platform, Quad/Graphics seeks out strategic partnerships with companies on the cutting edge of digital marketing. These partnerships bring together a company that is an expert at optimizing spend offline, with companies that are doing the same online, using robust analytics to deliver highly-relevant, consistent messages—at scale—to consumers across print and digital channels.

To further support its marketing solutions thought leadership, Quad/Graphics conducts annual quantitative research called, Customer Focus®™. This extensive survey, conducted by a third party, provides consumer insight on singular and integrated media usage. The survey reveals the unique characteristics of special demographic, generational, gender and socio-economic groups and how they consume advertising and marketing messaging, and their attitudes and engagement preferences in a number of industry segments. According to survey data, print remains a strong driver across generations. This active response to print has influenced magazine publishers to increase usage of custom product covers to enhance reader engagement and retailers who primarily use digital channels—such as online-only retailers, or electronic-retailers—to incorporate print into their marketing strategy. Further, Quad/Graphics is able to combine the insights from Customer Focus®™ and use its proprietary segmentation tool, called Accelerated Insights®, to leverage client data and create hyper-personalized online and offline campaigns. The ability to generate content that

is relevant to the consumer is one way the Company believes it can help its clients influence consumer behavior, lift response and enhance return on investment.

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In Quad 3.0, the Company remains committed to innovation throughout its print manufacturing and distribution processes to better serve its clients and remain the industry's high-quality, low-cost producer. Over the last five years, Quad/Graphics has invested an average of 2.7% of its annual net sales for capital expenditures. This investment has resulted in what the Company believes is the most advanced and efficient platform in the industry and has allowed the Company to reduce the amount invested in recent years without impacting its leading technological excellence.

To improve internal processes, enhance client service levels and further drive efficiencies, the Company has consistently focused on the rapid adoption of technological innovations. In the early years, the Company integrated its imaging, manufacturing and distribution networks into a single platform using a networked information technology infrastructure. This platform—connected via Quad/Graphics' own Smartools® proprietary enterprise resource planning ("ERP") system—provides seamless, real-time information flow across sales and estimating, production planning, scheduling, manufacturing, warehousing, logistics, invoicing, reporting and customer service. In Quad 3.0, the Company extended its spirit of innovation with business process management tools that further simplify and improve existing internal workflows. This includes pricing, job specifications and client acceptance to streamlining and automating the hand-offs between departments throughout the entire order workflow through invoicing. Quad/Graphics has also applied robotic process automation to automatable tasks to streamline data processing and report generation. This allows employees to focus on value-adding tasks, while the robotic process completes the transactional, repetitive functions. Quad/Graphics also leverages artificial intelligence ("AI") where appropriate, for example in labor management, scheduling and predictive maintenance where AI is used to better predict when machine maintenance is needed.

A commitment to innovation and creating a better way to do business has also helped to expand Quad/Graphics vertically-integrated non-print capabilities, such as data management, imaging, logistics and distribution, ink manufacturing (Chemical Research\Technology), paper procurement, and equipment research and design. This approach to business gives the Company a competitive advantage in delivering lower costs for its clients, enhancing customer service levels and allowing substantial control over critical links in the overall print supply chain to help it control the quality, cost and availability of key inputs in the printing process. In addition, QuadMed, the Company's health and wellness subsidiary, was founded in 1990 to create a better way to address the Company's own employees' needs for quality, cost-effective healthcare. Today, QuadMed provides employer-sponsored healthcare solutions on a national level to employers of all sizes, including private and public sector companies. These solutions include, but are not limited to, on-site and near-site healthcare clinics, occupational health services, telemedicine, and health and wellness programs.

Commitment to Platform Excellence

Quad/Graphics continues to invest in equipment and leading-edge technology to ensure its manufacturing platform remains the strongest and most sustainable in the printing industry and that it continues to support a vast range of traditional and digital print solutions, finishing techniques and distribution capabilities to create value for its clients in Quad 3.0. At the same time, the Company has continued to strengthen its platform by removing excess, under-utilized capacity and by consolidating work into facilities where it can achieve the greatest manufacturing and distribution efficiencies. Over the past seven years, the Company has closed 41 manufacturing plants representing nearly 13 million square feet of under-utilized production capacity. This commitment to consolidating work into fewer facilities to maximize capacity is one key way Quad/Graphics maintains platform excellence and remains the industry's high-quality, low-cost producer.

The Company has continuously invested in its print manufacturing platform through modern equipment and automation, which reduces labor costs, maximizes labor productivity and increases throughput. The Company's investment in its manufacturing platform has consistently been based on evaluating the economic useful life of the underlying equipment rather than focusing on the potential mechanical life of the equipment. This discipline is critical

in an industry in which technological change can create obsolescence well before the end of the mechanical life of equipment. To remain the industry's high-quality, low-cost producer, Quad/Graphics makes a concerted effort to treat all costs as variable and maintains a stringent focus on achieving productivity improvements and sustainable cost reductions through a variety of Continuous Improvement and Lean Enterprise programs in both manufacturing and administrative areas.

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Another key aspect of the Company's modern manufacturing platform is the combination of its footprint of mega plants (facilities greater than one million square feet) that produce a number of different products under one roof; mega zones where multiple facilities in close geographic proximity are managed as one large facility; and smaller strategically located facilities. The Company has continued to evolve its platform by equipping facilities to be product line agnostic, which enables the Company to maximize equipment utilization. Quad/Graphics believes that the large plant size of certain of its key printing facilities allows the Company to drive savings in certain product lines (such as publications and catalogs) due to economies of scale and from investments in automation and technology.

Quad/Graphics is also able to leverage the volume of products running through its plants for further client distribution savings by coordinating and consolidating shipments from single mega plants or multiple plants that create a mega zone, and then routing those shipments directly to thousands of local newspapers, United States Postal Service ("USPS") processing facilities or other distribution facilities. In addition, each major United States metropolitan area is within one day's drive of at least one of the Company's strategically located facilities, providing its clients the flexibility to print closest to their end consumers.

Postal rates are a significant component of many clients' cost structures, and Quad/Graphics believes that postal costs influence the number of pieces that its clients print and mail. Therefore, the Company has invested significantly in its mail preparation and distribution capabilities to mitigate increasing postage costs, and to help clients successfully navigate the ever-changing postal environment. The Company performs an analysis of mail list data as part of its logistics services, which allows it to reduce client freight costs for shipments to newsstands and postal centers, while providing a high level of dependability and rapid response times that are crucial to the delivery of time-sensitive materials. Further, the Company manages mail distribution of most of its clients' products to maximize efficiency and reduce these costs, and its co-mail program is the largest in the print industry, based on information published by or otherwise made available from competitors. Quad/Graphics' co-mail program involves the sorting and bundling of printed products to be mailed to consumers, in order to facilitate better integration with the USPS. In return, the USPS offers significant work-sharing discounts for this sorting, bundling and drop-shipping. Quad/Graphics co-mailed approximately 4.0 billion publications, catalogs and direct marketing pieces in 2017. Due to the continuously increasing costs of utilizing the USPS and to help control costs for its customers, Quad/Graphics has launched a pilot project revolving around alternate delivery strategies for customers' products that result in Quad/Graphics managing delivery directly to the consumer and bypassing the USPS as a delivery method.

The Company is in the midst of a three-year plan to transform some of its platform from conventional web offset presses to modern digital presses that will give marketers and publishers a full range of options to produce and deliver relevant direct mail and other commercial products faster and more cost-effectively. For example:

- The Company has invested in its technology-enabled direct mail platform to provide innovative front-end toolsets and data workflows; industry-best back-end logistics and postal optimization; and a diverse production platform that is highly leveraged on personalization technologies serving the needs of today's leading marketers. Personalization and targeting create the opportunity to reach the right recipients with a relevant message at the right time which, in turn, helps its clients increase consumer response rates, maximize their return on print spending and reduce overall costs. Built over many years, Quad/Graphics' data-driven, one-to-one direct marketing platform includes in-house capabilities to analyze mailing list data, demographic data, consumer transaction data and other consumer-specific data to help its clients create targeted and personalized printed materials.

- The Company also continues to transform its book platform through the rapid implementation of digital press technology and integrated systems, and the creation of On-Q™, a proprietary demand-driven ordering system that helps clients better manage ordering and inventory. Quad/Graphics is helping book publishers with increased customization and versioning capabilities; faster time-to-market; reduced waste, inventories and obsolescence; and lower fixed costs.

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- Recent investments in digital press technology for QuadPackaging, the Company's high-end folding carton packaging business, has enabled it to enter markets in which it previously was not as competitive, such as private label packaging. With its digital press platform, QuadPackaging is able to cost-competitively accommodate shorter runs with quicker turns.

Commitment to People and Lasting Culture

Quad/Graphics believes that its employees do not just make a difference—they are the difference. The Company believes this is a key competitive advantage that is not easily replicated by its competitors given its long-standing culture.

Quad/Graphics believes that its distinct corporate culture, which evolved from a core set of values conceived by the late founder Harry V. Quadracci, drives thoughtful decision-making, especially with regard to its disciplined approach to managing operations, creating solutions that redefine print in a multichannel media marketplace, and better positioning the Company to prevail in the dynamic and competitive printing industry. The Company fosters an entrepreneurial environment by inspiring and empowering employees to own projects and enact solutions that advance the Company's goals. Employees in the United States also may have a beneficial ownership interest in Quad/Graphics through Company stock held in an employee stock ownership plan, enhancing their sense of ownership. The Company believes that it is this sense of employee engagement and distinct corporate culture that drives its disciplined approach to all aspects of its business.

The Company demonstrates its commitment to employee engagement in a variety of ways, including the following:

- Offering employees a competitive compensation and benefits package;
- Providing employees with a safe work environment with robust safety training and accountability programs;
- Offering continuous learning and career advancement opportunities, such as through registered mechanical and electrical apprenticeship programs, youth apprenticeship programs, the Company's own Accelerated Career Training program for production employees, digital media training, affinity groups and leadership development training;
- Promoting employee health and wellness through a variety of personal improvement programs and facilities, including the Company's own QuadMed primary care clinics;
- Acting on employee feedback garnered through regular surveys and open forums at department and company-wide meetings;
- Offering an employee referral program and investing in technology and improved processes to facilitate an easy hiring and on-boarding process; and
- Fostering pride through employee recognition programs, employee and family events, community outreach activities and support, a history of environmental commitments, such as effective management of resources and reducing waste, and adhering to a published code of ethics.

Quad/Graphics is led by an experienced management team with a proven track record in the printing industry that is committed to preserving the Company's values-based culture. The senior management team includes individuals with long tenure with the Company augmented with seasoned industry talent realized through strategic hiring or recent acquisitions, further supplemented by managers and employees committed to advancing print solutions in coordination with the ever-evolving multichannel media landscape. The Company believes the experience and

stability of senior management, paired with next-generation entrepreneurially minded employees, will contribute to its long-term success as it continues on its path forward.

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Quad/Graphics also enjoys a competitive advantage in consistent, stable leadership that is focused on making decisions in the best long-term interest of the Company. It is able to do this because of the Quadracci family voting control, which enables the Company to manage its strategy and disciplined financial policy by being able to make decisions today that could benefit the Company years from now and avoid the pitfalls of short-term decision making that could potentially jeopardize the stability and longevity of the Company.

Quad/Graphics' leaders believe in a disciplined financial approach to maximize earnings and Free Cash Flow, and to maintain a strong balance sheet. Continuous Improvement and Lean Manufacturing methodologies are among the tools that Quad/Graphics uses to improve manufacturing productivity, simplify and streamline processes and to ultimately maximize operating margins. The Company applies these same methodologies to its selling, general and administrative functions to create a truly Lean Enterprise. The Company has been working diligently to lower its cost structure by consolidating its manufacturing platform into its most efficient facilities, as well as realizing purchasing, mailing and logistics efficiencies by centralizing and consolidating print manufacturing volumes and eliminating redundancies in its administrative and corporate operations. Quad/Graphics believes that its focused efforts to be the high-quality, low-cost producer generates increased Free Cash Flow and allows the Company to maintain a strong balance sheet through debt and pension liability reductions. The Company's disciplined financial approach also allows it to maintain sufficient liquidity as well as to reduce refinancing risk, with the nearest significant debt maturity not occurring until January 2021.

Segments

Quad/Graphics is a leading marketing solutions provider. The Company leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. The Company's operating and reportable segments are aligned with how the chief operating decision maker of the Company currently manages the business. The Company's operating and reportable segments, including their product and service offerings, and a "Corporate" category are as follows:

- United States Print and Related Services
- International
- Corporate

United States Print and Related Services

The United States Print and Related Services segment is predominantly comprised of the Company's United States printing operations and is managed as one integrated platform. This includes retail inserts, publications, catalogs, special interest publications, journals, direct mail, books, directories, in-store marketing and promotion, packaging, newspapers, custom print products, other commercial and specialty printed products and global paper procurement, together with marketing and other complementary services, , including consumer insights, audience targeting, personalization, media planning and placement, process optimization, campaign planning and creation, pre-media production, videography, photography, digital execution, print execution and logistics. This segment also includes the manufacture of ink. The United States Print and Related Services segment accounted for approximately 91%, 91% and 92% of Quad/Graphics' consolidated net sales in 2017, 2016 and 2015, respectively.

International

The International segment consists of the Company's printing operations in Europe and Latin America, including operations in England, France, Germany, Poland, Argentina, Colombia, Mexico and Peru, as well as investments in

printing operations in Brazil and India. This segment provides printed products and marketing and other complementary services consistent with the United States Print and Related Services segment. The International segment accounted for approximately 9%, 9% and 8% of the Company's consolidated net sales in 2017, 2016 and 2015, respectively.

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Corporate

Corporate consists of unallocated general and administrative activities and associated expenses including, in part, executive, legal and finance, as well as certain expenses and income from frozen employee retirement plans, such as pension benefit plans.

For additional financial information by segment and geographic area, see Note 21, "Segment Information," and Note 22, "Geographic Area and Product Information," to the consolidated financial statements, respectively, in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. For a discussion of the risks attendant to the Company's foreign operations, see the risk factor titled "There are risks associated with the Company's operations outside of the United States" in Item 1A, "Risk Factors," of this Annual Report on Form 10-K.

Clients

Quad/Graphics enjoys long-standing relationships with a diverse base of clients, which includes both national and regional corporations in North America, South America, Europe and Asia. The Company's clients include industry-leading blue chip companies that operate in a wide range of industries and serve both businesses and consumers, including retailers, publishers and direct marketers. The Company's relationships with its largest clients average around 20 years in duration.

In 2017, Quad/Graphics served approximately 6,900 clients, and its 10 largest clients accounted for approximately 16% of consolidated sales, with none representing more than 5% individually. The Company believes that its large and diverse client base, broad geographic coverage and extensive range of printing and print-related capabilities are competitive strengths.

Patents, Trademarks and Trade Names

Quad/Graphics operates research and development facilities that support the development of new equipment, process improvements, raw materials and content management, and distribution technologies to better meet client needs and improve operating efficiencies. The Company continues to innovate within the printing and print-related industry and, as a result, has developed what it believes to be one of the most powerful patent portfolios in the print industry.

Quad/Graphics currently holds or has rights to commercialize a wide variety of worldwide patents and applications relating to its business. The Company intends to continue to file patent applications that it believes will help ensure the continued strength of the Company and its portfolio. Additionally, the Company markets products, services and capabilities under a number of trademarks and trade names. Quad/Graphics aggressively defends its intellectual property rights and intends to continue to do so in the future.

Raw Materials

The primary raw materials that Quad/Graphics uses in its print business are paper, ink and energy. At this time, the Company's supply of raw materials is readily available from numerous vendors; however, based on market conditions, that could change in the future. The Company generally buys these raw materials based upon market prices that are established with the vendor as part of the procurement process.

The majority of paper used by the Company is supplied directly by its clients. For those clients that do not directly supply their own paper, the Company makes use of its purchasing efficiencies to supply paper by negotiating with leading paper vendors, uses a wide variety of paper grades, weights and sizes, and does not rely on any one vendor. In addition, the Company generally includes price adjustment clauses in sales contracts for paper and other critical raw

materials in the printing process. Although these clauses generally mitigate paper price risk, higher paper prices and tight paper supplies may have an impact on client demand for printed products. The Company's working capital requirements, including the impact of seasonality, are partially mitigated through the direct purchasing of paper by its clients.

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The Company produces the majority of ink used in its print production, allowing it to control the quality, cost and supply of key inputs. Raw materials for the ink manufacturing process are purchased externally from a variety of vendors.

The Company generally cannot pass on to clients the impact of higher electric and natural gas energy prices on its manufacturing costs, and increases in energy prices result in higher manufacturing costs for certain of its operations. The Company mitigates its risk through natural gas hedges when appropriate. In its logistic operations, however, the Company is able to pass a substantial portion of any increase in fuel prices directly to its clients.

Environmental Stewardship

As the owner, lessee or operator of various real properties and facilities, Quad/Graphics is subject to various federal, state and local environmental laws and regulations, including those relating to air emissions; waste generation, handling, management and disposal; sanitary and storm water discharge; and remediation of contaminated sites. Historically, compliance with these laws and regulations has not had a material adverse effect on the Company's results of operations, financial position or cash flows. Compliance with existing or new environmental laws and regulations may require the Company to make future expenditures.

Quad/Graphics strives to be the leader in the printing industry in adopting new technologies and processes to minimize the Company's impact on the environment. The Company believes it has long been known for its environmental stewardship. Quad/Graphics' proactive approach to incorporate holistic practices has also positively impacted operating costs through the reduction of waste, energy use, and emissions, as well as through the implementation of water conservation solutions. The Company has also undertaken steps to reduce greenhouse gas emissions from its manufacturing processes and to improve fuel efficiency and reduce emissions in its fleet of Company-owned tractor trailers.

Employees

As of December 31, 2017, Quad/Graphics had approximately 21,100 full-time equivalent employees in North America, South America, Europe and Asia. Within the United States, there were approximately 17,400 full-time equivalent employees, of which approximately 600 were covered by a collective bargaining agreement. Outside of the United States, there were approximately 3,700 full-time equivalent employees, of which approximately 1,200 were either governed by an industry-wide agreement, by a collective bargaining agreement or through a works council or similar arrangement. Quad/Graphics believes that its employee relations are good and that the Company maintains an employee-centric culture.

Business Acquisitions

There were no acquisitions completed during the year ended December 31, 2017. For additional information related to the Company's prior acquisition activity, see Note 2, "Acquisitions and Strategic Investments," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K.

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Executive Officers of Quad/Graphics

The following table sets forth the names, ages (as of February 16, 2018) and positions of Quad/Graphics' executive officers.

Name	Age	Position
J. Joel Quadracci	49	Chairman, President and Chief Executive Officer
Eric N. Ashworth	52	Executive Vice President of Product Solutions and Market Strategy, and President of BlueSoHo
Renee B. Badura	54	Executive Vice President of Sales
David A. Blais	55	Executive Vice President of Global Procurement and Platform Strategy
Thomas J. Frankowski	57	Executive Vice President and Chief Operating Officer
David J. Honan	49	Executive Vice President and Chief Financial Officer
Jennifer J. Kent	46	Executive Vice President of Administration and General Counsel
Kelly A. Vanderboom	43	Executive Vice President, President of Logistics and Treasurer
Steven D. Jaeger	53	Vice President and Chief Information Officer
Anne M. Bauer	53	Executive Director and Chief Accounting Officer

Mr. Quadracci has served as the Chairman, President and Chief Executive Officer of Quad/Graphics since January 2010. He previously served as President and Chief Executive Officer from July 2006 to January 2010, President from January 2005 to July 2006 and has served as a director of Quad/Graphics since 2003. Mr. Quadracci joined Quad/Graphics in 1991 and, prior to becoming President and Chief Executive Officer, served in various capacities, including Sales Manager, Regional Sales Strategy Director, Vice President of Print Sales, Senior Vice President of Sales & Administration, and President and Chief Operating Officer. Mr. Quadracci is the brother of Kathryn Quadracci Flores, a director of the Company, and the brother-in-law of Christopher B. Harned, a director of the Company.

Mr. Ashworth has served as Executive Vice President of Product Solutions and Market Strategy, and President of BlueSoHo since April 2016. He previously served as President of BlueSoHo and Media Solutions from August 2015 to April 2016. Prior to joining Quad/Graphics, Mr. Ashworth was President of SGK, Inc. (formerly Schawk, Inc.) from July 2012 to July 2015, Chief Growth and Strategy Officer of SGK from September 2009 to July 2012 and Global Chief Growth Officer of Anthem Worldwide (a division of SGK) from November 2003 to September 2009. Prior thereto, Mr. Ashworth was Co-founder and President of BlueMint Associates from June 2002 through November 2003, after serving in various marketing related roles since 1992.

Ms. Badura has served as Executive Vice President of Sales since June 2015. She previously served as Vice President of Omnichannel Sales Strategy from February 2014 to June 2015, as Regional Vice President of Sales-Midwest for Marketing Solutions from January 2012 to February 2014, as Vice President of Sales - East Coast for Magazines and Catalogs from April 2007 to December 2011, as Vice President of Sales - West Coast from January 2004 to March 2007 and in various other capacities since she joined Quad/Graphics in 1986.

Mr. Blais has served as Executive Vice President of Global Procurement and Platform Strategy since March 2014. He previously served as Executive Vice President of Sales and Client Services from January 2012 to March 2014 and as Executive Vice President and President of Magazines and Catalogs from July 2010 to January 2012. Mr. Blais was Senior Vice President of Sales & Administration from May 2005 to July 2010, Quad/Graphics' Vice President of Operations from 1999 to May 2005 and in various other capacities since he joined Quad/Graphics in 1984.

Mr. Frankowski has served as Executive Vice President and Chief Operating Officer since March 2014. He previously served as Executive Vice President of Manufacturing Operations and President of Europe from July 2010 to March 2014. Prior thereto, Mr. Frankowski was Senior Vice President of Manufacturing from 2004 to July 2010, President of Quad/Graphics Europe, Quad/Graphics' Polish subsidiary, from 2008 to July 2010, and he served in various other capacities since he joined Quad/Graphics in 1979.

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Mr. Honan has served as Executive Vice President and Chief Financial Officer since January 2015. He previously served as Vice President and Chief Financial Officer from March 2014 to January 2015, Vice President and Chief Accounting Officer from July 2010 to March 2014, Vice President and Corporate Controller from December 2009 to July 2010 and as the Company's Corporate Controller from when he joined Quad/Graphics in May 2009 until December 2009. Prior to joining Quad/Graphics, Mr. Honan served as Vice President, General Manager and Chief Financial Officer of Journal Community Publishing Group, a subsidiary of media conglomerate Journal Communications Inc., for five years. Before joining Journal Community Publishing Group, Mr. Honan worked in executive-level roles in investor relations and corporate development at Newell Rubbermaid, a global marketer of consumer and commercial products. Prior thereto, Mr. Honan worked at the accounting firm Arthur Andersen LLP for 11 years.

Ms. Kent has served as Executive Vice President of Administration and General Counsel since June 2015. She previously served as Vice President and General Counsel from December 2013 to June 2015 and as the Company's Assistant General Counsel from when she joined Quad/Graphics in August 2010 until December 2013. Prior to joining Quad/Graphics, Ms. Kent held various positions in the legal department at Harley-Davidson Motor Company from March 2003 to July 2010. Prior thereto, Ms. Kent served as an Assistant United States Attorney for the Eastern District of Wisconsin and practiced law at Foley & Lardner LLP, a Milwaukee-based law firm.

In February 2018, Mr. Vanderboom was promoted to Executive Vice President, President of Logistics and Treasurer. He previously served as Vice President and Treasurer and President of Logistics from March 2014 to February 2018, Quad/Graphics' Vice President & Treasurer from 2008 to March 2014 and as its Treasurer from 2007 to 2008. Prior to becoming Quad/Graphics' Treasurer, Mr. Vanderboom served as Director of Treasury, Risk & Planning from 2006 until 2007, as Controller of Quad/Graphics' Distribution and Facilities departments from 2004 until 2006, and in various other capacities since he joined Quad/Graphics in 1993.

Mr. Jaeger has served as Vice President and Chief Information Officer since November 2015. He previously served as Executive Vice President, President of Direct Marketing and Chief Information Officer from November 2014 to November 2015, as Executive Vice President, President of Direct Marketing and Media Solutions and Chief Information Officer from March 2014 to November 2014, as Corporate Vice President of Information and Technology for Quad/Graphics since 2013, Vice President of Information Systems and Infrastructure from 2007 to 2012 and as President of Quad/Direct since August 2007. Prior thereto, Mr. Jaeger had been Quad/Graphics' Vice President of Information Systems from 1998 to 2006 and had worked in various other capacities since he joined the Company in 1994. Prior to joining Quad/Graphics, Mr. Jaeger worked for Andersen Consulting for eight years.

Ms. Bauer has served as Executive Director and Chief Accounting Officer since March 2017. She previously served as Director - Corporate Controller of the Company from May 2016 until March 2017. She joined the Company in September 2011, serving as Director of Corporate Accounting until May 2016. Prior to joining Quad/Graphics, Ms. Bauer held various accounting positions at Journal Communications, Inc. during her 18 years there, including Vice President and Controller from June 2000 until September 2011.

Executive officers of the Company are elected by and serve at the discretion of the Company's Board of Directors. Other than described above, there are no family relationships between any directors or executive officers of Quad/Graphics.

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Item 1A. Risk Factors

You should carefully consider each of the risks described below, together with all of the other information contained in this Annual Report on Form 10-K, before making an investment decision with respect to Quad/Graphics' securities. If any of the following risks develop into actual events, the Company's business, financial condition or results of operations could be materially and adversely affected, and you may lose all or part of your investment.

Quad/Graphics operates in a highly competitive industry.

Quad/Graphics operates primarily in the commercial print portion of the printing industry. The printing industry, with approximately 46,000 companies in the United States, is highly fragmented and competitive. Although there has been significant industry consolidation, particularly in the past decade, the largest 400 U.S. printers represent less than half of the total industry revenue in the U.S., according to the December 2017 Printing Impressions PI400 rankings. As such, the Company competes for business not only with large and mid-sized printers, but also with smaller regional printers and the growing forms of digital alternatives to print. In certain circumstances, due primarily to factors such as freight rates and client preference for local services, printers with better access to certain regions of a given country may be preferred by clients in such regions.

The printing industry continues to experience a reduction in demand for printed materials and overcapacity due to various factors including the Great Recession of 2008 and 2009, which severely impacted volumes, and competition from alternative sources of communication, including email, electronic readers, interactive television and electronic retailing and other digital formats. Specifically, there is a sustained and increasing shift of digital substitution by marketers and advertisers, to both replace and augment campaigns that were historically focused on print. The impacts of overcapacity and intense competition have led to continued downward pricing pressures. Printing industry revenues may continue to decrease in the future. Some of the industries that the Company services have been subject to consolidation efforts, leading to a smaller number of potential clients. Furthermore, if the smaller clients of Quad/Graphics are consolidated with larger companies using other printing companies, the Company could lose its clients to competing printing companies.

The advertising and marketing services industries are highly competitive and are expected to remain so. The U.S. advertising and marketing services industry includes about 38,000 establishments (single-location companies and units of multi-location companies), with combined annual revenue of about $100 billion. Any failure on the part of the Company to compete effectively in the markets it serves could have a material adverse effect on its results of operations, financial condition or cash flows and could require changes to the way it conducts its business or require it to reassess strategic alternatives involving its operations.

Significant downward pricing pressure and decreasing demand for printing services caused by factors outside of the Company's control may adversely affect the Company.

The Company has experienced significant downward pricing pressures for printing services in the past, and pricing for printing services has declined significantly in recent years. Such pricing may continue to decline from current levels. In addition, demand for printing services has decreased in recent years and may continue to decrease. Any increases in the supply of printing services or decreases in demand could cause prices to continue to decline, and prolonged periods of low prices, weak demand and/or excess supply could have a material adverse effect on the Company's business growth, results of operations and liquidity.

The impact of electronic media and similar technological changes, including the substitution of printed products for digital content, may continue to adversely affect the results of the Company's operations.

The media landscape is experiencing rapid change due to the impact of electronic media and digital content on printed products. Improvements in the accessibility and quality of digital media through the online distribution and hosting of media content, mobile technologies, e-reader technologies, electronic retailing and the digital distribution of documents and data has resulted and may continue to result in increased consumer substitution. Continued consumer acceptance of such digital media, as an alternative to print materials, is uncertain and difficult to predict and may

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decrease the demand for the Company's printed products, result in reduced pricing for its printing services and additional excess capacity in the printing industry, and adversely affect the results of the Company's operations.

As competition increases among retail-based customers, they may enter into business combinations or alliances and establish companies in other market segments to expand their businesses. In addition, new and enhanced technologies, including search, web and infrastructure computing services, digital content, and electronic devices, affect the customers' reliance on the use of printed materials. The internet facilitates competitive entry and comparison shopping, and the reliance on digital retailing may reduce the Company's sales and profits.

Quad/Graphics may not be able to reduce costs and improve its operating efficiency rapidly enough to meet market conditions.

Because the markets in which the Company competes are highly competitive, Quad/Graphics will need to continue to improve its operating efficiency in order to maintain or improve its profitability. There can be no assurance that the Company's continuing cost reduction efforts will continue to be beneficial to the extent anticipated, or that the estimated productivity, cost savings or cash flow improvements will be realized as anticipated or at all. If the Company's efforts are not successful, it could have an adverse effect on the Company's operations and competitive position. In addition, the need to reduce ongoing operating costs have and, in the future, may continue to result in significant up-front costs to reduce workforce, close or consolidate facilities, or upgrade equipment and technology.

Future declines in economic conditions may adversely affect the Company's results of operations.

In general, demand for the Company's products and services is highly related to general economic conditions in the markets Quad/Graphics' clients serve. Declines in economic conditions in the United States or in other countries in which the Company operates may adversely impact the Company's financial results, and these impacts may be material. Because such declines in demand are difficult to predict, the Company or the industry may have increased excess capacity as a result. An increase in excess capacity has resulted, and may continue to result, in declines in prices for the Company's products and services. In addition, a prolonged decline in the global economy and an uncertain economic outlook has and could further reduce the demand in the printing industry. Economic weakness and constrained advertising spending have resulted, and may in the future result, in decreased revenue, operating margin, earnings and growth rates and difficulty in managing inventory levels and collecting accounts receivable. The Company has experienced, and expects to experience in the future, excess capacity and lower demand due to economic factors affecting consumers' and businesses' spending behavior. Uncertainty about future economic conditions makes it difficult for the Company to predict results of operations, financial position and cash flows and to make strategic decisions regarding the allocation and deployment of capital.

Quad/Graphics' business depends substantially on customer contract renewals and/or customer retention. Any contract non-renewals, renewals on different terms and conditions or decline in the Company's customer retention or expansion could materially adversely affect Quad/Graphics' results of operations, financial condition and cash flows.

The Company has historically derived a significant portion of its revenue from long-term contracts with significant clients as the Company progresses through Quad 3.0. If the Company loses significant clients, is unable to renew such contracts on similar terms and conditions, or at all, or is not awarded new long-term contracts with important clients in the future, its results of operations, financial condition and cash flows may be adversely affected.

The Company is exposed to risks of loss in the event of nonperformance by its clients. Some of the Company's clients are highly leveraged or otherwise subject to their own operating and regulatory risks. Even if the Company's credit review and analysis mechanisms work properly, the Company may experience financial losses and loss of future business if its clients become bankrupt, insolvent or otherwise are unable to pay the Company for its work performed.

Any increase in the nonpayment or nonperformance by clients could adversely affect the Company's results of operations and financial condition.

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Certain industries in which the Company's clients operate are experiencing consolidation. When client consolidation occurs, it is possible that the volume of work performed by the Company for a client after the consolidation will be less than it was before the consolidation or that the client's work will be completely moved to competitors. In addition, new and enhanced technologies, including search, web and infrastructure computing services, digital content, and electronic devices, may affect customers. The internet facilitates competitive entry and comparison shopping, and the reliance on digital retailing may reduce customers' volume. Any such reduction or loss of work could adversely affect the Company's results of operations and financial condition.

Quad/Graphics' transformation to a marketing solutions provider increases the complexity of the Company's business, and if the Company is unable to successfully adapt its business processes as required by these new markets, the Company will be at a competitive disadvantage and its ability to grow will be adversely affected.

As the Company expands its integrated marketing platform, the overall complexity of the Company's business increases at an accelerated rate and the Company becomes subject to different market dynamics. The new markets into which Quad/Graphics is expanding, or may expand, may have different characteristics from the markets in which the Company historically competed. These different characteristics may include, among other things, demand volume requirements, demand seasonality, product generation development rates, client concentrations and performance and compatibility requirements. The Company's failure to make the necessary adaptations to its business model to address these different characteristics, complexities and new market dynamics could adversely affect the Company's operating results.

Quad/Graphics may suffer a data-breach of sensitive information. If Quad/Graphics' efforts to protect the security of such information are unsuccessful, any such failure may result in costly government enforcement actions and private litigation, and the Company's sales and reputation could suffer.

Quad/Graphics and its clients are subject to various United States and foreign cyber-security laws, which require the Company to maintain adequate protections for electronically held information. The Company may not be able to anticipate techniques used to gain access to Quad/Graphics' systems or facilities, the systems of the Company's clients or vendors, or implement adequate prevention measures. Moreover, unauthorized parties may attempt to access Quad/Graphics' systems or facilities, or the systems of the Company's clients or vendors, through fraud or deception. In the event and to the extent that a data breach occurs, such breach could have an adverse effect on the Company's business and results of operations. Complying with these various laws could cause Quad/Graphics to incur substantial costs or require changes to the Company's business practices in a manner adverse to Quad/Graphics' business.

Quad/Graphics may be adversely affected by increases in its operating costs, including the cost and availability of raw materials, labor-related costs, fuel and other energy costs and freight rates.

The primary raw materials that Quad/Graphics uses in its print business are paper, ink and energy. The price of such raw materials has fluctuated over time and has caused fluctuations in the Company's net sales and cost of sales. This volatility may continue and Quad/Graphics may experience increases in the costs of its raw materials in the future as prices in the overall paper, ink and energy markets are expected to remain beyond its control.

The majority of paper used by the Company is supplied by its clients. For those clients that do not directly supply their own paper, the Company generally includes price adjustment clauses in sales contracts for paper and other critical raw materials in the printing process. Although these clauses generally mitigate paper price risk, higher paper prices and tight paper supplies may have an impact on client demand for printed products. If Quad/Graphics passes along increases in the cost of paper and the price of the Company's products and services increases as a result, client demand could be adversely affected, and thereby, negatively impact Quad/Graphics' financial performance. If the Company is unable to continue to pass along increases in the cost of paper to its clients, future increases in paper costs would

adversely affect its margins and profits.

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Due to the significance of paper in the Company's print business, it is dependent on the availability of paper. In periods of high demand, certain paper grades have been in short supply, including grades used in the Company's business. In addition, during periods of tight supply, many paper producers allocate shipments of paper based upon historical purchase levels of customers. Additionally, the declining number of paper suppliers in the United States and Canada has resulted in a contraction in the overall paper manufacturing industry. This contraction of suppliers may cause overall supply issues, may cause certain paper grades to be in short supply or unavailable, and may cause paper prices to substantially increase.

The U.S. Department of Commerce and the International Trade Association are in the process of conducting an investigation into determining if U.S. based manufacturers of uncoated groundwood paper are being disadvantaged as compared to their Canadian competitors due to subsidies from the federal government of Canada. Additionally, the investigation is looking into allegations the Canadian paper manufacturers are improperly exporting less expensive paper into the United States. If the United States Department of Commerce decides to impose a countervailing duty and/or an anti-dumping duty, suppliers for uncoated groundwood paper have announced that they will add these duties to the price of their products.

Those costs could be passed along directly to the consumers of uncoated groundwood paper. This is compounded by the fact that, currently, the United States paper manufacturers only are capable of supplying approximately one-third of the demand for uncoated groundwood paper in the United States. The other two-thirds is supplied by Canadian mills. Therefore, U.S.-based producers have to import a substantial portion of their uncoated groundwood paper needs. The end result is U.S. based producers may be required to pay any resulting higher prices or reduce their demand for uncoated groundwood paper to meet the supply that is available from U.S. paper mills. This could lead to a significant drop in demand for products printed on uncoated groundwood paper in the United States.

Although historically Quad/Graphics generally has not experienced significant difficulty in obtaining adequate quantities of paper, continued decline in suppliers, changes as referenced above in United States import or trade regulations, or other unforeseen developments in the overall paper markets could result in a decrease in the supply of paper and could adversely affect the Company's revenues or profits. In addition, the Company may not be able to resell waste paper and other by-products or the prices received for their sale may decline substantially.

Quad/Graphics is dependent upon the vendors within the Company's supply chain to maintain a steady supply of inventory, parts and materials. Many of the Company's products are dependent upon a limited number of vendors, and significant disruptions could adversely affect operations. Under recent market conditions, including the tightening credit market, it is possible that one or more of the Company's vendors will be unable to fulfill their operating obligations due to financial hardships, liquidity issues or other reasons related to the prolonged market recovery.

The Company generally cannot pass along increases in the cost of ink and energy to its clients. If the Company is unable to pass along increases in the cost of ink and energy, future increases in these items would adversely affect its margins and profits. Even if Quad/Graphics is able to pass along increases in the costs of ink and energy and the price of the Company's products and services increases as a result, client demand could be adversely affected, and thereby, negatively impact Quad/Graphics' financial performance.

Labor represents a significant component of the cost structure of Quad/Graphics. Increases in wages, salaries and benefits, such as medical, dental, pension and other post-retirement benefits, may impact the Company's financial performance. Changes in interest rates, investment returns or the regulatory environment may impact the amounts the Company will be required to contribute to the pension plans that it sponsors and may affect the solvency of these pension plans. Quad/Graphics may be unable to achieve labor productivity targets, to retain employees or labor may not be adequately available in locations in which the Company operates, which could negatively impact the Company's financial performance.

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Freight rates and fuel costs also represent a significant component of the Company's cost structure. In general, the Company has been able to pass along increases in the cost of freight and fuel to many of its clients. If the Company is not able to pass along a substantial portion of increases in freight rates or in the price of fuel, future increases in these items would adversely impact the Company's margin and profits. If Quad/Graphics passes along increases in the cost of freight and fuel and the price of the Company's products and services increases as a result, client demand could be adversely affected, and thereby, negatively impact Quad/Graphics' financial performance.

Failure to attract and retain qualified production personnel could materially adversely affect the Company's business, competitive position, financial condition and results of operations.

Quad/Graphics continues to be substantially dependent on its production personnel to print the Company's products in a cost-effective and efficient manner that allows the Company to obtain new customers and to drive sales from the Company's existing customers. Quad/Graphics believes that there is significant competition for production personnel with the skills and technical knowledge that the Company requires. The Company's ability to continue efficient operations, reduce production costs, and consolidate operations will depend, in large part, on the Company's success in recruiting, training, integrating and retaining sufficient numbers of production personnel to support the Company's production, cost savings and consolidation targets. New hires require significant training and it may take significant time before they achieve full productivity. In addition, an increase in the wages paid by competing employers could result in an increase in the wage rates that the Company must pay. As a result, Quad/Graphics may incur significant costs to attract, train and retain employees, including significant expenditures related to salaries and benefits, and the Company may lose new, as well as existing, employees to competitors or other companies before the Company realizes the benefit of its investment in recruiting and training them. The Company's recent hires and planned hires may not become productive as quickly as the Company expects, and the Company may be unable to hire or retain sufficient numbers of qualified individuals in the markets where the Company does business or plans to do business. In addition, due to turnover of production personnel, a large percentage of employees will be new to the Company. If the Company is unable to hire and train sufficient numbers of effective production personnel, the Company's business would be adversely affected.

Changes in postal rates, postal regulations and postal services may adversely impact customers' demand for print products and services.

Postal costs are a significant component of the cost structures of many of the Company's clients and potential clients. Postal rate changes and USPS regulations that result in higher overall costs can influence the volume that these clients will be willing to print and ultimately send through the USPS.

