

W R GRACE & CO

Form 10-K

February 23, 2017

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UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2016

or

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

For the transition period from _____ to _____

Commission file number 1-13953

W. R. GRACE & CO.

Delaware

65-0773649

(State or other jurisdiction of incorporation or organization) (I.R.S. Employer Identification No.)

7500 Grace Drive, Columbia, Maryland 21044-4098

(Address of principal executive offices) (Zip code)

(410) 531-4000

(Registrant's telephone number, including area code)

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

Title of each class	Name of each exchange on which registered
---------------------	---

Common Stock, \$.01 par value per share	New York Stock Exchange, Inc.
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Preferred Stock Purchase Rights

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 ý No o

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the

Act. Yes o No ý

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 ý No o

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ý No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulations 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. ý

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

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Large accelerated filer

Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company) Smaller reporting company

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

The aggregate market value of W. R. Grace & Co. voting and non-voting common equity held by non-affiliates as of June 30, 2016 (the last business day of the registrant's most recently completed second fiscal quarter) based on the closing sale price of \$73.21 as reported on the New York Stock Exchange was \$4,574,202,603.

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Section 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes No

At January 31, 2017, 68,280,258 shares of W. R. Grace & Co. Common Stock, \$.01 par value per share, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement to be delivered to stockholders in connection with the Annual Meeting of Stockholders to be held on May 9, 2017, are incorporated by reference into Part III.

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Grace[®], the Grace[®] logo and, except as otherwise indicated, the other trademarks, service marks or trade names used in the text of this report are trademarks, service marks or trade names of operating units of W. R. Grace & Co. or its affiliates and/or subsidiaries. RESPONSIBLE CARE[®] is a trademark, registered in the United States and/or other countries, of the American Chemistry Council. UNIPOL[®] is a trademark of The Dow Chemical Company or an affiliated company of Dow. W. R. Grace & Co.–Conn. and/or its affiliates are licensed to use the UNIPOE[®] trademark in the area of polypropylene.

Unless the context otherwise indicates, in this document the terms "Grace," "we," "us," or "our" mean W. R. Grace & Co. and/or its consolidated subsidiaries and affiliates, and the term the "Company" means W. R. Grace & Co. Unless otherwise indicated, the contents of websites mentioned in this report are not incorporated by reference or otherwise made a part of this Report. GRACE[®], the GRACE[®] logo and, except as otherwise indicated, the other trademarks, service marks or trade names used in the text of this Report are trademarks, service marks, or trade names of operating units of W. R. Grace & Co. or its affiliates and/or subsidiaries.

The Financial Accounting Standards Board is referred to in this Report as the "FASB." The FASB issues, among other things, Accounting Standards Codifications (ASCs) and Accounting Standards Updates (ASUs).

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PART I

Item 1. BUSINESS

BUSINESS OVERVIEW

W. R. Grace & Co. is engaged in the production and sale of specialty chemicals and specialty materials on a global basis through two reportable business segments: Grace Catalysts Technologies, which includes catalysts and related products and technologies used in refining, petrochemical and other chemical manufacturing applications; and Grace Materials Technologies, which includes specialty materials, including silica-based and silica-alumina-based materials, used in coatings, consumer, industrial, and pharmaceutical applications. We entered the specialty chemicals industry in 1954, the year in which we acquired the Davison Chemical Company. Grace is the successor to a company that began in 1854 and originally became a public company in 1953. W. R. Grace & Co. is a Delaware corporation. Our principal executive offices are located at 7500 Grace Drive, Columbia, Maryland 21044, telephone (410) 531-4000. As of December 31, 2016, we had approximately 3,700 global employees.

On January 27, 2016, Grace entered into a separation agreement with GCP Applied Technologies Inc., then a wholly-owned subsidiary of Grace ("GCP"), pursuant to which Grace agreed to transfer its Grace Construction Products operating segment and the packaging technologies business of its Grace Materials Technologies operating segment to GCP (the "Separation"). Grace and GCP completed the Separation on February 3, 2016 (the "Distribution Date"), by means of a pro rata distribution to the Company's stockholders of all of the outstanding shares of GCP common stock (the "Distribution"), with one share of GCP common stock distributed for each share of Company common stock held as of the close of business on January 27, 2016. As a result of the Distribution, GCP became an independent public company. GCP's historical financial results through the Distribution Date are reflected in Grace's Consolidated Financial Statements as discontinued operations.

On June 30, 2016, we completed the acquisition of the assets of the BASF Polyolefin Catalysts business (the "polyolefin catalysts acquisition"), which included technologies, patents, trademarks, and production plants in Pasadena, Texas, and Tarragona, Spain, for a purchase price of \$250.6 million. We added the following technologies to our catalysts portfolio: (1) LYNX[®] high-activity polyethylene ("PE") catalyst technologies used commercially in slurry processes for the production of high-density PE resins such as bimodal film and pipe, and (2) LYNX[®] polypropylene ("PP") catalyst technologies used commercially in all major PP process technologies including slurry, bulk loop, stirred gas, fluid gas, and stirred bulk. The acquisition also provided us with significant additional flexibility and capacity for our global polyolefin catalysts manufacturing network.

In 2016, we exited certain product lines that were previously part of our Discovery Sciences product group included in our Grace Materials Technologies operating segment, as these product lines no longer fit into our strategic growth plans. As part of the exit, we sold certain assets to unaffiliated buyers for aggregate proceeds of \$12.9 million.

In 2001, Grace and 61 of its United States subsidiaries and affiliates filed voluntary petitions for reorganization under Chapter 11 of the United States Bankruptcy Code in the United States Bankruptcy Court for the District of Delaware.

On February 3, 2014, the joint plan of reorganization (the "Joint Plan") filed by Grace and certain other parties became effective, concluding Grace's status as a debtor under Chapter 11.

Grace Catalysts Technologies produces and sells catalysts and related products and technologies used in refining, petrochemical and other chemical manufacturing applications, as follows:

Fluid catalytic cracking catalysts, also called FCC catalysts, that help to "crack" the hydrocarbon chain in distilled crude oil to produce transportation fuels, such as gasoline and diesel fuels, and other petroleum-based products; and FCC additives used to reduce sulfur in gasoline, maximize propylene production from refinery FCC units, and reduce emissions of sulfur oxides, nitrogen oxides and carbon monoxide from refinery FCC units.

Hydroprocessing catalysts (HPC), most of which are marketed through our Advanced Refining Technologies LLC, or ART, joint venture with Chevron Products Company in which we hold a 50% economic interest, that are used in process reactors to upgrade heavy oils into lighter, more useful products by removing impurities such as nitrogen, sulfur and heavy metals, allowing less expensive

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feedstocks to be used in the petroleum refining process. (ART is not consolidated in our financial statements so ART's sales are excluded from our sales.)

Polyolefin catalysts and catalyst supports, also called specialty catalysts (SC), for the production of polypropylene and polyethylene thermoplastic resins, which can be customized to enhance the performance of a wide range of industrial and consumer end-use applications including high pressure pipe, geomembranes, food packaging, automotive parts, medical devices, and textiles; chemical catalysts used in a variety of industrial, environmental and consumer applications; and gas-phase polypropylene process technology, which provides our licensees with a reliable capability to manufacture polypropylene products for a broad array of end-use applications.

Grace Materials Technologies produces and sells specialty materials, including silica-based and silica-alumina-based materials, used in coatings, consumer, industrial, and pharmaceutical applications, as follows:

Coatings and print media applications, functional additives that provide matting effects and corrosion protection for industrial and consumer coatings and media and paper products to enhance quality in ink jet coatings.

Consumer/Pharma applications, as a free-flow agent, carrier or processing aid in food and personal care products; as a toothpaste abrasive and thickener; and for the processing and stabilization of edible oils and beverages; as well as pharmaceutical, life science and related applications including silica-based separation media, excipients and pharmaceutical intermediates.

Chemical Process applications, such as tires and rubber, plastics, precision investment casting, refractory, insulating glass windows, adsorbents for use in petrochemical and natural gas processes and biofuels, various functions such as reinforcement, high temperature binding and moisture scavenging.

Global Scope

We operate our business on a global scale with approximately 72% of our 2016 sales outside the United States. We operate and/or sell to customers in over 60 countries and in 30 currencies. We manage our operating segments on a global basis, to serve global markets. Currency fluctuations affect our reported results of operations, cash flows, and financial position.

Strategy Overview

Our strategy is to increase enterprise value by profitably growing our specialty chemicals and specialty materials businesses in the global marketplace and achieving high levels of efficiency and cash flow. To meet these objectives, we plan to:

invest in research and development activities, with the goal of introducing new high-performance, technically differentiated products and services and enhancing manufacturing processes and operations;

expand sales and manufacturing into emerging regions, including China, India, other economies in Asia, Eastern Europe, the Middle East and Latin America;

pursue selected acquisitions and alliances that complement our current product offerings or provide opportunities for faster penetration of desirable market or geographic segments; and

continue our commitment to process and productivity improvements and cost-management, such as rigorous controls on working capital and capital spending, integration of functional support services worldwide, and programs for improving operations and supply chain management.

PRODUCTS AND MARKETS

Specialty Chemicals and Materials Industry Overview

Specialty chemicals and specialty materials are high value-added products used as catalysts, intermediates, components, protectants or additives in a wide variety of products and applications. They are generally produced in relatively small volumes (compared with commodity chemicals) and must satisfy well-defined performance

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requirements and specifications. Specialty chemicals and specialty materials are often critical components of end products, catalysts for the production of end products, and components used in end products. Consequently, they are tailored to meet customer needs, which generally results in a close relationship between the producer and the customer.

We focus our business on the following, which we believe are important competitive factors in the specialty chemicals and specialty materials industry:

- value-added products, technologies and services, sold at competitive prices;
- customer service, including rapid response to changing customer needs;
- technological leadership (resulting from investment in research and development and technical customer service); and
- reliability of product and supply.

We believe that our focus on these competitive factors enables us to deliver increased value to customers and competitive operating margins notwithstanding the increased customer service and research and development costs that this focus entails.

Grace Catalysts Technologies Reportable Segment

Catalysts Technologies principally applies alumina, zeolite and inorganic support technologies in the design and manufacture of products with the goal of creating significant value for our diverse customer base. Our customers include major oil refiners and plastics and chemicals manufacturers. We believe that our technological expertise provides a competitive advantage, allowing us to quickly design products that help our customers create value in their markets.

The following table sets forth Catalysts Technologies sales of similar products, technologies, and services as a percentage of Grace total revenue.

(In millions)	2016		2015		2014	
	Sales	% of Grace Revenue	Sales	% of Grace Revenue	Sales	% of Grace Revenue
Refining Catalysts	\$724.9	45.3 %	\$764.5	47.0 %	\$845.5	48.1 %
Polyolefin and Chemical Catalysts	438.8	27.5 %	397.6	24.4 %	401.3	22.8 %
Total Catalysts Technologies Revenue	\$1,163.7	72.8 %	\$1,162.1	71.4 %	\$1,246.8	70.9 %

The following table sets forth Catalysts Technologies sales by region as a percentage of Catalysts Technologies total revenue.

(In millions)	2016		2015		2014	
	Sales	% of Catalysts Technologies Revenue	Sales	% of Catalysts Technologies Revenue	Sales	% of Catalysts Technologies Revenue
North America	\$386.2	33.2 %	\$375.9	32.4 %	\$392.9	31.5 %
Europe Middle East Africa	438.8	37.7 %	402.5	34.6 %	459.1	36.8 %
Asia Pacific	261.1	22.4 %	293.0	25.2 %	291.4	23.4 %
Latin America	77.6	6.7 %	90.7	7.8 %	103.4	8.3 %
Total Catalysts Technologies Revenue	\$1,163.7	100.0 %	\$1,162.1	100.0 %	\$1,246.8	100.0 %

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Grace Catalysts Technologies—Refining Catalysts

FCC Catalysts

We are a global leader in developing and manufacturing fluid catalytic cracking, or FCC, catalysts and additives that are designed to enable petroleum refiners to increase profits by improving product yields, value and quality. Our FCC products also enable refiners to reduce emissions from their FCC units and reduce sulfur content in the transportation fuels they produce. Oil refining is a highly specialized discipline and FCC catalysts must be tailored to meet local variations in crude oil feedstocks and a refinery's product mix. We work regularly with our customers to identify the most appropriate catalyst and additive formulations for their changing needs.

Since our customers are refiners, our business is highly dependent on the economics of the petroleum refining industry. In particular, demand for our FCC products is affected by refinery throughput, the type and quality of refinery feedstocks, and the demand for transportation fuels and other refinery products, such as propylene.

In general, as a refinery utilizes more of its FCC unit capacity, it needs a greater amount of FCC catalyst. Refinery throughput, or the extent to which refiners utilize their available FCC capacity, is generally determined by demand for transportation fuels and petrochemical products and the availability of crude oil supply. In recent years, global economic growth, especially in emerging regions, has increased global demand for transportation fuels and petrochemical products. Retail gasoline and diesel fuel prices and the level of economic activity has also directly influenced transportation fuel demand. Improvements in vehicular fuel economy, as well as consumer trends and government policies that increase the use of non-petroleum-based fuels and/or decrease the use of petroleum-based fuels also will affect transportation fuel demand over time.

Refinery crude oil feedstocks vary in quality from light and sweet to heavy and sour. Light and sweet feedstocks are typically more expensive than heavy and sour feedstocks and yield a greater proportion of high-value petroleum products. They also yield a lower proportion of residual oil, or "resid," which is generally the lowest value feedstock contained in crude oil. Although heavy and sour feedstocks with high resid content are typically less expensive than higher quality feedstocks, the processing of high-resid feedstocks is more difficult because these feedstocks have more impurities and higher boiling points. Our customers generally determine the feedstocks to be used in their refineries based on relative pricing and availability of various quality feedstocks. Refinery configuration and complexity also plays a role in feedstock selection; more complex refineries tend to process a higher proportion of heavy and sour feedstocks. In general, as a refinery uses more heavy and sour feedstocks, it uses a greater amount of FCC catalyst. In addition, refiners use special high value-added formulations of FCC catalysts for efficient refining of heavy and sour feedstocks. We have designed our MIDAS® catalyst, IMPACT® catalyst, NEKTOR™ catalyst, and GENESIS® catalyst product portfolios to enable our customers to increase the efficiency and yield of high-resid feedstock refining.

Heavy and sour crude oil has a relatively high level of metals, nitrogen and sulfur contamination. Many countries and regions, including the U.S., European Union, Japan, Russia, India and China have imposed regulatory limitations on the sulfur content of gasoline and diesel fuel. We have developed a portfolio of products designed to assist refiners in meeting their gasoline sulfur-reduction targets, including our D-PRISM® and GSR® additives and our SURCA® catalyst family.