Integrated distribution with the postal service is an important component of the Company's business. Any material change in the current service levels provided by the postal service could impact the demand that clients have for print services. The USPS continues to experience financial problems. Without increased revenues or action by Congress to reform the USPS' cost structure, these losses will continue into the future. As a result of these financial difficulties, the USPS has come under increased pressure to adjust its postal rates and service levels. Additional price increases may result in customers reducing mail volumes and exploring the use of alternative methods for delivering a larger portion of their products, such as continued diversion to the internet and other alternative media channels in order to ensure that they stay within their expected postage budgets.

The USPS does offer "work-share" discounts that provide incentives to co-mail and place product as far down the mail-stream as possible. Discounts are earned as a result of less handling of the mail, and therefore, lower costs for the USPS. As a result, Quad/Graphics has made substantial investments in co-mailing technology and equipment to ensure customers benefit from these discounts. As the USPS reacts to its financial difficulties, it often revises design standards for mail entering its system. These design standards often increase costs for customers and, in turn, decrease

the value of the cost reductions that the Company's co-mailing services provide. If the incentives to co-mail are decreased by USPS regulations, the overall cost to mail printed products will increase and may result in print volumes declining.

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Current federal law limits postal rate increases (outside of an "exigent circumstance") to the increase in the Consumer Price Index ("CPI"). This cap works to ensure funding stability and predictability for mailers. However, that same federal statute requires the Postal Regulatory Commission ("PRC") to conduct a review of the overall rate-making structure for the USPS. The results of that study found that the current rate structure has been partially successful in meeting the USPS' goals. The current system does result in predictable and stable rate making. However, the PRC also concluded that the current rate structure does not meet USPS' revenue needs and lacks pricing efficiency. As a result, the PRC has proposed a new rate making structure that will provide the USPS with additional pricing flexibility over the current CPI cap. This proposal is currently under consideration and is open for public comments. The proposed rates may result in a substantially altered rate structure for mailers. There is a great deal of uncertainty as to the outcome of this review as the PRC issued a Notice of Proposed Rulemaking with comments due on March 1, 2018. Any newly revised rates that would be effective as a result of new rules issued by the PRC may include a higher rate cap or potentially the elimination of a rate cap altogether, which will result in no restrictions on the USPS' ability to increase rates from year to year. That kind of rate-making flexibility may lead to price spikes for mailers and may also reduce the incentive for the USPS to continue to take out costs and instead continue to rely on postage to cover the costs of an outdated postal service that does not reflect the industry's ability or willingness to pay. The end result may be reduced demand for printed products as customers may move more aggressively into other delivery methods such as the many digital and mobile options now available to consumers.

The fragility of and decline in overall distribution channels, including newspaper distribution channels, may adversely impact customers' access to cost effective distribution of their advertising materials, and therefore may adversely impact the Company's business.

The distribution channels of print products and services, including the newspaper industry, face significant competition from other sources of news, information and entertainment content delivery, and if overall distribution channels, including newspaper distribution channels, continue to decline, the Company's customers may be adversely impacted by the lack of access to cost effective distribution of their advertising materials. In turn, this decline in cost effective distribution channels may force customers to use other avenues of distribution that may be at significantly higher cost, which may decrease customer demand for the Company's products and services, and thus adversely affect Quad/Graphics financial condition, results of operations and cash flows.

If Quad/Graphics fails to identify, manage, complete and integrate acquisitions, investment opportunities or other significant transactions, it may adversely affect the Company's future results.

As part of Quad/Graphics' growth strategy, the Company may pursue acquisitions of, investment opportunities in, or other significant transactions with, companies that are complementary to the Company's business. In order to pursue this strategy successfully, the Company must identify attractive acquisition or investment opportunities, successfully complete the transaction, some of which may be large and complex, and manage post-closing issues such as integration of the acquired company or employees. Quad/Graphics may not be able to identify or complete appealing acquisition or investment opportunities given the intense competition for these transactions. Even if the Company identifies and completes suitable corporate transactions, the Company may not be able to successfully address inherent risks in a timely manner, or at all. These inherent risks include, among other things: (1) failure to successfully integrate the purchased operations, technologies, products or services and maintain uniform standard controls, policies and procedures; (2) substantial unanticipated integration costs; (3) loss of key employees including those of the acquired business; (4) diversion of management's attention from other operations; (5) failure to retain the clients of the acquired business; (6) failure to achieve any projected synergies and performance targets; (7) additional debt and/or assumption of known or unknown liabilities; (8) potential dilutive issuances of equity securities; and (9) a write-off of goodwill, client lists, other intangibles and amortization of expenses. If the Company fails to successfully integrate an acquisition, the Company may not realize all or any of the anticipated benefits of the acquisition, and Quad/Graphics' future results of operations could be adversely affected. In addition, the diversion of management's attention from the

Company's other operations due to these acquisitions and integration effort could adversely affect its business and have a negative financial impact.

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There are risks associated with the Company's operations outside of the United States.

Although the substantial majority of the Company's business activity takes place in the United States, a portion of Quad/Graphics net sales are derived from operations in foreign countries. The Company's products and services are sold primarily throughout North America, South America and Europe. In addition, the Company strategically sources packaging product manufacturing over multiple end markets in Central America and Asia. The Company's printing operations located in Europe and Latin America include operations in England, France, Germany, Poland, Argentina, Colombia, Mexico and Peru, as well as investments in printing operations in Brazil and India. Net sales from the Company's wholly-owned subsidiaries outside of the United States accounted for approximately 9% of its consolidated net sales for the years ended December 31, 2017 and 2016, and 8% of its consolidated net sales for the year ended December 31, 2015.

As a result, the Company is subject to the risks inherent in conducting business outside of the United States, including, but not limited to: the impact of economic and political instability; fluctuations in currency values, foreign-currency exchange rates, devaluation and conversion restrictions; exchange control regulations and other limits on the Company's ability to import raw materials or finished product; tariffs and other trade barriers; trade restrictions and economic embargoes by the United States or other countries; social unrest, acts of terrorism, force majeure, war or other armed conflicts; inflation and fluctuations in interest rates; language barriers; difficulties in staffing, training, employee retention and managing international operations; logistical and communications challenges; differing local business practices and cultural consideration; restrictions on the ability to repatriate funds; foreign ownership restrictions and the potential for nationalization or expropriation of property or other resources; longer accounts receivable payment cycles; potential adverse tax consequences and being subject to different legal and regulatory regimes that may preclude or make more costly certain initiatives or the implementation of certain elements of its business strategy. Any international expansion or acquisition that the Company undertakes could amplify these risks related to operating outside of the United States.

Quad/Graphics is exposed to the economic and political conditions in Argentina. The Argentine economy has experienced significant volatility in recent decades, characterized by periods of low or negative growth, high and variable levels of inflation and currency devaluation. As a consequence, the Company's business and operations have been, and could be in the future, affected from time to time to varying degrees by economic and political developments and other material events affecting the Argentine economy. The majority of the Company's employees in Argentina are covered by a collective bargaining agreement. A strike, work stoppage or other form of labor protest in Argentina in the future could disrupt the Company's Argentina operations and result in a material adverse impact to the Company's Argentina operations' financial condition, results of operations and cash flows, which could force the Company to reassess its strategic alternatives involving operations in Argentina. In addition, on March 25, 2015, due to deteriorating economic conditions, including inflation and currency devaluation, combined with uncertain political conditions, declining print volumes and labor challenges, the Company's Argentina subsidiaries, Anselmo L. Morvillo S.A. ("Morvillo") and World Color Argentina, S.A. (the "Argentina Subsidiaries") commenced bankruptcy restructuring proceedings with a goal of consolidating operations. The Company completed such consolidation and emerged from bankruptcy; however, the Company's Argentina operations' repayment and other obligations resulting from such consolidation, if not successfully completed as and when due, may result in an adverse effect on the Company's Argentina operations' financial position and cash flows. As of December 31, 2017, the Company had $23.2 million of total assets in Argentina, representing 0.9% of Quad/Graphics consolidated total assets. For the year ended December 31, 2017, the Company recognized $54.0 million of net sales in Argentina, representing 1.3% of Quad/Graphics consolidated net sales.

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Quad/Graphics may incur costs or suffer reputational damage due to improper conduct of its employees, contractors or agents.

The Company could be adversely affected by engaging in business practices that are in violation of United States and foreign anti-corruption laws, including the United States Foreign Corrupt Practices Act. The Company operates in parts of the world with developing economies that have experienced governmental corruption to some degree, and in certain circumstances, strict compliance with anti-corruption laws may conflict with local customs and practices. In certain countries, the Company does substantial business with government entities or instrumentalities, which creates increased risk of a violation of the Foreign Corrupt Practices Act and international laws. There can be no assurance that all of the Company's employees, contractors or agents, including those representing the Company in countries where practices which violate anti-corruption laws may be customary, will not take actions that violate Quad/Graphics' policies and procedures. The failure to comply with the laws governing international business practices may result in substantial penalties and fines. For additional information, see Note 10, "Commitments and Contingencies — Litigation," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K.

The Company is heavily dependent on its Chief Executive Officer, its management team and skilled personnel and, if the Company is unable to retain or motivate such personnel or hire qualified personnel, the Company may not be able to compete effectively.

The Company's future success depends on its continuing ability to identify, hire, develop, motivate and retain its Chief Executive Officer, the management team and skilled personnel for all areas of the organization. The Company's continued ability to compete effectively depends on its ability to attract new employees and retain and motivate its existing employees.

Quad/Graphics and its facilities are subject to various consumer protection and privacy laws and regulations, and will become subject to additional laws and regulations in the future. If Quad/Graphics' efforts to comply with such laws or protect the security of information are unsuccessful, any failure may subject the Company to material liability, require it to incur material costs or otherwise adversely affect its results of operations as a result of compliance with such laws, costly enforcement actions and private litigation.

The nature of the Company's business includes the receipt and storage of information about the Company's clients, vendors and the end-users of Quad/Graphics' products and services. Quad/Graphics and its clients are subject to various United States and foreign consumer protection, information security, data privacy and "do not mail" requirements at the federal, states, provincial and local levels. Quad/Graphics is subject to many legislative and regulatory laws and regulations around the world concerning data protection and privacy. In addition, the interpretation and application of consumer and data protection laws in the United States and elsewhere are often fluid and uncertain. To the extent that the Company or its clients become subject to additional or more stringent requirements or that the Company is not successful in its efforts to comply with existing requirements or protect the security of information, demand for the Company's services may decrease and the Company's reputation may suffer, which could adversely affect the Company's results of operations. In addition, such laws may be interpreted and applied in a manner inconsistent with Quad/Graphics' internal policies. If so, the Company could suffer costly enforcement actions (including an order requiring changes to Quad/Graphics' data practices) and private litigation, which could have an adverse effect on the Company's business and results of operations. Complying with these various laws could cause Quad/Graphics to incur substantial costs or require changes to the Company's business practices in a manner adverse to Quad/Graphics' business.

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If Quad/Graphics is not able to take advantage of technological developments in the printing industry on a timely basis, the Company may experience a decline in the demand for its services, be unable to implement its business strategy and experience reduced profits.

The printing industry is experiencing rapid change as new digital technologies are developed that offer clients an array of choices for their marketing and publication needs. In order to grow and remain competitive, the Company will need to adapt to future changes, especially with regard to technology, to enhance the Company's existing offerings and introduce new offerings to address the changing demands of clients. If Quad/Graphics is unable to meet future challenges from competing technologies on a timely basis or at an acceptable cost, the Company could lose clients to competitors. In general, the development of new communication channels inside and outside the printing and media solutions industry requires the Company to anticipate and respond to the varied and continually changing demands of clients. The Company may not be able to accurately predict technological trends or the success of new services in the market.

Changes in the legal and regulatory environment could limit the Company's business activities, increase its operating costs, reduce demand for its products or result in litigation.

The conduct of the Company's businesses is subject to various laws and regulations administered by federal, state and local government agencies in the United States, as well as to foreign laws and regulations administered by government entities and agencies in markets in which the Company operates. These laws and regulations and interpretations thereof may change, sometimes dramatically, as a result of political, economic or social events, such as the election of the new administration. Such regulatory environment changes may include changes in taxation requirements, accounting and disclosure standards, immigration laws and policy, environmental laws, and requirements of United States and foreign occupational health and safety laws. Changes in laws, regulations or governmental policy and the related interpretations may alter the environment in which Quad/Graphics does business, and therefore, may impact its results or increase its costs or liabilities.

In addition, the Company and its subsidiaries are party to a variety of legal and environmental remediation obligations arising in the normal course of business, as well as environmental remediation and related indemnification proceedings in connection with certain historical activities, former facilities and contractual obligations of acquired businesses. Permits are required for the operation of certain parts of the Company's business, and these permits are subject to renewal, modification and, in some circumstances, revocation. Due to regulatory complexities, uncertainties inherent in litigation and the risk of unidentified contaminants on current and former properties, the potential exists for remediation, liability and indemnification costs to differ materially from the costs the Company has estimated. Quad/Graphics cannot assure you that the Company's costs in relation to these matters will not exceed its established liabilities or otherwise have an adverse effect on its results of operations.

Various laws and regulations addressing climate change are being considered at the federal and state levels. Proposals under consideration include limitations on the amount of greenhouse gas that can be emitted (so-called "caps") together with systems of trading allowed emissions capacities. The impacts of such proposals could have a material adverse impact on the Company's financial condition and results of operations.

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If QuadMed, LLC, a wholly-owned subsidiary of the Company, fails to comply with applicable healthcare laws and regulations, the Company could face substantial penalties, and its business, reputation, operations, prospects and financial condition of the Company's subsidiary could be adversely affected.

QuadMed, LLC ("QuadMed") provides employer-sponsored healthcare solutions on a national level to employers of all sizes, including the Company and other private and public-sector companies. These solutions include, but are not limited to, on-site and near-site healthcare clinics, occupational health services, telemedicine, and health and wellness programs. The healthcare industry is heavily regulated, constantly evolving and subject to significant change and fluctuation. The U.S. federal and state healthcare laws and regulations that impact the QuadMed subsidiary business include, among others:

- The Health Insurance Portability and Accountability and the Health Information Technology for Economic and Clinical Health Acts, which, in general and among other things, establish comprehensive federal standards with respect to privacy, security and transmission of individually identifiable health information and impose requirements for the use of standardized electronic transactions with respect to transmission of such information;

- the laws and regulations administered and enforced by the Food and Drug Administration, including the Federal Food Drug and Cosmetics Act, Controlled Substances Act and other federal statutes and regulations;

- the federal Anti-Kickback Statute, which generally prohibits, among other things, soliciting, receiving or providing remuneration to induce the referral of an individual for an item or service or the purchasing or ordering of an item or service for which payment may be made under federal healthcare programs;

- the federal false claims laws, which generally prohibit, among other things, knowingly presenting or causing to be presented claims for payment from third-party payors that are false or fraudulent;

- state law equivalents of each of these federal laws, such as anti-kickback and false claims laws that may apply to items or services reimbursed by any third-party payor, including commercial insurers, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not be preempted by applicable federal laws, thus complicating compliance efforts; and

- state prohibitions on the Corporate Practice of Medicine (many of these state laws differ from one another in significant ways and are not preempted by federal law).

The Company has significant liabilities with respect to defined benefit pension plans that could grow in the future and cause the Company to incur additional costs.

As a result of the 2010 acquisition of World Color Press, Inc. ("World Color Press"), the Company assumed frozen single employer defined benefit pension plans for certain of its employees in the United States. The majority of the plans' assets are held in North American and global equity securities and debt securities. The asset allocation as of December 31, 2017, was approximately 41% equity securities and 59% debt securities.

As of December 31, 2017, the Company had underfunded pension liabilities of $84.1 million for single employer defined benefit plans in the United States. Under current United States pension law, pension funding deficits are generally required to be funded over a seven-year period. These pension deficits may increase or decrease depending on changes in the levels of interest rates, pension plan investment performance, pension legislation and other factors. Declines in global debt and equity markets would increase the Company's potential pension funding obligations. Any significant increase in the Company's required contributions could have a material adverse impact on its business, financial condition, results of operations and cash flows.

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In addition to the single employer defined benefit plans described above, the Company has previously participated in multiemployer pension plans ("MEPPs") in the United States, including the Graphic Communications International Union - Employer Retirement Fund ("GCIU") and the Graphic Communications Conference of the International Brotherhood of Teamsters National Pension Fund ("GCC"). Prior to the acquisition of World Color Press by Quad/Graphics, World Color Press received notice that certain plans in which it participated were in critical status, as defined in Section 432 of the Internal Revenue Code of 1986, as amended (the "Internal Revenue Code"). As a result, the Company could have been subject to increased contribution rates associated with these plans or other MEPPs suffering from declines in their funding levels. Due to the significantly underfunded status of the United States multiemployer plans and the potential increased contribution rates, the Company withdrew from participation in these multiemployer plans and has replaced these pension benefits with a Company-sponsored "pay as you go" defined contribution plan, which is historically the form of retirement benefit provided to the Company's employees.

As of December 31, 2017, the Company estimates and has recorded in its financial statements a pre-tax withdrawal liability for all United States multiemployer plans of $28.2 million in the aggregate. During the fourth quarter of 2016, the Company and the GCC reached a settlement agreement for all claims, with scheduled payments until February 2024. The Company is currently in litigation with the GCIU trustees to determine the amount and duration of the withdrawal payments for the GCIU. Arbitration proceedings with the GCIU have been completed, both sides have appealed the arbitrator's ruling, and litigation in Federal court has commenced. Until litigation with the GCIU trustees is concluded, the exact amount of the withdrawal liability will not be known, and, as such, a difference from the recorded estimate could have an adverse effect on the Company's results of operations, financial position and cash flows.

Quad/Graphics may be required to make capital expenditures to sustain its platform and processes and to remain technologically and economically competitive, which may increase its costs or disrupt its operations.

The Company may need to make significant capital expenditures as it develops and continues to maintain its platform and processes. The Company also may be required to make capital expenditures to develop and integrate new technologies to remain technologically and economically competitive. In order to accomplish this effectively, the Company will need to deploy its resources efficiently, maintain effective cost controls and bear potentially significant market and raw material risks. If the Company's revenues decline, it may impact the Company's ability to expend the capital necessary to develop and implement new technology and be economically competitive. Debt or equity financing, or cash generated from operations, may not be available or sufficient for these requirements or for other corporate purposes or, if debt or equity financing is available, it may not be on terms favorable to the Company. In addition, even if capital is available to the Company, there is risk that the Company's vendors will have discontinued the production of parts needed for repairs, replacements or improvements to the Company's existing manufacturing platform, leading the Company to expend more capital than expected to perform such repairs, replacements or improvements.

Quad/Graphics' debt facilities include various covenants imposing restrictions that may affect the Company's ability to operate its business.

On September 1, 1995, and as last amended on November 24, 2014, Quad/Graphics entered into a senior secured note agreement (the "Master Note and Security Agreement") pursuant to which the Company has issued over time senior notes in an aggregate principal amount of $1.1 billion in various tranches. As of December 31, 2017, the borrowings outstanding under the Master Note and Security Agreement were $123.6 million. On April 28, 2014, and as last amended on February 10, 2017, the Company entered into a senior secured credit facility (the "Senior Secured Credit Facility,") which includes three different loan facilities: a Term Loan A, a Term Loan B, and a revolving credit facility. The $725.0 million revolving credit facility and the $375.0 million Term Loan A mature on January 4, 2021. The $300.0 million Term Loan B matures on April 27, 2021. As of December 31, 2017, the borrowings outstanding

under the Senior Secured Credit Facility were $560.4 million. On April 28, 2014, the Company also issued $300.0 million aggregate principal amount of its unsecured 7.0% senior notes due May 1, 2022 ("Senior Unsecured Notes,"), of which $243.5 million remained outstanding as of December 31, 2017.

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The Company's various lending arrangements include certain financial covenants. In addition to the financial covenants, the debt facilities also include certain limitations on acquisitions, indebtedness, liens, dividends and repurchases of capital stock. As of December 31, 2017, the Company was in compliance with all financial covenants in its debt agreements. While the Company currently expects to be in compliance in future periods with all of the financial covenants, there can be no assurance that these covenants will continue to be met. The Company's failure to maintain compliance with the covenants could prevent the Company from borrowing additional amounts and could result in a default under any of the debt agreements. Such default could cause the outstanding indebtedness to become immediately due and payable, by virtue of cross-acceleration or cross-default provisions.

Quad/Graphics may be adversely affected by interest rates, particularly floating interest rates, and foreign exchange rates.

As of December 31, 2017, 33% of the Company's borrowings were subject to variable interest rates. As a result, the Company is exposed to market risks associated with fluctuations in interest rates, and increases in interest rates could adversely affect the Company.

The Company entered into a $250.0 million interest rate swap on February 7, 2017. The swap was designated as a cash flow hedge as its purpose is to reduce the variability of cash flows from interest payments related to a portion of Quad/Graphics' variable-rate debt. The swap effectively converts $250.0 million of the Company's variable-rate debt based on one-month London Interbank Offered Rate ("LIBOR") to a fixed rate of 3.64% (including a 1.75% spread on underlying debt at December 31, 2017). The variable interest rate resets monthly, and the swap is a five year arrangement, maturing on February 28, 2022.

Because a portion of the Company's operations are outside of the United States, significant revenues and expenses are denominated in local currencies. Although operating in local currencies may limit the impact of currency rate fluctuations on the results of operations of the Company's non-United States subsidiaries and business units, fluctuations in such rates may affect the translation of these results into the Company's consolidated financial statements. To the extent revenues and expenses are not in the applicable local currency, the Company may enter into foreign exchange forward contracts to hedge the currency risk. There can be no assurance, however, that the Company's efforts at hedging will be successful. There is always a possibility that attempts to hedge currency risks will lead to greater losses than predicted.

Quad/Graphics' revenue, operating income and cash flows are subject to cyclical and seasonal variations.

The Company's business is seasonal, with Quad/Graphics recognizing the majority of its operating income in the third and fourth quarters of the financial year, primarily as a result of the increased magazine advertising page counts and retail inserts, catalogs and books from back-to-school and holiday-related advertising and promotions. The fourth quarter is typically the highest seasonal quarter for cash flows from operating activities and Free Cash Flow due to the reduction of working capital requirements that reach peak levels during the third quarter. If the Company does not successfully manage the increased workflow, necessary increases in paper and ink inventory, production capacity flows and other business elements during these high seasons of activity, this seasonality could adversely affect the Company's cash flows and results of operations.

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Holders of class A common stock are not able to independently elect directors of Quad/Graphics or control any of the Company's management policies or business decisions or its decisions to issue additional shares, declare and pay dividends or enter into corporate transactions because the holders of class A common stock have substantially less voting power than the holders of the Company's class B common stock, all of which is owned by certain members of the Quadracci family, trusts for their benefit or other affiliates of Quad/Graphics, whose interests may be different from the holders of class A common stock.

The Company's outstanding stock is divided into two classes of common stock: class A common stock ("class A stock") and class B common stock ("class B stock"). The class B stock has ten votes per share on all matters and the class A stock is entitled to one vote per share. As of February 16, 2018, the class B stock constitutes approximately 78% of Quad/Graphics' total voting power. As a result, holders of class B stock are able to exercise a controlling influence over the Company's business, have the power to elect its directors and indirectly control decisions such as whether to issue additional shares, declare and pay dividends or enter into corporate transactions. All of the class B stock is owned by certain members of the Quadracci family or trusts for their benefit, whose interests may differ from the interests of the holders of class A stock.

Approximately 93% of the outstanding class B stock is held of record by the Quad/Graphics Voting Trust, and that constitutes approximately 73% of the Company's total voting power. The trustees of the Quad/Graphics Voting Trust have the authority to vote the stock held by the Quad/Graphics Voting Trust. Accordingly, the trustees of the Quad/Graphics Voting Trust are able to exercise a controlling influence over the Company's business, have the power to elect its directors and indirectly control decisions such as whether to issue additional shares, declare and pay dividends or enter into corporate transactions.

Quad/Graphics is a controlled company within the meaning of the rules of The New York Stock Exchange, LLC ("NYSE") and, as a result, it relies on exemptions from certain corporate governance requirements that provide protection to shareholders of other companies.

Since the Quad/Graphics Voting Trust owns more than 50% of the total voting power of the Company's stock, the Company is considered a controlled company under the corporate governance listing standards of the NYSE. As a controlled company, an exception under the NYSE listing standards exempts the Company from the obligation to comply with certain of the NYSE's corporate governance requirements, including the requirements:

- that a majority of the Company's Board of Directors consist of independent directors, as defined under the rules of the NYSE;

- that the Company have a corporate governance and nominating committee that is composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities; and

- that the Company have a compensation committee that is composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities.

Accordingly, for so long as Quad/Graphics is a controlled company, holders of class A stock will not have the same protections afforded to shareholders of companies that are subject to all of the corporate governance requirements of the NYSE.

Currently, there is a limited active market for Quad/Graphics' class A common stock and, as a result, shareholders may be unable to sell their class A common stock without losing a significant portion of their investment.

The Company's class A common stock has been traded on the NYSE under the symbol "QUAD" since July 6, 2010. However, there is currently a limited active market for the class A common shares. The Company cannot predict the extent to which investor interest in the Company will lead to the development of an active trading market for its class A common stock on the NYSE or how liquid that market will become. If a more active trading market does not develop, shareholders may have difficulty selling any class A common stock without negatively affecting the stock price, and thereby, losing a significant portion of their investment.

Furthermore, in response to recent public focus on dual class capital structures, certain stock index providers are implementing limitations on the inclusion of dual class share structures in their indices. If these restrictions increase, they may impact who buys and holds the Company's stock.

An other than temporary decline in operating results and enterprise value could lead to non-cash impairment charges due to the impairment of property, plant and equipment and other intangible assets.

The Company has a material amount of property, plant, equipment and other intangible assets on its balance sheet, due in part to acquisitions. As of December 31, 2017, the Company had the following long-lived assets on its consolidated balance sheet included in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K:

- Property, plant and equipment of $1,377.6 million; and

- Other intangible assets, primarily representing the value of customer relationships acquired, of $43.4 million.

As of December 31, 2017, these assets represented approximately 58% of the Company's total assets. The Company assesses impairment of property, plant and equipment and other intangible assets based upon the expected future cash flows of the respective assets. These valuations include management's estimates of sales, profitability, cash flow generation, capital structure, cost of debt, interest rates, capital expenditures and other assumptions. A decline in expected profitability, significant negative industry or economic trends, inability to effectively integrate acquired businesses, unexpected significant changes or planned changes in use of the assets or in entity structure, and divestitures may adversely impact the assumptions used in the valuations. As a result, the recoverability of these assets could be called into question, and the Company could be required to write down or write off these assets. Such an occurrence could have a material adverse effect on the Company's results of operations and financial position.

The Company may not be able to utilize deferred tax assets to offset future taxable income.

As of December 31, 2017, the Company had deferred tax assets, net of valuation allowances, of $152.8 million. The Company expects to utilize the deferred tax assets to reduce consolidated income tax liabilities in future taxable years. However, the Company may not be able to fully utilize the deferred tax assets if its future taxable income and related income tax liability is insufficient to permit their use. In addition, in the future, the Company may be required to record a valuation allowance against the deferred tax assets if the Company believes it is unable to utilize them, which would have an adverse effect on the Company's results of operations and financial position.

Quad/Graphics may be adversely affected by strikes and other labor protests.

As of December 31, 2017, Quad/Graphics had a total of approximately 21,100 full-time equivalent employees, of which approximately 1,800 were covered by an industry wide agreement, a collective bargaining agreement or through a works council or similar arrangement. As of December 31, 2017, the Company had five collective bargaining agreements in the United States and nine agreements outside of the United States that are either industry-wide individual collective bargaining agreements or works councils or similar arrangements.

While the Company believes its employee relations are good and that the Company maintains an employee-centric culture, and there has not been any material disruption in operations resulting from labor disputes, the Company cannot be certain that it will be able to maintain a productive and efficient labor environment. The Company cannot predict the outcome of any future negotiations relating to the renewal of the collective bargaining agreements, nor can

there be any assurance that work stoppages, strikes or other forms of labor protests pending the outcome of any future negotiations will not occur. A strike or other forms of labor protest affecting a series of major plants in the future could materially disrupt the Company's operations and result in a material adverse impact on its financial condition, results of operations and cash flows, which could force the Company to reassess its strategic alternatives involving certain of its operations.

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Item 1B. Unresolved Staff Comments

The Company has no unresolved staff comments to report pursuant to this item.

Item 2. Properties

Quad/Graphics' corporate office is located in Sussex, Wisconsin. The Company owned or leased 147 facilities located in 17 countries including manufacturing operations, warehouses and office space totaling approximately 28,980,000 square feet, of which approximately 21,770,000 is owned space and approximately 7,210,000 is leased space as of December 31, 2017. In addition to these owned and leased facilities, the Company has investments in printing operations located in Brazil and India.

Within the United States Print and Related Services segment, the Company operated 55 owned or leased manufacturing facilities encompassing approximately 21,578,000 square feet as of December 31, 2017. Within the International segment, the Company operated eight owned or leased manufacturing facilities encompassing approximately 1,820,000 square feet as of December 31, 2017. The following table lists the Company's operating locations with manufacturing facilities totaling over 500,000 square feet as of December 31, 2017:

Locations	Square Feet	Property Type	Segment
Lomira, Wisconsin, United States	2,174,000	Owned	United States Print and Related Services
Martinsburg, West Virginia, United States	2,123,000	Owned	United States Print and Related Services
Sussex, Wisconsin, United States	1,970,000	Owned	United States Print and Related Services
Hartford, Wisconsin, United States	1,682,000	Owned	United States Print and Related Services
Oklahoma City, Oklahoma, United States	1,128,000	Owned	United States Print and Related Services
Versailles, Kentucky, United States	1,065,000	Owned	United States Print and Related Services
Saratoga Springs, New York, United States	1,034,000	Owned	United States Print and Related Services
West Allis, Wisconsin, United States	913,000	Owned	United States Print and Related Services
The Rock, Georgia, United States	797,000	Owned	United States Print and Related Services
Wyszkow, Poland	709,000	Owned	International
Franklin, Kentucky, United States	617,000	Owned	United States Print and Related Services
Effingham, Illinois, United States	564,000	Owned	United States Print and Related Services
Merced, California, United States	539,000	Owned	United States Print and Related Services
Taunton, Massachusetts, United States	513,000	Owned/Leased	United States Print and Related Services
Pewaukee, Wisconsin, United States	504,000	Owned/Leased	United States Print and Related Services

Item 3. Legal Proceedings

Quad/Graphics is subject to various legal actions, administrative proceedings and claims arising out of the ordinary course of business. Quad/Graphics believes that such unresolved legal actions, proceedings and claims will not materially adversely affect its results of operations, financial condition or cash flows. For additional information, see Note 10, "Commitments and Contingencies — Litigation," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K.

Item 4. Mine Safety Disclosures

Not applicable.

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PART II

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

Capital Stock and Dividends

Quad/Graphics' authorized capital stock consists of 80.0 million shares of class A stock, 80.0 million shares of class B stock, 20.0 million shares of class C common stock and 0.5 million shares of preferred stock. The Company's outstanding capital stock as of December 31, 2017, consisted of 38.2 million shares of class A stock, 13.8 million shares of class B stock and no shares of class C common stock or preferred stock. As of February 16, 2018, there were 3,020 record holders of the class A stock and 22 record holders of the class B stock.

The Company's class A stock is listed on the NYSE under the symbol "QUAD". The class A stock is entitled to one vote per share. The Company's class B stock is held by certain members of the Quadracci family or trusts for their benefit (and can only be voluntarily transferred to the Company or to a member of the Quadracci "family group" as defined in the Company's amended and restated articles of incorporation; and any transfer in violation of the Company's amended and restated articles of incorporation results in the automatic conversion of such class B stock into class A stock). The class B stock is entitled to ten votes per share. Each share of class B stock may, at the option of the holder, be converted at any time into one share of class A stock. There is no public trading market for the class B stock.

Pursuant to the Company's amended and restated articles of incorporation, each outstanding class of common stock has equal rights with respect to cash dividends. Pursuant to the Company's debt facilities, the Company is subject to limitations on dividends and repurchases of capital stock. If the Company's total leverage ratio is greater than 3.00 to 1.00 (as defined in the Company's Senior Secured Credit Facility), the Company is prohibited from making greater than $120.0 million of annual dividend payments, capital stock repurchases and certain other payments. If the total leverage ratio is less than 3.00 to 1.00, there are no such restrictions. For the twelve months ended December 31, 2017, the Company's total leverage ratio was 2.06 to 1.00.

The high and low closing sales prices of the Company's class A stock during each quarter and the quarterly dividends paid per share of each class of common stock then outstanding during the years ended December 31, 2017 and 2016, are contained in the chart below:

			Class A Closing Stock Prices			
	Dividends Paid		2017		2016	
	2017	2016	High	Low	High	Low
First Quarter	$0.30	$0.30	$27.66	$22.10	$13.61	$7.85
Second Quarter	0.30	0.30	27.98	21.91	23.29	11.93
Third Quarter	0.30	0.30	23.27	18.35	29.18	23.07
Fourth Quarter	0.30	0.30	23.98	20.92	28.13	23.26

Securities Authorized For Issuance Under Equity Compensation Plans

See Part III, Item 12, "Security Ownership of Certain Beneficial Owners and Management and Related Shareholder Matters," of this Annual Report on Form 10-K for certain information regarding the Company's equity compensation plans.

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Issuer Purchases of Equity Securities

Information about the Company's repurchases of its class A stock during the three months ended December 31, 2017, were as follows:

Period	Issuer Purchases of Equity Securities			
	Total Number of Shares Purchased[1]	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs[1]	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs[2]
October 1, 2017 to October 31, 2017	—	—	—	79,158,311
November 1, 2017 to November 30, 2017	—	—	—	79,158,311
December 1, 2017 to December 31, 2017	2,418[3]	—	—	79,158,311
Total	2,418		—	

[1] Represents shares of the Company's class A stock.

[2] On September 6, 2011, the Company's Board of Directors authorized a share repurchase program of up to $100.0 million of the Company's outstanding class A stock. Under the authorization, share repurchases may be made at the Company's discretion, from time to time, in the open market and/or in privately negotiated transactions as permitted by federal securities laws and other legal requirements. The timing, manner, price and amount of any repurchase will depend on economic and market conditions, share price, trading volume, applicable legal requirements and other factors. The program may be suspended or discontinued at any time. During the year ended December 31, 2017, the Company repurchased 200,605 shares of its class A common stock at a weighted average price of $18.89 per share for a total purchase price of $3.8 million. During the year ended December 31, 2016, the Company repurchased 984,190 shares of its class A stock at a weighted average price of $8.96 per share for a total purchase price of $8.8 million. As of December 31, 2017, there were $79.2 million of authorized repurchases remaining under the program.

[3] Represents 2,418 shares of class A stock transferred from an employee to the Company to satisfy tax withholding requirements in connection with the vesting of restricted stock under the Quad/Graphics, Inc. 2010 Omnibus Incentive Plan ("Omnibus Plan") during December 2017.

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Stock Performance Information

The following graph compares cumulative shareholder return on Quad/Graphics' class A stock since December 31, 2012, as compared to the Standard & Poor's ("S&P") MidCap 400 Index and a selected peer group of companies over the same period. Due to the diversity of its product and service offerings, the Company does not believe that any single published industry index is appropriate for comparing stockholder return. As such, the Company has compiled a peer group to use in the below performance graph, incorporating companies from different industries, including commercial printing, marketing services and publishing.

The graph assumes a $100.00 investment and that all dividends are reinvested. The returns of each peer group company have been weighted to reflect their relative market capitalizations. The comparison in the graph below is based upon historical stock performance and should not be considered indicative of future stockholder returns.

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Indexed Returns

	Base Period 12/31/2012	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017
Quad/Graphics, Inc.	$ 100.00	$ 139.78	$ 124.46	$ 54.90	$ 168.04	$ 149.01
S&P MidCap 400 Index	100.00	133.50	146.54	143.35	173.08	201.20
Peer Group [1]	100.00	170.76	173.77	161.97	156.90	168.25

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[1] The following companies were included in the Peer Group:

Acxiom Corp.	InnerWorkings, Inc.
Alliance Data Systems Corp.	LSC Communications, Inc. [c]
Cenveo, Inc.	McClatchy Co.
Deluxe Corp.	Meredith Corp.
R.R. Donnelley & Sons Co. [a]	Scholastic Corp.
Gannett Co., Inc. [b]	John Wiley & Sons, Inc.
Harte Hanks, Inc.	

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[a] Adjusted for reverse split and spin offs of LSC Communications, Inc. and Donnelley Financial Solutions, Inc.

[b] Included from June 23, 2015, when Gannett Co., Inc. spun off from its parent company

[c] Included from October 1, 2016, when LSC Communications, Inc. spun off from R.R. Donnelley & Sons Co.

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Item 6. Selected Financial Data

The selected consolidated statements of operations data for the years ended December 31, 2017, 2016 and 2015, and the selected consolidated balance sheets data at December 31, 2017 and 2016, are derived from the audited consolidated financial statements of the Company included in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. The selected financial data includes the results of operations of acquired businesses prospectively from their respective acquisition dates. For additional information related to the Company's acquisition activity, see Note 2, "Acquisitions and Strategic Investments," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. The selected consolidated statements of operations data for the years ended December 31, 2014 and 2013, and the consolidated balance sheets data at December 31, 2015, 2014 and 2013, are derived from audited consolidated financial statements not included herein.

SELECTED FINANCIAL DATA
(In millions, except per share data)

	2017	2016	2015	2014	2013
Consolidated Statements of Operations Data:					
Net sales	$4,131.4	$4,329.5	$4,597.1	$4,777.6	$4,712.7
Operating income (loss)	164.9	122.4	(830.0)	141.3	142.2
Net earnings (loss)[(1)] [(2)]	$107.2	$44.9	$(641.9)	$18.6	$32.5
Earnings (loss) per diluted share[(2)]	$2.07	$0.90	$(13.40)	$0.38	$0.65
Consolidated Balance Sheets Data:					
Total assets	$2,452.4	$2,570.1	$2,847.5	$4,008.8	$4,103.6
Long-term debt and capital lease obligations (excluding current portion)	917.2	1,038.7	1,249.6	1,309.4	1,258.2
Other Financial Data:					
Dividends per share of common stock	$1.20	$1.20	$1.20	$1.20	$1.20

(1) Includes restructuring, impairment and transaction-related charges of $61.2 million, $80.6 million, $164.9 million, $67.3 million and $95.3 million for the years ended December 31, 2017, 2016, 2015, 2014 and 2013, respectively. Includes goodwill impairment charges of $808.3 million ($542.4 million, net of tax) for the year ended December 31, 2015. Excludes net loss attributable to non-controlling interests of $0.3 million and $1.6 million for the years ended December 31, 2014 and 2013, respectively.

(2) Includes a $28.8 million net income tax benefit recorded during the year ended December 31, 2017, as a result of the 2017 Tax Cuts and Jobs Act. See Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," and Note 14, "Income Taxes," to the Company's consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for further discussion.

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

The following discussion of the financial condition and results of operations of Quad/Graphics should be read together with the Quad/Graphics' audited consolidated financial statements for each of the three years in the period ended December 31, 2017, including the notes thereto, included in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. This discussion contains forward-looking statements that reflect the Company's plans, estimates and beliefs. The Company's actual results could differ materially from those discussed in these forward-looking statements. Factors that could cause or contribute to these differences include, but are not limited to, those discussed in "Forward-Looking Statements" and Part I, Item 1A, "Risk Factors," included earlier within this Annual Report on Form 10-K.

Management's discussion and analysis of financial condition and results of operations is provided as a supplement to the Company's consolidated financial statements and accompanying notes to help provide an understanding of the Company's financial condition, the changes in the Company's financial condition and the Company's results of operations. This discussion and analysis is organized as follows:

- Overview. This section includes a general description of the Company's business and segments, an overview of key performance metrics the Company's management measures and utilizes to evaluate business performance, and an overview of trends affecting the Company, including management's actions related to the trends.