Within certain limits, refiners have the ability to adjust their relative output of transportation fuels versus petrochemicals. Global economic growth, especially in emerging regions, has increased the demand for plastics. As a result, some of our refinery customers have sought increased profits from petrochemicals by increasing the yield of propylene from their FCC units. Our ZSM-5-based technology, including our OLEFINSMAX® and OLEFINSULTRA® additive products, is designed to maximize the propylene output of FCC units.

Many U.S. petroleum refiners have entered into consent decrees with the U.S. Environmental Protection Agency (the "EPA") under which the refiners have agreed to reduce emissions of nitrogen oxides and sulfur oxides. The European Union has also imposed requirements on refineries with respect to nitrogen oxides and sulfur oxides emissions. FCC units are generally the largest emitters of these pollutants in a refinery. Our additives are designed to assist refineries in meeting their obligations to reduce these pollutants. Our Super DESOX® additive reduces sulfur oxides emissions from commercial FCC units. Our DENOX® additives are designed to achieve reductions in nitrogen oxides emissions

comparable to those obtained from capital intensive

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alternatives available to a refinery, while our non-platinum-based combustion promoters XNOX[®] and CP[®]P are designed to enable refiners to control carbon monoxide emissions without increasing nitrogen oxides.

Competition in FCC catalysts and additives is based on technology, product performance, customer service and price. Our principal global FCC catalyst competitors are Albemarle Corp., BASF, and SINOPEC. Our principal global competitors in FCC additives are BASF and Johnson Matthey. We also have multiple regional competitors for FCC catalysts and additives.

Hydroprocessing Catalysts

We market hydroprocessing catalysts primarily through ART, our joint venture with Chevron. We established ART to combine our technology with that of Chevron and to develop, market and sell hydroprocessing catalysts to customers in the petroleum refining industry worldwide.

As discussed above, our business is dependent on the economics of the petroleum industry. We are a leading supplier of hydroprocessing catalysts designed for processing high resid content feedstocks. We offer products for fixed-bed resid hydrotreating, on-stream catalyst replacement and ebullating-bed resid hydrocracking processes.

We also offer a full line of catalysts, customized for individual refiners, used in distillate hydrotreating to produce ultra-low sulfur content gasoline and diesel fuel, including our SMART CATALYST SYSTEM[®] and APART[®] catalyst systems. As discussed above, regulatory limitations on the sulfur content of gasoline and diesel fuel are becoming more common. These products are designed to help refiners to reduce the sulfur content of their products. We have rights to sell hydrocracking and lubes hydroprocessing catalysts to licensees of Chevron Lummus Global and other petroleum refiners for unit refills. These rights allow us to streamline hydroprocessing catalyst supply and improve technical service for refining customers by establishing ART as their single point of contact for all their hydroprocessing catalyst needs.

Competition in the hydroprocessing catalyst industry is based on technology, product performance, customer service and price. Criterion, Albemarle, Haldor Topsoe, UOP and Axens are our leading global competitors in hydroprocessing catalysts. We also have multiple regional competitors.

Grace Catalysts Technologies—Polyolefin Catalysts, Catalyst Supports and Polypropylene Process Technology

We are a leading provider of catalyst systems and catalyst supports to the polyolefins industry for a variety of polyethylene and polypropylene process technologies. These types of catalysts are used for the manufacture of polyethylene and polypropylene thermoplastic resins used in products such as plastic film, high-performance plastic pipe, automobile parts, household appliances and household containers. We use a combination of proprietary catalyst and support technology and technology licensed from third parties to provide unique catalyst-based solutions to our customers and to provide a broad technology portfolio for enhancing collaboration opportunities with technology leaders.

Our MAGNAPORE[®] polymerization catalyst is used to produce high performance polyethylene in the slurry loop process for pipe and film applications. We offer our LYNX[®] catalysts systems for the production of high-density polyethylene resins, such as bimodal film and pipe, as well as commercial use for the production of polypropylene in all major process technologies including slurry, bulk loop, stirred gas, fluid gas, and stirred bulk. Our CONSISTA[®] 6th generation, non-phthalate catalysts are used to produce polypropylene resins that exhibit enhanced clarity, stiffness, and impact strength. Our POLYTRAK[®] polymerization catalyst is designed to achieve improved polypropylene performance, particularly for impact resistant applications such as automobile bumpers and household appliances.

Our standard and customized DAVICAT[®] catalysts offer a wide range of chemical and physical properties based on our material science technology for supported catalysts, polystyrene, herbicide, neutraceuticals and on-purpose olefins. Our RANEY[®] nickel, cobalt and copper hydrogenation and dehydrogenation catalysts are used for the synthesis of organic compounds for the fibers, polyurethanes, engineered plastics, pharmaceuticals, sweeteners and petroleum industries.

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The polyolefin catalyst and supports industry is technology-intensive, and suppliers must provide products formulated to meet customer specifications. There are many manufacturers of polyolefin catalysts and supports including Univation, LyondellBasell, Albemarle and PQ, and most sell their products worldwide.

We are also a leading licensor of gas-phase polypropylene process technology to polypropylene manufacturers. Our UNIPOL® polypropylene technology is designed to have fewer moving parts and require less equipment than other competing technologies in order to reduce operating costs. This technology provides our licensees with a reliable capability to manufacture products for a broad array of end-use applications. The polypropylene process licensing industry is technology-intensive and licensors must adapt the technology and the related licenses to meet individual customer needs. The major competing polypropylene process licensors are LyondellBasell, INEOS Technologies and Lummus Novolen Technology.

Grace Catalysts Technologies—Manufacturing, Marketing and Raw Materials

Our Catalysts Technologies products are manufactured by a network of globally coordinated plants. Our integrated planning organization is responsible for the effective utilization of our manufacturing capabilities.

We use a global organization of technical professionals with extensive experience in refining processes, catalyst development, and catalyst applications to market our refining catalysts and additives. These professionals work to tailor our technology to the needs of each specific customer. We generally negotiate prices for our refining catalysts because our formulations are specific to the needs of each customer and each customer receives individual attention and technical service. We sell a significant portion of our hydroprocessing catalysts through multiple-year supply agreements with our geographically diverse customer base.

We use a global direct sales force for our polyolefin catalysts, supports and technologies and chemical catalysts that seeks to maintain close working relationships with our customers. These relationships enable us to cooperate with major polymer and chemical producers to develop catalyst technologies that complement their process or application developments. We have geographically distributed our sales and technical service professionals to make them responsive to the needs of our geographically diverse customers. We typically operate under long-term contracts with our customers.

Seasonality does not have a significant overall effect on our Catalysts Technologies reportable segment. However, sales of FCC catalysts tend to be lower in the first calendar quarter prior to the shift in production by refineries from home heating oil for the winter season to gasoline production for the summer season. FCC catalysts and ebullating-bed hydroprocessing catalysts are consumed at a relatively steady rate and are replaced regularly.

Fixed-bed hydroprocessing catalysts are consumed over a period of years and are replaced in bulk in an irregular pattern. Since our customers periodically shut down their refining processes to replace fixed-bed hydroprocessing catalysts in bulk, our hydroprocessing catalyst sales to any customer can vary substantially over the course of a year and between years based on that customer's catalyst replacement schedule.