- Results of Operations. This section contains an analysis of the Company's results of operations by comparing the results for (1) the year ended December 31, 2017, to the year ended December 31, 2016; and (2) the year ended December 31, 2016, to the year ended December 31, 2015. The comparability of the Company's results of operations between periods was impacted by acquisitions, including the 2015 acquisitions of Marin's International, S.A. ("Marin's"), Copac Global Packaging, Inc. ("Copac") and Specialty Finishing, Inc. ("Specialty"). The results of operations of all acquisitions are included in the Company's consolidated results prospectively from their respective acquisition dates. Forward-looking statements providing a general description of recent and projected industry and Company developments that are important to understanding the Company's results of operations are included in this section. This section also provides a discussion of EBITDA and EBITDA margin, financial measures that the Company uses to assess the performance of its business that are not prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP").

- Liquidity and Capital Resources. This section provides an analysis of the Company's capitalization, cash flows, a statement about off-balance sheet arrangements and a discussion and table of outstanding debt and commitments. Forward-looking statements important to understanding the Company's financial condition are included in this section. This section also provides a discussion of Free Cash Flow and Debt Leverage Ratio, non-GAAP financial measures that the Company uses to assess liquidity and capital allocation and deployment.

- Critical Accounting Policies and Estimates. This section contains a discussion of the accounting policies that the Company's management believes are important to the Company's financial condition and results of operations, as well as allowances and reserves that require significant judgment and estimates on the part of the Company's management. In addition, all of the Company's significant accounting policies, including critical accounting policies, are summarized in Note 1, "Basis of Presentation and Summary of Significant Accounting Policies," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K.

- New Accounting Pronouncements.

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Overview

Business Overview

Quad/Graphics is a leading marketing solutions provider. The Company leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. With a consultative approach, worldwide capabilities, leading-edge technology and single-source simplicity, the Company believes it has the resources and knowledge to help a wide variety of clients in multiple vertical industries, including retail, publishing and healthcare. The Company's operating and reportable segments are aligned with how the chief operating decision maker of the Company currently manages the business. The Company's reportable and operating segments are summarized below.

The United States Print and Related Services segment is predominantly comprised of the Company's United States printing operations and is managed as one integrated platform. This includes retail inserts, publications, catalogs, special interest publications, journals, direct mail, books, directories, in-store marketing and promotion, packaging, newspapers, custom print products, other commercial and specialty printed products and global paper procurement, together with marketing and other complementary services, including consumer insights, audience targeting, personalization, media planning and placement, process optimization, campaign planning and creation, pre-media production, videography, photography, digital execution, print execution and logistics. This segment also includes the manufacture of ink. The United States Print and Related Services segment accounted for approximately 91% of the Company's consolidated net sales during the year ended December 31, 2017.

The International segment consists of the Company's printing operations in Europe and Latin America, including operations in England, France, Germany, Poland, Argentina, Colombia, Mexico and Peru, as well as investments in printing operations in Brazil and India. This segment provides printed products and marketing and other complementary services consistent with the United States Print and Related Services segment. The International segment accounted for approximately 9% of the Company's consolidated net sales during the year ended December 31, 2017.

Corporate consists of unallocated general and administrative activities and associated expenses including, in part, executive, legal and finance, as well as certain expenses and income from frozen employee retirement plans, such as pension benefit plans.

Key Performance Metrics Overview

The Company's management believes the ability to generate net sales growth, profit increases and positive cash flow, while maintaining the appropriate level of debt, are key indicators of the successful execution of the Company's business strategy and will increase shareholder value. The Company uses period over period net sales growth, EBITDA, EBITDA margin, net cash provided by operating activities, Free Cash Flow and Debt Leverage Ratio as metrics to measure operating performance, financial condition and liquidity. EBITDA, EBITDA margin, Free Cash Flow and Debt Leverage Ratio are non-GAAP financial measures (see the definitions of EBITDA, EBITDA margin and the reconciliation of net earnings (loss) to EBITDA in the "Results of Operations" section below, and see the definitions of Free Cash Flow and Debt Leverage Ratio, the reconciliation of net cash provided by operating activities to Free Cash Flow, and the calculation of Debt Leverage Ratio in the "Liquidity and Capital Resources" section below).

Net sales growth. The Company uses period over period net sales growth as a key performance metric. The Company's management assesses net sales growth based on the ability to generate increased net sales through

increased sales to existing clients, sales to new clients, sales of new or expanded solutions to existing and new clients and opportunities to expand sales through strategic investments, including acquisitions.

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EBITDA and EBITDA margin. The Company uses EBITDA and EBITDA margin as metrics to assess operating performance. The Company's management assesses EBITDA and EBITDA margin based on the ability to increase revenues while controlling variable expense growth.

Net cash provided by operating activities. The Company uses net cash provided by operating activities as a metric to assess liquidity. The Company's management assesses net cash provided by operating activities based on the ability to meet recurring cash obligations while increasing available cash to fund cash restructuring requirements related to cost reduction activities, as well as to fund capital expenditures, debt service requirements, World Color Press single employer pension plan contributions, World Color Press MEPPs withdrawal liabilities, acquisitions and other investments in future growth, shareholder dividends and share repurchases. Net cash provided by operating activities can be significantly impacted by the timing of non-recurring or infrequent receipts or expenditures.

Free Cash Flow. The Company uses Free Cash Flow as a metric to assess liquidity and capital deployment. The Company's management assesses Free Cash Flow as a measure to quantify cash available for strengthening the balance sheet (debt reduction), for strategic capital allocation and deployment through investments in the business (acquisitions and strategic investments) and for returning capital to the shareholders (dividends and share repurchases). The priorities for capital allocation and deployment will change as circumstances dictate for the business, and Free Cash Flow can be significantly impacted by the Company's restructuring activities and other unusual items.

Debt Leverage Ratio. The Company uses the Debt Leverage Ratio as a metric to assess liquidity and the flexibility of its balance sheet. Consistent with other liquidity metrics, the Company monitors the Debt Leverage Ratio as a measure to determine the appropriate level of debt the Company believes is optimal to operate its business, and accordingly, to quantify debt capacity available for strategic capital allocation and deployment through investments in the business (capital expenditures, acquisitions and strategic investments), for strengthening the balance sheet (pension liability reduction), and for returning capital to the shareholders (dividends and share repurchases). The priorities for capital allocation and deployment will change as circumstances dictate for the business, and the Debt Leverage Ratio can be significantly impacted by the amount and timing of large expenditures requiring debt financing, as well as changes in profitability.

Overview of Trends Affecting Quad/Graphics

Quad/Graphics is a leading marketing solutions provider. Opportunity for growth within the U.S. advertising services industry supports Quad/Graphics 3.0 transformation. The Company leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. With a consultative approach, worldwide capabilities, leading-edge technology and single-source simplicity, the Company believes it has the resources and knowledge to help a wide variety of clients in multiple vertical industries, including retail, publishing and healthcare.

From a marketing services perspective, media channel proliferation continues, and consumers remain in control of where, when and how they buy their products and services. This trend has contributed to marketers' and publishers' need for solutions to efficiently and effectively coordinate and measure both digital and traditional channels.

From a printing industry perspective, competition remains highly fragmented and intense, and the Company believes that there are indicators of heightened competitive pressures. The industry has excess manufacturing capacity created by continued declines in industry volumes which, in turn, has created accelerated downward pricing pressures. In addition, digital delivery of documents and data, including the online distribution and hosting of media content and mobile technologies, offer alternatives to traditional delivery of printed documents. Increasing consumer acceptance

of digital delivery of content has resulted in marketers and publishers allocating their marketing and advertising spend across the expanding selection of digital delivery options, which further reduces printing demand and contributes to industry overcapacity. The Company also faces competition from print management firms, which look to streamline processes and reduce the overall print spend of the Company's clients, as well as from strategic marketing firms focused on helping businesses integrate multiple channels into their marketing campaigns.

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The Company believes that a disciplined approach for capital management and a strong balance sheet are critical to be able to invest in profitable growth opportunities and technological advances, thereby providing the highest return for shareholders. Management balances the use of cash between deleveraging the Company's balance sheet (through reduction in debt and pension obligations), compelling investment opportunities (through capital expenditures, acquisitions and strategic investments) and returns to shareholders (through share repurchases and a quarterly dividend of $0.30 per share).

The Company remains disciplined with its debt leverage. The Company's consolidated debt and capital leases decreased by $166 million during the year ended December 31, 2017, primarily due to cash provided by operating activities. Since the Company completed the World Color Press acquisition in July 2010, the Company has reduced debt and capital leases by $775 million and has reduced the obligations for pension, postretirement and MEPPs by $450 million, for a total obligation reduction since July of 2010 of over $1.2 billion.

The Company makes continuous progress on integrating and streamlining all aspects of its business, thereby lowering its cost structure by consolidating its manufacturing platform into its most efficient facilities, as well as realizing purchasing, mailing and logistics efficiencies by centralizing and consolidating print manufacturing volumes and eliminating redundancies in its administrative and corporate operations. These efforts include the deployment of the Company's Smartools® systems to streamline workflows and improve data visibility across the consolidated platform, and cost reductions through Lean Manufacturing and Continuous Improvement initiatives, both on the production floor and with administrative support, in order to achieve improved efficiencies, reduce waste, lower overall operating costs, enhance quality and timeliness and create a safer work environment for the Company's employees. The Company continues to focus on proactively aligning its cost structure to the realities of the top-line pressures it faces in the printing industry through sustainable continuous improvement programs. Restructuring actions initiated by the Company beginning in 2010 have resulted in the announcement of 41 plant closures and have reduced headcount by approximately 11,800 employees through December 31, 2017. The Company intends to continue reducing costs, as evidenced by the fourth quarter of 2017 announcements of four plant closures that ceased operations in December 2017 and the first quarter of 2018.

Integrated distribution with the postal service is an important component of the Company's business. Any material change in the current service levels provided by the postal service could impact the demand that clients have for print services. The USPS continues to experience financial problems. Without action by Congress to reform the USPS' financial stability and remove unnecessary and costly congressional mandates, pressure on postal rates will continue to mount. Additionally, without reforms to address the systemic overall cost structure of the USPS, these losses will continue into the future, and the benefits from Congressional postal reform legislation will be short-lived. In 2006, the Postal Accountability and Enhancement Act ("PAEA"), created the predictable postal price-setting process in place today that is tied directly to the Consumer Price Index for All Urban Consumers. PAEA requires the PRC to review the price setting process after ten years. The PRC initiated this review in December 2016. In December 2017, the PRC issued a Notice of Proposed Rulemaking, with comments due on March 1, 2018. Any newly revised rates that would be effective as a result of new rules issued by the PRC may include a higher rate cap, or potentially the elimination of a rate cap altogether, which will result in no restrictions on the USPS' ability to increase rates from year to year. This may lead to price spikes for mailers and may also reduce the incentive for the USPS to continue to take out costs and instead continue to rely on postage to cover the costs of an outdated postal service that does not reflect the industry's ability or willingness to pay. The end result may be reduced demand for printed products as customers may move more aggressively into other delivery methods, such as the many digital and mobile options now available to consumers.

The Company has invested significantly in its mail preparation and distribution capabilities to mitigate the impact of increases in postage costs, and to help clients successfully navigate the ever-changing postal environment. Through its data analytics, unique software to merge mailstreams on a large scale, advanced finishing capabilities and technology,

and in-house transportation and logistics operations, the Company manages the mail preparation and distribution of most of its clients' products to maximize efficiency, to enable on-time and consistent delivery and to partially reduce these costs; however, the net impact of increasing postal costs may create a decrease in client demand for print and mail products.

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Another key aspect of the Company's modern manufacturing platform is the combination of its footprint of mega plants (facilities greater than 1.0 million square feet) that produce a number of different products under one roof; mega zones where multiple facilities in close geographic proximity are managed as one large facility; and smaller strategically located facilities. The Company has continued to evolve its platform, equipping facilities to be product line agnostic, which enables the Company to maximize equipment utilization. Quad/Graphics believes that the large plant size of certain of its key printing facilities allows the Company to drive savings in certain product lines (such as publications and catalogs) due to economies of scale and from investments in automation and technology.

2017

In 2017, the Company continued to make strategic investments that support its 3.0 transformation.

To strengthen its integrated marketing platform, Quad/Graphics continued to add client-side talent to its team — individuals who understand the unique challenges facing retailers, marketers and publishers and can build solutions to help drive client business results. The Company also continued to strengthen its strategic partnerships with agencies, such as Rise Interactive, that specialize in online channels. When combined with the expertise of its BlueSoHo multichannel agency, Quad/Graphics believes it is well-positioned to create greater value for its clients by helping them create, integrate, deploy and measure content more efficiently and effectively across a variety of channels.

The Company continued to make strategic investments in its core print platform as part of its ongoing commitment to maintaining the most efficient, automated and dependable manufacturing and distribution platform in the industry. These investments help fuel Quad/Graphics' 3.0 transformation and sustain its high-quality, low-cost producer position in the industry. These investments include the following:

- Direct Marketing Platform: The Company continued to strengthen its Direct Marketing platform through the addition of state-of-the-art digital press technology capable of producing 100% variable content in full color cost-effectively on a mass scale. With this technology, the Company can help its clients increase consumer engagement and response, and improve return on marketing investment. In 2017, the Company installed a Hewlett-Packard T490 digital press in its Midwest Digital Print Supercenter in Pewaukee, Wisconsin, to complement its existing Hewlett-Packard T410 press in Pewaukee. Quad/Graphics also invested in additional high-resolution inkjet print modules for offset presses in its Pewaukee and Effingham, Illinois, facilities. These modules are integrated into existing offset presses to give marketers the opportunity to create high-quality variable images in-line with static four-color print at high speeds.

- Commercial and Specialty Platform: The Company also invested in state-of-the-art digital and offset press technology to enhance its Commercial and Specialty Platform, which increasingly serves national clients in a variety of industries, including restaurants. These investments include a Fuji J press for its Woburn, Massachusetts facility, and a Heidelberg Speedmaster XL 106 eight-color perfecting sheetfed press, in its Burlington, Wisconsin, facility. Both presses are ideal for short-run and print-on-demand work, including promotional items.

- QuadPackaging Platform: In 2017, the Company more than doubled high-end packaging production capacity by moving its Dominican Republic operations into a newer, larger facility in Santo Domingo, close to where products are manufactured to improve timeliness and cost-efficiency. The facility features several new and/or upgraded pieces of equipment including a new Heidelberg Speedmaster XL 106 press, a rebuilt Heidelberg Speedmaster XL 105 press, two new Bobst Visioncut LE Diecutters, and a Marquip roll sheeting machine for cutting its own sheets of paper. QuadPackaging's Spartanburg, South Carolina, facility also installed a new Heidelberg Speedmaster XL 106 press and a new digital Fuji J press for short runs and/or variable printing in the folded carton market.

- In-Store Marketing Platform: Quad/Graphics' Europe, located in Poland, invested in a Heidelberg VLF (Very Large Format) sheetfed press for its In-Store Marketing group. The press is used to produce various types of packaging and

floor displays with complex shapes and structures, serving the food, cosmetics, chemical, motor, textile and other industries. In the United States, Quad/Graphics' Tempt in-store

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marketing group replaced two digital presses with two next generation Inca X3 presses, which print faster and feature more advanced automation to reduce operator error.

- Book Platform: The Company invested in a 64-page manroland LITHOMAN web offset press for its Versailles, Kentucky, plant. The high-speed press produces optimal quality with reduced production cycle times and waste, and complements the facility's short-run digital press capabilities. It also lowers the break-even point between traditional offset and digital printing so the Company can cost-effectively produce run lengths ranging from one copy to millions of copies. The Company also upgraded three of Versailles plant's five Hewlett-Packard digital presses to increase their top speeds from 600 feet-per-minute to 1,000 feet-per-minute, essentially adding the capacity of two additional presses. Further, it added a case-in machine for digital print finishing and continues to invest in its proprietary information technology solutions, including On-QTM a demand-driven ordering system that helps clients better manage ordering and inventory.

- Magazine, Catalog and Retail Platform: The Company continues to enhance productivity and offset labor shortages by using automation, including automated guided vehicles (driverless forktrucks) for moving work-in-process and finished goods and automated palletizers to stack product at the end of a finishing line at high speeds. In 2017, capital investments included 10 additional automated guided vehicles, for a total of 40 in its Sussex, Wisconsin mega plant, and 20 automated palletizers for a total of more than 100 company-wide.

2016

To strengthen its marketing services, the Company seeks out strategic partnerships with companies on the cutting edge of marketing solutions and, in 2016, partnered with, and made a minority investment in, Rise Interactive, a digital marketing agency. The strategic investment brings together a company that is adept at optimizing spend offline, with a company that is doing the same online, using robust analytics to deliver highly-relevant, consistent messages to consumers across print and digital channels. The strategic investment in Rise Interactive will enable both Quad/Graphics and Rise Interactive to accelerate growth through co-innovation that delivers more value to their collective clients.

Quad/Graphics made a number of strategic investments in 2016 to strengthen its core print platform and create further value for its clients. Highlights include the following:

- Direct Mail Platform: The Company announced that it will transform its Westampton, New Jersey, direct marketing production plant into an East Coast Digital Print Supercenter specializing in personalized, high-response direct marketing solutions. The expansion adds new technology that will enhance both the efficiency and effectiveness of direct marketers' efforts to reach individual consumers with superior-quality, cost effective, hyperpersonalized direct mail pieces on a mass scale. The Company's East Coast Digital Print Supercenter will include two new Hewlett-Packard Indigo 12000 digital presses. In addition, the Supercenter also will operate several other digital presses as well as offset presses with upgraded inkjet technology, and install two new high-speed letter inserters to enhance lettershop operations. The East Coast Digital Supercenter compliments Quad Graphics' existing Midwest Digital Print Supercenter in Pewaukee, Wisconsin, which recently added a Hewlett-Packard Indigo 12000 digital press; and Quad/Graphics Effingham, Illinois direct mail production facility, which recently expanded its personalization capabilities with the installation of a new Hewlett-Packard C800 four-color variable inkjet print module system.

- Commercial and Specialty Platform: The Company announced it will add state-of-the-art digital printing capabilities in its Dallas, Texas plant with two new digital presses. A new Fuji J Press is a digital print press offering the quality, reliability and consistency of offset printing in addition to full variable one-to-one data management. The Fuji J Press is complemented by a Kodak NexPress for short-run, quick-turn workflows. Finishing equipment will also be

installed including a Horizon StitchLiner 5500 saddle stitching system and two fully automated Horizon perfect binders as well as a folder, a flatcutter and a shrinkwrapper. Lastly, the Dallas plant will have expanded kitpacking and fulfillment solutions to simplify

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the management and distribution of finished products, integrated from order entry to doorstep delivery. This transformation will help Quad/Graphics better serve the next generation of marketers and brand owners in a variety of industry verticals, including retail, travel and hospitality, fast casual restaurants and automotive. While the Dallas, Texas plant will close in the first quarter of 2018, the state-of-the-art equipment will be re-installed in other Commercial and Specialty plants.

- Book Platform: Quad/Graphics has invested in multiple high-speed color digital web presses as part of a strategy to transform the Company's book platform to the widest, most productive digital web presses available in the marketplace today. The Company is committed to helping book publishers produce and deliver books on demand, bringing zero inventory and just-in-time delivery closer to reality. The Company will continue to invest in its book platform to match its clients' changing needs and redefine the book supply chain through increased customization and versioning capabilities, faster time to market, reduced waste, inventories and obsolescence and lower fixed costs.

2015

- The Company completed the acquisition of Specialty on August 25, 2015, for a net purchase price of$61 million, excluding acquired cash. Specialty is a full-service paperboard folding carton manufacturer and logistics provider located in Omaha, Nebraska.

- The Company completed the acquisition of Copac on April 14, 2015, for a net purchase price of $59 million, excluding acquired cash. Copac is a leading international provider of innovative packaging and supply chain solutions, including turnkey packaging design, production and fulfillment services across a range of end markets, headquartered in Spartanburg, South Carolina. Copac manufactures products such as folding cartons, labels, inserts, tags and specialty envelopes, and has production facilities in Spartanburg and Santo Domingo, Dominican Republic, as well as strategically sourcing packaging product manufacturing over multiple end markets in Central America and Asia, giving it a global footprint.

- The Company completed the acquisition of Marin's on February 3, 2015, for a net purchase price of $21 million, excluding acquired cash. Marin's is a worldwide leader in the point-of-sale display industry and specializes in the research and design of display solutions, headquartered in Paris, France. Marin's products are produced by a global network of licensees, including Quad/Graphics, as well as one wide-format digital print, kitting and fulfillment facility in Paris. Marin's uses its own European-based sales force and the global licensees to sell its patented product portfolio.

The Company is subject to seasonality in its quarterly results as net sales and operating income are higher in the third and fourth quarters of the calendar year as compared to the first and second quarters. The fourth quarter is typically the highest seasonal quarter for cash flows from operating activities and Free Cash Flow due to the reduction of working capital requirements that reach peak levels during the third quarter. Seasonality is driven by increased magazine advertising page counts, retail inserts, catalogs and books primarily due to back-to-school and holiday-related advertising and promotions. The Company expects this seasonality impact to continue in future years.

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Results of Operations for the Year Ended December 31, 2017, Compared to the Year Ended December 31, 2016

Summary Results

The Company's operating income, operating margin, net earnings (computed using a 40% normalized tax rate) and diluted earnings per share for the year ended December 31, 2016, changed from the year ended December 31, 2016, as follows (dollars in millions, except per share data):

	Operating Income	Operating Margin	Net Earnings	Diluted Earnings Per Share
For the year ended December 31, 2016	$ 122.4	2.8 %	$ 44.9	$ 0.90
2017 restructuring, impairment and transaction-related charges [1]	(61.2)	(1.5)%	(36.7)	(0.71)
2016 restructuring, impairment and transaction-related charges [2]	80.6	1.9 %	48.4	0.97
Interest expense [3]	N/A	N/A	3.7	0.07
2017 loss on debt extinguishment [4]	N/A	N/A	(1.6)	(0.03)
2016 gain on debt extinguishment [5]	N/A	N/A	(8.5)	(0.17)
Income taxes [6]	N/A	N/A	41.8	0.81
Investments in unconsolidated entities, net of tax [7]	N/A	N/A	1.4	0.03
Operating income [8]	23.1	0.8 %	13.8	0.20
For the year ended December 31, 2017	$ 164.9	4.0 %	$ 107.2	$ 2.07

(1) Restructuring, impairment and transaction-related charges of $61.2 million ($36.7 million, net of tax) incurred during the year ended December 31, 2017, included the following:

a. $26.9 million of employee termination charges related to workforce reductions through facility consolidations and voluntary and involuntary separation programs;

b. $12.0 million of impairment charges, including $6.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Waseca, Minnesota; Columbus, Ohio; and Taunton, Massachusetts, as well as other capacity reduction restructuring activities; and $5.3 million of impairment charges for land and building related to the Waseca, Minnesota and Taunton, Massachusetts plant closures;

c. $3.1 million of transaction-related charges, consisting of professional service fees for business acquisition and divestiture activities;

d. $19.2 million of various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges, net of $7.1 million in gains from the sale of the Atglen, Pennsylvania; Dickson, Tennessee; East Greenville, Pennsylvania; Lenexa, Kansas; and Marengo, Iowa plants, and a $1.2 million gain from the Company's Argentina Subsidiaries' settlements with vendors through bankruptcy proceedings. Other restructuring charges also included a $6.7 million loss on the sale of a business and an $0.8 million non-cash pension settlement charge related to lump-sum pension payments.

The Company expects to incur additional restructuring and integration costs in future reporting periods in connection with eliminating excess manufacturing capacity and properly aligning its cost structure in conjunction with the Company's acquisitions and strategic investments, and other cost reduction programs.

(2)

Restructuring, impairment and transaction-related charges of $80.6 million ($48.4 million, net of tax) incurred during the year ended December 31, 2016, included the following:

a. $12.9 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs;

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b. $26.8 million of impairment charges, including $14.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; Woodstock, Illinois; and Queretaro, Mexico, as well as other capacity reduction restructuring activities; and $12.1 million of impairment charges for land and building related to the Atglen, Pennsylvania plant closure;

c. $2.2 million of transaction-related charges, consisting of professional service fees for business acquisition and divestiture activities;

d. $0.1 million of acquisition-related integration costs; and

e. $38.6 million of various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges. Other restructuring charges also included an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge related to lump-sum pension payments.

(3) Interest expense decreased $6.1 million ($3.7 million, net of tax) during the year ended December 31, 2017, to $71.1 million. This change was due to lower average debt levels in the year ended December 31, 2017, as compared to the year ended December 31, 2016.

(4) A $2.6 million loss on debt extinguishment ($1.6 million, net of tax) was recognized during the year ended December 31, 2017, from the refinancing of the Senior Secured Credit Facility, completed on February 10, 2017.

(5) A $14.1 million gain on debt extinguishment ($8.5 million, net of tax) was recognized during the year ended December 31, 2016, primarily from the repurchase of $56.5 million aggregate principal amount of Senior Unsecured Notes.

(6) The $41.8 million decrease in income taxes as calculated in the following table is primarily due to a $28.8 million tax benefit related to the reduced federal rate applied to net domestic deferred tax liabilities in accordance with the Tax Cuts and Jobs Act and a $21.0 million tax benefit from the release of valuation allowances primarily related to foreign credits, partially offset by a $7.1 million decreased tax benefit of domestic deductions. See Note 14, "Income Taxes," to the consolidated financial statements in Part II, Item 8 of this Annual Report on Form 10-K for further information on income taxes.

	Year Ended December 31,		
	2017	2016	$ Change
Earnings before income taxes and equity in loss of unconsolidated entities	$91.2	$59.3	$31.9
40% normalized tax rate	40.0 %	40.0 %	40.0 %
Income tax expense at 40% normalized tax rate	36.5	23.7	12.8
Less: Income tax (benefit) expense from the consolidated statements of operations	(16.0)	13.0	(29.0)
Impact of income taxes	$52.5	$10.7	$41.8

(7) The decrease in net loss attributable to investments in unconsolidated entities, net of tax, of $1.4 million during the year ended December 31, 2017, was related to a decrease in losses at the Company's Brazilian joint venture investment in Plural Industria Gráfica Ltda ("Plural").

(8)

Operating income, excluding restructuring, impairment and transaction-related charges, increased $23.1 million ($13.8 million, net of tax) primarily due to the following: (1) a $44.6 million decrease in depreciation and amortization expense; (2) a $19.4 million vacation reserve reduction from an employee vacation policy change; (3) $6.8 million in lower legal expenses; (4) a $5.0 million gain from a property insurance claim; and (5) savings from cost reduction initiatives, including employee-related costs. These impacts were partially offset by lower print volume and pricing due to ongoing industry pressures and a $10.4 million benefit in 2016 that did not repeat in 2017 related to the collection of a previously written-off vendor receivable.

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Operating Results

The following table sets forth certain information from the Company's consolidated statements of operations on an absolute dollar basis and as a relative percentage of total net sales for each noted period, together with the relative percentage change in such information between the periods set forth below:

	Year Ended December 31,					
	2017		2016			
	(dollars in millions)					
	Amount	% of Net Sales	Amount	% of Net Sales	$ Change	% Change
Net sales:						
Products	$3,529.0	85.4 %	$3,717.1	85.9 %	$(188.1)	(5.1)%
Services	602.4	14.6 %	612.4	14.1 %	(10.0)	(1.6)%
Total net sales	4,131.4	100.0%	4,329.5	100.0%	(198.1)	(4.6)%
Cost of sales:						
Products	2,827.3	68.4 %	2,971.0	68.6 %	(143.7)	(4.8)%
Services	432.1	10.5 %	423.8	9.8 %	8.3	2.0 %
Total cost of sales	3,259.4	78.9 %	3,394.8	78.4 %	(135.4)	(4.0)%
Selling, general & administrative expenses	413.4	10.0 %	454.6	10.5 %	(41.2)	(9.1)%
Depreciation and amortization	232.5	5.6 %	277.1	6.4 %	(44.6)	(16.1)%
Restructuring, impairment and transaction-related charges	61.2	1.5 %	80.6	1.9 %	(19.4)	(24.1)%
Total operating expenses	3,966.5	96.0 %	4,207.1	97.2 %	(240.6)	(5.7)%
Operating income	$164.9	4.0 %	$122.4	2.8 %	$42.5	34.7 %

Net Sales

Product sales decreased $188.1 million, or 5.1%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a $141.6 million decrease in product sales in the Company's core print and specialty print product lines due to ongoing industry volume and pricing pressures and a $47.1 million decrease from pass-through paper sales, partially offset by $0.6 million in positive foreign exchange impacts.

Service sales, which primarily consist of imaging, logistics, distribution and medical services, decreased $10.0 million, or 1.6%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a $9.7 million decrease in logistics sales resulting from lower print shipment volume.

Cost of Sales

Cost of product sales decreased $143.7 million, or 4.8%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, primarily due to the following: (1) lower print and paper volume; (2) an $8.5 million vacation reserve reduction from an employee vacation policy change; and (3) cost reduction initiatives. These reductions were partially offset by a $10.4 million benefit in 2016 that did not repeat in 2017 related to the collection of a previously written-off vendor receivable.

Cost of product sales as a percentage of net sales decreased to 68.4% for the year ended December 31, 2017, from 68.6% for the year ended December 31, 2016, primarily due to the reasons provided above.

Cost of service sales increased $8.3 million, or 2.0%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, primarily due to increased shipment cost.

Cost of service sales as a percentage of net sales increased to 10.5% for the year ended December 31, 2017, from 9.8% for the year ended December 31, 2016, primarily due to the reasons provided above.

Selling, General and Administrative Expenses

Selling, general and administrative expenses decreased $41.2 million, or 9.1%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, primarily due to the following: (1) a $10.9 million vacation reserve reduction from an employee vacation policy change; (2) a $6.8 million decrease in legal expenses; (3) a $5.0 million gain from a property insurance claim; and (4) savings from cost reduction initiatives, including employee-related costs. Selling, general and administrative expenses as a percentage of net sales decreased from 10.5% for the year ended December 31, 2016, to 10.0% for the year ended December 31, 2017, primarily due to the reasons stated above.

Depreciation and Amortization

Depreciation and amortization decreased $44.6 million, or 16.1%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, due to a $32.4 million decrease in amortization expense, primarily related to customer relationship intangibles becoming fully amortized in the second quarter of 2016; and a $12.2 million decrease in depreciation expense from property, plant and equipment becoming fully depreciated over the past year and a decrease in purchases of property, plant and equipment in 2017 compared to 2016.

Restructuring, Impairment and Transaction-Related Charges

Restructuring, impairment and transaction-related charges decreased $19.4 million, or 24.1%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, primarily due to the following: (1) a $14.8 million decrease in impairment charges; (2) a $0.1 million decrease in acquisition-related integration costs; and (3) a $19.4 million decrease in other restructuring charges. These decreases were partially offset by a $14.0 million increase in employee termination charges and a $0.9 million increase in transaction-related charges.

Restructuring, impairment and transaction-related charges of $61.2 million incurred in the year ended December 31, 2017, included the following: (1) $26.9 million of employee termination charges related to workforce reductions through facility consolidations and voluntary and involuntary separation programs; (2) $12.0 million of impairment charges, including $6.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Waseca, Minnesota; Columbus, Ohio; and Taunton, Massachusetts, as well as other capacity reduction restructuring activities; and $5.3 million of impairment charges for land and building related to the Waseca, Minnesota and Taunton, Massachusetts plant closures; (3) $3.1 million of transaction-related charges consisting of professional service fees related to business acquisition and divestiture activities; and (4) $19.2 million of various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges, net of $7.1 million in gains from the sale of the Atglen, Pennsylvania; Dickson, Tennessee; East Greenville, Pennsylvania; Lenexa, Kansas; and Marengo, Iowa plants, and a $1.2 million gain from the Company's Argentina Subsidiaries' settlements with vendors through bankruptcy proceedings. Other restructuring charges also included a $6.7 million loss on the sale of a business and an $0.8 million non-cash pension settlement charge related to lump-sum pension payments.

Restructuring, impairment and transaction-related charges of $80.6 million incurred in the year ended December 31, 2016, included the following: (1) $12.9 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $26.8 million of impairment charges, including $14.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; Woodstock, Illinois; and Queretaro, Mexico, as well as other capacity reduction restructuring

activities; and $12.1 million of impairment charges for land and building related to the Atglen, Pennsylvania plant closure; (3) $2.2 million of transaction-related charges consisting of professional service fees related to business acquisition and divestiture activities; (4) $0.1 million of acquisition-related integration costs; and (5) $38.6 million of various other restructuring charges, including costs to maintain and exit closed facilities, lease exit charges,

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an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge related to lump-sum pension payments.

EBITDA and EBITDA Margin—Consolidated

EBITDA and EBITDA margin for the year ended December 31, 2017, compared to the year ended December 31, 2016, were as follows:

	Year Ended December 31,			
	2017		2016	
	Amount	% of Net Sales	Amount	% of Net Sales
	(dollars in millions)			
EBITDA and EBITDA margin	$394.8	9.6 %	$412.2	9.5 %

EBITDA decreased $17.4 million for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to lower print volume and pricing due to ongoing industry pressures and a $10.4 million benefit in 2016 that did not repeat in 2017 related to the collection of a previously written-off vendor receivable. These impacts were partially offset by the following: (1) $19.4 million of decreased restructuring, impairment and transaction-related charges; (2) a $19.4 million vacation reserve reduction from an employee vacation policy change; (3) $6.8 million in lower legal expenses; (4) a $5.0 million gain from a property insurance claim; and (5) savings from cost reduction initiatives, including employee-related costs.

EBITDA is defined as net earnings (loss) excluding (1) interest expense, (2) income tax expense (benefit) and (3) depreciation and amortization. EBITDA margin represents EBITDA as a percentage of net sales. EBITDA and EBITDA margin are presented to provide additional information regarding Quad/Graphics' performance. Both are important measures by which Quad/Graphics gauges the profitability and assesses the performance of its business. EBITDA and EBITDA margin are not measures of financial performance in accordance with GAAP. EBITDA and EBITDA margin should not be considered alternatives to net earnings (loss) as a measure of operating performance or to cash flows provided by operating activities as a measure of liquidity. Quad/Graphics' calculation of EBITDA and EBITDA margin may be different from the calculations used by other companies, and therefore, comparability may be limited. A reconciliation of EBITDA to net earnings for the years ended December 31, 2017 and 2016, was as follows:

	Year Ended December 31,	
	2017	2016
	(dollars in millions)	
Net earnings[1]	$ 107.2	$ 44.9
Interest expense	71.1	77.2
Income tax (benefit) expense	(16.0)	13.0
Depreciation and amortization	232.5	277.1
EBITDA	$ 394.8	$ 412.2

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(1) Net earnings included the following:

a. Restructuring, impairment and transaction-related charges of $61.2 million and $80.6 million for the years ended December 31, 2017 and 2016, respectively;

b. Loss on debt extinguishment of $2.6 million for the year ended December 31, 2017;

c. Gain on debt extinguishment of $14.1 million for the year ended December 31, 2016; and

d. Equity in loss of unconsolidated entities of $1.4 million for the year ended December 31, 2016.

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United States Print and Related Services

The following table summarizes net sales, operating income, operating margin and certain items impacting comparability within the United States Print and Related Services segment:

	Year Ended December 31,			
	2017	2016		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Net sales:				
Products	$3,156.9	$3,335.1	$(178.2)	(5.3)%
Services	583.2	591.9	(8.7)	(1.5)%
Operating income (including restructuring, impairment and transaction-related charges)	194.3	186.1	8.2	4.4 %
Operating margin	5.2 %	4.7 %	N/A	N/A
Restructuring, impairment and transaction-related charges	$53.6	$59.3	$(5.7)	(9.6)%

Net Sales

Product sales for the United States Print and Related Services segment decreased $178.2 million, or 5.3%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a $137.6 million decrease in product sales in the Company's core print and specialty print product lines (predominantly due to ongoing volume and pricing pressures from excess capacity in the printing industry) and a $40.6 million decrease in pass-through paper sales.

Service sales for the United States Print and Related Services segment decreased $8.7 million, or 1.5%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to an $8.4 million decrease in logistic sales resulting from lower print shipment volume.

Operating Income

Operating income for the United States Print and Related Services segment increased $8.2 million, or 4.4%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to the following: (1) a $41.6 million decrease in depreciation and amortization; (2) a $19.4 million vacation reserve reduction due to an employee vacation policy change; (3) a $5.7 million decrease in restructuring, impairment and transaction-related charges; (4) a $5.0 million gain from a property insurance claim; and (5) savings from cost reduction initiatives, including employee-related costs. These impacts were partially offset by lower print volume and pricing and a $10.4 million benefit in 2016 that did not repeat in 2017 related to the collection of a previously written-off vendor receivable.

The operating margin for the United States Print and Related Services segment increased to 5.2% for the year ended December 31, 2017, from 4.7% for the year ended December 31, 2016, primarily due to the reasons provided above.

Restructuring, Impairment and Transaction-Related Charges

Restructuring, impairment and transaction-related charges for the United States Print and Related Services segment for the year ended December 31, 2017, were $53.6 million, consisting of: (1) $21.7 million of employee termination charges related to workforce reductions through facility consolidations and voluntary and involuntary separation

programs; (2) $11.5 million of impairment charges, including $6.2 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Waseca, Minnesota; Columbus, Ohio; and Taunton, Massachusetts, as well as other capacity reduction restructuring activities; and $5.3 million of impairment charges for land and building related to the Waseca, Minnesota and Taunton, Massachusetts plant closures; and (3) $19.4 million of various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges, net of $7.1 million in gains from the sale of the Atglen, Pennsylvania; Dickson, Tennessee; East Greenville, Pennsylvania; Lenexa, Kansas; and Marengo, Iowa plants. Other restructuring charges also included a $6.7 million loss on the sale of a business.

Restructuring, impairment and transaction-related charges for the United States Print and Related Services segment for the year ended December 31, 2016, were $59.3 million, consisting of: (1) $10.5 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $25.9 million of impairment charges, including $13.8 million for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; and Woodstock, Illinois, as well as other capacity reduction restructuring activities; and $12.1 million of land and building impairment related to the Atglen, Pennsylvania plant closure; (3) $0.1 million of acquisition-related integration costs; and (4) $22.8 million various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges.

International

The following table summarizes net sales, operating income, operating margin, certain items impacting comparability and equity in loss of unconsolidated entities within the International segment:

	Year Ended December 31,			
	2017	2016		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Net sales:				
Products	$372.1	$382.0	$ (9.9)	(2.6)%
Services	19.2	20.5	(1.3)	(6.3)%
Operating income (including restructuring, impairment and transaction-related charges)	19.6	13.5	6.1	45.2 %
Operating margin	5.0 %	3.4 %	N/A	N/A
Restructuring, impairment and transaction-related charges (income)	$3.3	$(1.1)	$ 4.4	nm
Equity in loss of unconsolidated entities	—	1.4	(1.4)	(100.0)%

Net Sales

Product sales for the International segment decreased $9.9 million, or 2.6%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a $6.5 million decrease in pass-through paper sales and a $4.0 million decrease in volume and pricing, primarily in Peru, partially offset by $0.6 million in favorable foreign exchange impacts, primarily in Europe.

Service sales for the International segment decreased $1.3 million, or 6.3%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a decrease in logistics revenue in Europe.

Operating Income

Operating income for the International segment increased $6.1 million, or 45.2%, for the year ended December 31, 2017, compared to the year ended December 31, 2016, primarily due to a $7.4 million increase in operating income, primarily in Europe and Mexico, and a $3.1 million decrease in depreciation and amortization expense, partially offset by a $4.4 million increase in restructuring and impairment expenses;

Restructuring, Impairment and Transaction-Related Charges (Income)

Restructuring, impairment and transaction-related charges (income) for the International segment for the year ended December 31, 2017, were $3.3 million, consisting of the following: (1) $4.7 million of employee termination charges related to workforce reductions through facility consolidations and voluntary and involuntary separation programs; (2) $0.5 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations; and (3) $(1.9) million of various other restructuring income primarily related to the Company's Argentina Subsidiaries' gain from settlements with vendors through bankruptcy proceedings, partially offset by charges to maintain and exit closed facilities.