The principal raw materials for Catalysts Technologies products include molybdenum oxide, zeolite, caustic soda, sodium aluminate, aluminum sulfate, alumina, sodium silicate, rare earths, aluminum metal, and tungsten salt.

Multiple suppliers are generally available for each of these materials; however, some of our raw materials may be provided by single sources of supply. We seek to mitigate the risk of using single source suppliers by identifying and qualifying alternative suppliers or, for unique materials, by using alternative formulations from other suppliers or by passing price increases on to customers. In some instances, we produce our own raw materials and intermediates.

Prices for many of our raw materials, including metals, and energy can be volatile. In response to increases in raw material and energy costs, we generally take actions to mitigate the effect of higher costs including increasing prices, developing alternative formulations for our products, increasing productivity, and hedging purchases of certain raw materials.

As in many chemical businesses, we consume significant quantities of natural gas in the production of Catalysts Technologies products. World events and other economic factors cause volatility in the price of natural gas. Increases or decreases in the cost of natural gas and raw materials can have a significant impact on our operating margins. We have implemented a risk management program under which we hedge natural gas in a way that is designed to provide protection against price volatility. See also disclosure in this Report in Item 7A (Quantitative and Qualitative

Disclosures about Market Risk).

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Grace Materials Technologies Reportable Segment

Materials Technologies principally applies specialty silica, zeolite and fine chemical technologies in the design and manufacture of products to create significant value for our diverse customer base. Our customers include coatings manufacturers, consumer product manufacturers, plastics manufacturers, petrochemical and natural gas processors, and pharmaceutical companies. We believe that our technological expertise and broad technology platform provide a competitive advantage, allowing us to tailor our products to specific customers' requirements and help them create value in their markets.

The following table sets forth Materials Technologies sales of similar products as a percentage of Grace total revenue.

(In millions)	2016			2015			2014		
	Sales	% of		Sales	% of		Sales	% of	
		Grace Revenue	Grace Revenue		Grace Revenue	Grace Revenue			
Coatings and print media	\$136.5	8.5	%	\$133.6	8.2	%	\$151.5	8.6	%
Consumer/Pharma	121.9	7.6	%	125.1	7.7	%	136.8	7.8	%
Chemical process and other	176.5	11.1	%	207.4	12.7	%	222.2	12.7	%
Total Materials Technologies Revenue(1)	\$434.9	27.2	%	\$466.1	28.6	%	\$510.5	29.1	%

(1) In 2016, we exited certain product lines that accounted for approximately \$35 million and \$38 million of Materials Technologies sales in 2015 and 2014, respectively.

The following table sets forth Materials Technologies sales by region as a percentage of Materials Technologies total revenue.

(In millions)	2016			2015			2014		
	Sales	% of		Sales	% of		Sales	% of	
		Materials Technologies Revenue	Materials Technologies Revenue		Materials Technologies Revenue	Materials Technologies Revenue			
North America	\$104.5	24.0	%	\$114.1	24.5	%	\$116.2	22.8	%
Europe Middle East Africa	209.0	48.1	%	218.7	46.9	%	247.3	48.4	%
Asia Pacific	87.8	20.2	%	97.9	21.0	%	105.8	20.7	%
Latin America	33.6	7.7	%	35.4	7.6	%	41.2	8.1	%
Total Materials Technologies Revenue	\$434.9	100.0	%	\$466.1	100.0	%	\$510.5	100.0	%

Grace Materials Technologies—Engineered Materials

We globally manufacture functional additives and process aids, such as silica gel, colloidal silica, zeolitic adsorbents, precipitated silica and silica-aluminas, for a wide variety of applications and end-use industries. We also custom manufacture fine chemical intermediates and regulatory starting materials used primarily in the pharmaceutical and nutritional supplements industries. Our product portfolio includes:

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Application	Use	Key Brands
Coatings and Print Media	Matting agents, anticorrosion pigments, TiO ₂ extenders and moisture scavengers for paints and lacquers Additives for matte, semi-glossy and glossy ink receptive coatings on high performance ink jet papers, photo paper, and commercial wide-format print media Paper retention aids, functional fillers, paper frictionizers	SYLOID [®] , SHIELDEX [®] , SYLOSIV [®] , SYLOWHITE [™] SYLOJET [®] , DURAFILL [®] , LUDOX [®]
Consumer/Pharma	Toothpaste abrasives and thickening agents Free-flow agents, anticaking agents, heating agents, tableting aids, cosmetic additives and flavor carriers Edible oil refining agents, stabilizers and clarification aids for beer, juices and other beverages Pharmaceutical excipients and drug delivery	DURAFILL [®] , LUDOX [®] SYLODENT [®] , SYLOBLANC [®] PERKASIL [®] , SYLOID [®] , SYLOSIV [®] TRISYL [®] , DARACLAR [®]
Chemical Process	Fine chemical intermediates and regulatory starting materials Chromatography purification media Reinforcing agents for rubber and tires Inorganic binders and surface smoothening aids for precision investment casting and refractory applications Static adsorbents for dual pane windows and refrigerant applications, moisture scavengers, and package desiccants Chemical metal polishing aids and formulations for chemical mechanical planarization/electronics applications Antiblocking additives for plastic films to prevent adhesion of layers in manufacturing Process adsorbents used in petrochemical and natural gas processes for such applications as ethylene-cracked-gas-drying, natural gas drying and sulfur removal	SYLOID [®] FP, SYLOID [®] XDP, SILSOL [™] SYNTHETECH [™] DAVISIL [®] , VYDAC [®] PERKASIL [®] LUDOX [®] PHONOSORB [®] , SYLOSIV [®] , CRYOSIV [®] , PROTEKSORB [®] POLIEDGE [®] SYLOBLOC [®] SYLOBEAD [®]

Our materials are integrated into our customers' manufacturing processes and when combined with our technical support, can increase the efficiency and performance of their products. By working closely with our customers, we seek to help them respond quickly to changing consumer demands. In addition, we focus on developing and manufacturing products that differentiate our customers' products and help them meet evolving regulatory and environmental requirements. For example, our coatings additives are designed to be used in more sustainable water-based and VOC-compliant coatings, our pharmaceutical excipients help improve bioavailability, extend shelf-life, and/or make drug manufacturing more efficient. Our dental silicas are engineered to provide high cleaning with gentle abrasivity. Recent innovations in our beer stabilization silicas offer greater productivity to breweries while reducing solid waste and water usage. Our custom manufacturing of intermediates supports pharmaceutical drug development processes enabling commercialization of life saving therapies. Our products are used in a wide range of industries, including paint and coatings, pharmaceutical, food and beverage, personal care, plastics and rubber, and petrochemical and biofuels. We can modify the base silica and surface chemistry for our customers in order to enhance our product performance for their unique applications.

Our global footprint allows us to partner effectively with both multi-national and regional companies requiring multiple manufacturing facilities complimented by regional technical expertise in local languages. There are many manufacturers of engineered materials that market their products on a global basis including Evonik, PQ, and UOP. Competition is generally based on product performance, technical service, quality and reliability, price, and other

differentiated product features to address the needs of customers, end-users and brand owners. Our products compete on the basis of distinct technology, product quality, and customer support. Competition for these products is highly fragmented, with a large number of companies that sell their products on a global or regional basis.

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Grace Materials Technologies—Manufacturing, Marketing and Raw Materials

Our Materials Technologies products are manufactured by a network of globally integrated plants that are positioned to service our customers regionally. Our integrated planning organization is responsible for the effective utilization of our manufacturing capabilities.

We use country-based direct sales forces that are dedicated to each product line and backed by application-specific technical customer service teams to market our Materials Technologies products. Our sales force seeks to develop long-term relationships with our customers and focuses on consultative sales, technical support and key account growth programs. To ensure full geographic coverage, our direct sales organization is further supplemented by a network of distributors and agents.

Seasonality does not have a significant overall effect on our Materials Technologies reportable segment; however, our adsorbents for dual frame windows are affected by seasonal and weather-related factors and the level of construction activity, and our edible oil refining agents, stabilizers and clarification aids for beer, juices and other beverages are affected by the level of consumption of beverages. These impacts are mitigated by the global scope of our business. The principal raw materials for Materials Technologies products include sodium silicate, soda ash, zeolite, sulfuric acid, and caustic soda. Multiple suppliers are generally available for each of these materials; however, some of our raw materials may be provided by single sources of supply. We seek to mitigate the risk of using single source suppliers by identifying and qualifying alternative suppliers or, for unique materials, by using alternative formulations from other suppliers or by passing price increases on to customers. In some instances, we produce our own raw materials and intermediates.

Prices for many of our raw materials and energy can be volatile. In response to increases in raw material and energy costs, we generally take actions intended to mitigate the effect of higher costs including increasing prices, developing alternative formulations for our products, increasing productivity, and hedging purchases of certain raw materials. As in many chemical businesses, we consume significant quantities of natural gas in the production of Materials Technologies products. World events and other economic factors can cause volatility in the price of natural gas. Increases or decreases in the cost of natural gas and raw materials can have a significant impact on our operating margins. We have implemented a risk management program under which we hedge natural gas in a way that is intended to provide protection against price volatility. See also disclosure in this Report in Item 7A (Quantitative and Qualitative Disclosures about Market Risk).

FINANCIAL INFORMATION ABOUT INDUSTRY SEGMENTS AND GEOGRAPHIC AREAS

Disclosure of financial information about industry segments and geographic areas for 2016, 2015 and 2014 is provided in this Report in Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 17 (Segment Information) to the Consolidated Financial Statements, which disclosure is incorporated herein by reference. Disclosure of risks attendant to our foreign operations is provided in this Report in Item 1A (Risk Factors).

BACKLOG OF ORDERS

While at any given time there may be some backlog of orders, this backlog is not material in respect to our total annual sales, nor are the changes, from time to time, significant.

INTELLECTUAL PROPERTY; RESEARCH ACTIVITIES

Competition in the specialty chemicals and specialty materials industry is often based on technological superiority and innovation. Our ability to maintain our margins and effectively compete with other suppliers depends on our ability to introduce new products based on innovative technology, as well as our ability to obtain patent or other intellectual property protection. Our research and development programs emphasize development of new products and processes, improvement of existing products and processes and application of existing products and processes to new industries and uses. Most research activity is conducted in North America and Europe.

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We routinely file and obtain patents in a number of countries around the world that are significant to our businesses in order to protect our investments in innovation, research, and product development. Numerous patents and patent applications protect our products, formulations, manufacturing processes, equipment, and improvements. We also benefit from the use of trade secret information, including know-how and other proprietary information relating to many of our products and processing technologies. There can be no assurance, however, that our patents, patent applications and precautions to protect trade secrets and know-how will provide sufficient protection for our intellectual property. In addition, other companies may independently develop technology that could replicate, and thus diminish the advantage provided by, our trade secrets. Other companies may also develop alternative technology or design-arounds that could circumvent our patents or may acquire patent rights applicable to our business which might interpose a limitation on expansion of our business in the future.

Research and development expenses were approximately \$49 million, \$47 million, and \$51 million in 2016, 2015, and 2014, respectively. These amounts include depreciation and amortization expenses related to research and development assets and expenses incurred in funding external research projects. The amount of research and development expenses relating to government- and customer-sponsored projects (rather than projects that we sponsor) was not material during these periods. Grace also conducts research and development activities with our ART joint venture, which are not included in the amounts above.

ENVIRONMENT, HEALTH AND SAFETY MATTERS

We are subject, along with other manufacturers of specialty chemicals, to stringent regulations under numerous regional, national, provincial, state and local environment, health and safety laws and regulations relating to the manufacture, storage, handling, disposal and stewardship of chemicals and other materials. Environmental laws require that certain responsible parties, as defined in the relevant statute, fund remediation actions regardless of legality of original disposal or ownership of a disposal site. We are involved in various response actions to address the presence of chemical substances as required by applicable laws.

We have expended substantial funds to comply with environmental laws and regulations and expect to continue to do so in the future. The following table sets forth our expenditures in the past three years, and our estimated expenditures in 2017 and 2018, for (i) the operation and maintenance of manufacturing facilities and the disposal of wastes; (ii) capital expenditures for environmental control facilities; and (iii) site remediation:

Year (In millions)	Operation of Facilities and Waste Disposal	Capital Expenditures	Site Remediation	
2014	\$ 53	\$ 22	\$ 12	
2015	47	15	12	
2016	62	10	18	
2017	53	15	23	(1)
2018	53	14	14	(1)

(1) Amounts are based on environmental response matters for which sufficient information is available to estimate costs, and reflect estimated spending following the Separation. We do not have sufficient information to estimate all of Grace's possible future environmental response costs. As we receive new information, our estimate of such costs may change materially.

Additional information about our environmental remediation activities is provided in this Report in Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 10 (Commitments and Contingent Liabilities) to the Consolidated Financial Statements.

We continuously seek to improve our environment, health and safety performance. To the extent applicable, we extend the basic elements of the American Chemistry Council's RESPONSIBLE CARE® program to all our locations

worldwide, embracing specific performance objectives in the key areas of management systems, product stewardship, employee health and safety, community awareness and emergency response, distribution, process safety and pollution prevention. We have implemented the RESPONSIBLE CARE® Security Code through a company-wide security program focused on the security of our people, processes, and systems. We have reviewed existing security (including cybersecurity) vulnerability and taken actions to enhance security systems where deemed necessary. In addition, we are complying with the Department of Homeland Security's

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Chemical Facility Anti-Terrorism Standards, including identifying facilities subject to the standards, conducting security vulnerability assessments and developing site security plans, as necessary.

EMPLOYEE RELATIONS

As of December 31, 2016, we employed approximately 3,700 persons, of whom approximately 1,900 were employed in the United States and approximately 1,000 were employed in Germany. Of our total employees, approximately 2,300 were salaried and 1,400 were hourly.

As of December 31, 2016, approximately 630 of our manufacturing employees in the United States are represented by unions. We have operated without a labor work stoppage for more than 10 years.

As of December 31, 2016, we have works councils representing the majority of our European sites serving approximately 1,100 employees.

AVAILABILITY OF REPORTS AND OTHER DOCUMENTS

We maintain an Internet website at www.grace.com. Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports, filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, are available, free of charge, on our website as soon as reasonably practicable after such reports are electronically filed with, or furnished to, the Securities and Exchange Commission, or SEC. These reports may be accessed through our website's investor information page. In addition, the charters for the Audit, Compensation, Nominating and Governance, and Corporate Responsibility Committees of our Board of Directors, our corporate governance principles and code of ethics are available, free of charge, on our website at www.grace.com/en-us/corporate-leadership/pages/governance.aspx. Printed copies of the charters, governance principles and code of ethics may be obtained free of charge by contacting Grace Shareholder Services at 410-531-4167.