Restructuring, impairment and transaction-related charges (income) for the International segment for the year ended December 31, 2016, were $(1.1) million, consisting of the following: (1) $1.4 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $0.9 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Queretaro, Mexico; (3) $0.1 million of transaction-related charges; and (4) $(3.5) million of other restructuring income primarily related to the Company's Argentina Subsidiaries' gain from settlements with vendors through bankruptcy proceedings and a gain on the sale of the Pilar, Argentina plant.

Equity in Loss of Unconsolidated Entities

Investments in entities where Quad/Graphics has the ability to exert significant influence, but not control, are accounted for using the equity method of accounting. The Company holds a 49% ownership interest in Plural, a commercial printer based in São Paulo, Brazil. The equity in loss of unconsolidated entities in the International segment decreased $1.4 million for the year ended December 31, 2017, compared to the year ended December 31, 2016, due to a decrease in losses from the Company's investment in Plural.

Unrestricted Subsidiaries

Unrestricted subsidiaries as defined in the Senior Unsecured Notes indenture represented less than 2.0% of total consolidated net sales for the year ended December 31, 2017.

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Corporate

The following table summarizes unallocated operating expenses presented as Corporate:

	Year Ended December 31,			
	2017	2016		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Operating expenses (including restructuring, impairment and transaction-related charges)	$49.0	$ 77.2	$(28.2)	(36.5)%
Restructuring, impairment and transaction-related charges	4.3	22.4	(18.1)	(80.8)%

Operating Expenses

Corporate operating expenses decreased $28.2 million, or 36.5%, for the year ended December 31, 2017, compared with the year ended December 31, 2016, primarily due to an $18.1 million decrease in restructuring, impairment and transaction-related charges, an $8.0 million decrease in legal expenses and a $4.6 million decrease in incentive compensation expense.

Restructuring, Impairment and Transaction-Related Charges

Corporate restructuring, impairment and transaction-related charges for the year ended December 31, 2017, were $4.3 million, consisting of the following: (1) $0.5 million of employee termination charges related to workforce reductions through facility consolidations and voluntary and involuntary separation programs; (2) $2.1 million of transaction-related charges which primarily included professional service fees; and (3) $1.7 million of other restructuring charges, including an $0.8 million non-cash pension settlement charge related to lump-sum pension payments.

Corporate restructuring, impairment and transaction-related charges for the year ended December 31, 2016, were $22.4 million, consisting of the following: (1) $1.0 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $2.1 million of transaction-related charges which primarily included professional service fees; and (3) $19.3 million of other restructuring charges, including an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge related to lump-sum pension payments.

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Results of Operations for the Year Ended December 31, 2016, Compared to the Year Ended December 31, 2015

Summary Results

The Company's operating income (loss), operating margin, net earnings (loss) (computed using a 40% normalized tax rate) and diluted earnings (loss) per share for the year ended December 31, 2016, changed from the year ended December 31, 2015, as follows (dollars in millions, except per share data):

	Operating Income(Loss)	Operating Margin	Net Earnings (Loss)	Diluted Earnings (Loss) Per Share
For the year ended December 31, 2015	$ (830.0)	(18.1)%	$ (641.9)	$ (13.40)
2016 restructuring, impairment and transaction-related charges (1)	(80.6)	(1.9)%	(48.4)	(0.97)
2015 restructuring, impairment and transaction-related charges (2)	164.9	3.6 %	108.0	2.25
2015 goodwill impairment (3)	808.3	17.6 %	542.4	11.32
Interest expense (4)	N/A	N/A	6.7	0.13
2016 gain on debt extinguishment (5)	N/A	N/A	8.5	0.17
Income taxes (6)	N/A	N/A	28.8	0.58
Investments in unconsolidated entities, net of tax (7)	N/A	N/A	4.9	0.10
Operating income (8)	59.8	1.6 %	35.9	0.72
For the year ended December 31, 2016	$ 122.4	2.8 %	$ 44.9	$ 0.90

(1) Restructuring, impairment and transaction-related charges of $80.6 million ($48.4 million, net of tax) incurred during the year ended December 31, 2016, included the following:

a. $12.9 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs;

b. $26.8 million of impairment charges, including $14.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; Woodstock, Illinois; and Queretaro, Mexico, as well as other capacity reduction restructuring activities; and $12.1 million of impairment charges for land and building related to the Atglen, Pennsylvania plant closure;

c. $2.2 million of transaction-related charges, consisting of professional service fees for business acquisition and divestiture activities;

d. $0.1 million of acquisition-related integration costs; and

e. $38.6 million of various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges. Other restructuring charges also included an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge related to lump-sum pension payments.

The Company expects to incur additional restructuring and integration costs in future reporting periods in connection with eliminating excess manufacturing capacity and properly aligning its cost structure in conjunction with the Company's acquisitions and strategic investments, and other cost reduction programs.

(2) Restructuring, impairment and transaction-related charges of $164.9 million incurred during the year ended December 31, 2015, included the following:

a. $42.1 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs;

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b. $95.3 million of impairment charges, including the following: (1) $54.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations including Atlanta, Georgia; Augusta, Georgia; Dickson, Tennessee; East Greenville, Pennsylvania; Loveland, Colorado; and Queretaro, Mexico, as well as other capacity reduction restructuring initiatives; (2) $18.6 million of investment-related impairment charges, primarily related to $16.7 million of impairment charges to reduce the book value of the Company's equity method investment in Quad/Graphics Chile S.A. ("Chile") to fair value (see Note 8, "Equity Method Investments in Unconsolidated Entities," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K, for additional details related to the impairment of the Company's equity method investment in Chile); (3) $12.7 million of land and building impairment charges primarily related to the Augusta, Georgia and East Greenville, Pennsylvania plant closures; (4) $7.1 million of customer relationship intangible asset impairments; and (5) $2.2 million of impairment charges recorded for property, plant and equipment and other intangible assets as a result of the restructuring proceedings in Argentina for the Company's Argentina Subsidiaries;

c. $(6.7) million of transaction-related charges (income), including a $10.0 million non-recurring gain as a result of Courier Corporation's ("Courier") termination of the agreement pursuant to which Quad/Graphics was to acquire Courier, partially offset by $3.3 million of professional service fees, including fees for the terminated acquisition of Courier and the acquisitions of Marin's, Copac and Specialty;

d. $5.1 million of acquisition-related integration costs primarily related to preparing existing facilities to meet new production requirements resulting from work transferring from closed plants, as well as other costs related to the integration of the acquired companies; and

e. $29.1 million of various other restructuring charges, including a $6.0 million non-cash and nondeductible expense to recognize accumulated foreign exchange losses on the sale of the Chile equity method investment and lease exit charges related to closed facilities, as well as other costs to maintain and exit closed facilities.

(3) Pre-tax non-cash goodwill impairment charges of $808.3 million ($542.4 million, net of tax) were recorded during the year ended December 31, 2015, of which $778.3 million related to the United States Print and Related Services segment and $30.0 million related to the International segment.

(4) Interest expense decreased $11.2 million ($6.7 million, net of tax) during the year ended December 31, 2016, to $77.2 million. This change was due to lower average debt levels in the year ended December 31, 2016, as compared to the year ended December 31, 2015.

(5) A non-recurring $14.1 million gain on debt extinguishment ($8.5 million, net of tax) was recognized during the year ended December 31, 2016, primarily from the repurchase of $56.5 million aggregate principal amount of Senior Unsecured Notes.

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(6) The $28.8 million benefit of income taxes as calculated in the following table is primarily due to the following: (1) $13.3 million of increased taxable income in foreign jurisdictions where the Company was able to use operating loss carryforwards; (2) $8.0 million increased domestic deductions and (3) $4.7 million from increased state deferred tax assets. See Note 14, "Income Taxes," to the consolidated financial statements in Part II, Item 8 of this Annual Report on Form 10-K for further information on income taxes.

	Year Ended December 31,		
	2016	2015	$ Change
Earnings (loss) before income taxes and equity in loss of unconsolidated entities	$59.3	$(918.4)	$977.7
Goodwill impairment charges	—	808.3	(808.3)
Nondeductible equity method investment impairment	—	16.7	(16.7)
Nondeductible foreign exchange losses on the sale of investment	—	6.0	(6.0)
Income (loss) subject to income taxes	59.3	(87.4)	146.7
40% normalized tax rate	40.0 %	40.0 %	40.0 %
Income tax expense (benefit) at 40% normalized tax rate	23.7	(35.0)	58.7
Plus: tax benefit related to goodwill impairment charges (Note 14)	—	(265.9)	265.9
	23.7	(300.9)	324.6
Less: Income tax expense (benefit) from the consolidated statements of operations	13.0	(282.8)	295.8
Impact of income taxes	$10.7	$(18.1)	$28.8

(7) The decrease in net loss attributable to investments in unconsolidated entities, net of tax, of $4.9 million during the year ended December 31, 2016, was primarily related to a $4.1 million decrease in losses from unconsolidated entities at the Company's investment in Plural, the Company's Brazilian joint venture, and a $0.8 million decrease in losses at the Company's investment in Chile that was sold on July 31, 2015.

(8) Operating income (loss), excluding restructuring, impairment and transaction-related charges and goodwill impairment charges, increased $59.8 million ($35.9 million, net of tax) primarily due to the following: (1) lower costs primarily associated with production cost reduction initiatives; (2) a $48.2 million decrease in depreciation and amortization expense; (3) the 2016 collection of a $10.4 million vendor receivable that was written-off in the fourth quarter of 2015 due to collectability concerns; and (4) the additional earnings on sales generated from acquisitions. These impacts were partially offset by the following: (1) lower print volume and pricing in product lines owned more than a year; (2) a $6.3 million increase in selling, general and administrative expenses primarily due to increased incentive compensation and legal expenses; and (3) a $4.0 million vacation expense reduction in 2015 due to a vacation policy change that did not repeat in 2016.

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Operating Results

The following table sets forth certain information from the Company's consolidated statements of operations on an absolute dollar basis and as a relative percentage of total net sales for each noted period, together with the relative percentage change in such information between the periods set forth below:

	Year Ended December 31,					
	2016		2015			
	(dollars in millions)					
	Amount	% of Net Sales	Amount	% of Net Sales	$ Change	% Change
Net sales:						
Products	$3,717.1	85.9 %	$3,949.7	85.9 %	$(232.6)	(5.9)%
Services	612.4	14.1 %	647.4	14.1 %	(35.0)	(5.4)%
Total net sales	4,329.5	100.0%	4,597.1	100.0 %	(267.6)	(5.8)%
Cost of sales:						
Products	2,971.0	68.6 %	3,213.5	69.9 %	(242.5)	(7.5)%
Services	423.8	9.8 %	466.8	10.2 %	(43.0)	(9.2)%
Total cost of sales	3,394.8	78.4 %	3,680.3	80.1 %	(285.5)	(7.8)%
Selling, general & administrative expenses	454.6	10.5 %	448.3	9.7 %	6.3	1.4 %
Depreciation and amortization	277.1	6.4 %	325.3	7.1 %	(48.2)	(14.8)%
Restructuring, impairment and transaction-related charges	80.6	1.9 %	164.9	3.6 %	(84.3)	(51.1)%
Goodwill impairment	—	— %	808.3	17.6 %	(808.3)	nm
Total operating expenses	4,207.1	97.2 %	5,427.1	118.1 %	(1,220.0)	(22.5)%
Operating income (loss)	$122.4	2.8 %	$(830.0)	(18.1)%	$952.4	nm

Net Sales

Product sales decreased $232.6 million, or 5.9%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to the following: (1) a $172.9 million decrease in product sales in the Company's core print and specialty print product lines owned more than a year predominantly due to ongoing industry volume and pricing pressures; (2) a $97.3 million decrease from pass-through paper sales; and (3) $26.1 million in negative foreign exchange impacts. These decreases were partially offset by a $63.7 million sales increase from acquisitions.

Service sales, which primarily consist of imaging, logistics and distribution services, decreased $35.0 million, or 5.4%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to a $25.0 million decrease in logistics sales resulting from lower print shipment volume and lower fuel prices and $6.9 million in decreased sales of print imaging services.

Cost of Sales

Cost of product sales decreased $242.5 million, or 7.5%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, primarily due to the following: (1) lower costs primarily associated with production cost reduction initiatives; (2) lower print volume in product lines owned more than a year; and (3) the 2016 collection of a $10.4 million vendor receivable that was written-off in the fourth quarter of 2015 due to collectability concerns. These reductions were partially offset by the following: (1) increased cost of product sales resulting from acquisitions; and (2) a $4.0 million vacation expense reduction in 2015 due to a vacation policy change that did not repeat in 2016.

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Cost of product sales as a percentage of net sales decreased to 68.6% for the year ended December 31, 2016, from 69.9% for the year ended December 31, 2015, primarily due to the reasons provided above.

Cost of service sales decreased $43.0 million, or 9.2%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, primarily due to lower logistics volume and overall cost reduction initiatives.

Cost of service sales as a percentage of net sales decreased to 9.8% for the year ended December 31, 2016, from 10.2% for the year ended December 31, 2015, primarily due to the reasons provided above.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased $6.3 million, or 1.4%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, due to the following: (1) a $21.2 million increase in incentive compensation expense; (2) a $10.7 million increase in legal expenses due to 2016 reserves established and favorable settlements of legal claims in 2015 that did not repeat in 2016; (3) a $4.6 million increase in foreign currency losses; (4) a $3.8 million increase in bad debt expense; and (5) a $3.4 million decrease in gains on the sale of property, plant and equipment. These increases were partially offset by a $30.1 million decrease in employee-related costs and a $7.4 million decrease in general administrative expenses primarily due to the Company's cost reduction initiatives. Selling, general and administrative expenses as a percentage of net sales increased from 9.7% for the year ended December 31, 2015, to 10.5% for the year ended December 31, 2016, primarily due to lower net sales and the reasons stated above.

Depreciation and Amortization

Depreciation and amortization decreased $48.2 million, or 14.8%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, due to a $28.9 million decrease in amortization expense, predominantly related to customer relationship intangibles becoming fully amortized in the second quarter of 2016, and a $19.3 million decrease in depreciation expense from property, plant and equipment becoming fully depreciated over the past year.

Restructuring, Impairment and Transaction-Related Charges

Restructuring, impairment and transaction-related charges decreased $84.3 million, or 51.1%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, primarily due to the following: (1) a $68.5 million decrease in impairment charges; (2) a $29.2 million decrease in employee termination charges; and (3) a $5.0 million decrease in acquisition-related integration costs. These decreases were partially offset by a $9.5 million increase in other restructuring charges and an $8.9 million increase in transaction-related charges.

Restructuring, impairment and transaction-related charges of $80.6 million incurred in the year ended December 31, 2016, included the following: (1) $12.9 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $26.8 million of impairment charges, including $14.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; Woodstock, Illinois; and Queretaro, Mexico, as well as other capacity reduction restructuring activities; and $12.1 million of impairment charges for land and building related to the Atglen, Pennsylvania plant closure; (3) $2.2 million of transaction-related charges consisting of professional service fees related to business acquisition and divestiture activities; (4) $0.1 million of acquisition-related integration costs; and (5) $38.6 million of various other restructuring charges, including costs to maintain and exit closed facilities, lease exit charges, an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge

related to lump-sum pension payments.

Restructuring, impairment and transaction-related charges of $164.9 million incurred in the year ended December 31, 2015, included the following: (1) $42.1 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $95.3 million of impairment charges,

including $54.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atlanta, Georgia; Augusta, Georgia; Dickson, Tennessee; East Greenville, Pennsylvania; Loveland, Colorado; and Queretaro, Mexico, as well as other capacity reduction restructuring initiatives; $18.6 million of investment-related impairment charges, primarily related to $16.7 million of impairment charges to reduce the book value of the Company's equity method investment in Chile to fair value (see Note 8, "Equity Method Investments in Unconsolidated Entities," for additional details related to the impairment of the Company's equity method investment in Chile); $12.7 million of land and building impairment charges primarily related to the Augusta, Georgia and East Greenville, Pennsylvania plant closures; $7.1 million of customer relationship intangible asset impairments and $2.2 million of impairment charges recorded for property, plant and equipment and other intangible assets as a result of the restructuring proceedings in Argentina for the Company's Argentina Subsidiaries; (3) $(6.7) million of transaction-related charges (income), which includes a $10.0 million non-recurring gain as a result of Courier's termination of the agreement pursuant to which Quad/Graphics was to acquire Courier, partially offset by $3.3 million of professional service fees for the terminated acquisition of Courier and the acquisitions of Marin's, Copac and Specialty; (4) $5.1 million of acquisition-related integration costs primarily related to preparing existing facilities to meet new production requirements resulting from work transferring from closed plants, as well as other costs related to the integration of the acquired companies; and (5) $29.1 million of other restructuring charges, including costs to maintain and exit closed facilities, lease exit charges, and a $6.0 million non-cash expense to recognize accumulated foreign exchange losses on the sale of the Chile equity method investment.

Goodwill Impairment

On March 25, 2015, due to deteriorating economic conditions, including inflation and currency devaluation, combined with uncertain political conditions, declining print volumes and labor challenges, the Company's Argentina Subsidiaries (included within the Latin America reporting unit) commenced bankruptcy restructuring proceedings with a goal of consolidating operations. The Company conducted an interim goodwill impairment assessment of the Latin America reporting unit, which included comparing the carrying amount of net assets, including goodwill, to its respective fair value as of March 31, 2015, the date of the interim assessment. As a result of the interim goodwill impairment assessment as well as the annual impairment test as of October 31, 2015, the Company's International segment recorded non-cash nondeductible goodwill impairment charges of $30.0 million in the year ended December 31, 2015, primarily including a $23.3 million non-cash goodwill impairment charge for the Latin America reporting unit.

Due to the decline in the Company's stock price in the third quarter of 2015, an interim goodwill impairment test of the three reporting units in the United States Print and Related Services segment was performed as of July 31, 2015. As a result of the interim goodwill impairment assessment as well as the annual impairment test as of October 31, 2015, the Company's United States Print and Related Services segment recorded pre-tax non-cash goodwill impairment charges of $778.3 million ($512.4 million after tax) in the year ended December 31, 2015, that included impairment charges of $640.8 million, $118.9 million and $18.6 million in the Core Print and Related Services reporting unit, the Specialty Print and Related Services reporting unit and the Other United States Products and Services reporting unit, respectively.

In total, the Company recorded pre-tax non-cash goodwill impairment charges of $808.3 million ($542.4 million after tax) in the year ended December 31, 2015.

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EBITDA and EBITDA Margin—Consolidated

EBITDA and EBITDA margin for the year ended December 31, 2016, compared to the year ended December 31, 2015, were as follows:

	Year Ended December 31,			
	2016		2015	
	Amount	% of Net Sales	Amount	% of Net Sales
	(dollars in millions)			
EBITDA and EBITDA margin	$412.2	9.5 %	$(511.0)	(11.1)%

EBITDA increased $923.2 million for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to the following: (1) an $808.3 million non-cash goodwill impairment charge recorded in 2015 that did not repeat in 2016; (2) $84.3 million of decreased restructuring, impairment and transaction-related charges; (3) lower costs primarily associated with production cost reduction initiatives; (4) the 2016 collection of a $10.4 million vendor receivable that was written-off in the fourth quarter of 2015 due to collectability concerns; and (5) the additional earnings on sales generated from acquisitions. These impacts were partially offset by the following: (1) lower print volume and pricing in product lines owned more than a year; (2) a $6.3 million increase in selling, general and administrative expenses primarily due to an increase in incentive compensation and legal expenses; and (3) a $4.0 million vacation expense reduction in 2015 due to a vacation policy change that did not repeat in 2016.

EBITDA is defined as net earnings (loss) excluding (1) interest expense, (2) income tax expense (benefit) and (3) depreciation and amortization. EBITDA margin represents EBITDA as a percentage of net sales. EBITDA and EBITDA margin are presented to provide additional information regarding Quad/Graphics' performance. Both are important measures by which Quad/Graphics gauges the profitability and assesses the performance of its business. EBITDA and EBITDA margin are not measures of financial performance in accordance with GAAP. EBITDA and EBITDA margin should not be considered alternatives to net earnings (loss) as a measure of operating performance or to cash flows provided by operating activities as a measure of liquidity. Quad/Graphics' calculation of EBITDA and EBITDA margin may be different from the calculations used by other companies, and therefore, comparability may be limited. A reconciliation of EBITDA to net earnings (loss) for the years ended December 31, 2016 and 2015, was as follows:

	Year Ended December 31,	
	2016	2015
	(dollars in millions)	
Net earnings (loss)[1]	$ 44.9	$ (641.9)
Interest expense	77.2	88.4
Income tax expense (benefit)	13.0	(282.8)
Depreciation and amortization	277.1	325.3
EBITDA	$ 412.2	$ (511.0)

(1) Net earnings (loss) included the following:

a. Restructuring, impairment and transaction-related charges of $80.6 million and $164.9 million for the years ended December 31, 2016 and 2015, respectively;

b. A non-cash goodwill impairment charge of $808.3 million for the year ended December 31, 2015;

c. Gain on debt extinguishment of $14.1 million for the year ended December 31, 2016; and

d. Equity in loss of unconsolidated entities of $1.4 million and $6.3 million for the years ended December 31, 2016 and 2015, respectively.

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United States Print and Related Services

The following table summarizes net sales, operating income (loss), operating margin and certain items impacting comparability within the United States Print and Related Services segment:

	Year Ended December 31,			
	2016	2015		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Net sales:				
Products	$3,335.1	$3,580.1	$(245.0)	(6.8)%
Services	591.9	628.5	(36.6)	(5.8)%
Operating income (loss) (including restructuring, impairment and transaction-related charges and goodwill impairment)	186.1	(706.1)	892.2	nm
Operating margin	4.7%	(16.8)%	N/A	N/A
Restructuring, impairment and transaction-related charges	$59.3	$101.4	$(42.1)	(41.5)%
Goodwill impairment	—	778.3	(778.3)	nm

Net Sales

Product sales for the United States Print and Related Services segment decreased $245.0 million, or 6.8%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to a $198.5 million decrease in product sales in the Company's core print and specialty print product lines owned more than a year, predominantly due to ongoing volume and pricing pressures from excess capacity in the printing industry, and a $108.9 million decrease in pass-through paper sales, partially offset by a $62.4 million increase in net sales from acquisitions.

Service sales for the United States Print and Related Services segment decreased $36.6 million, or 5.8%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to a $26.6 million decrease in logistics sales resulting from lower print shipment volume and lower fuel prices and $6.9 million in decreased sales of print imaging services.

Operating Income (Loss)

Operating income (loss) for the United States Print and Related Services segment increased $892.2 million for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to the following: (1) a $778.3 million non-cash goodwill impairment charge recorded in 2015 that did not repeat in 2016; (2) lower costs primarily associated with production cost reduction initiatives; (3) a $42.1 million decrease in restructuring, impairment and transaction-related charges; (4) the 2016 collection of a $10.4 million vendor receivable that was written-off in the fourth quarter of 2015 due to collectability concerns; and (5) the additional earnings on sales generated from acquisitions. These impacts were partially offset by the following: (1) lower print volume and pricing in product lines owned more than a year; and (2) a $4.0 million vacation expense reduction in 2015 due to a vacation policy change that did not repeat in 2016.

The operating margin for the United States Print and Related Services segment increased to 4.7% for the year ended December 31, 2016, from negative 16.8% for the year ended December 31, 2015, primarily due to the reasons provided above.

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Restructuring, Impairment and Transaction-Related Charges

Restructuring, impairment and transaction-related charges for the United States Print and Related Services segment for the year ended December 31, 2016, were $59.3 million, consisting of: (1) $10.5 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $25.9 million of impairment charges, including $13.8 million for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; and Woodstock, Illinois, as well as other capacity reduction restructuring activities; and $12.1 million of land and building impairment related to the Atglen, Pennsylvania plant closure; (3) $0.1 million of acquisition-related integration costs; and (4) $22.8 million various other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges.

Restructuring, impairment and transaction-related charges for the United States Print and Related Services segment for the year ended December 31, 2015, were $101.4 million, consisting of the following: (1) $27.3 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $50.7 million of impairment charges, including $33.5 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atlanta, Georgia; Augusta, Georgia; Dickson, Tennessee; East Greenville, Pennsylvania; and Loveland, Colorado, as well as other capacity reduction restructuring initiatives; $11.2 million of land and building impairment charges primarily related to the Augusta, Georgia and East Greenville, Pennsylvania plant closures and $6.0 million of customer relationship intangible asset impairments; (3) $4.6 million of acquisition-related integration costs primarily related to preparing existing facilities to meet new production requirements resulting from work transferring from closed plants, as well as other costs related to the integration of the acquired companies; and (4) $18.8 million of other restructuring charges, including costs to maintain and exit closed facilities, as well as lease exit charges.

Goodwill Impairment

Due to the decline in the Company's stock price in the third quarter of 2015, an interim goodwill impairment test of the three reporting units in the United States Print and Related Services segment was performed as of July 31, 2015. As a result of the interim goodwill impairment assessment, as well as the annual impairment test as of October 31, 2015, the Company's United States Print and Related Services segment recorded pre-tax non-cash goodwill impairment charges of $778.3 million ($512.4 million after tax) in the year ended December 31, 2015, that included impairment charges of $640.8 million, $118.9 million and $18.6 million in the Core Print and Related Services reporting unit, the Specialty Print and Related Services reporting unit and the Other United States Products and Services reporting unit, respectively.

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International

The following table summarizes net sales, operating income (loss), operating margin, certain items impacting comparability and equity in loss of unconsolidated entities within the International segment:

	Year Ended December 31, 2016	2015		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Net sales:				
Products	$382.0	$369.6	$ 12.4	3.4 %
Services	20.5	18.9	1.6	8.5 %
Operating income (loss) (including restructuring, impairment and transaction-related charges and goodwill impairment)	13.5	(63.4)	76.9	nm
Operating margin	3.4 %	(16.3)%	N/A	N/A
Restructuring, impairment and transaction-related charges (income)	$(1.1)	$38.8	$ (39.9)	(102.8)%
Goodwill impairment	—	30.0	(30.0)	nm
Equity in loss of unconsolidated entities	1.4	6.3	(4.9)	(77.8)%

Net Sales

Product sales for the International segment increased $12.4 million, or 3.4%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to a $27.0 million net increase in price and volume primarily in Argentina, Mexico, Colombia, Europe and Peru, an $11.5 million increase in pass-through paper sales, partially offset by $26.1 million in negative foreign exchange impacts primarily in Argentina, Mexico, Peru and Colombia.

Service sales for the International segment increased $1.6 million, or 8.5%, for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to an increase in logistics revenue in Europe.

Operating Income (Loss)

Operating income (loss) for the International segment increased $76.9 million for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to the following: (1) a $39.9 million decrease in restructuring and impairment expenses; (2) a $30.0 million non-cash goodwill impairment charge recorded in 2015 that did not repeat in 2016; and (3) a $7.0 million increase in operating income primarily in Mexico and Europe.

Restructuring, Impairment and Transaction-Related Charges (Income)

Restructuring, impairment and transaction-related charges (income) for the International segment for the year ended December 31, 2016, were $(1.1) million, consisting of the following: (1) $1.4 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $0.9 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Queretaro, Mexico; (3) $0.1 million of transaction-related charges; (4) $(3.5) million of other restructuring income primarily related to the Company's Argentina Subsidiaries' gain from settlements with vendors through bankruptcy proceedings and a gain on the sale of the Pilar, Argentina plant.

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Restructuring, impairment and transaction-related charges for the International segment for the year ended December 31, 2015, were $38.8 million, consisting of the following: (1) $7.3 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $22.8 million of impairment charges, including $16.7 million of impairment charges to reduce the book value of the Company's equity method investment in Chile to fair value (see Note 8, "Equity Method Investments in Unconsolidated Entities," for additional details related to the impairment of the Company's equity method investment in Chile); $2.2 million of impairment charges primarily related to the restructuring proceedings in Argentina for the Company's Argentina Subsidiaries for land, building, machinery and equipment and other intangible assets; $1.5 million of land and building impairment charges; $1.3 million of impairment charges for machinery and equipment no longer being utilized in production, as well as other capacity reduction restructuring initiatives; and $1.1 million of customer relationship intangible asset impairments; and (3) $8.7 million of other restructuring charges, primarily related to the $6.0 million non-cash expense to recognize accumulated foreign exchange losses on the sale of the Chile equity method investment.

Goodwill Impairment

On March 25, 2015, due to deteriorating economic conditions, including inflation and currency devaluation, combined with uncertain political conditions, declining print volumes and labor challenges, the Company's Argentina Subsidiaries (included within the Latin America reporting unit) commenced bankruptcy restructuring proceedings with a goal of consolidating operations. The Company conducted an interim goodwill impairment assessment of the Latin America reporting unit, which included comparing the carrying amount of net assets, including goodwill, to its respective fair value as of March 31, 2015, the date of the interim assessment. As a result of the interim goodwill impairment assessment as well as the annual impairment test as of October 31, 2015, the Company's International segment recorded non-cash nondeductible goodwill impairment charges of $30.0 million in the year ended December 31, 2015, primarily including a $23.3 million non-cash goodwill impairment charge for the Latin America reporting unit.

Equity in Loss of Unconsolidated Entities

Investments in entities where Quad/Graphics has the ability to exert significant influence, but not control, are accounted for using the equity method of accounting. The Company holds a 49% ownership interest in Plural, a commercial printer based in São Paulo, Brazil. The Company also held a 50% interest in a joint venture based in Chile that was acquired as part of the World Color Press acquisition until July 31, 2015, when the investment was sold. The equity in loss of unconsolidated entities in the International segment decreased $4.9 million for the year ended December 31, 2016, compared to the year ended December 31, 2015, primarily due to a $4.1 million decrease in losses from unconsolidated entities at the Company's investment in Plural, the Company's Brazilian joint venture, and a $0.8 million decrease in losses at the Company's investment in Chile that was sold on July 31, 2015.

Unrestricted Subsidiaries

Unrestricted subsidiaries as defined in the Senior Unsecured Notes indenture represented less than 2.0% of total consolidated net sales for the year ended December 31, 2016.

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Corporate

The following table summarizes unallocated operating expenses presented as Corporate:

	Year Ended December 31,			
	2016	2015		
	(dollars in millions)			
	Amount	Amount	$ Change	% Change
Operating expenses (including restructuring, impairment and transaction-related charges)	$77.2	$ 60.5	$ 16.7	27.6 %
Restructuring, impairment and transaction-related charges	22.4	24.7	(2.3)	(9.3)%

Operating Expenses

Corporate operating expenses increased $16.7 million, or 27.6%, for the year ended December 31, 2016, compared with the year ended December 31, 2015, primarily due to a $15.2 million increase in incentive compensation expenses and a $8.0 million increase in legal expenses, partially offset by cost reduction initiatives and a $2.3 million decrease in restructuring, impairment and transaction-related charges, which included a $10.0 million non-recurring gain in 2015 as a result of Courier's termination of the agreement pursuant to which Quad/Graphics was to acquire Courier.

Restructuring, Impairment and Transaction-Related Charges

Corporate restructuring, impairment and transaction-related charges for the year ended December 31, 2016, were $22.4 million, consisting of the following: (1) $1.0 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $2.1 million of transaction-related charges which primarily included professional service fees; and (3) $19.3 million of other restructuring charges, including an $11.2 million adjustment to its MEPPs withdrawal liability and a $7.0 million non-cash pension settlement charge related to lump-sum pension payments.

Corporate restructuring, impairment and transaction-related charges for the year ended December 31, 2015, were $24.7 million, consisting of the following: (1) $7.5 million of employee termination charges related to workforce reductions through facility consolidations and involuntary separation programs; (2) $21.8 million of impairment charges, including $19.9 million of impairment charges for corporate equipment and $1.9 million of investment related impairment charges; (3) $(6.7) million of transaction-related charges (income), which includes the $10.0 million non-recurring gain from Courier, partially offset by $3.3 million of professional service fees, including fees for the terminated acquisition of Courier and the acquisitions of Marin's, Copac and Specialty; (4) $0.3 million of acquisition-related integration costs primarily related to professional fees; and (5) $1.8 million of other restructuring charges.

Liquidity and Capital Resources

The Company utilizes cash flows from operating activities and borrowings under its credit facilities to satisfy its liquidity and capital requirements. At December 31, 2017, the Company had cash and cash equivalents of $64.3 million. In addition to cash and cash equivalents, the Company has $686.1 million of unused capacity under its revolving credit arrangement at December 31, 2017, which is net of $38.9 million of issued letters of credit. The Company believes its expected future cash flows from operating activities, $686.1 million of unused capacity under the revolving credit arrangement and available cash on hand provide sufficient resources to fund ongoing operating

requirements and the integration and restructuring requirements related to acquired operations, as well as future capital expenditures, debt and pension service requirements, investments in future growth to create value for its shareholders, shareholder dividends and share repurchases. There were no borrowings under the $725.0 million revolving credit facility as of December 31, 2017, and peak borrowings were $50.8 million during the year ended December 31, 2017.

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Net Cash Provided by Operating Activities

Year Ended December 31, 2017, Compared to Year Ended December 31, 2016

Net cash provided by operating activities was $344.0 million for the year ended December 31, 2017, compared to $352.5 million for the year ended December 31, 2016, resulting in an $8.5 million decrease in cash provided by operating activities. The decrease was primarily due to a $29.9 million decrease in cash flows from changes in operating assets and liabilities, partially offset by a $21.4 million increase in cash from earnings.

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

Net cash provided by operating activities was $352.5 million for the year ended December 31, 2016, compared to $348.1 million for the year ended December 31, 2015, resulting in a $4.4 million increase in cash provided by operating activities. The increase was primarily due to a $12.6 million increase in cash from earnings, partially offset by an $8.2 million decrease in cash flows from changes in operating assets and liabilities.

Net Cash Used in Investing Activities

Year Ended December 31, 2017, Compared to Year Ended December 31, 2016

Net cash used in investing activities was $37.3 million for the year ended December 31, 2017, compared to $84.4 million for the year ended December 31, 2016, resulting in a $47.1 million decrease in cash used in investing activities. The decrease was primarily due to the following: (1) a $20.2 million decrease in purchases of property, plant and equipment; (2) a $14.1 million increase in proceeds from the sale of a business; (3) a $9.9 million decrease in cost method investments; and (4) an $8.0 million increase in proceeds from insurance claims. These decreases were partially offset by a $7.3 million increase in a loan to an unconsolidated entity.

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

Net cash used in investing activities was $84.4 million for the year ended December 31, 2016, compared to $216.7 million for the year ended December 31, 2015, resulting in a $132.3 million decrease in cash used in investing activities. The decrease was primarily due to the following: (1) a $143.4 million decrease in cash payments related to acquisitions of businesses, as the Marin's, Copac and Specialty acquisitions were completed in 2015, and there were no acquisitions of businesses in 2016; and (2) a $26.9 million decrease in purchases of property, plant and equipment. These decreases were partially offset by $13.3 million of increased receipts of restricted cash during 2015 and $10.5 million of proceeds received during 2015 for the sale of the Company's 50% ownership interest in Chile.

Net Cash Used in Financing Activities

Year Ended December 31, 2017, Compared to Year Ended December 31, 2016

Net cash used in financing activities was $251.7 million for the year ended December 31, 2017, compared to $269.3 million for the year ended December 31, 2016, resulting in a $17.6 million decrease in cash used in financing activities. The decrease was primarily due to a $54.9 million decrease in net repayments of debt and lease obligations in 2017 as compared to 2016, and a $5.0 million decrease in treasury stock purchases. These decreases were partially offset by the following: (1) $27.7 million of decreased proceeds from stock options exercised; (2) $4.6 million of increased payments of debt issuance costs and financing fees; and (3) $4.6 million of increased equity awards redeemed to pay employees' tax obligations.

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

Net cash used in financing activities was $269.3 million for the year ended December 31, 2016, compared to $127.9 million for the year ended December 31, 2015, resulting in a $141.4 million increase in cash used in financing activities. The increase was primarily due to a $159.0 million increase in net repayments of debt and lease obligations in 2016 as compared to 2015 and $8.8 million of purchases of treasury stock in 2016, offset by $28.1 million of increased proceeds from stock options exercised in 2016.

Free Cash Flow

Free Cash Flow is defined as net cash provided by operating activities less purchases of property, plant and equipment.

The Company's management assesses Free Cash Flow as a measure to quantify cash available for (1) strengthening the balance sheet (debt reduction), (2) strategic capital allocation and deployment through investments in the business (acquisitions and strategic investments) and (3) returning capital to the shareholders (dividends and share repurchases). The priorities for capital allocation and deployment will change as circumstances dictate for the business, and Free Cash Flow can be significantly impacted by the Company's restructuring activities and other unusual items.

Free Cash Flow is a non-GAAP measure. Free Cash Flow should not be considered an alternative to cash flows provided by operating activities as a measure of liquidity. Quad/Graphics' calculation of Free Cash Flow may be different from similar calculations used by other companies, and therefore, comparability may be limited.

Free Cash Flow for the years ended December 31, 2017, 2016 and 2015, was as follows:

	Year Ended December 31,		
	2017	2016	2015
	(dollars in millions)		
Net cash provided by operating activities	$344.0	$352.5	$348.1
Less: purchases of property, plant and equipment	(85.9)	(106.1)	(133.0)
Free Cash Flow	$258.1	$246.4	$215.1

Free Cash Flow increased $11.7 million for the year ended December 31, 2017, compared to the year ended December 31, 2016, due to a $20.2 million decrease in capital expenditures, offset by an $8.5 million decrease in net cash provided by operating activities primarily attributable to a decrease in cash flows from changes in operating assets and liabilities.

Free Cash Flow increased $31.3 million for the year ended December 31, 2016, compared to the year ended December 31, 2015, due to the following: (1) a $26.9 million decrease in capital expenditures; and (2) a $4.4 million increase in net cash provided by operating activities primarily attributable to an increase in cash from earnings.

See the "Net Cash Provided by Operating Activities" section above for further explanations of the changes in operating cash flows and the "Net Cash Used in Investing Activities" section above for further explanations of the changes in purchases of property, plant and equipment.

Debt Leverage Ratio

The Debt Leverage Ratio is defined as total debt and capital lease obligations divided by the sum of the following: (1) the last twelve months of EBITDA (see the definition of EBITDA and the reconciliation of net earnings (loss) to EBITDA in the "Results of Operations" section above); (2) restructuring, impairment and transaction-related charges; (3) loss (gain) on debt extinguishment; and (4) equity in loss of unconsolidated entities.

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The Company uses the Debt Leverage Ratio as a metric to assess liquidity and the flexibility of its balance sheet. Consistent with other liquidity metrics, the Company monitors the Debt Leverage Ratio as a measure to determine the appropriate level of debt the Company believes is optimal to operate its business, and accordingly, to quantify debt capacity available for strategic capital allocation and deployment through investments in the business (capital expenditures, acquisitions and strategic investments), for strengthening the balance sheet (pension liability reduction), and for returning capital to the shareholders (dividends and share repurchases). The priorities for capital allocation and deployment will change as circumstances dictate for the business, and the Debt Leverage Ratio can be significantly impacted by the amount and timing of large expenditures requiring debt financing, as well as changes in profitability.

The Debt Leverage Ratio is a non-GAAP measure, and should not be considered an alternative to cash flows provided by operating activities as a measure of liquidity. Quad/Graphics' calculation of the Debt Leverage Ratio may be different from similar calculations used by other companies and, therefore, comparability may be limited.

The Debt Leverage Ratio calculated below differs from both the total leverage ratio and senior secured leverage ratio included in the Company's debt covenant calculations (see Note 12, "Debt," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for further information on debt covenants). The total leverage ratio included in the Company's debt covenants includes letters of credit as debt, excludes non-cash stock-based compensation expense from EBITDA and includes the equity in loss of unconsolidated entity in EBITDA. Similarly, the senior secured leverage ratio included in the Company's debt covenants includes and excludes the same adjustments as the total leverage ratio, in addition to the exclusion of the outstanding balance of the Senior Unsecured Notes.

The Debt Leverage Ratio as of December 31, 2017 and 2016, was as follows:

	December 31, 2017	December 31, 2016
	(dollars in millions)	
Total debt and capital lease obligations on the consolidated balance sheets	$964.8	$ 1,130.8
Divided by: EBITDA as adjusted for purposes of calculating the Debt Leverage Ratio	$458.6	$ 480.1
Debt Leverage Ratio[1]	2.10 x	2.36 x

[1] The Company had $64 million in cash at December 31, 2017, $54 million higher than the Company's typical year-end cash balance of approximately $10 million. The Debt Leverage Ratio would have been 1.99x if the $54 million of excess cash was used to further pay down debt at December 31, 2017.

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The calculation of EBITDA as adjusted for purposes of calculating the Debt Leverage Ratio for the years ended December 31, 2017 and 2016, was as follows:

	Year Ended December 31,	
	2017	2016
	(dollars in millions)	
Net earnings	$ 107.2	$ 44.9
Interest expense	71.1	77.2
Income tax (benefit) expense	(16.0)	13.0
Depreciation and amortization	232.5	277.1
EBITDA	$ 394.8	$ 412.2
Restructuring, impairment and transaction-related charges	61.2	80.6
Loss (gain) on debt extinguishment	2.6	(14.1)
Equity in loss of unconsolidated entities	—	1.4
EBITDA as adjusted for purposes of calculating the Debt Leverage Ratio	$ 458.6	$ 480.1

The Debt Leverage Ratio decreased 0.26x at December 31, 2017, compared to December 31, 2016, primarily due to a $166.0 million decrease in debt and capital lease obligations, partially offset by $21.5 million of decreased EBITDA, as adjusted for purposes of calculating the Debt Leverage Ratio. The Debt Leverage Ratio at December 31, 2017, of 2.10x is within management's desired target Debt Leverage Ratio range of 2.0x to 2.5x; however, the Company operates at times above the Debt Leverage Ratio target range depending on the timing of compelling strategic investment opportunities and seasonal working capital needs.

Description of Significant Outstanding Debt Obligations as of December 31, 2017

As of December 31, 2017, the Company utilized a combination of debt instruments to fund cash requirements, including the following:

- Senior Secured Credit Facility:

  $725.0 million revolving credit facility (no outstanding balance as of December 31, 2017);

  $375.0 million Term Loan A ($281.3 million outstanding as of December 31, 2017); and

  $300.0 million Term Loan B ($279.1 million outstanding as of December 31, 2017);

- Senior Unsecured Notes ($243.5 million outstanding as of December 31, 2017); and

- Master Note and Security Agreement ($123.6 million outstanding as of December 31, 2017).

Senior Secured Credit Facility

The Senior Secured Credit Facility consists of three different loan facilities. The first facility is a revolving credit facility in the amount of $725.0 million with a term of just under four years maturing on January 4, 2021. The second facility is a Term Loan A in the aggregate amount of $375.0 million with a term of just under four years maturing on January 4, 2021, subject to certain required amortization. The third facility is a Term Loan B in the amount of $300.0 million with a term of seven years maturing on April 27, 2021, subject to certain required amortization.

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The Company completed the second amendment to the Company's Senior Secured Credit Facility on February 10, 2017. This second amendment was completed to reduce the size of the revolving credit facility and Term Loan A and to extend the Company's debt maturity profile while maintaining the Company's current cost of borrowing and covenant structure. The revolving credit facility was lowered to a maximum borrowing amount of $725.0 million from $850.0 million, and the Term Loan A was lowered to an aggregate amount of $375.0 million from $450.0 million. This amendment to the Senior Secured Credit Facility did not have an impact on the Company's quarterly financial covenant requirements.

Borrowings under the revolving credit facility and Term Loan A made under the Senior Secured Credit Facility at December 31, 2017, bear interest at 1.75% in excess of reserve adjusted LIBOR, or 0.75% in excess of an alternate base rate. The weighted average interest rate for the revolving credit facility was 3.04% and the weighted average interest rate for the Term Loan A loans was 3.01% at December 31, 2017, and interest is payable monthly. Borrowings under the Term Loan B at December 31, 2017, bear interest at 3.25% in excess of reserve adjusted LIBOR, with a LIBOR floor of 1.00%, or 2.25% in excess of an alternative base rate at the Company's option. The weighted average interest rate for the Term Loan B was 4.39% at December 31, 2017, and interest is payable monthly.

The Senior Secured Credit Facility is secured by substantially all of the unencumbered assets of the Company. The Senior Secured Credit Facility also requires the Company to provide additional collateral to the lenders in certain limited circumstances.

Senior Unsecured Notes

The Company received $294.8 million in net proceeds from the sale of the $300.0 million Senior Unsecured Notes, after deducting the initial purchasers' discounts and commissions. The Senior Unsecured Notes bear interest at 7.00%, and interest is payable semi-annually. The Senior Unsecured Notes are due May 1, 2022.

The Company repurchased $56.5 million of its Senior Unsecured Notes in the open market, resulting in a net gain on debt extinguishment of $14.3 million, during the year ended December 31, 2016. All repurchased Senior Unsecured Notes were canceled. The Company used cash flows from operating activities and borrowings under its revolving credit facility to fund the repurchases. These repurchases were primarily completed to efficiently reduce debt balances and interest expense based on current LIBOR rates.

Each of the Company's existing and future domestic subsidiaries that is a borrower or guarantees indebtedness under the Company's Senior Secured Credit Facility or that guarantees certain of the Company's other indebtedness or indebtedness of the Company's restricted subsidiaries (other than intercompany indebtedness) fully and unconditionally guarantee or, in the case of future subsidiaries, will guarantee, on a joint and several basis, the Senior Unsecured Notes (the "Guarantor Subsidiaries"). All of the current Guarantor Subsidiaries are 100% owned by the Company. Guarantor Subsidiaries will be automatically released from these guarantees upon the occurrence of certain events, including the following: (1) the designation of any of the Guarantor Subsidiaries as an unrestricted subsidiary; (2) the release or discharge of any guarantee or indebtedness that resulted in the creation of the guarantee of the Senior Unsecured Notes by any of the Guarantor Subsidiaries; or (3) the sale or disposition, including the sale of substantially all the assets, of any of the Guarantor Subsidiaries.

Master Note and Security Agreement (sometimes referred to as senior notes)

On September 1, 1995, and as last amended on November 24, 2014, the Company entered into the Master Note and Security Agreement pursuant to which the Company issued over time senior notes in an aggregate principal amount of $1.1 billion in various tranches, of which $123.6 million was outstanding as of December 31, 2017. The weighted average interest rate for the senior notes was 7.43% at December 31, 2017, which is fixed to maturity, and interest is

payable semiannually. Principal payments commenced September 1997 and extend through April 2031 in various tranches. The notes are collateralized by certain United States land, buildings and press and finishing equipment under the terms of the Master Note and Security Agreement.

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The Company redeemed $60.1 million of its senior notes under the Master Note and Security Agreement, resulting in a net loss on debt extinguishment of $0.2 million, during the year ended December 31, 2016. All tendered senior notes under the Master Note and Security Agreement were canceled. The Company used cash flows from operating activities and borrowings under its revolving credit facility to fund the tender. The tender was primarily completed to reallocate debt to the lower interest rate revolving credit facility and thereby reduce interest expense based on current LIBOR rates.

Covenants and Compliance

The Company's various lending arrangements include certain financial covenants (all financial terms, numbers and ratios are as defined in the Company's debt agreements). Among these covenants, the Company was required to maintain the following as of December 31, 2017:

- Total Leverage Ratio. On a rolling twelve-month basis, the total leverage ratio, defined as total consolidated debt to consolidated EBITDA, shall not exceed 3.75 to 1.00 (for the twelve months ended December 31, 2017, the Company's total leverage ratio was 2.06 to 1.00).

- Senior Secured Leverage Ratio. On a rolling twelve-month basis, the senior secured leverage ratio, defined as senior secured debt to consolidated EBITDA, shall not exceed 3.50 to 1.00 (for the twelve months ended December 31, 2017, the Company's senior secured leverage ratio was 1.55 to 1.00).

- Minimum Interest Coverage Ratio. On a rolling twelve-month basis, the minimum interest coverage ratio, defined as consolidated EBITDA to consolidated cash interest expense, shall not be less than 3.50 to 1.00 (for the twelve months ended December 31, 2017, the Company's minimum interest coverage ratio was 7.03 to 1.00).

The indenture underlying the Senior Unsecured Notes contains various covenants, including, but not limited to, covenants that, subject to certain exceptions, limit the Company's and its restricted subsidiaries' ability to incur and/or guarantee additional debt; pay dividends, repurchase stock or make certain other restricted payments; enter into agreements limiting dividends and certain other restricted payments; prepay, redeem or repurchase subordinated debt; grant liens on assets; enter into sale and leaseback transactions; merge, consolidate, transfer or dispose of substantially all of the Company's consolidated assets; sell, transfer or otherwise dispose of property and assets; and engage in transactions with affiliates.

The Company was in compliance with all financial covenants in its debt agreements as of December 31, 2017. While the Company currently expects to be in compliance in future periods with all of the financial covenants, there can be no assurance that these covenants will continue to be met. The Company's failure to maintain compliance with the covenants could prevent the Company from borrowing additional amounts and could result in a default under any of the debt agreements. Such default could cause the outstanding indebtedness to become immediately due and payable, by virtue of cross-acceleration or cross-default provisions.

In addition to those covenants, the Senior Secured Credit Facility also includes certain limitations on acquisitions, indebtedness, liens, dividends and repurchases of capital stock, including the following:

- If the Company's total leverage ratio is greater than 3.00 to 1.00 (as defined in the Senior Secured Credit Facility), the Company is prohibited from making greater than $120.0 million of annual dividend payments, capital stock repurchases and certain other payments. If the total leverage ratio is less than 3.00 to 1.00, there are no such restrictions.

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If the Company's senior secured leverage ratio is greater than 3.00 to 1.00 or the Company's total leverage ratio is greater than 3.50 to 1.00 (these ratios as defined in the Senior Secured Credit Facility), the Company is prohibited from voluntarily prepaying any of the Senior Unsecured Notes and from voluntarily prepaying any other unsecured or subordinated indebtedness, with certain exceptions (including any mandatory prepayments on the Senior Unsecured Notes or any other unsecured or subordinated debt). If

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the senior secured leverage ratio is less than 3.00 to 1.00 and the total leverage ratio is less than 3.50 to 1.00, there are no such restrictions.

Net Pension Obligations

The net underfunded pension and MEPPs obligations decreased by $50.0 million during the year ended December 31, 2017, from $162.3 million at December 31, 2016, to $112.3 million at December 31, 2017. This $50.0 million decrease in overall pension obligations was despite a $20.7 million increase attributable to a 39 basis point decline in the pension discount rate from 3.91% at December 31, 2016, to 3.52% at December 31, 2017. The Company was able to reduce its pension obligations during 2017, despite the negative impact from the discount rate, due to the following:

(1) Achieved an actual return on plan assets of 14.3% during the year ended December 31, 2017, which exceeded the expected return on plan assets assumption of 6.5%.

(2) Made payments totaling $24.0 million to the MEPPs.

(3) Facilitated lump-sum pension payments to terminated vested participants. During 2017, the Company settled $23.3 million of pension liabilities for $21.4 million of pension payouts. Payments to eligible participants who elected to receive a lump-sum pension payment were funded from existing pension plan assets and constituted a settlement of the Company's pension liabilities with respect to these participants.

The Company continues to focus on reducing pension obligations through cash contributions to the plans, lump-sum settlements and plan design changes.

Share Repurchase Program

On September 6, 2011, the Company's Board of Directors authorized a share repurchase program of up to $100.0 million of the Company's outstanding class A stock. Under the authorization, share repurchases may be made at the Company's discretion, from time to time, in the open market and/or in privately negotiated transactions as permitted by federal securities laws and other legal requirements. The timing, manner, price and amount of any repurchase will depend on economic and market conditions, share price, trading volume, applicable legal requirements and other factors. The program may be suspended or discontinued at any time. During the year ended December 31, 2017, the Company repurchased 200,605 shares of its class A common stock at a weighted average price of $18.89 per share for a total purchase price of $3.8 million. During the year ended December 31, 2016, the Company repurchased 984,190 shares of its class A common stock at a weighted average price of $8.96 per share for a total purchase price of $8.8 million. There were no share repurchases during the year ended December 31, 2015. As of December 31, 2017, there were $79.2 million of authorized repurchases remaining under the program.

Risk Management

For a discussion of the Company's exposure to market risks and management of those market risks, see Item 7A, "Quantitative and Qualitative Disclosures About Market Risk," of this Annual Report on Form 10-K.

Off-Balance Sheet Arrangements

Except as set forth below in the Contractual Obligations and Other Commitments table and in Note 13, "Lease Obligations," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K (including operating leases and future interest on debt and capital leases to be incurred), the Company has no off-balance sheet arrangements, financings or special purpose entities that the

Company expects to have a material current or future effect on financial condition, changes in financial condition, results of operations, liquidity, capital expenditures, capital resources or significant components of sales or expenses.

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Contractual Obligations and Other Commitments

The Company's contractual cash obligations at December 31, 2017, were as follows (in millions):

	Payments Due by Period						
	Total	2018	2019	2020	2021	2022	Thereafter
Debt obligations[1]	$1,145.8	$93.1	$80.9	$114.2	$571.6	$259.9	$ 26.1
Operating lease obligations	154.0	43.1	34.5	26.2	14.8	10.4	25.0
Pension benefits[2]	68.2	8.5	17.5	13.0	13.5	15.7	—
Capital lease obligations[3]	21.2	6.5	5.0	4.1	3.6	1.6	0.4
Purchase obligations[4]	32.5	32.5	—	—	—	—	—
Total[5][6]	$1,421.7	$183.7	$137.9	$157.5	$603.5	$287.6	$ 51.5

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(1) During 2017, the Company paid in advance the full amount of required amortization payments on its Term Loan A, totaling $72.7 million for the years ended December 31, 2018 and 2019, and through the first quarter ended March 31, 2020. The Company also paid in advance the full amount of required amortization payments on its Term Loan B, totaling $9.0 million for the years ended December 31, 2018, 2019 and 2020. Debt obligations include $188.6 million for anticipated future interest payments, and exclude $10.3 million and $1.4 million for future amortization of debt issuance costs and original issue discount, respectively. With respect to the variable interest rate portions of the debt, the interest amounts were calculated by applying the December 31, 2017 weighted average interest rate to determine the value of future interest payments. For the Master Note and Security Agreement, the weighted average interest rate of the notes was applied to the average principal balance outstanding for each time period. Amounts included in "Thereafter" include principal payments and estimated interest expense through April 2031.

(2) For the pension benefits, contributions and benefit payments to be funded from Company assets included in the table have been actuarially estimated over a five year period. While benefit payments under these benefit plans are expected to continue beyond 2022, the Company believes that an estimate beyond this period is unreasonable. The contractual obligations table above does not include a $28.2 million estimated withdrawal liability for the United States World Color Press MEPPs due to the uncertainty with the amount and timing of GCIU potential withdrawal liability payments. During 2018, the Company is scheduled to make minimum payments of $8.8 million for the MEPPs, pending no settlement or conclusion to the litigation with the GCIU trustees. See Note 16, "Employee Retirement Plans," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for further discussion of the MEPPs withdrawal.

(3) Capital lease obligations include $1.9 million for anticipated future interest payments.

(4) Purchase obligations consist primarily of $22.3 million in firm commitments to purchase press and finishing equipment, as well as $10.2 million of other purchase obligations.

(5) The contractual obligations table above does not include reserves for uncertain tax positions recorded in accordance with the accounting guidance on uncertainties in income taxes. The Company has taken tax positions for which the ultimate amount and the year(s) any necessary payments will be made that pertain to those tax positions is uncertain. The reserve for uncertain tax positions prior to interest and penalties was $21.6 million as of December 31, 2017, of which $14.6 million was included in other long-term liabilities, $6.2 million was included in deferred income taxes and $0.8 million was included in accrued liabilities in the consolidated balance sheets. The Company has also recorded reserves for interest and penalties related to uncertain tax positions of $3.3 million and $0.5 million, respectively, as of December 31, 2017.

(6) The contractual obligations table above does not include the share repurchase program as no repurchases are required under the program. See the "Share Repurchase Program" section above for further discussion, including the maximum potential cash payments under the program.

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Critical Accounting Policies and Estimates

The Company's consolidated financial statements are prepared in accordance with GAAP. The Company's most critical accounting policies are those that are most important to the portrayal of its financial condition and results of operations, and which require the Company to make its most difficult and subjective estimates. Management is required to make judgments and estimates that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the statements, and the reported amounts of revenues and expenses during the reporting period. The Company bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances. The Company's management believes that such judgments and estimates are made with consistent and appropriate methods based on information available at the time, and that any reasonable deviation from those judgments and estimates would not have a material impact on the Company's consolidated financial position or results of operations. Actual results may differ from these estimates under different assumptions or conditions. To the extent that the estimates used differ from actual results, adjustments to the consolidated statements of operations and corresponding consolidated balance sheets would be necessary. These adjustments would be made in future statements.

The Company has identified the following as its critical accounting policies and estimates.

Revenue Recognition

The Company recognizes its printing revenues upon transfer of title and the passage of risk of loss, which is generally upon shipment to the customer, and when there is a reasonable assurance as to collectability. Under agreements with certain customers, products may be stored by the Company for future delivery. In these situations, the Company may receive warehouse management fees for the services it provides. Product returns are not significant because products are customized; however, the Company accrues for the estimated amount of customer allowances at the time of sale based on historical experience and known trends.

Revenue from services is recognized as services are performed. Revenues related to the Company's imaging operations, which include digital content management, photography, color services and page production, are recognized in accordance with the terms of the contract, typically upon completion of the performed service and acceptance by the customer. With respect to the Company's logistics operations, which include the delivery of printed material, the Company recognizes revenue upon completion of services.

Certain revenues earned by the Company require judgment to determine if revenue should be recorded gross as a principal or net of related costs as an agent. Billings for third-party shipping and handling costs, primarily in the Company's logistics operations, and out-of-pocket expenses are recorded gross in net sales and cost of sales in the consolidated statements of operations in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. Many of the Company's operations process materials, primarily paper, that may be supplied directly by customers or may be purchased by the Company and sold to customers. No revenue is recognized for customer-supplied paper. Revenues for Company-supplied paper are recognized on a gross basis.

The accounting policies and estimates related to revenue recognition have been updated effective January 1, 2018 with the adoption of the revised guidance on recognizing revenue from contracts with customers (See Footnote 24, "New Accounting Pronouncements" to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for more information).

Impairment of Property, Plant and Equipment and Finite-lived Intangible Assets

The Company performs impairment evaluations of its long-lived assets whenever business conditions, events or circumstances indicate that those assets may be impaired, including whether the estimated useful life of such long-lived assets may warrant revision or whether the remaining balance of an asset may not be recoverable. The Company's most significant long-lived assets are property, plant and equipment and customer relationship intangible assets recorded in conjunction with an acquisition. Assessing the impairment of long-lived assets requires the Company to make important estimates and assumptions, including, but not limited to, the expected future cash flows that the assets will generate, how

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the assets will be used based on the strategic direction of the Company, their remaining useful life and their residual value, if any. Considerable judgment is also applied in incorporating the potential impact of the current economic climate on customer demand and selling prices, the cost of production and the limited activity on secondary markets for the assets and on the cost of capital. When the estimated future undiscounted cash flows to be generated by the assets are less than the carrying value of the long-lived assets, the assets are written down to fair value and a charge is recorded to current operations. The Company uses internal discounted cash flow estimates, quoted market prices when available and independent appraisals, as appropriate, to determine fair value. This fair value determination was categorized as Level 3 in the fair value hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for the definition of Level 3 inputs). Based on the assessments completed during the years ended December 31, 2017, 2016 and 2015, the Company recognized property, plant and equipment impairment charges of $12.0 million, $26.8 million and $69.5 million, respectively, primarily related to facility consolidations, as well as other capacity reduction restructuring initiatives. The Company recorded finite-lived intangible asset impairment charges of $7.2 million during the year ended December 31, 2015. There were no finite-lived intangible asset impairment charges recorded during the years ended December 31, 2017 and 2016.

The Company continues to monitor groups of assets to identify any new events or changes in circumstances that could indicate that their carrying values are not recoverable, particularly in light of potential declines in profitability that may result from the highly competitive industry landscape and continued uncertainty in the global economy. In the event that there are significant and unanticipated changes in circumstances, such as significant adverse changes in business climate, adverse actions by regulators, unanticipated competition, loss of key customers and/or changes in technology or markets, or that actual results differ from management's estimates, a provision for impairment could be required in a future period.

Pension Plans

As a result of the acquisition of World Color Press, the Company acquired multiple underfunded pension plans. Pension plan costs are determined using actuarial methods and are funded through contributions determined in accordance with the projected benefit method pro-rated on service. The Company records amounts relating to its pension plans based on calculations which include various actuarial assumptions. The Company believes that the two most critical assumptions are the discount rate and assumed rate of return on assets. Changes in these assumptions are primarily influenced by factors outside of the Company's control and can have a significant effect on the amounts reported in the financial statements. The Company reviews its actuarial assumptions on an annual basis and modifies the assumptions based on current rates and trends when it is appropriate to do so. The effects of modifications are recognized immediately on the consolidated balance sheets, but are generally amortized into operating income over future periods, with the deferred amount recorded in accumulated other comprehensive loss on the consolidated balance sheets included in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K. The Company believes that the assumptions utilized in recording its obligations under its plans are reasonable based on its experience, market conditions and input from its actuaries and investment advisors. When an event gives rise to both a curtailment and a settlement, the curtailment is accounted for prior to the settlement. The Company's measurement date to measure the defined benefit plan assets and the projected benefit obligation is December 31. For the purposes of calculating the expected return on plan assets, those assets are valued at fair value.

The Company determines its assumption for the discount rate to be used for purposes of computing annual service and interest costs for each pension plan based on an index of high-quality corporate bond yields and matched-funding yield curve analysis as of that date. For 2015, the Company measured interest costs utilizing a single weighted average discount rate derived from the yield curve used to measure the plan obligations. Beginning in 2016, the Company changed the approach used to measure interest costs for pension benefits and elected to measure interest costs by applying the specific spot rates along that yield curve to the plans' liability cash flows. The new method would also

impact the calculation of service costs, but this is not applicable to the Company's pension plans due to their frozen status. The Company made this change to provide a more precise measurement of interest costs by aligning the timing of the plans' liability cash flows to the corresponding spot rates on the yield curve. This change did not affect the measurement of the plan obligations. The Company has reflected this as a change in accounting estimate, and accordingly, has accounted for it on a prospective basis.

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The weighted average discount rate used to determine benefit obligations for the pension plans at December 31, 2017, was 3.52%, a 39 basis point decrease from the December 31, 2016, discount rate of 3.91%. A one-percentage point change in the discount rate would have the following impact on the December 31, 2017, projected benefit obligation:

	1.0% Increase	1.0% Decrease
	(in millions)	
Projected benefit obligation	$ (47.8)	$ 57.1

The Company employs a total return on investment approach for its pension plans whereby a diversified mix of equity securities and debt securities are used to maximize the long-term pension plan assets. The intent of this strategy is to outperform the growth in plan liabilities over the long run, such that plan contributions can be decreased, balanced with maintaining a lower degree of investment risk. Risk tolerance is established through careful consideration of plan liabilities, plan funded status, and corporate financial condition. Equity securities are diversified across geography and market capitalization through investments in United States large-capitalization stocks, United States small-capitalization stocks and international securities. Investment risk is measured and monitored on an ongoing basis through annual liability measurements, periodic asset/liability studies and quarterly investment portfolio reviews. The expected long-term rate of return for plan assets is based upon many factors including expected asset allocations, historical asset returns, current and expected future market conditions and risk. The current target asset allocation for plan assets on a weighted average basis are 42% equity securities and 58% debt securities. The actual asset allocation as of December 31, 2017, was approximately 41% equity securities and 59% debt securities. The expected return on plan assets assumption at December 31, 2017 and 2016, was 6.5% for the Company's funded United States pension plans. Actual return on plan assets for the years ended December 31, 2017 and 2016, was 14.3% and 7.3%, respectively. Certain pension plans are unfunded (those plans do not hold plan assets).

A 25 basis point change in the expected return on plan assets would have the following impact on 2018 pension income:

	0.25% Increase	0.25% Decrease
	(in millions)	
Pension income	$ 1.1	$ (1.1)

The Company also participated in MEPPs as a result of the acquisition of World Color Press. The Company has withdrawn from all significant MEPPs and replaced these union sponsored "promise to pay in the future" defined benefit plans with a Company sponsored "pay as you go" defined contribution plan. The two MEPPs, the GCIU and the GCC, are significantly underfunded, and require the Company to pay a withdrawal liability to fund its pro rata share of the underfunding as of the plan year the full withdrawal was completed. As a result of the decision to withdraw, the Company accrued the estimated withdrawal liability based on information provided by each plan's trustee.

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The Company has received a notice of withdrawal and demand for payment letter from the GCIU, which is in excess of the reserve established by the Company for the GCIU withdrawal. The Company is currently in litigation with the GCIU trustees to determine the amount and duration of the withdrawal payments for the GCIU. Arbitration proceedings with the GCIU have been completed, both sides have appealed the arbitrator's ruling, and litigation in Federal court has commenced. During April 2017, a Federal district court overturned the arbitration decision in one of the pending disputes in this matter. The Company has appealed the district court's ruling to the Ninth Circuit. During the fourth quarter of 2016, the Company and the GCC reached a settlement agreement for all claims, with scheduled payments until February 2024. The withdrawal liability reserved by the Company as of December 31, 2017, is within the range of the Company's estimated potential outcomes, and it will be updated based on significant events, such as potential new information from the ongoing litigation proceedings with the GCIU, until the final withdrawal liability is determined. The exact amount of the withdrawal liability could be higher or lower than the estimate depending on, among other things, the nature and timing of any triggering events, the funding status of the plans at that time and the final conclusion of the litigation with the GCIU trustees.

New Accounting Pronouncements

See Note 24, "New Accounting Pronouncements," to the consolidated financial statements in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K.

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Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The Company is exposed to a variety of market risks which may adversely impact the Company's results of operations and financial condition, including changes in interest and foreign currency exchange rates, changes in the economic environment that would impact credit positions and changes in the prices of certain commodities. The Company's management takes an active role in the risk management process and has developed policies and procedures that require specific administrative and business functions to assist in the identification, assessment and control of various risks. These risk management strategies may not fully insulate the Company from adverse impacts due to market risks.

Interest Rate Risk

The Company is exposed to interest rate risk on variable rate debt obligations and price risk on fixed rate debt and capital leases. The variable rate debt outstanding at December 31, 2017 is primarily comprised of $281.3 million outstanding on the Term Loan A and $279.1 million outstanding on the Term Loan B. As of December 31, 2017, there was no outstanding balance on the revolving credit facility. In order to reduce the variability of cash flows from interest payments related to a portion of Quad/Graphics' variable-rate debt, the Company entered into a $250.0 million interest rate swap during February 2017, and has classified $250.0 million of the Company's variable rate debt as fixed rate debt. Including the impact of the $250.0 million interest rate swap of variable rate to fixed rate debt, Quad/Graphics had variable rate debt outstanding of $314.2 million at a current weighted average interest rate of 4.3% and fixed rate debt and capital leases outstanding of $650.6 million at a current weighted average interest rate of 5.7% at December 31, 2017. The Term Loan B bears interest primarily based on LIBOR; however, it is subject to a 1.0% LIBOR minimum rate, and thus the interest rate on the Term Loan B will not begin to fluctuate until LIBOR exceeds that percentage. At December 31, 2017, LIBOR was over 1.0%, or at 1.6%, and as a result, the interest on the Term Loan B would fluctuate with a 10% increase in the market interest rate. Including the Term Loan B, a hypothetical 10% increase in the market interest rates impacting the Company's current weighted average interest rate on variable rate debt obligations would not have a material impact on the Company's interest expense. A hypothetical 10% change in market interest rates would change the fair value of fixed rate debt at December 31, 2017, by approximately $9 million.

Foreign Currency Risk and Translation Exposure

The Company is exposed to the impact of foreign currency fluctuations in certain countries in which it operates. The exposure to foreign currency movements is limited in most countries because the operating revenues and expenses of its various subsidiaries and business units are substantially in the local currency of the country in which they operate. To the extent revenues and expenses are not in the applicable local currency, the Company may enter into foreign exchange forward contracts to hedge the currency risk.

Although operating in local currencies may limit the impact of currency rate fluctuations on the results of operations of the Company's non-United States subsidiaries and business units, rate fluctuations may impact the consolidated financial position as the assets and liabilities of its foreign operations are translated into U.S. dollars in preparing the Company's consolidated balance sheets. As of December 31, 2017, the Company's foreign subsidiaries had net current assets (defined as current assets less current liabilities) subject to foreign currency translation risk of $51.9 million. The potential decrease in net current assets as of December 31, 2017, from a hypothetical 10% adverse change in quoted foreign currency exchange rates would be approximately $5.2 million. This sensitivity analysis assumes a parallel shift in all major foreign currency exchange rates versus the U.S. dollar. Exchange rates rarely move in the same direction relative to the U.S. dollar due to positive and negative correlations of the various global currencies. This assumption may overstate or understate the impact of changing exchange rates on individual assets and liabilities denominated in a foreign currency.

The Company's hedging operations have historically not been material, and gains or losses from these operations have not been material to the Company's results of operations, financial position or cash flows. The Company does not use derivative financial instruments for trading or speculative purposes.

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These international operations are subject to risks typical of international operations, including, but not limited to, differing economic conditions, changes in political climate, potential restrictions on the movement of funds, differing tax structures, and other regulations and restrictions. Accordingly, future results could be adversely impacted by changes in these or other factors.

Credit Risk

Credit risk is the possibility of loss from a customer's failure to make payments according to contract terms. Prior to granting credit, each customer is evaluated in an underwriting process, taking into consideration the prospective customer's financial condition, past payment experience, credit bureau information and other financial and qualitative factors that may affect the customer's ability to pay. Specific credit reviews and standard industry credit scoring models are used in performing this evaluation. Customers' financial condition is continuously monitored as part of the normal course of business. Some of the Company's customers are highly leveraged or otherwise subject to their own operating and regulatory risks. Based on those customer account reviews and due to the continued uncertainty of the global economy, the Company has established an allowance for doubtful accounts of $28.9 million as of December 31, 2017.

The Company has a large, diverse customer base and does not have a high degree of concentration with any single customer account. During the year ended December 31, 2017, the Company's largest customer accounted for less than 5% of the Company's net sales. Even if the Company's credit review and analysis mechanisms work properly, the Company may experience financial losses in its dealings with customers and other parties. Any increase in nonpayment or nonperformance by customers could adversely impact the Company's results of operations and financial condition. Economic disruptions could result in significant future charges.

Commodity Risk

The primary raw materials that Quad/Graphics uses in its print business are paper, ink and energy. At this time, the Company's supply of raw materials is readily available from numerous vendors; however, based on market conditions, that could change in the future. The Company generally buys these raw materials based upon market prices that are established with the vendor as part of the procurement process.

The majority of paper used in the printing process is supplied directly by its clients. For those clients that do not directly supply their own paper, the Company makes use of its purchasing efficiencies to supply paper by negotiating with leading paper vendors, uses a wide variety of paper grades, weights and sizes, and does not rely on any one vendor. In addition, the Company generally includes price adjustment clauses in sales contracts for paper and other critical raw materials in the printing process. Although these clauses generally mitigate paper price risk, higher paper prices and tight paper supplies, as well as changes in the U.S. import or trade regulations may have an impact on client demand for printed products. The Company's working capital requirements, including the impact of seasonality, are partially mitigated through the direct purchasing of paper by its clients.

The Company produces the majority of ink used in its print production, allowing it to control the quality, cost and supply of key inputs. Raw materials for the ink manufacturing process are purchased externally from a variety of vendors.

The Company generally cannot pass on to clients the impact of higher electric and natural gas energy prices on its manufacturing costs, and increases in energy prices result in higher manufacturing costs for certain of its operations. The Company mitigates its risk through natural gas hedges when appropriate. In its logistic operations, however, the Company is able to pass a substantial portion of any increase in fuel prices directly to its clients.

As a result, management believes a hypothetical 10% change in the price of paper and other raw materials would not have a significant direct impact on the Company's consolidated annual results of operations or cash flows; however, significant increases in commodity pricing or tight supply could influence future client demand for printed products. Inflation has not had a significant impact on the Company historically.

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Item 8. Financial Statements and Supplementary Data

Quarterly Financial Data (Unaudited)

The following table sets forth selected financial information for each of the eight quarters in the two-year period ended December 31, 2017. This unaudited information has been prepared by the Company on the same basis as the consolidated financial statements and includes all normal recurring adjustments necessary to present this information fairly when read in conjunction with the Company's audited consolidated financial statements and the notes thereto.
UNAUDITED INTERIM FINANCIAL INFORMATION
(In millions, except per share data)

	Year Ended December 31,				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year
2017					
Net sales	$998.6	$963.2	$1,005.4	$1,164.2	$4,131.4
Operating income[(1)]	53.6	32.7	49.4	29.2	164.9
Net earnings	25.4	6.7	19.8	55.3	107.2
Earnings per share	0.49	0.13	0.38	1.06	2.07
Closing stock price high	27.66	27.98	23.27	23.98	27.98
Closing stock price low	22.10	21.91	18.35	20.92	18.35
Closing stock price at quarter-end	25.24	22.92	22.61	22.60	22.60
2016					
Net sales	$1,042.5	$1,032.3	$1,056.4	$1,198.3	$4,329.5
Operating income	13.0	13.3	33.8	62.3	122.4
Net earnings (loss)	3.8	(7.7)	11.3	37.5	44.9
Earnings (loss) per share	0.08	(0.16)	0.22	0.73	0.90
Closing stock price high	13.61	23.29	29.18	28.13	29.18
Closing stock price low	7.85	11.93	23.07	23.26	7.85
Closing stock price at quarter-end	12.94	23.29	26.72	26.88	26.88

(1) Operating income increased $40.6 million during the three months ended March 31, 2017, as compared to the three months ended March 31, 2016, primarily due to the following: (1) a $19.7 million decrease in restructuring, impairment and transaction-related charges; (2) a $19.4 million decrease in depreciation and amortization expense; (3) a $15.4 million vacation reserve reduction from an employee vacation policy change; and (4) $6.3 million in lower legal expenses. These impacts were partially offset by lower print volume and pricing due to ongoing industry pressures and a $10.4 million benefit in 2016 that did not repeat in 2017 related to the collection of a previously written-off vendor receivable.

Operating income increased $19.4 million during the three months ended June 30, 2017, as compared to the three months ended June 30, 2016, primarily due to the following: (1) a $19.1 million decrease in depreciation and amortization expense; (2) a $5.0 million gain from a property insurance claim; (3) a $2.1 million decrease in restructuring, impairment and transaction-related charges; and (4) savings from cost reduction initiatives. These impacts were partially offset by lower print volume and pricing due to ongoing industry pressures.

Operating income increased $15.6 million during the three months ended September 30, 2017, as compared to the three months ended September 30, 2016, primarily due to the following: (1) an $18.1 million decrease in restructuring, impairment and transaction-related charges; (2) a $3.4 million decrease in depreciation and amortization expense; and (3) savings from cost reduction initiatives. These impacts were partially offset by lower print volume and pricing due to ongoing industry pressures.

Operating income decreased $33.1 million for the three months ended December 31, 2017, compared to the three months ended December 31, 2016, primarily due to an increase of $20.5 million in restructuring, impairment and transaction-related charges and lower print volume and pricing due to ongoing industry pressures, partially offset by savings from cost reduction initiatives.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Quad/Graphics, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Quad/Graphics, Inc. and subsidiaries (the "Company") as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity and cash flows for each of the three years in the period ended December 31, 2017, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 21, 2018, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

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

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

/s/ Deloitte & Touche LLP

Milwaukee, Wisconsin
February 21, 2018

We have served as the Company's auditor since 2002.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Quad/Graphics, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Quad/Graphics, Inc. and subsidiaries (the "Company") as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended December 31, 2017, of the Company and our report dated February 21, 2018, expressed an unqualified opinion on those financial statements.

Basis for Opinion

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ Deloitte & Touche LLP

Milwaukee, Wisconsin
February 21, 2018

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QUAD/GRAPHICS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(in millions, except per share data)

	Year Ended December 31, 2017	2016	2015
Net sales			
Products	$ 3,529.0	$ 3,717.1	$ 3,949.7
Services	602.4	612.4	647.4
Total net sales	4,131.4	4,329.5	4,597.1
Cost of sales			
Products	2,827.3	2,971.0	3,213.5
Services	432.1	423.8	466.8
Total cost of sales	3,259.4	3,394.8	3,680.3
Operating expenses			
Selling, general and administrative expenses	413.4	454.6	448.3
Depreciation and amortization	232.5	277.1	325.3
Restructuring, impairment and transaction-related charges	61.2	80.6	164.9
Goodwill impairment	—	—	808.3
Total operating expenses	3,966.5	4,207.1	5,427.1
Operating income (loss)	$ 164.9	$ 122.4	$ (830.0)
Interest expense	71.1	77.2	88.4
Loss (gain) on debt extinguishment	2.6	(14.1)	—
Earnings (loss) before income taxes and equity in loss of unconsolidated entities	91.2	59.3	(918.4)
Income tax (benefit) expense	(16.0)	13.0	(282.8)
Earnings (loss) before equity in loss of unconsolidated entities	107.2	46.3	(635.6)
Equity in loss of unconsolidated entities	—	1.4	6.3
Net earnings (loss)	$ 107.2	$ 44.9	$ (641.9)
Earnings (loss) per share			
Basic	$ 2.16	$ 0.94	$ (13.40)
Diluted	$ 2.07	$ 0.90	$ (13.40)
Weighted average number of common			

shares outstanding			
Basic	49.6	47.9	47.9
Diluted	51.8	49.8	47.9

See accompanying Notes to Consolidated Financial Statements.

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QUAD/GRAPHICS, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in millions)

	Year Ended December 31,		
	2017	2016	2015
Net earnings (loss)	$107.2	$44.9	$(641.9)
Other comprehensive income (loss)			
Translation adjustments			
Foreign currency translation adjustments	14.8	(15.5)	(63.4)
Translation of long-term loans to foreign subsidiaries	(2.0)	11.6	17.5
Revaluation loss on the sale of a business	2.1	—	—
Revaluation loss on the sale of an equity method investment	—	—	7.7
Total translation adjustments	14.9	(3.9)	(38.2)
Interest rate swap adjustments	2.1	—	—
Pension benefit plan adjustments			
Net gain (loss) arising during period	18.7	(0.8)	3.7
Settlement charge on pension benefit plans included in net earnings (loss)	0.8	7.0	—
Total pension benefit plan adjustments	19.5	6.2	3.7
Other comprehensive income (loss), before tax	36.5	2.3	(34.5)
Income tax impact related to items of other comprehensive income (loss)	(8.3)	(2.4)	(1.4)
Other comprehensive income (loss), net of tax	28.2	(0.1)	(35.9)
Total comprehensive income (loss)	$135.4	$44.8	$(677.8)

See accompanying Notes to Consolidated Financial Statements.