The information on our website is not, and shall not be deemed to be, a part of this report or incorporated into any other filings we make with the SEC.

Our Chief Executive Officer and Chief Financial Officer have submitted certifications to the SEC pursuant to the Sarbanes Oxley Act of 2002 as exhibits to this Report.

EXECUTIVE OFFICERS

See "Executive Officers of the Registrant" following Part I, Item 4 of this Report for information about our Executive Officers.

Item 1A. RISK FACTORS

This Report, including the Financial Supplement, contains, and our other public communications may contain, forward-looking statements; that is, information related to future, not past, events. Such statements generally include the words "believes," "plans," "intends," "targets," "will," "expects," "suggests," "anticipates," "outlook," "continues" or similar expressions. Forward-looking statements include, without limitation, all statements regarding: expected financial positions; results of operations; cash flows; financing plans; business strategy; operating plans; capital and other expenditures; competitive positions; growth opportunities for existing products; benefits from new technology and cost reduction initiatives, plans and objectives; and markets for securities. For these statements, we claim the protection of the safe harbor for forward-looking statements contained in Section 27A of the Securities Act and Section 21E of the Exchange Act. We are subject to risks and uncertainties that could cause our actual results to differ materially from our projections or that could cause other forward-looking statements to prove incorrect. Factors that could cause actual events to materially differ from those contained in the forward-looking statements include those factors set forth below and elsewhere in this Annual Report on Form 10-K. Our reported results should not be considered as an indication of our future performance. Readers are cautioned not to place undue reliance on our projections and forward-looking statements, which speak only as of the date thereof. We undertake no obligation to publicly release any revisions to the projections and forward-looking statements contained in this document, or to update them to reflect events or circumstances occurring after the date of this document. In addition to general economic, business and market conditions, we are subject to other risks and uncertainties, including, without limitation, the following:

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Risks Related to the Business

The global scope of our operations subjects us to the risks of doing business in foreign countries, which could adversely affect our business, financial condition and results of operations.

We operate our business on a global scale with approximately 72% of our 2016 sales outside the United States. We operate and/or sell to customers in over 60 countries and in 30 currencies. We currently have many production facilities, research and development facilities and administrative and sales offices located outside North America, including facilities and offices located in EMEA, Asia Pacific and Latin America. We expect non-U.S. sales to continue to represent a substantial majority of our revenue. Accordingly, our business is subject to risks related to the differing legal, political, social and regulatory requirements and economic conditions of many jurisdictions. Risks inherent in non-U.S. operations include the following:

- commercial agreements may be more difficult to enforce and receivables more difficult to collect;
- intellectual property rights may be more difficult to enforce;
- increased shipping costs, disruptions in shipping or reduced availability of freight transportation;
- we may have difficulty transferring our profits or capital from foreign operations to other countries where such funds could be more profitably deployed;
- we may experience unexpected adverse changes in export duties, quotas and tariffs and difficulties in obtaining export licenses;
- some foreign countries have adopted, and others may impose, additional withholding and other taxes or adopt other restrictions on foreign trade or investment, including import, currency exchange and capital controls, charges and limitations;
- foreign governments may nationalize private enterprises;
- our business and profitability in a particular country could be affected by political or economic repercussions on a domestic, country-specific or global level from terrorist activities and the response to such activities;
- we may be affected by unexpected adverse changes in foreign laws or regulatory requirements;
- and
- we are exposed to geopolitical risk, where unexpected changes in global, regional, or local political or social conditions could adversely affect our foreign operations.

Our success as a global business will depend, in part, upon our ability to succeed in differing legal, regulatory, economic, social and political conditions by developing, implementing and maintaining policies and strategies that are effective in each location where we do business.

We are exposed to currency exchange rate changes that impact our profitability.

We are exposed to currency exchange rate risk through our U.S. and non-U.S. operations. Changes in currency exchange rates may materially affect our operating results. For example, changes in currency exchange rates may affect the relative prices at which we and our competitors sell products in the same region and the cost of materials used in our operations. A substantial portion of our net sales and assets are denominated in currencies other than the U.S. dollar, particularly the euro. When the U.S. dollar strengthens against other currencies, at a constant level of business, our reported sales, earnings, assets and liabilities are reduced because the non-U.S. currencies translate into fewer U.S. dollars.

We incur a currency transaction risk whenever one of our operating subsidiaries enters into either a purchase or a sales transaction using a currency different from the operating subsidiary's functional currency. Given the volatility of exchange rates, we may not be able to manage our currency transaction risks effectively, or volatility in currency exchange rates may expose our financial condition or results of operations to a significant additional risk.

Prices for certain raw materials and energy are volatile and can have a significant effect on our manufacturing and supply chain strategies as we seek to maximize our profitability. If we are unable to successfully adjust our strategies in response to volatile raw materials and energy prices, such volatility could have a negative effect on our earnings in future periods.

We use petroleum-based materials, metals, natural gas and other materials in the manufacture of our products. We consume substantial amounts of energy in our manufacturing processes. Prices for these materials and energy are

volatile and can have a significant effect on our pricing, sales, manufacturing and supply chain strategies as we seek to maximize our profitability. Our ability to successfully adjust strategies in response to

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volatile raw material and energy prices is a significant factor in maintaining or improving our profitability. If we are unable to successfully adjust our strategies in response to volatile prices, such volatility could have a negative effect on our sales and earnings in future periods.

A substantial portion of our raw materials are commodities whose prices fluctuate as market supply and demand fundamentals change.

We attempt to manage exposure to price volatility of major commodities through:

• long-term supply contracts;

• contracts with customers that permit adjustments for changes in prices of commodity-based materials and energy;

• forward buying programs that layer in our expected requirements systematically over time; and

• limited use of financial instruments.

Although we regularly assess our exposure to raw material price volatility, we cannot always predict the prospects of volatility and we cannot always cover the risk in a cost effective manner.

We have a policy of maintaining, when available, multiple sources of supply for raw materials. However, certain of our raw materials may be provided by single sources of supply. We may not be able to obtain sufficient raw materials due to unforeseen developments that would cause an interruption in supply. Even if we have multiple sources of supply for raw materials, these sources may not make up for the loss of a major supplier.

If we are not able to continue our technological innovation and successful introduction of new products, our customers may turn to other suppliers to meet their requirements.

The specialty chemicals industry and the end-use markets into which we sell our products experience ongoing technological change and product improvements. A key element of our business strategy is to invest in research and development activities with the goal of introducing new high-performance, technically differentiated products. We may not be successful in developing new technology and products that effectively compete with products introduced by our competitors, and our customers may not accept, or may have lower demand for, our new products. If we fail to keep pace with evolving technological innovations or fail to improve our products in response to our customers' needs, then our business, financial condition and results of operations could be adversely affected as a result of reduced sales of our products.

We spend large amounts of money for environmental compliance in connection with our current and former operations.

As a manufacturer of specialty chemicals and specialty materials, we are subject to stringent regulations under numerous U.S. federal, state, local and foreign environmental, health and safety laws and regulations relating to the generation, storage, handling, discharge, disposition and stewardship of chemicals and other materials. We have expended substantial funds to comply with such laws and regulations and have established a policy to minimize our emissions to the environment. Nevertheless, legislative, regulatory and economic uncertainties (including existing and potential laws and regulations pertaining to climate change) make it difficult for us to project future spending for these purposes and if there is an acceleration in new regulatory requirements, we may be required to expend substantial additional funds to remain in compliance.