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QUAD/GRAPHICS, INC.
CONSOLIDATED BALANCE SHEETS
(in millions, except per share data)

	December 31, 2017	December 31, 2016
ASSETS		
Cash and cash equivalents	$ 64.3	$ 9.0
Receivables, less allowances for doubtful accounts of $28.9 at December 31, 2017, and $53.5 at December 31, 2016	552.5	563.6
Inventories	246.5	265.4
Prepaid expenses and other current assets	45.1	54.4
Restricted cash	0.1	10.2
Total current assets	908.5	902.6
Property, plant and equipment—net	1,377.6	1,519.9
Intangible assets—net	43.4	59.7
Equity method investment in unconsolidated entity	3.6	3.6
Other long-term assets	119.3	84.3
Total assets	$ 2,452.4	$ 2,570.1
LIABILITIES AND SHAREHOLDERS' EQUITY		
Accounts payable	$ 381.6	$ 323.5
Accrued liabilities	316.7	359.0
Short-term debt and current portion of long-term debt	42.0	84.7
Current portion of capital lease obligations	5.6	7.4
Total current liabilities	745.9	774.6
Long-term debt	903.5	1,019.8
Capital lease obligations	13.7	18.9
Deferred income taxes	41.9	35.3
Other long-term liabilities	225.0	280.0
Total liabilities	1,930.0	2,128.6
Commitments and contingencies (Note 10)		
Shareholders' equity (Note 19)		
Preferred stock, $0.01 par value; Authorized: 0.5 million shares; Issued: None	—	—
Common stock, Class A, $0.025 par value; Authorized: 80.0 million shares; Issued: 40.0 million shares at December 31, 2017 and 2016	1.0	1.0
Common stock, Class B, $0.025 par value; Authorized: 80.0 million shares; Issued: 13.8 million shares at December 31, 2017, and 15.0 million shares at December 31, 2016	0.4	0.4
Common stock, Class C, $0.025 par value; Authorized: 20.0 million shares; Issued: 0.5 million shares at December 31, 2017 and 2016	—	—
Additional paid-in capital	861.1	912.4
Treasury stock, at cost, 2.3 million shares at December 31, 2017, and 4.1 million shares at December 31, 2016	(52.8)	(113.3)
Accumulated deficit	(162.9)	(206.4)
Accumulated other comprehensive loss	(124.4)	(152.6)

Total shareholders' equity	522.4	441.5
Total liabilities and shareholders' equity	$ 2,452.4	$ 2,570.1

See accompanying Notes to Consolidated Financial Statements.

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QUAD/GRAPHICS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in millions)

	Year Ended December 31,		
	2017	2016	2015
OPERATING ACTIVITIES			
Net earnings (loss)	$107.2	$44.9	$(641.9)
Adjustments to reconcile net earnings (loss) to net cash provided by operating activities:			
Depreciation and amortization	232.5	277.1	325.3
Impairment charges	12.0	26.8	95.3
Goodwill impairment	—	—	808.3
Amortization of debt issuance costs and original issue discount	3.5	4.2	4.4
Loss (gain) on debt extinguishment	2.6	(14.1)	—
Stock-based compensation	16.4	15.2	7.2
Gain on the sale or disposal of property, plant and equipment	(6.9)	(9.0)	(4.1)
Loss on the sale of a business	7.7	—	—
Gain from a property insurance claim	(5.0)	—	—
Foreign exchange losses on sale of investment	—	—	6.0
Settlement loss on pension benefit plans	0.8	7.0	—
Deferred income taxes	(22.5)	(26.6)	(292.5)
Equity in loss of unconsolidated entities	—	1.4	6.3
Changes in operating assets and liabilities—net of acquisitions:			
Receivables	8.7	84.8	109.6
Inventories	13.1	12.7	24.6
Prepaid expenses and other current assets	3.8	(18.0)	4.0
Accounts payable and accrued liabilities	9.9	(16.1)	(60.5)
Other	(39.8)	(37.8)	(43.9)
Net cash provided by operating activities	344.0	352.5	348.1
INVESTING ACTIVITIES			
Purchases of property, plant and equipment	(85.9)	(106.1)	(133.0)
Cost investment in unconsolidated entities	—	(9.9)	(1.2)
Proceeds from the sale of property, plant and equipment	23.9	25.9	29.2
Proceeds from the sale of a business	14.1	—	—
Proceeds from property insurance claims	8.0	—	—
Proceeds from the sale of investments	—	1.3	14.0
Transfers from restricted cash	9.9	4.4	17.7
Loan to an unconsolidated entity	(7.3)	—	—
Acquisition of businesses—net of cash acquired (Note 2)	—	—	(143.4)
Net cash used in investing activities	(37.3)	(84.4)	(216.7)
FINANCING ACTIVITIES			
Proceeds from issuance of long-term debt	375.0	19.7	—
Payments of long-term debt	(522.9)	(192.0)	(90.9)
Payments of capital lease obligations	(7.6)	(9.5)	(5.0)
Borrowings on revolving credit facilities	718.5	871.9	1,462.5
Payments on revolving credit facilities	(736.0)	(918.0)	(1,435.5)
Payments of debt issuance costs and financing fees	(4.7)	(0.1)	—

Purchases of treasury stock	(3.8)	(8.8)	—
Proceeds from stock options exercised	2.6	30.3	2.2
Equity awards redeemed to pay employees' tax obligations	(6.0)	(1.4)	(1.6)
Payment of cash dividends	(62.5)	(61.1)	(62.3)
Other financing activities	(4.3)	(0.3)	2.7
Net cash used in financing activities	(251.7)	(269.3)	(127.9)
Effect of exchange rates on cash and cash equivalents	0.3	(0.6)	(2.3)
Net increase (decrease) in cash and cash equivalents	55.3	(1.8)	1.2
Cash and cash equivalents at beginning of year	9.0	10.8	9.6
Cash and cash equivalents at end of year	$64.3	$9.0	$10.8

See accompanying Notes to Consolidated Financial Statements.

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QUAD/GRAPHICS, INC.
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
(in millions)

	Common Stock		Additional Paid-in	Treasury Stock		Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Income (Loss)	Shareholders' Equity
	Shares	Amount	Capital	Shares	Amount			
Balance at January 1, 2015	55.5	$ 1.4	$ 971.3	(6.6)	$ (218.8)	$ 515.2	$ (116.6)	$ 1,152.5
Net loss	—	—	—	—	—	(641.9)	—	(641.9)
Foreign currency translation adjustments	—	—	—	—	—	—	(38.2)	(38.2)
Pension benefit plan liability adjustments, net of tax	—	—	—	—	—	—	2.3	2.3
Cash dividends declared ($1.20 per share)	—	—	—	—	—	(61.4)	—	(61.4)
Stock-based compensation	—	—	7.2	—	—	—	—	7.2
Stock options exercised	—	—	(3.0)	0.2	5.2	—	—	2.2
Issuance of restricted stock and deferred stock units	—	—	(21.2)	0.6	21.2	—	—	—
Tax benefit on equity award activity	—	—	2.8	—	—	—	—	2.8
Equity awards vested	—	—	(0.4)	—	0.4	—	—	—
Equity awards redeemed to pay employees' tax obligations	—	—	—	(0.1)	(1.6)	—	—	(1.6)
Balance at December 31, 2015	55.5	$ 1.4	$ 956.7	(5.9)	$ (193.6)	$ (188.1)	$ (152.5)	$ 423.9
Net earnings	—	—	—	—	—	44.9	—	44.9
Foreign currency translation adjustments	—	—	—	—	—	—	(3.9)	(3.9)
Pension benefit plan liability adjustments, net of tax	—	—	—	—	—	—	3.8	3.8
Cash dividends declared ($1.20 per share)	—	—	—	—	—	(63.2)	—	(63.2)
Stock-based compensation	—	—	15.2	—	—	—	—	15.2
Purchases of treasury stock	—	—	—	(1.1)	(8.8)	—	—	(8.8)
Stock options exercised	—	—	(13.3)	1.6	43.6	—	—	30.3
Issuance of restricted stock and deferred stock units	—	—	(45.6)	1.4	45.6	—	—	—
Issuance of shares for settlement of MEPPs liability	—	—	—	—	0.7	—	—	0.7
Equity awards vested	—	—	(0.6)	—	0.6	—	—	—
Equity awards redeemed to pay employees' tax obligations	—	—	—	(0.1)	(1.4)	—	—	(1.4)
Balance at December 31, 2016	55.5	$ 1.4	$ 912.4	(4.1)	$ (113.3)	$ (206.4)	$ (152.6)	$ 441.5
Net earnings	—	—	—	—	—	107.2	—	107.2
Foreign currency translation adjustments	—	—	—	—	—	—	14.9	14.9
Pension benefit plan liability adjustments, net of tax	—	—	—	—	—	—	12.0	12.0
	—	—	—	—	—	—	1.3	1.3

Interest rate swap adjustments, net of tax								
Cash dividends declared ($1.20 per share)	—	—	—	—	—	(63.7)	—	(63.7)
Stock-based compensation	—	—	16.4	—	—	—	—	16.4
Purchases of treasury stock	—	—	—	(0.2)	(3.8)	—	—	(3.8)
Stock options exercised	—	—	(1.7)	0.2	4.3	—	—	2.6
Issuance of restricted stock and deferred stock units	—	—	(19.8)	0.7	19.8	—	—	—
Cancellation of class B treasury shares (Note 19)	(1.2)	—	(41.9)	1.2	41.9	—	—	—
Equity awards vested	—	—	(4.3)	0.2	4.3	—	—	—
Equity awards redeemed to pay employees' tax obligations	—	—	—	(0.3)	(6.0)	—	—	(6.0)
Balance at December 31, 2017	54.3	$ 1.4	$ 861.1	(2.3)	$ (52.8)	$ (162.9)	$ (124.4)	$ 522.4

See accompanying Notes to Consolidated Financial Statements.

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QUAD/GRAPHICS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(In millions, except share and per share data and unless otherwise indicated)

Note 1. Basis of Presentation and Summary of Significant Accounting Policies

Nature of Operations—Quad/Graphics is a leading marketing solutions provider that leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. The Company provides marketing and other complementary services for its customers. The Company operates primarily in the commercial print portion of the printing industry as a printer of retail inserts, publications, catalogs, special interest publications, journals, direct mail, books, directories, in-store marketing and promotion, packaging, newspapers, custom print products, other commercial and specialty printed products and global paper procurement. The Company's products and services for a variety of industries are sold primarily throughout North America, South America and Europe. In addition, the Company strategically sources packaging product manufacturing over multiple end markets in Central America and Asia.

Principles of Consolidation and Basis of Presentation—The accompanying consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries and have been prepared in accordance with GAAP. The results of operations and accounts of businesses acquired are included in the consolidated financial statements from the dates of acquisition (see Note 2, "Acquisitions and Strategic Investments").

Investments in entities where the Company has both the ability to exert significant influence but not control and an ownership interest of 50% or less but more than 20% are accounted for using the equity method of accounting. Investments in entities where the Company does not exert significant influence or control and has an ownership interest of less than 20% are accounted for using the cost method of accounting. Intercompany transactions and balances have been eliminated in consolidation.

Foreign Operations—Assets and liabilities denominated in foreign currencies are translated into United States dollars at the exchange rate existing at the respective balance sheet dates. Income and expense items are translated at the average rates during the respective periods. Translation adjustments resulting from fluctuations in exchange rates are recorded as a separate component of accumulated other comprehensive income (loss) on the consolidated statements of shareholders' equity, while transaction gains and losses are recorded in selling, general and administrative expenses on the consolidated statements of operations. Foreign exchange transactions resulted in gains of $1.5 million during the year ended December 31, 2017, and losses of $6.0 million and $1.4 million for the years ended December 31, 2016 and 2015, respectively.

The Company has a 49% interest in Plural, a commercial printer based in Brazil, and formerly owned 50% of a commercial printer in Chile, until the Company sold its ownership interest in Chile on July 31, 2015. The Company accounts for those entities using the equity method of accounting (see Note 8, "Equity Method Investments in Unconsolidated Entities," for further discussion). The Company's equity loss of Plural's and Chile's operations was recorded in equity in loss of unconsolidated entities in the Company's consolidated statements of operations, and was included within the International segment. Distributions received from equity method investees follow the nature of the distribution approach, where each distribution is evaluated on the basis of the source of the payment and is classified as either operating cash inflows or investing cash inflows. There are no other significant unconsolidated entities.

Use of Estimates—The preparation of consolidated financial statements requires the use of management's estimates and assumptions that affect the reported assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting periods. Actual results could differ from these estimates. Estimates are used when accounting for items and matters including, but not limited to: allowances for doubtful accounts, inventory obsolescence, asset valuations and useful lives, pension and postretirement benefits, self-insurance reserves, stock-based compensation, taxes, restructuring and other provisions and contingencies.

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QUAD/GRAPHICS, INC.
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Revenue Recognition—The Company recognizes its printing revenues upon transfer of title and the passage of risk of loss, which is generally upon shipment to the customer, and when there is a reasonable assurance as to collectability. Under agreements with certain customers, products may be stored by the Company for future delivery. In these situations, the Company may receive warehouse management fees for the services it provides. Product returns are not significant because the products are customized; however, the Company accrues for the estimated amount of customer allowances at the time of sale based on historical experience and known trends.

Revenue from services is recognized as services are performed. Revenues related to the Company's imaging operations, which include digital content management, photography, color services and page production, are recognized in accordance with the terms of the contract, typically upon completion of the performed service and acceptance by the customer. Revenues related to the Company's logistics operations, which includes the delivery of printed material, are recognized upon completion of services.

Certain revenues earned by the Company require judgment to determine if revenue should be recorded gross as a principal or net of related costs as an agent. Billings for third-party shipping and handling costs, primarily in the Company's logistics operations, and out-of-pocket expenses are recorded gross in net sales and cost of sales in the consolidated statements of operations. Many of the Company's operations process materials, primarily paper, that may be supplied directly by customers or may be purchased by the Company and sold to customers. No revenue is recognized for customer-supplied paper. Revenues for Company-supplied paper are recognized on a gross basis.

Byproduct Recoveries—The Company presents byproduct recoveries as a reduction of cost of sales–products in the consolidated statements of operations. Classification of byproduct recoveries as a reduction of cost of sales aligns the proceeds from byproduct recoveries with the corresponding manufacturing costs.

Financial Instruments—The Company uses derivative financial instruments for the purpose of hedging interest rate, commodity and foreign exchange exposures that exist as part of ongoing business operations, including interest rate swap agreements, natural gas forward purchase contracts and foreign exchange contracts. As a policy, the Company does not engage in speculative or leveraged transactions, nor does the Company hold or issue financial instruments for trading purposes.

Derivative instruments are recorded on the consolidated balance sheets as either assets or liabilities measured at their fair value. If the derivative is designated as a fair value hedge, the changes in the fair value of the derivative and of the hedged item attributable to the hedged risk are recognized in earnings. If the derivative is designated as a cash flow hedge, the effective portion of the changes in the fair value of the derivative are recorded as a component of accumulated other comprehensive income (loss) and recognized in the consolidated statements of operations when the hedged item affects earnings.

The ineffective portions of the changes in the fair value of hedges are insignificant and recognized in earnings. Cash flows from derivatives that are accounted for as cash flow or fair value hedges are included in the consolidated statements of cash flows in the same category as the item being hedged.

Fair Value Measurement—The Company applies fair value accounting for all assets and liabilities that are recognized or disclosed at fair value in its consolidated financial statements on a recurring basis. Fair value represents the amount that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities that are required to be recorded at fair value, the Company considers the principal or most advantageous market and the market-based risk measurements or assumptions that market participants would use in pricing the asset or liability. See Note 15, "Financial Instruments and Fair Value Measurements," for further discussion.

QUAD/GRAPHICS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
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Research and Development—Research and development costs related to the development of new products or the adaptation of existing products are expensed as incurred, included in cost of sales and totaled $9.0 million, $9.3 million and $10.3 million during the years ended December 31, 2017, 2016 and 2015, respectively.

Cash and Cash Equivalents—The Company considers all highly liquid investments with original maturities of three months or less to be cash equivalents.

Receivables—Receivables are stated net of allowances for doubtful accounts. No single customer comprised more than 5% of the Company's consolidated net sales in 2017, 2016 or 2015, or 5% of the Company's consolidated receivables as of December 31, 2017 or 2016. Specific customer provisions are made when a review of significant outstanding amounts, utilizing information about customer creditworthiness and current economic trends, indicates that collection is doubtful. In addition, provisions are made at differing rates, based upon the age of the receivable and the Company's historical collection experience. Accounts that are deemed uncollectible are written off when all reasonable collection efforts have been exhausted. See Note 5, "Receivables," for further discussion on the transactions affecting the allowances for doubtful accounts.

Inventories—Inventories include material, labor, and plant overhead and are stated at the lower of cost or net realizable value. At December 31, 2017 and 2016, all inventories were valued using the first-in, first-out ("FIFO") method. See Note 6, "Inventories," for the components of the Company's inventories.

Property, Plant and Equipment—Property, plant and equipment are recorded at cost, and are depreciated over the estimated useful lives of the assets using the straight-line method for financial reporting purposes. See Note 7, "Property, Plant and Equipment," for the components of the Company's property, plant and equipment. Major improvements that extend the useful lives of existing assets are capitalized and charged to the asset accounts. Repairs and maintenance, which do not significantly improve or extend the useful lives of the respective assets, are expensed as incurred. Leasehold improvements are depreciated over the shorter of the lease term or the estimated useful life of the respective asset. When an asset is retired or disposed, the associated costs and accumulated depreciation are eliminated, and the resulting gain or loss is recognized in the Company's consolidated statements of operations.

Asset Category	Range of Useful Lives
Buildings	10 to 40 Years
Machinery and equipment	3 to 15 Years
Other	3 to 10 Years

Other Intangible Assets—Identifiable intangible assets are recognized apart from goodwill and are amortized over their estimated useful lives.

Impairment of Long-Lived and Other Intangible Assets—The Company evaluates long-lived assets and other intangible assets (of which the most significant are property, plant and equipment and customer relationship intangible assets) whenever events and circumstances have occurred that indicate the carrying value of an asset may not be recoverable. Determining whether impairment has occurred typically requires various estimates and assumptions, including determining which cash flows are directly related to the potentially impaired asset, the useful life over which cash flows will occur, their amount and the asset's residual value, if any. In turn, assessing whether there is an impairment

loss requires a determination of recoverability, which is generally estimated by the ability to recover the balance of the assets from expected future operating cash flows on an undiscounted basis. If impairment is determined to exist, any related impairment loss is calculated based on the difference in the fair value and carrying value of the asset.

QUAD/GRAPHICS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
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Goodwill—When applicable, goodwill is reviewed annually for impairment as of October 31, or more frequently if events or changes in circumstances indicate that it is more likely than not that the fair value of a reporting unit is below its carrying value. In performing this analysis, the Company compares each reporting unit's fair value estimated based on comparable company market valuations and/or expected future discounted cash flows to be generated by the reporting unit to its carrying value. If the carrying value exceeds the reporting unit's fair value, the Company performs a fair value measurement calculation to determine the impairment loss, which would be charged to operations in the period identified. See Note 4, "Goodwill and Other Intangible Assets," for further discussion.

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

The Company records net deferred tax assets to the extent the Company believes these assets will more likely than not be realized. This determination is based upon all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax planning strategies, and recent financial operations. If the Company determines that a deferred income tax asset will not be fully realized in the future, then a valuation allowance is established or increased to reflect the amount at which the asset will more likely than not be realized, which would increase the Company's provision for income taxes. In a period after a valuation allowance has been established, if the Company determines the related deferred income tax assets will be realized in the future in excess of their net recorded amount, then an adjustment to reduce the related valuation allowance will be made, which would reduce the Company's provision for income taxes.

The Company is regularly audited by foreign and domestic tax authorities. These audits occasionally result in proposed assessments where the ultimate resolution might result in the Company owing additional taxes, including in some cases, penalties and interest. The Company recognizes a tax position in its consolidated financial statements when it is more likely than not that the position would be sustained upon examination by tax authorities. This recognized tax position is then measured at the largest amount of benefit that is more likely than not of being recognized upon ultimate settlement. The Company recognizes interest and penalties related to unrecognized tax benefits in income tax expense.

The determination of the Company's worldwide tax provision and related tax assets and liabilities requires the use of significant judgment in estimating the impact of uncertainties in the application of GAAP and the interpretation of complex tax laws. In the ordinary course of business, there are transactions and calculations where the final tax outcome is uncertain. Where fair market value is required to measure a tax asset or liability for GAAP purposes, the Company periodically obtains independent, third party assistance to validate that such value is determined in conformity with Internal Revenue Service fair market value guidelines. While the Company believes it has the appropriate support for the positions taken, certain positions may be successfully challenged by taxing authorities. Resolution of these uncertainties in a manner inconsistent with management's expectations could have a material impact on the Company's financial condition and operating results. The Company applies the provisions of the authoritative guidance on accounting for uncertain tax positions to determine the appropriate amount of tax benefits to

be recognized with respect to uncertain tax positions. The determination of the Company's worldwide tax provision includes the impact of any changes to the amount of tax benefits recognized with respect to uncertain tax positions. See Note 14, "Income Taxes," for further discussion.

Pension Plans—The Company assumed certain frozen underfunded defined benefit pension plans as part of the 2010 World Color Press acquisition. Pension plan costs are determined using actuarial methods and are funded through contributions. The Company records amounts relating to its pension plans based on calculations which include various actuarial assumptions including discount rates, assumed rates of return, mortality, compensation increases and turnover

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rates. The Company reviews its actuarial assumptions on an annual basis and modifies the assumptions based on current rates and trends when it is appropriate to do so. The effects of modifications are recognized immediately on the consolidated balance sheets, but are generally amortized into operating income over future periods, with the deferred amount recorded in accumulated other comprehensive loss on the consolidated balance sheets. The Company believes that the assumptions utilized in recording its obligations under its plans are reasonable based on its experience, market conditions and input from its actuaries and investment advisors. For the purposes of calculating the expected return on plan assets, those assets are valued at fair value. When an event gives rise to both a curtailment and a settlement, the curtailment is accounted for prior to the settlement. The Company's measurement date to measure the defined benefit plan assets and the projected benefit obligation is December 31.

The Company has previously participated in MEPPs as a result of the acquisition of World Color Press. Due to the significant underfunded status of the MEPPs, the Company has withdrawn from all significant MEPPs and replaced these union sponsored "promise to pay in the future" defined benefit plans with a Company sponsored "pay as you go" defined contribution plan, which is historically the form of retirement benefit provided to Quad/Graphics' employees. As a result of the decision to withdraw, the Company recorded an estimated withdrawal liability for the MEPPs as part of the World Color Press purchase price allocation process based on information received from the MEPPs' trustees. The estimated withdrawal liability is updated based on significant events, such as potential new information from the litigation proceedings with the MEPPs, until the final withdrawal liability is determined. The exact amount of the withdrawal liability could be higher or lower than the estimate. See Note 16, "Employee Retirement Plans," for further discussion.

Stock-Based Compensation—The Company recognizes stock-based compensation expense over the vesting period for all stock-based awards made to employees and directors based on the fair value of the instrument at the time of grant. See Note 18, "Equity Incentive Programs," for further discussion.

Accumulated Other Comprehensive Income (Loss)—Accumulated other comprehensive income (loss) consists primarily of unrecognized actuarial gains and losses and prior service costs for pension plans, foreign currency translation adjustments and interest rate swap adjustments, and is presented in the consolidated statements of shareholders' equity. See Note 20, "Accumulated Other Comprehensive Loss," for further discussion.

Supplemental Cash Flow Information—The following table summarizes certain supplemental cash flow information for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Interest paid, net of amounts capitalized	$57.8	$65.9	$76.5
Income taxes paid	6.5	34.0	1.5
Non-cash investing and financing activities:			
Capital lease additions (see Note 13)	0.5	21.0	5.9
Leased equipment purchased through term loan	—	—	3.7
Acquisitions of businesses (see Note 2):			
Fair value of assets acquired, net of cash	$—	$—	$137.0
Liabilities assumed	—	—	(28.6)
Goodwill	—	—	33.8

Deferred payment for 2013 Proteus and Transpak acquisition	—	—	0.6
Deferred payment for 2014 UniGraphic acquisition	—	—	0.6
Acquisition of businesses—net of cash acquired	$—	$—	$143.4

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Note 2. Acquisitions and Strategic Investments

2015 Specialty Finishing, Inc. Acquisition

The Company completed the acquisition of Specialty on August 25, 2015, for $61.0 million. Specialty is a full-service paperboard folding carton manufacturer and logistics provider located in Omaha, Nebraska. The purchase price of $61.0 million included $0.3 million of acquired cash for a net purchase price of $60.7 million. Included in the purchase price allocation are $9.6 million of identifiable intangible assets, which are amortized over their estimated useful lives ranging from three to six years, and $3.5 million of goodwill. The final allocation of the purchase price was based on valuations performed to determine the fair value of the net assets as of the acquisition date. The net assets acquired, excluding acquired cash, were classified as Level 3 in the valuation hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs). Specialty's operations are included in the United States Print and Related Services segment.

2015 Copac Global Packaging, Inc. Acquisition

The Company completed the acquisition of Copac on April 14, 2015, for $59.4 million. Copac is a leading international provider of innovative packaging and supply chain solutions, including turnkey packaging design, production and fulfillment services across a range of end markets. Copac manufactures products such as folding cartons, labels, inserts, tags and specialty envelopes, and has production facilities in Spartanburg, South Carolina and Santo Domingo, Dominican Republic, as well as strategically sourcing packaging product manufacturing over multiple end markets in Central America and Asia, giving it a global footprint. The purchase price of $59.4 million included $0.9 million of acquired cash for a net purchase price of $58.5 million. Included in the purchase price allocation are $22.2 million of identifiable intangible assets, which are amortized over their estimated useful lives of six years, and $23.5 million of goodwill. The final allocation of the purchase price was based on valuations performed to determine the fair value of the net assets as of the acquisition date. The net assets acquired, excluding acquired cash, were classified as Level 3 in the valuation hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs). Copac's operations are included in the United States Print and Related Services segment.

2015 Marin's International Acquisition

The Company completed the acquisition of Marin's on February 3, 2015, for $31.1 million. Marin's, headquartered in Paris, France, is a worldwide leader in the point-of-sale display industry and specializes in the research and design of display solutions. Marin's products are produced by a global network of licensees, including Quad/Graphics, as well as one wide-format digital print, kitting and fulfillment facility in Paris. Marin's uses its own European–based sales force and the global licensees to sell its patented product portfolio. The purchase price of $31.1 million included $10.1 million of acquired cash for a net purchase price of $21.0 million. Included in the purchase price allocation are $17.9 million of identifiable intangible assets, which are amortized over their estimated useful lives ranging from three to eight years, and $6.8 million of goodwill. The final allocation of the purchase price was based on valuations performed to determine the fair value of the net assets as of the acquisition date. The net assets acquired, excluding acquired cash, were classified as Level 3 in the valuation hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs). Marin's operations are included in the International

segment.

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Note 3. Restructuring, Impairment and Transaction-Related Charges

The Company recorded restructuring, impairment and transaction-related charges for the years ended December 31, 2017, 2016 and 2015, as follows:

	2017	2016	2015
Employee termination charges	$26.9	$12.9	$42.1
Impairment charges	12.0	26.8	95.3
Transaction-related charges (income)	3.1	2.2	(6.7)
Integration costs	—	0.1	5.1
Other restructuring charges	19.2	38.6	29.1
Total	$61.2	$80.6	$164.9

The costs related to these activities have been recorded on the consolidated statements of operations as restructuring, impairment and transaction-related charges. See Note 21, "Segment Information," for restructuring, impairment and transaction-related charges by segment.

Restructuring Charges

The Company began a restructuring program in 2010 related to eliminating excess manufacturing capacity and properly aligning its cost structure. The Company has announced a total of 41 plant closures and has reduced headcount by approximately 11,800 employees since 2010.

The Company announced the closures of the Waseca, Minnesota; Columbus, Ohio; Taunton, Massachusetts; and Dallas, Texas plants during the year ended December 31, 2017. The Company recorded the following charges as a result of plant closures and other restructuring programs for the year ended December 31, 2017:

- Employee termination charges of $26.9 million were recorded by the Company as a result of workforce reductions through facility consolidations and voluntary and involuntary separation programs.

- Other restructuring charges of $19.2 million were recorded by the Company, which consisted of the following: (1) $14.2 million of vacant facility carrying costs, (2) a $6.7 million loss on the sale of a business; (3) $3.9 million of lease exit charges, including the lease termination of the Huntington Beach, California and Manassas, Virginia plants; (4) $1.9 million of equipment and infrastructure removal costs from closed plants; and (5) an $0.8 million non-cash pension settlement charge related to lump-sum pension payments during the year ended December 31, 2017, (see Note 16, "Employee Retirement Plans," for additional details). Other restructuring charges were presented net of $7.1 million in gains from the sale of the Atglen, Pennsylvania; Dickson, Tennessee; Lenexa, Kansas; East Greenville, Pennsylvania and Marengo, Iowa facilities; and a $1.2 million gain from settlements with vendors through bankruptcy proceedings for the Company's Argentina Subsidiaries.

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The Company announced the closures of the Atglen, Pennsylvania; Huntington Beach, California; Lenexa, Kansas; Manassas, Virginia; Monroe, New Jersey; and York, Pennsylvania plants during the year ended December 31, 2016. The Company recorded the following charges as a result of plant closures and other restructuring programs for the year ended December 31, 2016:

- Employee termination charges of $12.9 million were recorded by the Company as a result of workforce reductions through facility consolidations and involuntary separation programs.

- Integration costs of $0.1 million were recorded by the Company primarily related to preparing existing facilities to meet new production requirements resulting from work transferring from closed plants, as well as other costs related to the integration of acquired companies.

- Other restructuring charges of $38.6 million were recorded by the Company, which consisted of the following: (1) $13.6 million of vacant facility carrying costs; (2) an $11.2 million adjustment to its MEPPs withdrawal liability; (3) a $7.0 million non-cash pension settlement charge related to lump-sum pension payments during the year ended December 31, 2017, (see Note 16, "Employee Retirement Plans," for additional details); (4) $4.9 million of equipment and infrastructure removal costs from closed plants; and (5) $4.5 million of lease exit charges, including the lease termination of the Pittsburg, California facility. Other restructuring charges were presented net of the following: (1) a $1.3 million gain from settlements with vendors due to the Company's Argentina Subsidiaries emerging from bankruptcy during the fourth quarter of 2016 and (2) a $1.3 million gain on the sale of the Pilar, Argentina building.

The Company announced the closures of the Augusta, Georgia; East Greenville, Pennsylvania; Enfield, Connecticut; Loveland, Colorado; Pilar, Argentina; and Queretaro, Mexico plants during the year ended December 31, 2015. The Company recorded the following charges as a result of plant closures and other restructuring programs for the year ended December 31, 2015:

- Employee termination charges of $42.1 million were recorded by the Company as a result of workforce reductions through facility consolidations and involuntary separation programs.

- Integration costs of $5.1 million were recorded by the Company primarily related to preparing existing facilities to meet new production requirements resulting from work transferring from closed plants, as well as other costs related to the integration of acquired companies.

- Other restructuring charges of $29.1 million were recorded by the Company, which consisted of the following: (1) $11.7 million of vacant facility carrying costs; (2) $2.8 million of equipment and infrastructure removal costs from closed plants; and (3) $8.6 million of lease exit charges primarily related to the closure of the Atlanta, Georgia and Loveland, Colorado facilities. The Company also recorded a $6.0 million non-cash expense to recognize accumulated foreign exchange losses on the sale of the Chile equity method investment (see Note 8, "Equity Method Investments in Unconsolidated Entities," for additional details).

The restructuring charges recorded were based on plans that have been committed to by management and were, in part, based upon management's best estimates of future events. Changes to the estimates may require future restructuring charges and adjustments to the restructuring liabilities. The Company expects to incur additional

restructuring charges related to these and other initiatives.

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Impairment Charges

The Company recognized impairment charges of $12.0 million during the year ended December 31, 2017, consisting of the following: (1) $6.7 million of impairment charges primarily for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Waseca, Minnesota; Columbus, Ohio; and Taunton, Massachusetts, as well as other capacity reduction restructuring initiatives; and (2) $5.3 million of land and building impairment charges related to the Waseca, Minnesota and Taunton, Massachusetts plant closures.

The Company recognized impairment charges of $26.8 million during the year ended December 31, 2016, consisting of the following: (1) $12.1 million of land and building impairment charges related to the Atglen, Pennsylvania plant closure; and (2) $14.7 million of impairment charges primarily for machinery and equipment no longer being utilized in production as a result of facility consolidations, including Atglen, Pennsylvania; Augusta, Georgia; East Greenville, Pennsylvania; Monroe, New Jersey; Woodstock, Illinois; and Queretaro, Mexico, as well as other capacity reduction restructuring activities.

The Company recognized impairment charges of $95.3 million during the year ended December 31, 2015, consisting of the following: (1) $54.7 million of impairment charges for machinery and equipment no longer being utilized in production as a result of facility consolidations including Atlanta, Georgia; Augusta, Georgia; Dickson, Tennessee; East Greenville, Pennsylvania; Loveland, Colorado; and Queretaro, Mexico, as well as other capacity reduction restructuring initiatives; (2) $18.6 million of investment-related impairment charges, primarily related to $16.7 million of impairment charges to reduce the book value of the Company's equity method investment in Chile to fair value (see Note 8, "Equity Method Investments in Unconsolidated Entities," for additional details related to the impairment of the Company's equity method investment in Chile); (3) $12.7 million of land and building impairment charges primarily related to the Augusta, Georgia and East Greenville, Pennsylvania plant closures; (4) $7.1 million of customer relationship intangible asset impairments; and (5) $2.2 million of impairment charges primarily related to the restructuring proceedings in Argentina for the Company's Argentina Subsidiaries for land, building, machinery and equipment and other intangible assets.

The fair values of the impaired assets were determined by the Company to be Level 3 under the fair value hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs) and were estimated based on broker quotes, internal expertise related to current marketplace conditions and estimated future discounted cash flows. These assets were adjusted to their estimated fair values at the time of impairment.

The non-cash goodwill impairment charges included in the line item entitled goodwill impairment on the Company's consolidated statements of operations are discussed in Note 4, "Goodwill and Other Intangible Assets."

Transaction-Related Charges (Income)

The Company incurs transaction-related charges (income) primarily consisting of professional service fees related to business acquisition and divestiture activities. The Company recognized transaction-related charges of $3.1 million and $2.2 million during the years ended December 31, 2017 and 2016, respectively, including $1.0 million related to the sale of a business during the year ended December 31, 2017. The Company recognized transaction-related income of $6.7 million during the year ended December 31, 2015, which included a $10.0 million non-recurring gain as a

result of Courier's termination of the agreement pursuant to which Quad/Graphics was to acquire Courier, partially offset by $3.3 million of professional service fees including fees for the terminated acquisition of Courier and the acquisitions of Marin's, Copac and Specialty.

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Restructuring Reserves

Activity impacting the Company's restructuring reserves for the years ended December 31, 2017 and 2016, was as follows:

	Employee Termination Charges	Impairment Charges	Transaction-Related Charges (Income)	Integration Costs	Other Restructuring Charges	Total
Balance at January 1, 2016	$ 24.4	$ —	$ 0.1	$ 1.4	$ 13.0	$ 38.9
Expense	12.9	26.8	2.2	0.1	38.6	80.6
Cash payments	(29.5)	—	(2.2)	(0.3)	(23.6)	(55.6)
Non-cash adjustments/reclassifications	(0.2)	(26.8)	—	(0.1)	(17.6)	(44.7)
Balance at December 31, 2016	$ 7.6	$ —	$ 0.1	$ 1.1	$ 10.4	$ 19.2
Expense	26.9	12.0	3.1	—	19.2	61.2
Cash payments	(19.0)	—	(2.8)	(0.1)	(14.5)	(36.4)
Non-cash adjustments/reclassifications	2.1	(12.0)	—	(0.8)	(3.8)	(14.5)
Balance at December 31, 2017	$ 17.6	$ —	$ 0.4	$ 0.2	$ 11.3	$ 29.5

The Company's restructuring reserves at December 31, 2017, included a short-term and a long-term component. The short-term portion included $24.6 million in accrued liabilities (see Note 9, "Accrued Liabilities and Other Long-Term Liabilities") and $0.7 million in accounts payable in the consolidated balance sheets as the Company expects these reserves to be paid within the next twelve months. The long-term portion of $4.2 million was included in other long-term liabilities (see Note 9, "Accrued Liabilities and Other Long-Term Liabilities") in the consolidated balance sheets.

Note 4. Goodwill and Other Intangible Assets

Goodwill represents the excess of the purchase price over the fair value of identifiable net assets acquired in a business combination. Goodwill is assigned to specific reporting units and is tested annually for impairment as of October 31 or more frequently if events or changes in circumstances indicate that it is more likely than not that the fair value of a reporting unit is below its carrying value.

United States Print and Related Services Segment

Due to the decline in the Company's stock price in the third quarter of 2015, an interim goodwill impairment test of the three reporting units in the United States Print and Related Services segment was performed as of July 31, 2015. These reporting units include the Core Print and Related Services reporting unit, the Specialty Print and Related Services reporting unit and the Other United States Products and Services reporting unit, with goodwill of $640.8 million, $115.6 million and $18.6 million, respectively, as of July 31, 2015.

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As a result of the interim goodwill impairment assessment as well as the annual impairment test as of October 31, 2015, the Company's United States Print and Related Services segment recorded pre-tax non-cash goodwill impairment charges of $778.3 million in the year ended December 31, 2015, that included impairment charges of $640.8 million, $118.9 million and $18.6 million in the Core Print and Related Services reporting unit, the Specialty Print and Related Services reporting unit and the Other United States Products and Services reporting unit, respectively. The goodwill impairment charges resulted from a reduction in estimated fair value of each reporting unit based on lower expectations for future revenue, profitability and cash flows due to volume and pricing pressures as compared to expectations in the previous annual goodwill impairment assessment performed as of October 31, 2014.

International Segment

On March 25, 2015, due to deteriorating economic conditions, including inflation and currency devaluation, combined with uncertain political conditions, declining print volumes and labor challenges, the Company's Argentina Subsidiaries (included within the Latin America reporting unit) commenced bankruptcy restructuring proceedings with a goal of consolidating operations. As a result, the Company conducted an interim goodwill impairment assessment of the Latin America reporting unit, which included comparing the carrying amount of net assets, including goodwill, to its respective fair value as of March 31, 2015, the date of the interim assessment.

As a result of the interim goodwill impairment assessment as well as the annual impairment test as of October 31, 2015, the Company's International segment recorded non-cash nondeductible goodwill impairment charges of $30.0 million in the year ended December 31, 2015, primarily including a $23.3 million non-cash goodwill impairment charge for the Latin America reporting unit. The goodwill impairment charges resulted from a reduction in estimated fair value of the reporting unit based on lower expectations for future revenue, profitability and cash flows due to volume and pricing pressures as compared to expectations in the previous annual goodwill impairment assessment performed as of October 31, 2014.

Non-cash goodwill impairment charges of $808.3 million were recorded during the year ended December 31, 2015. No goodwill impairment charges were recorded during the years ended December 31, 2017 or 2016. The accumulated goodwill impairment losses and the carrying value of goodwill at December 31, 2017 and 2016, were as follows:

	United States Print and Related Services	International	Total
Goodwill	$ 778.3	$ 30.0	$ 808.3
Accumulated goodwill impairment loss	(778.3)	(30.0)	(808.3)
Balance at December 31, 2017 and December 31, 2016	$ —	$ —	$ —

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Activity impacting goodwill for the year ended December 31, 2015, was as follows:

	United States Print and Related Services	International	Total
Balance at January 1, 2015	$ 751.3	$ 24.2	$775.5
Marin's acquisition (see Note 2)	—	6.8	6.8
Copac acquisition (see Note 2)	23.5	—	23.5
Specialty acquisition (see Note 2)	3.5	—	3.5
Impairment	(778.3)	(30.0)	(808.3)
Translation adjustment	—	(1.0)	(1.0)
Balance at December 31, 2015	$ —	$ —	$—

The components of other intangible assets at December 31, 2017 and 2016, were as follows:

	December 31, 2017				December 31, 2016			
	Weighted Average Amortization Period (Years)	Gross Carrying Amount	Accumulated Amortization	Net Book Value	Weighted Average Amortization Period (Years)	Gross Carrying Amount	Accumulated Amortization	Net Book Value
Finite-lived intangible assets:								
Trademarks, patents, licenses and agreements	7	$ 24.0	$ (13.5)	$ 10.5	7	$ 21.7	$ (9.3)	$ 12.4
Capitalized software	5	2.8	(2.3)	0.5	5	6.4	(6.2)	0.2
Acquired technology	5	2.0	(2.0)	—	5	6.1	(6.1)	—
Customer relationships	6	460.8	(428.4)	32.4	6	459.4	(412.3)	47.1
Total finite-lived intangible assets		$ 489.6	$ (446.2)	$ 43.4		$ 493.6	$ (433.9)	$ 59.7

The gross carrying amount and accumulated amortization within other intangible assets—net in the consolidated balance sheets at December 31, 2017, and December 31, 2016, differs from the value originally recorded at acquisition due to impairment charges recorded in prior years and the effects of currency fluctuations since the purchase date.

Other intangible assets are evaluated for potential impairment whenever events or circumstances indicate that the carrying value may not be recoverable. There were no impairment charges recorded on finite-lived intangible assets for the years ended December 31, 2017 and 2016. The Company recorded finite-lived intangible asset impairment charges of $7.2 million, primarily related to customer relationships, during the year ended December 31, 2015 (see Note 3, "Restructuring, Impairment and Transaction-Related Charges" for further discussion on impairment charges).

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Amortization expense for other intangible assets was $18.3 million, $50.7 million and $79.6 million for the years ended December 31, 2017, 2016 and 2015, respectively. The following table outlines the estimated future amortization expense related to other intangible assets as of December 31, 2017:

	Amortization Expense
2018	$ 18.2
2019	13.2
2020	7.9
2021	2.9
2022	1.2
Total	$ 43.4

Note 5. Receivables

Activity impacting the allowances for doubtful accounts for the years ended December 31, 2017, 2016 and 2015, was as follows:

	2017	2016	2015
Balance at beginning of year	$53.5	$50.1	$57.8
Provisions	2.6	8.0	4.2
Write-offs[1]	(26.3)	(4.0)	(12.0)
Translation and other	(0.9)	(0.6)	0.1
Balance at end of year	$28.9	$53.5	$50.1

[1] Write-offs for the year ended December 31, 2017, primarily consisted of fully reserved receivables.

Note 6. Inventories

The components of inventories at December 31, 2017 and 2016, were as follows:

	2017	2016
Raw materials and manufacturing supplies	$128.7	$142.4
Work in process	43.6	45.3
Finished goods	74.2	77.7
Total	$246.5	$265.4

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Note 7. Property, Plant and Equipment

The components of property, plant and equipment at December 31, 2017 and 2016, were as follows:

	2017	2016
Land	$122.5	$126.2
Buildings	924.5	935.4
Machinery and equipment	3,617.1	3,574.4
Other[1]	197.5	191.5
Construction in progress	33.0	59.5
Property, plant and equipment—gross	$4,894.6	$4,887.0
Less: accumulated depreciation	(3,517.0)	(3,367.1)
Property, plant and equipment—net	$1,377.6	$1,519.9

(1) Other consists of computer equipment, vehicles, furniture and fixtures, leasehold improvements and communication related equipment.

The Company recorded impairment charges of $12.0 million, $26.8 million and $69.5 million during the years ended December 31, 2017, 2016 and 2015, respectively, to reduce the carrying amounts of certain property, plant and equipment no longer utilized in production to fair value (see Note 3, "Restructuring, Impairment and Transaction-Related Charges" for further discussion on impairment charges).

The Company recognized depreciation expense of $214.2 million, $226.4 million and $245.7 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Assets Held for Sale

The Company considered certain closed facilities as held for sale classification in the consolidated balance sheets. There were no assets held for sale as of December 31, 2017, and the net book value of assets held for sale was $5.2 million as of December 31, 2016. These assets were carried at the lesser of original cost or fair value, less the estimated costs to sell. The fair values were determined by the Company to be Level 3 under the fair value hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs) and were estimated based on internal discounted cash flow estimates, quoted market prices where available and independent appraisals, as appropriate. Assets held for sale were included in prepaid expenses and other current assets in the consolidated balance sheets.

Note 8. Equity Method Investments in Unconsolidated Entities

The Company has a 49% ownership interest in Plural, a commercial printer based in São Paulo, Brazil. The Company had a 50% ownership interest in Chile, a commercial printer based in Santiago, Chile, until the Company sold its ownership interest in Chile on July 31, 2015. The Company's ownership interest in Plural (and Chile, for the period of ownership) was accounted for using the equity method of accounting. The Company's equity loss of Plural's and Chile's operations was recorded in equity in loss of unconsolidated entities in the Company's consolidated statements

of operations, and was included within the International segment.

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The Company reviews its equity method investments regularly for indicators of other than temporary impairment. During the second quarter of 2015, the Company recorded a $16.7 million impairment charge to reduce the book value of the 50% ownership interest in Chile to fair value based on the intent to sell the investment. The impairment was recorded in restructuring, impairment and transaction-related charges on the consolidated statement of operations, and was included within the International segment. The fair value measurement of the investment, which was classified as Level 3 in the fair value hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 3 inputs), was determined using internal expertise of current marketplace conditions.

On July 31, 2015, the Company sold its 50% ownership interest in Chile for $10.5 million. The Company recorded a $6.0 million non-cash expense to recognize accumulated foreign exchange losses on the sale of the Chile equity method investment during the year ended December 31, 2015, which was recorded within restructuring, impairment and transaction-related charges on the consolidated statements of operations.

The condensed balance sheets for Plural at December 31, 2017 and 2016, were as follows:

	2017	2016
Current assets	$23.8	$29.1
Long-term assets	14.6	18.3
Total assets	$38.4	$47.4
Current liabilities	$17.4	$26.1
Long-term liabilities	5.2	6.3
Total liabilities	$22.6	$32.4

The condensed statements of operations for Plural for the years ended December 31, 2017 and 2016, and the combined condensed statements of operations for Plural and Chile for the year ended December 31, 2015, are presented below. Results from the Chile equity method investment are included in the following table through the July 31, 2015 sale date:

	2017	2016	2015
Net sales	$72.7	$71.3	$110.7
Operating (income) loss	(1.7)	(1.4)	10.6
Net (earnings) loss	(0.1)	2.9	12.8

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Note 9. Accrued Liabilities and Other Long-Term Liabilities

The components of accrued and other long-term liabilities at December 31, 2017 and 2016, were as follows:

	December 31, 2017			December 31, 2016		
	Accrued Liabilities	Other Long-Term Liabilities	Total	Accrued Liabilities	Other Long-Term Liabilities	Total
Employee-related liabilities[1]	$152.1	$ 67.4	$219.5	$194.3	$ 61.7	$256.0
Single employer pension plan obligations	1.7	82.4	84.1	1.8	112.4	114.2
Multiemployer pension plans – withdrawal liability	8.8	19.4	28.2	10.6	33.4	44.0
Tax-related liabilities	29.0	18.2	47.2	24.6	22.9	47.5
Restructuring liabilities	24.6	4.2	28.8	13.5	4.8	18.3
Interest and rent liabilities	6.7	1.9	8.6	7.6	3.3	10.9
Other	93.8	31.5	125.3	106.6	41.5	148.1
Total	$316.7	$ 225.0	$541.7	$359.0	$ 280.0	$639.0

(1) Employee-related liabilities consist primarily of payroll, bonus, vacation, health and workers' compensation.

Note 10. Commitments and Contingencies

Commitments

The Company had firm commitments of $22.3 million as of December 31, 2017, to purchase press and finishing equipment.

Litigation

The Company is named as a defendant in various lawsuits in which claims are asserted against the Company in the normal course of business. The liabilities, if any, which ultimately result from such lawsuits are not expected by management to have a material impact on the consolidated financial statements of the Company.

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In April 2016, the Company self-reported to the SEC and the Department of Justice ("DOJ") certain Foreign Corrupt Practices Act ("FCPA") issues, and a resulting internal investigation, related to its operations managed from Peru. These operations had approximate annual sales ranging from $95.0 million to $135.0 million from the date that the Company acquired those operations in July 2010 until the date the issues were discovered. The self-reported issues were identified by the Company's financial internal controls. The Company, under the oversight of its Audit Committee and Board of Directors, proactively initiated an investigation into this matter with the assistance of external legal counsel and external forensic accountants. Additional compliance issues arising out of the Peru subsidiary have been identified during the course of the investigation and are known to the SEC and DOJ. During the course of its internal investigation, the Company has also identified, and self-reported to the DOJ and SEC, transactions raising similar issues involving certain sales made in its Quad/Tech China operations. For the period 2011 through 2015, the approximate annual sales of these China operations ranged from $2.0 million to $3.0 million. During the course of its internal investigation, the Company has also identified and informed the Office of Foreign Assets Control ("OFAC"), the DOJ and SEC, of certain transactions involving Cuba, and continues to investigate the propriety of such transactions under United States trade sanctions. In connection with this investigation, the Company has made, and continues to evaluate, certain enhancements to its compliance program. The Company is fully cooperating with the OFAC, the SEC and the DOJ. At this time, the Company does not anticipate any material adverse effect on its business or financial condition as a result of this matter.

Environmental Reserves

The Company is subject to various laws, regulations and government policies relating to health and safety, to the generation, storage, transportation, and disposal of hazardous substances, and to environment protection in general. The Company provides for expenses associated with environmental remediation obligations when such amounts are probable and can be reasonably estimated. Such reserves are adjusted as new information develops or as circumstances change. The environmental reserves are not discounted. The Company believes it is in compliance with such laws, regulations and government policies in all material respects. Furthermore, the Company does not anticipate that maintaining compliance with such environmental statutes will have a material impact upon the Company's consolidated financial position.

Note 11. World Color Press Insolvency Proceedings

The Company has managed the bankruptcy claim resolution and settlement process for Quebecor World Inc. ("QWI") in the United States and Canada since 2010, when the Company acquired World Color Press. (QWI changed its name to World Color Press in connection with emerging from bankruptcy on July 21, 2009). In December 2017, the United States Bankruptcy Court for the Southern District of New York entered an order closing the QWI bankruptcy in the United States. In addition, in December 2017, the Quebec Superior Court, Commercial Division, for the Judicial District of Montreal (the "Canadian Court") entered a discharge order providing that upon the final distributions being completed and a final certificate being filed with the Canadian Court, the Canadian bankruptcy proceedings would be terminated. The final distributions in the QWI bankruptcy proceedings are underway as of December 31, 2017, and the distribution process will conclude in 2018. The Company had $1.2 million of total bankruptcy claims reserves as of December 31, 2017, to address future contingencies during the distribution process, which was recorded in accrued liabilities in the consolidated balance sheet. The Company has received refunds of restricted cash to offset certain bankruptcy-related payments, and as of December 31, 2017, $0.1 million of restricted cash remains to be refunded to

the Company.

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Activity impacting restricted cash for the years ended December 31, 2017 and 2016, was as follows:

	Restricted Cash
Balance at January 1, 2016	$ 13.5
Class 3 Claim payments	(0.3)
Restricted cash refunded to Quad/Graphics	(4.0)
Restricted cash for Class 4 Claim payments	1.1
Non-bankruptcy related restricted cash receipts	(0.1)
Balance at December 31, 2016	$ 10.2
Class 3 Claim payments	(4.2)
Restricted cash refunded to Quad/Graphics	(3.0)
Restricted cash for Class 4 Claim payments	(1.0)
Non-bankruptcy related restricted cash receipts	(1.9)
Balance at December 31, 2017	$ 0.1

Note 12. Debt

The components of long-term debt at December 31, 2017 and 2016, were as follows:

	Weighted Average Interest Rate	2017	2016
Master note and security agreement	7.43 %	$123.6	$152.6
Term loan A—$375.0 million due January 2021	3.01 %	281.3	376.9
Term loan B—$300.0 million due April 2021	4.39 %	279.1	290.6
Revolving credit facility—$725.0 million due January 2021	3.04 %	—	19.0
Senior unsecured notes—$300.0 million due May 2022	7.00 %	243.5	243.5
International Term Loan - $21.3 million	1.72 %	14.9	16.8
International revolving credit facility - $17.2 million	2.41 %	9.8	5.3
Equipment term loans	2.53 %	2.4	9.5
Other	17.68 %	1.2	1.6
Debt issuance costs		(10.3)	(11.3)
Total debt		$945.5	$1,104.5
Less: short-term debt and current portion of long-term debt		(42.0)	(84.7)
Long-term debt		$903.5	$1,019.8

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Description of Debt Obligations

Master Note and Security Agreement

On September 1, 1995, and as last amended on November 24, 2014, Quad/Graphics entered into its Master Note and Security Agreement. As of December 31, 2017, the borrowings outstanding under the Master Note and Security Agreement were $123.6 million. The senior notes under the Master Note and Security Agreement had a weighted average interest rate of 7.43% at December 31, 2017, which is fixed to maturity, with interest payable semiannually. Principal payments commenced September 1997 and extend through April 2031 in various tranches. The notes are collateralized by certain United States land, buildings and press and finishing equipment under the terms of the Master Note and Security Agreement.

The Company redeemed $60.1 million of its senior notes under the Master Note and Security Agreement, resulting in a net loss on debt extinguishment of $0.2 million, during the year ended December 31, 2016. All tendered senior notes under the Master Note and Security Agreement were canceled. The Company used cash flows from operating activities and borrowings under its revolving credit facility to fund the tender. The tender was primarily completed to reallocate debt to the lower interest rate revolving credit facility and thereby reduce interest expense based on current LIBOR rates.

Senior Secured Credit Facility

On April 28, 2014, and as last amended on February 10, 2017, the Company entered into its Senior Secured Credit Facility, which includes a revolving credit facility, Term Loan A and Term Loan B. The Senior Secured Credit Facility was originally entered into to extend and stagger the Company's debt maturity profile, to further diversify its capital structure and to provide more borrowing capacity to better position the Company to execute on its strategic goals. The proceeds from the Senior Secured Credit Facility were used to repay the Company's previous debt financing arrangements and to fund acquisitions, as well as other general corporate purposes.

The Senior Secured Credit Facility consists of three different loan facilities. The first facility is a revolving credit facility in the amount of $725.0 million with a term of just under four years, maturing on January 4, 2021. The second facility is a Term Loan A in the aggregate amount of $375.0 million with a term of just under four years, maturing on January 4, 2021, subject to certain required amortization. The third facility is a Term Loan B in the amount of $300.0 million with a term of seven years, maturing on April 27, 2021, subject to certain required amortization. At December 31, 2017, the Company had no outstanding borrowings on the revolving credit facility, and had $38.9 million of issued letters of credit, leaving $686.1 million available for future borrowings.

Borrowings under the revolving credit facility and Term Loan A made under the Senior Secured Credit Facility at December 31, 2017, bear interest at 1.75% in excess of reserve adjusted LIBOR, or 0.75% in excess of an alternate base rate, and borrowings under the Term Loan B at December 31, 2017, bear interest at 3.25% in excess of reserve adjusted LIBOR, with a LIBOR floor of 1.00%, or 2.25% in excess of an alternative base rate at the Company's option. The Senior Secured Credit Facility is secured by substantially all of the unencumbered assets of the Company. The Senior Secured Credit Facility also requires the Company to provide additional collateral to the lenders in certain limited circumstances.

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The Company completed the second amendment to the Company's Senior Secured Credit Facility on February 10, 2017. This second amendment was completed to reduce the size of the revolving credit facility and Term Loan A and to extend the Company's debt maturity profile while maintaining the Company's current cost of borrowing and covenant structure. The revolving credit facility was lowered to a maximum borrowing amount of $725.0 million from $850.0 million, and the Term Loan A was lowered to an aggregate amount of $375.0 million from $450.0 million. This amendment to the Senior Secured Credit Facility did not have an impact on the Company's quarterly financial covenant requirements and resulted in a loss on debt extinguishment of $2.6 million during the year ended December 31, 2017.

Senior Unsecured Notes

The Company completed the issuance of $300.0 million aggregate principal amount of its Senior Unsecured Notes due May 1, 2022, on April 28, 2014. The Senior Unsecured Notes bear interest at 7.00%, and interest is payable semi-annually. The Senior Unsecured Notes were issued to extend and stagger the Company's debt maturity profile, further diversify its capital structure and provide more borrowing capacity to better position the Company to execute on its strategic goals. The Company received $294.8 million in net proceeds from the sale of the Senior Unsecured Notes, after deducting the initial purchasers' discounts and commissions. The proceeds from the Senior Unsecured Notes were used for the same purposes detailed in the April 28, 2014 Senior Secured Credit Facility above.

The Company repurchased $56.5 million of its Senior Unsecured Notes in the open market, resulting in a net gain on debt extinguishment of $14.3 million, during the year ended December 31, 2016. All repurchased Senior Unsecured Notes were canceled. The Company used cash flows from operating activities and borrowings under its revolving credit facility to fund the repurchases. These repurchases were primarily completed to efficiently reduce debt balances and interest expense based on current LIBOR rates.

Each of the Company's existing and future domestic subsidiaries that is a borrower or guarantees indebtedness under the Company's Senior Secured Credit Facility or that guarantees certain of the Company's other indebtedness or indebtedness of the Company's restricted subsidiaries (other than intercompany indebtedness) fully and unconditionally guarantee or, in the case of future subsidiaries, will guarantee, on a joint and several basis, the Senior Unsecured Notes (the "Guarantor Subsidiaries"). All of the Guarantor Subsidiaries are 100% owned by the Company. Guarantor Subsidiaries will be automatically released from these guarantees upon the occurrence of certain events. See Note 23, "Separate Financial Information of Subsidiary Guarantors of Indebtedness," for further details on the Guarantor Subsidiaries.

International Debt Obligations

The Company entered into a fixed rate Euro denominated international term loan on December 28, 2015, for purposes of financing certain capital expenditures and general business needs. The $21.3 million term loan was fully funded during 2016 and had $14.9 million outstanding at a weighted average interest rate of 1.72% as of December 31, 2017. The term loan has a term of six years, maturing on December 28, 2021.

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The Company has two multicurrency international revolving credit facilities that are used for financing working capital and general business needs. The Company had $9.8 million of borrowings outstanding at a weighted average interest rate of 2.41% on the international revolving credit facilities as of December 31, 2017, leaving $7.4 million available for future borrowing. The terms of the international revolving credit facilities includes certain financial covenants, a guarantee of the international revolving credit facilities by the Company and a security agreement that includes collateralizing substantially all of the Quad/Graphics Europe Sp. z.o.o. assets. The first multicurrency international revolving credit facility expires on October 31, 2018, and bears interest at the aggregate of the Warsaw Interbank Offered Rate ("WIBOR") plus 0.90% for any Polish Zloty denominated borrowings or the aggregate of Euro Interbank Offered Rate ("EURIBOR") plus 0.95% for any Euro denominated borrowings. The second multicurrency international revolving credit facility expires on November 20, 2018, and bears interest at the aggregate of WIBOR plus 0.70% for any Polish Zloty denominated borrowings or the aggregate of EURIBOR plus 0.70% for any Euro denominated borrowings.

Fair Value of Debt

Based upon the interest rates available to the Company for borrowings with similar terms and maturities, the fair value of the Company's total debt was approximately $1.0 billion and $1.1 billion at December 31, 2017 and 2016, respectively. The fair value determination of the Company's total debt was categorized as Level 2 in the fair value hierarchy (see Note 15, "Financial Instruments and Fair Value Measurements," for the definition of Level 2 inputs). As of December 31, 2017, approximately $2.3 billion of the Company's assets were pledged as security under various loans and other agreements.

Debt Issuance Costs and Original Issue Discount

Activity impacting the Company's capitalized debt issuance costs for the years ended December 31, 2017 and 2016, was as follows:

	Capitalized Debt Issuance Costs
Balance at January 1, 2016	$ 16.1
Write off of debt issuance costs from Master Note and Security Agreement redemption	(0.2)
Write off of debt issuance costs from Senior Unsecured Notes repurchase	(0.8)
Amortization of debt issuance costs	(3.8)
Balance at December 31, 2016	$ 11.3
Debt issuance costs from February 10, 2017 debt financing amendment	3.2
Write off of debt issuance costs from April 28, 2014 debt financing agreement	(1.1)
Amortization of debt issuance costs	(3.1)
Balance at December 31, 2017	$ 10.3

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Activity impacting the Company's original issue discount for the years ended December 31, 2017 and 2016, was as follows:

	Original Issue Discount
Balance at January 1, 2016	$ 2.2
Amortization of original issue discount	(0.4)
Balance at December 31, 2016	$ 1.8
Amortization of original issue discount	(0.4)
Balance at December 31, 2017	$ 1.4

Amortization expense for debt issuance costs was $3.1 million, $3.8 million and $3.9 million for the years ended December 31, 2017, 2016 and 2015, respectively. Amortization expense for original issue discount was $0.4 million, $0.4 million and $0.5 million for the years ended December 31, 2017, 2016 and 2015, respectively. The debt issuance costs and original issue discount are being amortized on a straight-line basis over the four, seven and eight year lives of the related debt instruments.

Loss (Gain) on Debt Extinguishment

2017 Loss on Debt Extinguishment

The Company incurred $4.7 million in debt issuance costs in conjunction with the second amendment to the Company's Senior Secured Credit Facility. In accordance with the accounting guidance for the treatment of debt issuance costs in a debt extinguishment, of the $4.7 million in new debt issuance costs, $3.2 million is classified as a reduction of long-term debt in the consolidated balance sheets and $1.5 million was expensed and is classified as loss on debt extinguishment in the consolidated statements of operations.

The loss on debt extinguishment recorded in the consolidated statements of operations for the year ended December 31, 2017, was comprised of the following:

	Loss on Debt Extinguishment
Debt issuance costs from April 28, 2014 debt financing arrangement	$ 1.1
Debt issuance costs from February 10, 2017 debt financing arrangement	1.5
Total	$ 2.6

2016 Gain on Debt Extinguishment

The Company recorded a net gain on debt extinguishment of $14.1 million during the year ended December 31, 2016. The $14.1 million was comprised of a $14.3 million gain incurred in conjunction with the repurchase of $56.5 million of the Company's Senior Unsecured Notes, offset by a net loss on debt extinguishment of $0.2 million resulting from the redemption of $60.1 million of the Company's senior notes under the Master Note and Security Agreement.

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The gain on debt extinguishment recorded in the consolidated statements of operations for the year ended December 31, 2016, was comprised of the following:

	Master Note and Security Agreement	Senior Unsecured Notes	Total
Principal amount repurchased	$ 60.1	$ 56.5	$116.6
Repurchase price	61.2	42.5	103.7
Less: accrued interest paid	(1.2)	(1.1)	(2.3)
Net repurchase price	60.0	41.4	101.4
Debt financing fees expensed	(0.1)	—	(0.1)
Debt issuance costs expensed	(0.2)	(0.8)	(1.0)
Gain (loss) on debt extinguishment	$ (0.2)	$ 14.3	$14.1

Covenants and Compliance

The Company's various lending arrangements include certain financial covenants (all financial terms, numbers and ratios are as defined in the Company's debt agreements). Among these covenants, the Company was required to maintain the following as of December 31, 2017:

- Total Leverage Ratio. On a rolling twelve-month basis, the total leverage ratio, defined as total consolidated debt to consolidated EBITDA, shall not exceed 3.75 to 1.00 (for the twelve months ended December 31, 2017, the Company's total leverage ratio was 2.06 to 1.00).

- Senior Secured Leverage Ratio. On a rolling twelve-month basis, the senior secured leverage ratio, defined as senior secured debt to consolidated EBITDA, shall not exceed 3.50 to 1.00 (for the twelve months ended December 31, 2017, the Company's senior secured leverage ratio was 1.55 to 1.00).

- Minimum Interest Coverage Ratio. On a rolling twelve-month basis, the minimum interest coverage ratio, defined as consolidated EBITDA to consolidated cash interest expense, shall not be less than 3.50 to 1.00 (for the twelve months ended December 31, 2017, the Company's minimum interest coverage ratio was 7.03 to 1.00).

The indenture underlying the Senior Unsecured Notes contains various covenants, including, but not limited to, covenants that, subject to certain exceptions, limit the Company's and its restricted subsidiaries' ability to incur and/or guarantee additional debt; pay dividends, repurchase stock or make certain other restricted payments; enter into agreements limiting dividends and certain other restricted payments; prepay, redeem or repurchase subordinated debt; grant liens on assets; enter into sale and leaseback transactions; merge, consolidate, transfer or dispose of substantially all of the Company's consolidated assets; sell, transfer or otherwise dispose of property and assets; and engage in transactions with affiliates.

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In addition to those covenants, the Senior Secured Credit Facility also includes certain limitations on acquisitions, indebtedness, liens, dividends and repurchases of capital stock, including the following:

- If the Company's total leverage ratio is greater than 3.00 to 1.00 (as defined in the Senior Secured Credit Facility), the Company is prohibited from making greater than $120.0 million of annual dividend payments, capital stock repurchases and certain other payments. If the total leverage ratio is less than 3.00 to 1.00, there are no such restrictions.

- If the Company's senior secured leverage ratio is greater than 3.00 to 1.00 or the Company's total leverage ratio is greater than 3.50 to 1.00 (these ratios as defined in the Senior Secured Credit Facility), the Company is prohibited from voluntarily prepaying any of the Senior Unsecured Notes and from voluntarily prepaying any other unsecured or subordinated indebtedness, with certain exceptions (including any mandatory prepayments on the Senior Unsecured Notes or any other unsecured or subordinated debt). If the senior secured leverage ratio is less than 3.00 to 1.00 and the total leverage ratio is less than 3.50 to 1.00, there are no such restrictions.

Estimated Principal Payments

The approximate annual principal amounts due on long-term debt, excluding $10.3 million for future amortization of debt issuance costs and $1.4 million for future amortization of original issue discount, at December 31, 2017, were as follows:

	Principal Payments
2018	$ 42.4
2019	30.6
2020	65.8
2021	546.7
2022	249.8
2023 – 2027	17.8
2028 – 2031	4.1
Total	$ 957.2

Note 13. Lease Obligations

The Company enters into various master lease agreements for press, finishing and transportation equipment. These leases provide the Company with options to purchase the related equipment at the termination value, as defined, and at various early buyout dates during the term of the lease. These leases are accounted for as capital leases on the consolidated balance sheets.

The components of capital lease assets at December 31, 2017 and 2016, were as follows:

	2017	2016
Leased equipment—gross	$38.0	$37.6

Less: accumulated depreciation	(19.3)	(12.5)
Leased equipment—net	$18.7	$25.1

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The future maturities of capitalized leases at December 31, 2017, were as follows:

	Future Maturities of Capitalized Leases
2018	$ 6.5
2019	5.0
2020	4.1
2021	3.6
2022	1.6
2023 and thereafter	0.4
Total minimum payments	$ 21.2
Less: amounts representing interest	(1.9)
Present value of minimum payments	$ 19.3
Less: current portion	(5.6)
Long-term capital lease obligations	$ 13.7

The Company has various operating lease agreements. Future minimum rental commitments under non-cancelable leases at December 31, 2017, were as follows:

	Future Minimum Rental Commitments
2018	$ 43.1
2019	34.5
2020	26.2
2021	14.8
2022	10.4
2023 and thereafter	25.0
Total	$ 154.0

Rent expense under these operating lease agreements totaled $37.3 million, $43.7 million and $44.8 million during the years ended December 31, 2017, 2016 and 2015, respectively.

Note 14. Income Taxes

Income taxes have been based on the following components of earnings (loss) before income taxes and equity in loss of unconsolidated entities for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015

United States	$65.6	$48.4	$(855.1)
Foreign	25.6	10.9	(63.3)
Total	$91.2	$59.3	$(918.4)

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The components of income tax (benefit) expense for the years ended December 31, 2017, 2016 and 2015, were as follows:

	2017	2016	2015
Federal:			
Current	$1.4	$32.0	$5.6
Deferred	(5.5)	(20.0)	(281.4)
State:			
Current	2.7	3.9	0.5
Deferred	(0.5)	(5.3)	(13.9)
Foreign:			
Current	2.4	3.7	3.6
Deferred	(16.5)	(1.3)	2.8
Total income tax (benefit) expense	$(16.0)	$13.0	$(282.8)

The Company recorded $808.3 million of non-cash goodwill impairment charges during the year ended December 31, 2015, of which $743.0 million was nondeductible for income tax purposes. The tax benefit related to goodwill impairment charges of $265.9 million was composed of the following: (1) a $241.4 million deferred tax benefit associated with the reduction of the deferred tax liability related to the investments in United States subsidiaries due to the lower estimated fair value of the United States Print and Related Services segment; and (2) a $24.5 million tax benefit on the $65.3 million of deductible goodwill. The deferred tax liability related to the investments in United States subsidiaries was originally established when the former World Color Press entities emerged from bankruptcy in 2009.

The following table outlines the reconciliation of differences between the Federal statutory tax rate and the Company's effective tax rate for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Federal statutory rate	35.0 %	35.0 %	35.0 %
Federal rate change	(31.6)	—	—
Adjustment to valuation allowances	(22.0)	1.7	(1.0)
Foreign rate differential	(3.2)	(8.4)	0.2
Adjustment of uncertain tax positions	(2.9)	1.6	(0.1)
Adjustment of deferred tax liabilities	(1.9)	3.7	(0.1)
Domestic production activity deduction	(1.0)	(5.6)	—
Impact from foreign branches	7.8	6.1	(0.3)
State taxes, net of federal benefit	2.2	(3.5)	—
Loss on foreign investment	—	(7.9)	—
Investment in United States subsidiaries	—	—	26.3
Nondeductible goodwill impairment	—	—	(28.3)
Other	0.1	(0.8)	(0.9)
Effective income tax rate	(17.5)%	21.9 %	30.8 %

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The 22.0% adjustment to valuation allowances primarily relates to an income tax credit to be utilized by the Company's Polish subsidiaries due to sustainable profitability. The Company determined the utilization of the credit is sufficient to record a reduction in the valuation allowance in order to reflect the current net realizable value of related deferred tax assets based on estimated credit utilization through 2026, the year the credit expires.

Deferred Income Taxes

The significant deferred tax assets and liabilities as of December 31, 2017 and 2016, were as follows:

	2017	2016
Deferred tax assets:		
Net operating loss and other tax carryforwards	$129.6	$150.9
Interest limitation	43.7	84.6
Pension and workers compensation benefits	42.7	82.9
Accrued compensation	20.2	39.0
Accrued liabilities	19.3	21.4
Goodwill and intangible assets	7.5	11.6
Allowance for doubtful accounts	7.3	18.0
Other	9.4	17.9
Total deferred tax assets	279.7	426.3
Valuation allowance	(126.9)	(155.9)
Net deferred tax assets	$152.8	$270.4
Deferred tax liabilities:		
Property, plant and equipment	$(165.0)	$(293.0)
Other	(8.5)	(12.7)
Total deferred tax liabilities	(173.5)	(305.7)
Net deferred tax liabilities	$(20.7)	$(35.3)

The Company has recorded deferred income tax liabilities of $41.9 million and $35.3 million as of December 31, 2017 and 2016, respectively, which were included in deferred income taxes in the consolidated balance sheets. As of December 31, 2017, the Company has also recorded deferred income tax assets of $21.2 million, which were included in other long-term assets in the consolidated balance sheets.

At December 31, 2017, the Company had the following gross amounts of tax-related carryforwards:

- Net operating loss carryforwards of $108.8 million and $481.6 million for foreign and state, respectively. Of the foreign net operating loss carryforwards, $38.4 million are available without expiration, while the remainder expire through 2037. The state net operating loss carryforwards expire in varying amounts through 2037.

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- Capital loss carryforwards of $20.8 million and $10.7 million for federal and state, respectively. Of the federal capital loss carryforwards, $6.2 million expires in 2019, $1.1 million expires in 2021 and $13.5 million expires in 2022; and of the state capital loss carryforwards, $3.9 million expires in 2019, $0.5 million expires in 2021 and $6.3 million expires in 2022.

- Various credit carryforwards of $32.3 million and $47.0 million for foreign and state, respectively. The foreign credit carryforward expires in 2026. The state credit carryforwards include $31.9 million that are available without expiration, while the remainder expire through 2032

As of December 31, 2017, the Company has recorded a valuation allowance of $126.9 million on its consolidated balance sheet primarily related to the tax-affected amounts of the above carryforwards. The valuation allowance includes $4.4 million, $64.5 million and $58.0 million of federal, foreign and state deferred tax assets, respectively, that are not expected to be realized.

Uncertain Tax Positions

The following table summarizes the activity of the Company's liability for unrecognized tax benefits at December 31, 2017, 2016 and 2015:

	2017	2016	2015
Balance at beginning of period	$29.6	$29.8	$31.1
Additions for tax positions of the current year	2.3	0.3	0.7
Additions for tax positions of prior years	1.3	1.0	1.4
Reductions for tax positions of prior years	(11.3)	(0.7)	(0.9)
Lapses of applicable statutes of limitations	(0.3)	(0.8)	(1.6)
Settlements during the period	—	—	(0.8)
Foreign exchange and other	—	—	(0.1)
Balance at end of period	$21.6	$29.6	$29.8

As of December 31, 2017, $21.6 million of unrecognized tax benefits would impact the Company's effective tax rate, if recognized. Of that amount, it is reasonably possible that $7.5 million of the total amount of unrecognized tax benefits will decrease within the next twelve months due to resolution of income tax audits or statute expirations.

The Company classified interest (income) expense and any related penalties related to income tax uncertainties as a component of income tax (benefit) expense. The following table summarizes the Company's interest (income) expense related to tax uncertainties and penalties recognized during the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Interest (income) expense	$(2.5)	$1.0	$ —
Penalties recognized	0.1	—	(0.1)

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Accrued interest and penalties related to income tax uncertainties are reported as components of other current liabilities and other long-term liabilities in the consolidated balance sheets. The following table summarizes the Company's liabilities for accrued interest and penalties related to income tax uncertainties at December 31, 2017 and 2016:

	December 31, 2017		December 31, 2016	
	Accrued interest	Accrued penalties	Accrued interest	Accrued penalties
Other current liabilities	$ 0.1	$ 0.2	$ —	$ —
Other long-term liabilities	3.2	0.3	5.9	0.4
Total liabilities	$ 3.3	$ 0.5	$ 5.9	$ 0.4

The Company has tax years from 2014 through 2017 that remain open and subject to examination by the Internal Revenue Service. Tax years from 2012 through 2017 remain open and subject to examination in the Company's various major state jurisdictions within the United States.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "Tax Act"). The Tax Act makes broad and complex changes to the U.S. tax code, including, but not limited to, the following: (1) reducing the U.S. federal corporate tax rate from 35 percent to 21 percent; (2) requiring companies to pay a one-time transition tax on certain unrepatriated earnings of foreign subsidiaries; (3) generally eliminating U.S. federal income taxes on dividends from foreign subsidiaries; (4) requiring a current inclusion in U.S. federal taxable income of certain earnings of controlled foreign corporations, or also referred to as global intangible low taxed income ("GILTI"); (5) creating a new limitation on deductible interest expense; (6) creating the base erosion anti-abuse tax ("BEAT"), a new minimum tax; (7) repealing the domestic production activity deduction; and (8) establishing bonus depreciation that will allow for full expensing of qualified property.

The SEC staff issued Staff Accounting Bulletin No. 118 ("SAB 118"), which provides guidance on accounting for the tax effects of the Tax Act. SAB 118 provides a measurement period that should not extend beyond one year from the Tax Act enactment date for companies to complete the accounting under Accounting Standards Codification 740 ("ASC 740"). In accordance with SAB 118, in the period the Tax Act is enacted, a company must reflect the income tax effects of those aspects of the Tax Act for which the accounting under ASC 740 is complete. To the extent that a company's accounting for certain income tax effects of the Tax Act is incomplete, but it is able to determine a reasonable estimate, it must record a provisional estimate in the financial statements. If a company cannot determine a provisional estimate to be included in the financial statements, it should continue to apply ASC 740 on the basis of the provisions of the tax laws that were in effect immediately before the enactment of the Tax Act.

In connection with the initial analysis of the impact of the Tax Act, the Company has recorded a discrete net tax benefit of $28.8 million for the corporate rate reduction as of December 31, 2017. While the assessment for the income tax effects of the Tax Act is ongoing, the Company has recorded a provisional adjustment for certain elements of the Tax Act where reasonable estimates of the tax effects were determinable. Adjustments were not recorded for those elements where the Company was unable to reasonably estimate the impact, and the Company has continued accounting for those items in accordance with ASC 740 on the basis of the tax laws in effect before the Tax Act.

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The Company was able to reasonably estimate certain effects of the Tax Act and has recorded provisional adjustments as follows:

- Reduction of US federal corporate rate: The Tax Act reduces the corporate tax rate to 21 percent, effective January 1, 2018. The Company has recorded a provisional decrease of $23.7 million to its deferred income taxes, with a corresponding net adjustment to deferred income tax expense and a $5.1 million decrease to uncertain tax positions with a corresponding net adjustment to current income tax expense for the year ended December 31, 2017. While the Company was able to make a reasonable estimate of the impact of the reduction in corporate rate, it may be affected by other analyses related to the Tax Act which are not yet able to be completed, as indicated below.

- Deemed Repatriation Transition Tax: The Deemed Repatriation Transition Tax ("Transition Tax") is a tax on previously untaxed accumulated and current earnings and profits ("E&P") of certain foreign subsidiaries. To determine the amount of the Transition Tax, the Company must determine, in addition to other factors, the amount of post-1986 E&P of the relevant subsidiaries, as well as the amount of non-U.S. income taxes paid on such earnings. The Company is able to make a reasonable estimate that the Transition Tax will be zero based on an estimated aggregate post-1986 foreign earnings and profits deficit of the relevant subsidiaries. While the Company was able to make a reasonable estimate of the Transition Tax, the Company is continuing to gather additional information to more precisely compute the amount of aggregate foreign earnings and profits and related amount of Transition Tax, if any.

- Cost recovery: While the Company has not yet completed all of the computations necessary or completed an inventory of 2017 expenditures that qualify for immediate expensing, the Company has recorded a provisional benefit for this temporary difference based on the current intent to fully expense all qualifying expenditures.

The Company was unable to reasonably estimate certain effects of the Tax Act and has not recorded provisional adjustments for the following elements of the Tax Act:

- Global intangible low taxed income: The Tax Act creates a new requirement that certain income (i.e. GILTI) earned by controlled foreign corporations ("CFCs") must be included currently in the gross income of the CFCs' U.S. shareholder. GILTI is the excess of the Shareholder's "net CFC tested income" over the net deemed tangible income return.

Because of the complexity of the new GILTI tax rules, the Company is continuing to evaluate this provision of the Tax Act and the application of ASC 740. Under GAAP, the Company is allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions beginning January 1, 2018 in taxable income related to GILTI as current-period expense when incurred (the "period cost method") or (2) factoring such amounts into a company's measurement of its deferred taxes ("deferred method") as of December 31, 2017. The Company's election of an accounting policy with respect to the new GILTI tax rules will depend, in part, on analyzing global income to determine whether future U.S. inclusions in taxable income related to GILTI are expected and, if so, what the impact is expected to be. Because whether the Company expects to have future U.S. inclusions in taxable income related to GILTI depends not only on the Company's current structure and estimated future results of global operations, but also the intent and ability to modify the structure and/or the business, the Company is not yet able to reasonably estimate the effect of this provision of the Tax Act. Therefore, the Company has not made any adjustments related to potential GILTI tax in the financial statements and has not made a policy decision regarding whether to record deferred taxes

on GILTI.

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- Valuation allowances: The Company must assess whether valuation allowances assessments are affected by various aspects of the Tax Act (e.g. GILTI inclusions). Since, as discussed herein, the Company has recorded no amounts related to certain portions of the Tax Act, any corresponding determination of the need for or change in valuation allowance has not been completed, and no changes to valuation allowances as a result of the Tax Act have been recorded.