We are subject to environmental clean-up costs, fines, penalties and damage claims that have been and continue to be costly.

In the U.S., we are subject to lawsuits and regulatory actions, in connection with current and former operations (including some divested businesses and off-site disposal facilities), that seek clean-up or other remedies. We are also subject to similar risks outside of the U.S.

We operated a vermiculite mine in Libby, Montana, until 1990. Some of the vermiculite ore that was mined at the Libby mine contained naturally occurring asbestos. We are cooperating with the U.S. Environmental Protection Agency (the "EPA") and other federal, state and local governmental agencies in a remedial investigation and feasibility study ("RI/FS") of the Libby mine and the surrounding area to determine the location, scope and extent of required remediation. The EPA is also investigating or remediating formerly owned or operated sites that processed Libby vermiculite into finished products. We are cooperating with the EPA on these

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investigation and remediation activities, and have recorded a liability to the extent that our review has indicated that a probable liability has been incurred and the cost is estimable.

We have recorded liabilities for all environmental matters for which a loss is considered to be probable and sufficient information is available to reasonably estimate the loss. These liabilities do not include the cost to remediate the Libby vermiculite mine and surrounding area or costs related to any additional EPA claims, whether resulting from the EPA's investigation of vermiculite facilities or otherwise, which may be material but are not currently estimable. Due to these vermiculite-related matters, it is probable that our ultimate liability for environmental matters will exceed our current estimates by material amounts.

Our indebtedness may materially affect our business, including our ability to fulfill our obligations, react to changes in our business and incur additional debt to fund future needs.

We have a substantial amount of debt. As of December 31, 2016, we had \$1,028.2 million of unsecured indebtedness outstanding and \$555.9 million of secured indebtedness outstanding. Our indebtedness may have material effects on our business, including to:

require us to dedicate a substantial portion of our cash flow to debt payments, thereby reducing funds available for working capital, capital expenditures, acquisitions, research and development, distributions to stockholders, stock repurchase programs and other purposes;

restrict us from making strategic acquisitions or taking advantage of favorable business opportunities;

limit our flexibility in planning for, or reacting to, changes in our business and the industries in which we operate;

increase our vulnerability to adverse economic, credit and industry conditions, including recessions;

make it more difficult for us to satisfy our debt service and other obligations;

place us at a competitive disadvantage compared to our competitors that have relatively less debt; and

limit our ability to borrow additional funds, or to dispose of assets to raise funds, if needed, for working capital, capital expenditures, acquisitions, research and development and other purposes.

If we incur additional debt, the risks related to our indebtedness may intensify.

Restrictions imposed by agreements governing our indebtedness may limit our ability to operate our business, finance our future operations or capital needs, or engage in other business activities. If we fail to comply with certain restrictions under these agreements, our debt could be accelerated and we may not have sufficient cash to pay our accelerated debt.

The agreements governing our indebtedness contain various covenants that limit, among other things, our ability, and the ability of certain of our subsidiaries, to:

incur certain liens;

enter into sale and leaseback transactions; and

consolidate, merge or sell all or substantially all of our assets or the assets of our guarantors.

As a result of these covenants, we will be limited in the manner in which we can conduct our business, and may be unable to engage in favorable business activities or finance future operations or capital needs. Accordingly, these restrictions may limit our flexibility to operate our business. A failure to comply with the restrictions contained in these agreements, including maintaining the financial ratios required by our credit facilities, could lead to an event of default which could result in an acceleration of our indebtedness. We cannot assure you that our future operating results will be sufficient to enable us to comply with the covenants contained in the agreements governing our indebtedness or to remedy any such default. In addition, in the event of an acceleration, we may not have or be able to obtain sufficient funds to make any accelerated payments.

Our indebtedness exposes us to interest expense increases if interest rates increase.

As of December 31, 2016, \$313.0 million, or approximately 20%, of our borrowings were at variable interest rates and expose us to interest rate risk. If interest rates increase, our debt service obligations on the variable rate indebtedness would increase even though the amount borrowed would remain the same, and our net income would decrease. An increase of 100 basis points in the interest rates payable on our variable rate indebtedness would increase our annual estimated debt-service requirements by \$3.1 million, assuming our consolidated variable interest rate indebtedness outstanding as of December 31, 2016, remains the same.

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We have unfunded and underfunded pension plan liabilities. We will require future operating cash flow to fund these liabilities. We have no assurance that we will generate sufficient cash to satisfy these obligations.

We maintain U.S. and non-U.S. defined benefit pension plans covering current and former employees who meet or met age and service requirements. Our net pension liability and cost is materially affected by the discount rate used to measure pension obligations, the longevity and actuarial profile of our workforce, the level of plan assets available to fund those obligations and the actual and expected long-term rate of return on plan assets. Significant changes in investment performance or a change in the portfolio mix of invested assets can result in corresponding increases and decreases in the valuation of plan assets or in a change in the expected rate of return on plan assets. Assets available to fund the pension benefit obligation of the U.S. advance-funded pension plans at December 31, 2016, were approximately \$1,086 million, or approximately \$82 million less than the measured pension benefit obligation on a U.S. GAAP basis. In addition, any changes in the discount rate could result in a significant increase or decrease in the valuation of pension obligations, affecting the reported funded status of our pension plans as well as the net periodic pension cost in the following years. Similarly, changes in the expected return on plan assets can result in significant changes in the net periodic pension cost in the following years.

Our obligation to make payments to the PD Trust in respect of asbestos PD Claims (other than ZAI PD Claims) is not capped and we may be obligated to make additional payments.

Under the Joint Plan of reorganization that concluded Grace's status as a debtor under Chapter 11, as discussed above (the "Joint Plan"), an asbestos property damage trust has been established and funded under Section 524(g) of the Bankruptcy Code. The order of the Bankruptcy Court confirming the Joint Plan contains a channeling injunction which provides that all pending and future asbestos-related property damage claims and demands, PD Claims, can only be brought against the PD Trust. The PD Trust contains two accounts. One of these accounts, the PD Account, is funded solely in respect of PD Claims other than those PD Claims related to our former ZAI attic insulation product. Unresolved and future non-ZAI PD Claims are to be litigated pursuant to procedures approved by the Bankruptcy Court and, to the extent such PD claims are determined to be allowed claims, are to be paid in cash by the PD Trust. We are obligated to make a payment to the PD Trust every six months in the amount of any non-ZAI PD Claims allowed during the preceding six months plus interest (if any) and the amount of PD Trust expenses for the preceding six months (the "PD Obligation"). The aggregate amount we are required to pay under the PD Obligation is not capped so we may have to make additional payments to the PD Account in respect of the PD Obligation. We are also obligated to make up to 10 contingent deferred payments to the PD Trust of \$8 million each during the 20-year period beginning February 3, 2019, in respect of ZAI PD Claims in the event the ZAI PD Account's assets fall below \$10 million in the preceding year. We have accrued liabilities for probable PD Claims but have not accrued any liability for the contingent ZAI PD payments as we do not believe they are probable.

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Our ability to use net operating losses and tax credits to reduce future tax payments may be limited if there is a change in ownership of Grace or if Grace does not generate sufficient U.S. taxable income. Our ability to use these attributes is also subject to time limitations. Changes in tax laws and regulations may reduce their value and availability.