As a result of the Tax Act, historical earnings in certain foreign subsidiaries became subject to the U.S. Transition Tax, as described above. However, an actual repatriation from these subsidiaries could be subject to additional foreign and U.S. state income taxes. The Company considers its foreign earnings to be indefinitely invested. Accordingly, the Company does not provide for, nor expect to incur, any significant, additional taxes which could become payable upon repatriation of such amounts.

Note 15. Financial Instruments and Fair Value Measurements

Certain assets and liabilities are required to be recorded at fair value on a recurring basis, while other assets and liabilities are recorded at fair value on a nonrecurring basis, generally as a result of acquisitions or impairment charges. Fair value is determined based on the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants. GAAP also classifies the inputs used to measure fair value into the following hierarchy:

Level 1: Quoted prices in active markets for identical assets or liabilities.

Level 2: Quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets or liabilities in markets that are not active, or inputs other than quoted prices that are observable for the asset or liability.

Level 3: Unobservable inputs for the asset or liability. There were no Level 3 recurring measurements of assets or liabilities as of December 31, 2017.

Interest Rate Swap

The Company entered into a $250.0 million interest rate swap on February 7, 2017. The swap was designated as a cash flow hedge as its purpose is to reduce the variability of cash flows from interest payments related to a portion of Quad/Graphics' variable-rate debt. The swap effectively converts $250.0 million of the Company's variable-rate debt based on one-month LIBOR to a fixed rate of 3.64% (including a 1.75% spread on underlying debt at December 31, 2017). The variable interest rate resets monthly and the swap is a five year arrangement, maturing on February 28, 2022.

The Company classifies the interest rate swap as Level 2 because the inputs into the valuation model are observable or can be derived or corroborated utilizing observable market data at commonly quoted intervals. The interest rate swap was highly effective as of December 31, 2017; therefore, the increase in fair value of $2.1 million during 2017 is included in accumulated other comprehensive loss in the consolidated balance sheets and is shown as a change in other comprehensive income in the consolidated statements of comprehensive income (loss). No amount of

ineffectiveness has been recorded into earnings related to this cash flow hedge. The fair value of the interest rate swap as of December 31, 2017, was an asset of $2.1 million and was recorded in prepaid expenses and other current assets in the consolidated balance sheets.

The net payment of interest under the terms of the interest rate swap totaled an expense of $1.6 million during 2017 and has been recognized as an adjustment to interest expense in the consolidated statements of operations.

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Foreign Exchange Contracts

The Company has operations in countries that have transactions outside their functional currencies and periodically enters into foreign exchange contracts. These contracts are used to hedge the net exposures of changes in foreign currency exchange rates and are designated as either cash flow hedges or fair value hedges. Gains or losses on net foreign currency hedges are intended to offset losses or gains on the underlying net exposures in an effort to reduce the earnings volatility resulting from fluctuating foreign currency exchange rates. There were no open foreign currency exchange contracts as of December 31, 2017.

Natural Gas Forward Contracts

The Company periodically enters into natural gas forward purchase contracts to hedge against increases in commodity costs. The Company's commodity contracts qualified for the exception related to normal purchases and sales during the years ended December 31, 2017 and 2016, as the Company takes delivery in the normal course of business.

Debt

The Company measures fair value on its debt instruments using interest rates available to the Company for borrowings with similar terms and maturities and is categorized as Level 2. See Note 12, "Debt," for the fair value of the Company's debt as of December 31, 2017.

Nonrecurring Fair Value Measurements

In addition to assets and liabilities that are recorded at fair value on a recurring basis, the Company is required to record certain assets and liabilities at fair value on a nonrecurring basis, generally as a result of acquisitions or the remeasurement of assets resulting in impairment charges. See Note 2, "Acquisitions and Strategic Investments," for further discussion on acquisitions. See Note 3, "Restructuring, Impairment and Transaction-Related Charges," Note 4, "Goodwill and Other Intangible Assets," Note 7, "Property, Plant and Equipment," and Note 8, "Equity Method Investments in Unconsolidated Entities," for further discussion on impairment charges recorded as a result of the remeasurement of certain long-lived assets.

Other Estimated Fair Value Measurements

The Company records the fair value of its forward contracts and pension plan assets on a recurring basis. The fair value of cash and cash equivalents, receivables, inventories, restricted cash, accounts payable and accrued liabilities approximate their carrying values as of December 31, 2017 and 2016. See Note 16, "Employee Retirement Plans," for the details of Level 1 and Level 2 inputs related to employee retirement plans.

Note 16. Employee Retirement Plans

Defined Contribution Plans

The Quad/Graphics Diversified Plan is comprised of participant-directed 401(k) contributions, Company match and profit sharing contributions, with total participant assets of $2.1 billion as of December 31, 2017. Company 401(k) matching contributions were $7.2 million, $13.3 million and $16.6 million for the years ended December 31, 2017, 2016 and 2015, respectively. The Quad/Graphics Employee Stock Ownership Plan holds profit sharing contributions of Company stock, which are made at the discretion of the Company's Board of Directors. There were no profit sharing contributions for the years ended December 31, 2017, 2016 and 2015.

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Defined Benefit Plans

The Company assumed various funded and unfunded frozen pension plans for a portion of its full-time employees in the United States as part of the acquisition of World Color Press in 2010. Benefits are generally based upon years of service and compensation. These plans are funded in conformity with the applicable government regulations. The Company funds at least the minimum amount required for all qualified plans using actuarial cost methods and assumptions acceptable under government regulations.

The components of net pension income for the years ended December 31, 2017, 2016 and 2015, were as follows:

	Pension Benefits		
	2017	2016	2015
Interest cost	$(17.3)	$(18.1)	$(26.9)
Expected return on plan assets	27.7	30.2	34.9
Net periodic benefit income	10.4	12.1	8.0
Settlement charge	(0.8)	(7.0)	—
Total income	$9.6	$5.1	$8.0

The underfunded pension obligations are calculated using generally accepted actuarial methods and are measured annually as of December 31. The following table provides a reconciliation of the projected benefit obligation, fair value of plan assets and the funded status of the pension plans as of December 31, 2017 and 2016:

	Pension Benefits	
	2017	2016
Changes in benefit obligation		
Projected benefit obligation, beginning of year	$(560.6)	$(645.9)
Interest cost	(17.3)	(18.1)
Actuarial loss	(17.2)	(22.3)
Benefits paid	54.3	107.9
Liability benefit from lump-sum settlement	1.9	17.8
Projected benefit obligation, end of year	$(538.9)	$(560.6)
Changes in plan assets		
Fair value of plan assets, beginning of year	$446.4	$508.1
Actual return on plan assets	61.7	33.8
Employer contributions	1.0	12.4
Benefits paid	(54.3)	(107.9)
Fair value of plan assets, end of year	$454.8	$446.4
Funded status	$(84.1)	$(114.2)

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Amounts recognized on the consolidated balance sheets as of December 31, 2017 and 2016, were as follows:

	Pension Benefits	
	2017	2016
Current liabilities	$(1.7)	$(1.8)
Noncurrent liabilities	(82.4)	(112.4)
Total amount recognized	$(84.1)	$(114.2)

The following table provides a reconciliation of the Company's accumulated other comprehensive loss prior to any deferred tax effects at December 31, 2017 and 2016:

	Pension Benefits Actuarial Gain / (Loss), net
Balance at January 1, 2016	$ (40.9)
Amount arising during the period	(0.8)
Impact of pension plan settlement charge included in net earnings (loss)	7.0
Balance at December 31, 2016	$ (34.7)
Amount arising during the period	18.7
Impact of pension plan settlement charge included in net earnings (loss)	0.8
Balance at December 31, 2017	$ (15.2)

On July 1, 2017, the Company provided the option to receive a lump-sum pension payment to a select group of terminated vested participants. Total lump sum payments of $21.4 million were paid during 2017, of which $8.4 million was paid in October 2017 under the lump-sum program. During 2017, the Company settled $23.3 million of pension liabilities for $21.4 million of pension payments.

On April 1, 2016, the Company provided the option to receive a lump-sum pension payment to a select group of terminated vested participants. Total lump-sum payments of $74.8 million were paid during 2016, of which $56.4 million was paid in July 2016 under the lump-sum program. During 2016, the Company settled $92.6 million of pension liabilities for $74.8 million of pension payouts.

Payments to eligible participants who elected to receive a lump-sum pension payment were funded from existing pension plan assets and constituted a settlement of the Company's pension liabilities with respect to these participants. As a result of the lump-sums paid to participants, non-cash settlement charges of $0.8 million and $7.0 million were recognized during the years ended December 31, 2017 and 2016, respectively. The settlement charges were classified as restructuring, impairment and transaction-related charges in the consolidated statement of operations. These charges resulted from the recognition in earnings of a portion of the actuarial losses recorded in accumulated other comprehensive loss based on the proportion of the obligation settled.

Actuarial gains and losses in excess of 10% of the greater of the projected benefit obligation or the market-related value of plan assets are recognized as a component of net periodic benefit costs over the average remaining service period of a plan's active employees. Unrecognized prior service costs or credits are also recognized as a component of net periodic benefit cost over the average remaining service period of a plan's active employees. No amortization of amounts in accumulated other comprehensive loss is expected to be recognized as a component of net periodic pension income in 2018.

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The weighted average assumptions used to determine net periodic benefit costs for the years ended December 31, 2017, 2016 and 2015, were as follows:

	Pension Benefits		
	2017	2016	2015
Discount rate	3.91%	3.32%	3.90%
Expected long-term return on plan assets	6.50%	6.50%	6.50%

The weighted average assumptions used to determine pension benefit obligations at December 31, 2017 and 2016, were as follows:

	Pension Benefits	
	2017	2016
Discount rate (end of year rate)	3.52%	3.91%

The Company determines its assumed discount rate based on an index of high-quality corporate bond yields and matched-funding yield curve analysis as of the measurement date. For 2015, the Company measured interest costs utilizing a single weighted average discount rate derived from the yield curve used to measure the plan obligations. Beginning in 2016, the Company changed the approach used to measure interest costs for pension benefits and elected to measure interest costs by applying the specific spot rates along that yield curve to the plans' liability cash flows. The new method would also impact the calculation of service costs, but this is not applicable to the Company's pension plans due to their frozen status. The Company made this change to provide a more precise measurement of interest costs by aligning the timing of the plans' liability cash flows to the corresponding spot rates on the yield curve. This change did not affect the measurement of the plan obligations. The Company has reflected this as a change in accounting estimate, and accordingly, has accounted for it on a prospective basis.

Estimated Company Contributions and Benefit Payments

In 2018, the Company expects to make cash contributions of $6.7 million to its qualified benefit pension plans and expects to make estimated benefit payments of $1.7 million to its non-qualified defined benefit pension plans. The actual pension contributions may differ based on the funding calculations, and the Company may choose to make additional discretionary contributions. The estimated benefit payments may differ based on actual experience.

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Estimated Future Benefit Payments by the Plans to or on behalf of Plan Participants

An estimate of the Plans' future benefit payments to be made from funded qualified plans and unfunded non-qualified plans to plan participants at December 31, 2017, were as follows:

	Pension Benefits
2018	$ 41.9
2019	39.9
2020	39.1
2021	38.0
2022	37.4
2023 – 2027	169.3
Thereafter	173.3
Total	$ 538.9

Plan Assets and Investment Strategy

The Company follows a disciplined investment strategy, which provides diversification of investments by asset class, foreign currency, sector and company. The Pension Committee has an approved investment policy for the pension plan that establishes long-term asset mix targets based on several factors including the following: the funded status, historical returns achieved by worldwide investment markets, the time horizon of the pension plan's obligations, and the investment risk. An allocation range by asset class is developed whereby a mix of equity securities and debt securities are used to provide an appropriate risk-adjusted long-term return on plan assets. Third-party investment managers are employed to invest assets in both passively-indexed and actively-managed strategies and investment returns and risks are monitored on an ongoing basis. Derivatives are used at certain times to hedge foreign currency exposure. Gains or losses on the derivatives are offset by a corresponding change in the value of the hedged assets. Derivatives are strictly used for hedging purposes and not speculative purposes.

The current target allocations for plan assets on a weighted average basis are 42% equity securities and 58% debt securities, including cash and cash equivalents. The actual asset allocation as of December 31, 2017, was approximately 41% equity securities and 59% debt securities. The actual asset allocation as of December 31, 2016, was approximately 56% equity securities and 44% debt securities. Equity investments are diversified by country, issuer and industry sector. Debt securities primarily consist of government bonds and corporate bonds from diversified industries.

The expected long-term rate of return on assets assumption is selected by first identifying the expected range of long-term rates of return for each major asset class. Expected long-term rates of return are developed based on long-term historical averages, current expectations of future returns and anticipated inflation rates. The expected long-term rate of return on plan assets is then calculated by weighting each asset class.

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The fair values of the Company's pension plan assets at December 31, 2017 and 2016, by asset category were as follows:

Asset Category	December 31, 2017				December 31, 2016			
	Total	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3
Cash and cash equivalents	$2.6	$ 2.6	$—	$ —	$0.9	$0.9	$—	$ —
Debt securities	118.4	—	118.4	—	91.4	—	91.4	—
Equity securities	40.0	—	40.0	—	75.1	22.0	53.1	—
	161.0	$ 2.6	$158.4	$ —	167.4	$22.9	$144.5	$ —
Investments measured at net asset value ("NAV") (1)	293.8				279.0			
	$454.8				$446.4			

(1) These investments consist of privately placed funds that are valued based on NAV. NAV of the funds is based on the fair value of each fund's underlying investments. In accordance with ASC Subtopic 820-10, certain investments that are measured at fair value using the NAV per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy.

There are no Level 3 assets as of December 31, 2017 and 2016. See Note 15, " Financial Instruments and Fair Value Measurements," for definitions of fair value levels.

The Company segregated its plan assets by the following major categories and levels for determining their fair value as of December 31, 2017:

Cash and cash equivalents. Carrying value approximates fair value and these assets are classified as Level 1.

Debt Securities. This category consists of bonds, short-term fixed income securities and fixed income pooled funds fair valued based on a compilation of primarily observable market information or broker quotes in over-the-counter markets and are classified as Level 2.

Equity Securities. This category consists of equity pooled funds that are classified as Level 2 in the fair value hierarchy. Level 2 assets are valued using quoted prices in markets that are not active, broker dealer quotations, and other methods by which all significant input was observable at the measurement date.

The valuation methodologies described above may generate a fair value calculation that may not be indicative of net realizable value or future fair values. While the Company believes the valuation methodologies used are appropriate, the use of different methodologies or assumptions in calculating fair value could result in different amounts. The Company invests in various assets in which valuation is determined by NAV. The Company believes that NAV is representative of fair value at the reporting date, as there are no significant restrictions on redemption on these investments or other reasons to indicate that the investment would be redeemed at an amount different than NAV.

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The fair value measurements in common/collective trusts, calculated using a NAV and their redemption restrictions, for the years ended December 31, 2017 and 2016, are as follows:

	Fair Value		Redemption Frequency (If Currently Eligible)	Redemption Notice Period
	2017	2016		
JP Morgan Chase Bank Strategic Property Fund	$23.3	$26.4	Quarterly	45 days
Pyramis Long Corporate A or Better	73.9	53.2	Daily	15 days
Pyramis Long Duration	73.5	52.6	Daily	15 days
Russell 3000 Index NL	123.1	—	Daily	1 day
Russell 1000 Index NL	—	146.8	Daily	1 day
Total value of investments measured at NAV	$293.8	$279.0		

Risk Management

For all directly invested funds, the concentration risk is monitored through specific guidelines in the investment manager mandates. The investment manager mandates were developed by the Company's external investment advisor, and specify diversification standards such as the maximum exposure per issuer, and concentration limits per type of security, industry and country when applicable.

For the investments made through pooled funds, the investment mandates of the funds were again reviewed by the Company's external investment advisor, to determine that the investment objectives and guidelines were consistent with the Company's overall pension plan risk management objectives. In managing the plan assets, management reviews and manages risk associated with funded status risk, interest rate risk, market risk, counterparty risk, liquidity risk and operational risk. Liability management and asset class diversification are central to the Company's risk management approach and are integral to the overall investment strategy.

Given the process in place to ensure a proper diversification of the portfolio, management believes that the Company pension plan assets are not exposed to significant concentration risk.

Multiemployer Pension Plans

The Company has previously participated in a number of MEPPs under terms of collective bargaining agreements that cover a number of its employees. The risks of participating in these MEPPs are different from single employer plans in the following aspects:

- Assets contributed to the MEPPs by one company may be used to provide benefits to employees of other participating companies.

- If a participating company stops contributing to the plan, the unfunded obligations of the plan may be borne by the remaining participating companies.

- If the Company stops participating in some or all of its MEPPs, and continues in business, the Company would be required to pay an amount, referred to as a withdrawal liability, based on the unfunded status of the plan.

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The Company has withdrawn from all significant MEPPs and replaced these union sponsored "promise to pay in the future" defined benefit plans with a Company sponsored "pay as you go" defined contribution plan. The two MEPPs, the GCIU and GCC, are significantly underfunded, and will require the Company to pay a withdrawal liability to fund its pro rata share of the underfunding as of the plan year the full withdrawal was completed. As a result of the decision to withdraw, the Company accrued the estimated withdrawal liability based on information provided by each plan's trustee, as part of the purchase price allocation for World Color Press.

The GCIU Plan is a defined benefit plan that provides retirement benefits, total and permanent disability benefits, and pre-retirement death benefits for the participating union employees of the Company. The funded status of the GCIU Plan is classified as critical and declining based on the GCIU Plan's 2017 certification to the United States Department of Labor, as the funded percentage for the plan is less than 65%, and the plan is projected to become insolvent by 2028. As a result, the GCIU Plan implemented a rehabilitation plan to improve the plan's funded status.

The Company has received a notice of withdrawal and demand for payment letter from the GCIU, which is in excess of the reserve established by the Company for the GCIU withdrawal. The Company is currently in litigation with the GCIU trustees to determine the amount and duration of the withdrawal payments for the GCIU. Arbitration proceedings with the GCIU have been completed, both sides have appealed the arbitrator's ruling, and litigation in Federal court has commenced. During April 2017, a Federal district court overturned the arbitration decision in one of the pending disputes in this matter. The Company has appealed the district court's ruling to the Ninth Circuit.

The GCC Plan is a defined benefit plan that provides retirement benefits, disability benefits, and early retirement benefits for the participating union employees of the Company. The funded status of the GCC Plan is classified as critical and declining based on the GCC Plan's 2017 certification to the United States Department of Labor, as the funded percentage for the plan is less than 65%, and the plan is projected to become insolvent by 2023. As a result, the GCC Plan implemented a rehabilitation plan to improve the plan's funded status.

During the fourth quarter of 2016, the Company and the GCC reached a settlement agreement for all claims, with scheduled payments until February 2024.

The Company made payments totaling $24.0 million, $11.8 million and $11.4 million for the years ended December 31, 2017, 2016 and 2015, respectively. The Company has reserved $28.2 million as its estimate of the total MEPPs withdrawal liability as of December 31, 2017, of which $19.4 million was recorded in other long-term liabilities and $8.8 million was recorded in accrued liabilities in the consolidated balance sheets. The withdrawal liability reserved by the Company is within the range of the Company's estimated potential outcomes. This estimate may increase or decrease depending on the final conclusion of the litigation with the GCIU trustees.

Note 17. Earnings (Loss) Per Share

Basic earnings (loss) per share is computed as net earnings (loss), divided by the basic weighted average common shares outstanding. The calculation of diluted earnings per share includes the effect of any dilutive equity incentive instruments. The Company uses the treasury stock method to calculate the effect of outstanding dilutive equity incentive instruments, which requires the Company to compute total proceeds as the sum of the amount the employee must pay upon exercise of the award and the amount of unearned stock-based compensation costs attributed to future

services.

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Equity incentive instruments for which the total employee proceeds from exercise exceed the average fair value of the same equity incentive instrument over the period have an anti-dilutive effect on earnings per share during periods with net earnings, and accordingly, the Company excludes them from the calculation. Anti-dilutive equity incentive instruments of 0.7 million and 1.9 million of class A common shares were excluded from the computations of diluted net earnings per share for the years ended December 31, 2017 and 2016, respectively. Due to the net loss incurred during the year ended December 31, 2015, the assumed exercise of all equity incentive instruments was anti-dilutive and therefore, not included in the diluted loss per share calculation for that period.

Reconciliations of the numerator and the denominator of the basic and diluted per share computations for the Company's common stock for the years ended December 31, 2017, 2016 and 2015, are summarized as follows:

	2017	2016	2015
Numerator:			
Net earnings (loss)	$107.2	$44.9	$(641.9)
Denominator:			
Basic weighted average number of common shares outstanding for all classes of common shares	49.6	47.9	47.9
Plus: effect of dilutive equity incentive instruments	2.2	1.9	—
Diluted weighted average number of common shares outstanding for all classes of common shares	51.8	49.8	47.9
Earnings (loss) per share:			
Basic	$2.16	$0.94	$(13.40)
Diluted	$2.07	$0.90	$(13.40)
Cash dividends paid per common share for all classes of common shares	$1.20	$1.20	$1.20

Note 18. Equity Incentive Programs

The shareholders of the Company approved the Omnibus Plan for two complementary purposes: (1) to attract and retain outstanding individuals to serve as directors, officers and employees; and (2) to increase shareholder value. In May 2016, an additional 3,000,000 shares were approved for issuance, providing for an aggregate 10,871,652 shares of class A common stock reserved for issuance under the Omnibus Plan. Awards under the Omnibus Plan may consist of incentive awards, stock options, stock appreciation rights, performance shares ("PS"), performance share units ("PSU"), shares of class A stock, restricted stock ("RS"), restricted stock units ("RSU"), deferred stock units ("DSU") or other stock-based awards as determined by the Company's Board of Directors. Each stock option granted has an exercise price of no less than 100% of the fair market value of the class A common stock on the date of grant. As of December 31, 2017, there were 2,139,257 shares available for issuance under the Omnibus Plan. Authorized unissued shares or treasury shares may be used for issuance under the Company's equity incentive programs. The Company intends to use treasury shares of its class A common stock to meet the stock requirements of its awards in the future.

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The Company recognizes compensation expense based on estimated grant date fair values for all share-based awards issued to employees and non-employee directors, including stock options, performance shares, performance share units, restricted stock, restricted stock units and deferred stock units. The Company recognizes these compensation costs for only those awards expected to vest, on a straight-line basis over the requisite three to four year service period of the awards, except DSU awards, which are fully vested and expensed on the grant date. The Company estimated the number of awards expected to vest based, in part, on historical forfeiture rates and also based on management's expectations of employee turnover within the specific employee groups receiving each type of award. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods, if actual forfeitures differ from those estimates.

Equity Incentive Compensation Expense

The total compensation expense recognized related to all equity incentive programs was $16.4 million, $15.2 million and $7.2 million for the years ended December 31, 2017, 2016 and 2015, respectively, and was recorded in selling, general and administrative expenses in the consolidated statements of operations. Total future compensation expense related to all equity incentive programs granted as of December 31, 2017, is estimated to be $17.1 million, which consists entirely of expense for RS and RSU awards. Estimated future compensation expense is $10.1 million for 2018, $6.1 million for 2019 and $0.9 million for 2020.

Stock Options

Options vest over four years, with no vesting in the first year and one-third vesting upon the second, third and fourth anniversary dates. As defined in the individual grant agreements, acceleration of vesting may occur under a change in control, death, disability or normal retirement of the grantee. Options expire no later than the tenth anniversary of the grant date, 24 months after termination for death, 36 months after termination for normal retirement or disability and 90 days after termination of employment for any other reason. Options are not credited with dividend declarations, except for the November 18, 2011 grants. Stock options are only to be granted to employees.

There were no stock options granted during the years ended December 31, 2017, 2016 and 2015. There was no compensation expense recognized related to stock options for the years ended December 31, 2017 and 2016. Compensation expense recognized related to stock options was $0.2 million for the year ended December 31, 2015. There is no future compensation expense for stock options granted as of December 31, 2017.

The following table is a summary of the stock option activity for the year ended December 31, 2017:

	Shares Under Option	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (years)	Aggregate Intrinsic Value (millions)
Outstanding and exercisable at December 31, 2016	1,702,866	$ 23.00	3.3	$ 12.3
Granted	—	—		

Exercised	(156,049)	16.11		
Canceled/forfeited/expired	(14,784)	33.22		
Outstanding and exercisable at December 31, 2017	1,532,033	$ 23.60	2.3	$ 6.8

The intrinsic value of options outstanding and exercisable as of December 31, 2017 and 2016, was based on the fair value of the stock price. All outstanding options are vested as of December 31, 2017.

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The following table is a summary of the stock option exercises and vesting activity for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Total intrinsic value of stock options exercised	$ 1.7	$ 12.4	$ 1.3
Proceeds from stock options exercised	2.6	30.3	2.2
Total grant date fair value of stock options vested	—	0.3	1.8

Performance Share and Performance Share Units

Performance share and performance share unit awards consist of shares or the rights to shares of the Company's class A common stock which are awarded to employees of the Company. There were no PS or PSU awards granted during the years ended December 31, 2017, 2016 and 2015. Shares awarded in 2013 had a performance period of three years that ended December 31, 2015. The Company did not achieve the established performance targets for the performance period ended December 31, 2015; therefore, the PS and PSU awards were canceled.

Compensation expense for awards granted was recognized based on a best estimate of the anticipated payout, net of estimated forfeitures. There was no compensation expense recognized related to PS and PSUs for the years ended December 31, 2017 and 2016. Compensation income recognized related to PS and PSUs was $4.5 million for the year ended December 31, 2015.

Restricted Stock and Restricted Stock Units

Restricted stock and restricted stock unit awards consist of shares or the rights to shares of the Company's class A common stock which are awarded to employees of the Company. The awards are restricted such that they are subject to substantial risk of forfeiture and to restrictions on their sale or other transfer by the employee. RSU awards are typically granted to eligible employees outside of the United States. As defined in the individual grant agreements, acceleration of vesting may occur under a change in control, death, disability or normal retirement of the grantee. Grantees receiving RS grants are able to exercise full voting rights and receive full credit for dividends during the vesting period. All such dividends will be paid to the RS grantee within 45 days of full vesting. Grantees receiving RSUs are not entitled to vote but do earn dividends. Upon vesting, RSUs will be settled either through cash payment equal to the fair market value of the RSUs on the vesting date or through issuance of Company class A common stock.

The following table is a summary of RS and RSU award activity for the year ended December 31, 2017:

	Restricted Stock			Restricted Stock Units		
	Shares	Weighted-Average Grant Date Fair Value Per Share	Weighted-Average Remaining Contractual Term (Years)	Units	Weighted-Average Grant Date Fair Value Per Share	Weighted-Average Remaining Contractual Term (Years)
Nonvested at December 31, 2016	2,485,389	$ 15.89	1.5	235,886	$ 11.04	1.8

Granted	665,517	26.85		71,438	26.88	
Vested	(619,646)	23.36		(192,382)	13.55	
Forfeited	(61,102)	16.57		—	—	
Nonvested at December 31, 2017	2,470,158	$ 16.95	1.2	114,942	$ 16.68	1.3

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In general, RS and RSU awards will vest on the third anniversary of the grant date, provided the holder of the share is continuously employed by the Company until the vesting date. Compensation expense recognized for RS and RSUs was $15.5 million, $14.4 million and $10.7 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Deferred Stock Units

Deferred stock units are awards of rights to shares of the Company's class A common stock and are awarded to non-employee directors of the Company. The following table is a summary of DSU award activity for the year ended December 31, 2017:

	Deferred Stock Units	
	Units	Weighted Average Grant Date Fair Value Per Share
Outstanding at December 31, 2016	249,739	$ 16.98
Granted	34,656	26.88
Dividend equivalents granted	11,412	22.36
Settled	(99,894)	18.65
Outstanding at December 31, 2017	195,913	$ 18.18

Each DSU award entitles the grantee to receive one share of class A common stock upon the earlier of the separation date of the grantee or the second anniversary of the grant date, but could be subject to acceleration for a change in control, death or disability as defined in the individual DSU grant agreement. Grantees of DSU awards may not exercise voting rights, but are credited with dividend equivalents and those dividend equivalents will be converted into additional DSU awards based on the closing price of the class A common stock. Compensation expense recognized for DSUs was $0.9 million, $0.8 million, and $0.8 million for the years ended December 31, 2017, 2016 and 2015, respectively. As DSU awards are fully vested on the grant date, all compensation expense was recognized at the date of grant.

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Note 19. Shareholders' Equity

The Company has three classes of common stock as follows (share data in millions):

	Authorized Shares	Issued Common Stock		
		Outstanding	Treasury	Total Issued Shares
Class A stock ($0.025 par value)	80.0			
December 31, 2017		38.2	1.8	40.0
December 31, 2016		37.2	2.8	40.0
December 31, 2015		35.4	4.6	40.0
Class B stock ($0.025 par value)	80.0			
December 31, 2017		13.8	—	13.8
December 31, 2016		14.2	0.8	15.0
December 31, 2015		14.2	0.8	15.0
Class C stock ($0.025 par value)	20.0			
December 31, 2017		—	0.5	0.5
December 31, 2016		—	0.5	0.5
December 31, 2015		—	0.5	0.5

In accordance with the Articles of Incorporation, each class A common share has one vote per share and each class B and class C common share has ten votes per share on all matters voted upon by the Company's shareholders. Liquidation rights are the same for all three classes of stock.

The Company also has 0.5 million shares of $0.01 par value preferred stock authorized, of which none were issued at December 31, 2017, 2016 and 2015. The Company has no present plans to issue any preferred stock.

On September 6, 2011, the Company's Board of Directors authorized a share repurchase program of up to $100.0 million of the Company's outstanding class A stock. During the year ended December 31, 2017, the Company repurchased 200,605 shares of its class A common stock at a weighted average price of $18.89 per share for a total purchase price of $3.8 million. During the year ended December 31, 2016, the Company repurchased 984,190 shares of its class A common stock at a weighted average price of $8.96 per share for a total purchase price of $8.8 million. There were no share repurchases during the year ended December 31, 2015. As of December 31, 2017, there were $79.2 million of authorized repurchases remaining under the program.

On October 13, 2017, the Company's Board of Directors authorized the cancellation of 1,027,907 shares of the Company's class B common stock held in the Company's treasury and returned the shares to the status of authorized but unissued shares. In addition, all future acquired shares of the Company's class B common stock will be immediately canceled and returned to the status of authorized but unissued shares. In November 2017, 136,654 shares of class B common stock were converted to class A common stock and the class B common shares were canceled and returned to the status of authorized but unissued shares.

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In accordance with the Articles of Incorporation, dividends are paid equally for all three classes of common shares. The following table details the dividend activity related to the then outstanding shares of common stock for the years ended December 31, 2017, 2016 and 2015:

	Declaration Date	Record Date	Payment Date	Dividend Amount per Share
2017				
Q4 Dividend	October 31, 2017	November 20, 2017	December 1, 2017	$ 0.30
Q3 Dividend	August 1, 2017	August 21, 2017	September 1, 2017	0.30
Q2 Dividend	May 1, 2017	May 22, 2017	June 2, 2017	0.30
Q1 Dividend	February 17, 2017	February 27, 2017	March 10, 2017	0.30
2016				
Q4 Dividend	October 31, 2016	November 28, 2016	December 9, 2016	$ 0.30
Q3 Dividend	August 1, 2016	August 29, 2016	September 9, 2016	0.30
Q2 Dividend	May 3, 2016	June 6, 2016	June 17, 2016	0.30
Q1 Dividend	February 19, 2016	March 7, 2016	March 18, 2016	0.30
2015				
Q4 Dividend	November 3, 2015	December 7, 2015	December 18, 2015	$ 0.30
Q3 Dividend	August 4, 2015	September 7, 2015	September 18, 2015	0.30
Q2 Dividend	May 5, 2015	June 8, 2015	June 19, 2015	0.30
Q1 Dividend	February 23, 2015	March 9, 2015	March 20, 2015	0.30

Note 20. Accumulated Other Comprehensive Loss

The changes in accumulated other comprehensive loss by component, net of tax, for the years ended December 31, 2017 and 2016, were as follows:

	Translation Adjustments	Interest Rate Swap Adjustments	Pension Benefit Plan Adjustments	Total
Balance at January 1, 2016	$ (126.9)	$ —	$ (25.6)	$(152.5)
Other comprehensive loss before reclassifications	(3.9)	—	(0.5)	(4.4)

Amounts reclassified from accumulated other comprehensive loss to net earnings (loss)	—	—	4.3	4.3
Net other comprehensive income (loss)	(3.9)	—	3.8	(0.1)
Balance at December 31, 2016	$ (130.8)	$ —	$ (21.8)	$(152.6)
Other comprehensive income before reclassifications	12.8	1.3	11.5	25.6
Amounts reclassified from accumulated other comprehensive loss to net earnings (loss)	2.1	—	0.5	2.6
Net other comprehensive income	14.9	1.3	12.0	28.2
Balance at December 31, 2017	$ (115.9)	$ 1.3	$ (9.8)	$(124.4)

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The details about the reclassifications from accumulated other comprehensive loss to net earnings (loss) for the years ended December 31, 2017, 2016 and 2015, were as follows:

Details about Accumulated Other Comprehensive Loss Components	Year Ended December 31,			Consolidated Statements of Operations Presentation
	2017	2016	2015	
Revaluation loss on the sale of a business	$2.1	$—	$—	Restructuring, impairment and transaction-related charges
Revaluation loss on the sale of an equity method investment	—	—	7.7	Restructuring, impairment and transaction-related charges
Settlement charge on pension benefit plans	0.8	7.0	—	Restructuring, impairment and transaction-related charges
Impact of income taxes	(0.3)	(2.7)	—	Income tax (benefit) expense
Settlement charge on pension benefit plans, net of tax	0.5	4.3	—	
Total reclassifications for the period	2.9	7.0	7.7	
Impact of income taxes	(0.3)	(2.7)	—	
Total reclassifications for the period, net of tax	$2.6	$4.3	$7.7	

Note 21. Segment Information

The Company is a leading marketing solutions provider. The Company leverages its strong print foundation as part of a much larger, robust integrated marketing platform that helps marketers and content creators improve the efficiency and effectiveness of their marketing spend across offline and online media channels. The Company's operating and reportable segments are aligned with how the chief operating decision maker of the Company currently manages the business. The Company's operating and reportable segments, including their product and service offerings, and a "Corporate" category are as follows:

- United States Print and Related Services
- International
- Corporate

United States Print and Related Services

The United States Print and Related Services segment is predominantly comprised of the Company's United States printing operations and is managed as one integrated platform. This includes retail inserts, publications, catalogs, special interest publications, journals, direct mail, books, directories, in-store marketing and promotion, packaging, newspapers, custom print products, other commercial and specialty printed products and global paper procurement, together with marketing and other complementary services, including consumer insights, audience targeting, personalization, media planning and placement, process optimization, campaign planning and creation, pre-media production, videography, photography, digital execution, print execution and logistics. This segment also includes the

manufacture of ink.

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International

The International segment consists of the Company's printing operations in Europe and Latin America, including operations in England, France, Germany, Poland, Argentina, Colombia, Mexico and Peru, as well as investments in printing operations in Brazil and India. This segment provides printed products and marketing and other complementary services consistent with the United States Print and Related Services segment. Unrestricted subsidiaries as defined in the Senior Unsecured Notes indenture represent less than 2.0% of total consolidated assets as of December 31, 2017, and less than 2.0% of total consolidated net sales for the year ended December 31, 2017.

Corporate

Corporate consists of unallocated general and administrative activities and associated expenses including, in part, executive, legal and finance, as well as certain expenses and income from frozen employee retirement plans, such as pension benefit plans.

The following is a summary of segment information for the years ended December 31, 2017, 2016 and 2015:

	Net Sales		Operating Income(Loss)	Depreciation and Amortization	Capital Expenditures	Restructuring, Impairment and Transaction-Related Charges	Goodwill Impairment
	Products	Services					
Year ended December 31, 2017							
United States Print and Related Services	$3,156.9	$583.2	$ 194.3	$ 210.8	$ 73.3	$ 53.6	$ —
International	372.1	19.2	19.6	21.0	12.6	3.3	—
Total operating segments	3,529.0	602.4	213.9	231.8	85.9	56.9	—
Corporate	—	—	(49.0)	0.7	—	4.3	—
Total	$3,529.0	$602.4	$ 164.9	$ 232.5	$ 85.9	$ 61.2	$ —
Year ended December 31, 2016							
United States Print and Related Services	$3,335.1	$591.9	$ 186.1	$ 252.4	$ 88.1	$ 59.3	$ —
International	382.0	20.5	13.5	24.1	18.0	(1.1)	—
Total operating segments	3,717.1	612.4	199.6	276.5	106.1	58.2	—
Corporate	—	—	(77.2)	0.6	—	22.4	—
Total	$3,717.1	$612.4	$ 122.4	$ 277.1	$ 106.1	$ 80.6	$ —
Year ended December 31, 2015							
United States Print and Related Services	$3,580.1	$628.5	$ (706.1)	$ 297.5	$ 121.5	$ 101.4	$ 778.3
International	369.6	18.9	(63.4)	26.1	11.5	38.8	30.0
Total operating segments	3,949.7	647.4	(769.5)	323.6	133.0	140.2	808.3
Corporate	—	—	(60.5)	1.7	—	24.7	—

Total	$3,949.7	$647.4	$(830.0)	$325.3	$133.0	$164.9	$808.3

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Restructuring, impairment and transaction-related charges for the years ended December 31, 2017, 2016 and 2015, are further described in Note 3, "Restructuring, Impairment and Transaction-Related Charges," and are included in the operating income (loss) results by segment above. Goodwill impairment for the year ended December 31, 2015, is further described in Note 4, "Goodwill and Other Intangible Assets," and is included in the operating income (loss) results by segment above.

A reconciliation of operating income (loss) to earnings (loss) before income taxes and equity in loss of unconsolidated entities as reported in the consolidated statements of operations for the years ended December 31, 2017, 2016 and 2015, was as follows:

	2017	2016	2015
Operating income (loss)	$164.9	$122.4	$(830.0)
Less: interest expense	71.1	77.2	88.4
Less: loss (gain) on debt extinguishment	2.6	(14.1)	—
Earnings (loss) before income taxes and equity in loss of unconsolidated entities	$91.2	$59.3	$(918.4)

Total assets by segment at December 31, 2017, 2016 and 2015, were as follows:

	2017	2016	2015
United States Print and Related Services	$2,060.9	$2,241.3	$2,498.1
International	329.5	312.7	327.2
Total operating segments	2,390.4	2,554.0	2,825.3
Corporate	62.0	16.1	22.2
Total	$2,452.4	$2,570.1	$2,847.5

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Note 22. Geographic Area and Product Information

The table below presents the Company's net sales and long-lived assets for the years ended December 31, 2017, 2016 and 2015, by geographic region. The amounts in this table differ from the segment data presented in Note 21, "Segment Information," because each operating segment includes operations in multiple geographic regions, based on the Company's management reporting structure.

	United States	Europe	Latin America	Other	Combined
2017					
Net sales					
Products	$3,121.2	$167.6	$ 209.3	$30.9	$ 3,529.0
Services	583.2	19.2	—	—	602.4
Property, plant and equipment—net	1,215.1	85.5	68.3	8.7	1,377.6
Intangible assets—net	32.3	11.1	—	—	43.4
Other long-term assets	92.0	16.2	10.7	0.4	119.3
2016					
Net sales					
Products	$3,299.1	$169.8	$ 217.4	$30.8	$ 3,717.1
Services	591.9	20.5	—	—	612.4
Property, plant and equipment—net	1,362.8	79.7	67.7	9.7	1,519.9
Intangible assets—net	47.6	12.1	—	—	59.7
Other long-term assets	71.6	0.3	12.2	0.2	84.3