Our ability to use future tax deductions, including net operating losses ("NOLs"), is dependent on our ability to generate sufficient future taxable income in the U.S. In addition, our ability to use future tax deductions may be limited by Section 382 of the Internal Revenue Code resulting from future changes in the ownership of outstanding Company common stock. Our Amended and Restated Certificate of Incorporation provides that under certain circumstances, our Board of Directors would have the authority to impose restrictions on the transfer of Company common stock with respect to certain 5% stockholders in order to preserve these future tax deductions.

Under U.S. federal income tax law, a corporation is generally permitted to carry forward NOLs for a 20-year period for deduction against future taxable income. Foreign tax credits also expire over time. Also, our ability to use NOLs and tax credits and their value may be adversely affected by changes in tax laws and regulations.

We intend to pursue acquisitions, joint ventures and other transactions that complement or expand our businesses. We may not be able to complete proposed transactions and even if completed, the transactions may involve a number of risks that may materially and adversely affect our business, financial condition and results of operations.

We intend to continue to pursue opportunities to buy other businesses or technologies that could complement, enhance or expand our current businesses or product lines or that might otherwise offer us growth opportunities. We may have difficulty identifying appropriate opportunities or, if we do identify opportunities, we may not be successful in completing transactions for a number of reasons. Any transactions that we are able to identify and complete may involve a number of risks, including:

- the diversion of management's attention from our existing businesses to integrate the operations and personnel of the acquired or combined business or joint venture;
- possible adverse effects on our operating results during the integration process;
- failure of the acquired business to achieve expected operational objectives; and
- our possible inability to achieve the intended objectives of the transaction.

In addition, we may not be able to successfully or profitably integrate, operate, maintain and manage any newly acquired operations or their employees. We may not be able to maintain uniform standards, controls, procedures and policies, which may lead to operational inefficiencies.

We work with dangerous materials that can injure our employees, damage our facilities and disrupt our operations. Some of our operations involve the handling of hazardous materials that may pose the risk of fire, explosion, or the release of hazardous substances. Such events could result from natural disasters, operational failures or terrorist attacks, and might cause injury or loss of life to our employees and others, environmental contamination, and property damage. These events might cause a temporary shutdown of an affected plant, or portion thereof, and we could be subject to penalties or claims as a result. A disruption of our operations caused by these or other events could have a material adverse effect on our results of operations.

Some of our employees are unionized, represented by works councils or employed subject to local laws that are less favorable to employers than the laws in the United States.

As of December 31, 2016, we had approximately 3,700 global employees. Approximately 630 of our approximately 1,900 U.S. employees are unionized. In addition, a large number of our employees are employed in countries in which employment laws provide greater bargaining or other rights to employees than the laws in the United States. Such employment rights require us to work collaboratively with the legal representatives of the employees to effect any changes to labor arrangements. For example, most of our employees in Europe are represented by works councils that have co-determination rights on any changes in conditions of employment, including certain salaries and benefits and staff changes, and may impede efforts to restructure our workforce. A strike, work stoppage or slowdown by our employees or significant dispute with our employees, whether or not related to these negotiations, could result in a significant disruption of our operations or higher ongoing labor costs.

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We may be subject to claims of infringement of the intellectual property rights of others, which could hurt our business.

From time to time, we face infringement claims from our competitors or others alleging that our processes or products infringe on their proprietary technologies. Any claims that our products or processes infringe the intellectual property rights of others, regardless of the merit or resolution of the claims, could cause us to incur significant costs in responding to, defending and resolving the claims, and may divert the efforts and attention of our management and technical personnel from our business. If we are found to be infringing on the proprietary technology of others, we may be liable for damages, and we may be required to change our processes, redesign our products, pay others to use the technology or stop using the technology or producing the infringing product. Even if we ultimately prevail, the existence of the lawsuit could prompt our customers to switch to products that are not the subject of infringement suits.

We are subject to business continuity risks that may adversely affect our business, financial condition and results of operations.

We are subject to significant risks from both natural disasters and accidents such as fires, storms and floods, and other disruptive events, such as war, insurrection and terrorist actions. These types of occurrences can negatively affect our manufacturing, supply chain, logistics, transportation, and communications functions. Similarly, they can strike major suppliers and customers, thus restricting or delaying our supply of raw materials or energy as well as reducing or deferring demand for our products and services. Also, we have centralized certain administrative functions, primarily in North America, Europe and Asia, to improve efficiency and reduce costs. To the extent that these central locations are disrupted or disabled, key business processes, such as invoicing, payments and general management operations, could be interrupted.

As we operate worldwide in a competitive environment, global economic and financial market conditions may adversely affect our business, financial condition and results of operations.

We compete by selling value-added products, technologies and services. Increased levels and numbers of competitors, globally or regionally, could negatively impact our results of operations. Economic conditions around the world can have a direct impact on our revenues. A global or regional economic downturn or market uncertainty could reduce the demand for our products, technologies and services, which could negatively impact our results of operations. Since many of our customers are refiners, our fluid catalytic cracking (FCC) catalyst business is highly dependent on the economics of the petroleum refining industry. Demand for our FCC products is affected by refinery throughput, the type and quality of refinery feedstocks, and the demand for transportation fuels and other refinery products, such as propylene. Also, disruptions in the financial markets could have an adverse effect on our ability to finance our operations and growth plans, and could negatively impact our suppliers and customers in similar manners.

Our ability to operate our businesses and our financial condition could be significantly undermined by cybersecurity breaches.

Despite our implementation of security measures, our information technology (“IT”) systems are subject to cyber attack and other similar disruptions. Breaches by hackers, the introduction of computer viruses and other cybersecurity incidents affecting our IT systems could result in disruptions to our operations. Also, such incidents could include theft of our trade secrets and other intellectual property, as well as confidential customer and business information, which could be used by unauthorized parties and publicly disclosed. This could negatively affect our relationships with customers and our ability to compete effectively, and could ultimately harm our reputation, business, financial condition and results of operations. In addition, we may be required to incur significant costs to protect against damage caused by cybersecurity breaches in the future.

A failure of our information technology infrastructure could adversely impact our business and operations.

We rely upon the capacity, reliability and security of our IT infrastructure and our ability to expand and continually update this infrastructure in response to the changing needs of our business. If we experience a problem with the functioning of an important IT system, the resulting disruptions could have an adverse effect on our business. Our IT systems affect virtually every aspect of our business, including supply chain, manufacturing, logistics, finance and communications. We and certain of our third-party vendors receive and store personal

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information in connection with our human resources operations and other aspects of our business. Any IT system failure, natural disaster, accident, or intentional breach could result in disruptions to our operations.

Risks Related to the Separation

Grace and GCP are subject to restrictions under a Tax Sharing Agreement between them, and a violation of the Tax Sharing Agreement may result in tax liability to Grace and its stockholders.

We entered into a Tax Sharing Agreement with GCP to preserve the tax-free treatment, for U.S. federal income tax purposes, of the separation and distribution of GCP common stock to Grace stockholders. Under this Tax Sharing Agreement, we and GCP will be restricted from engaging in certain transactions that could result in the Separation becoming taxable to us and our stockholders. Compliance with the Tax Sharing Agreement and the restrictions therein may limit our near-term ability to pursue certain strategic transactions or engage in activities that might be beneficial from a business perspective. This may result in missed opportunities or the pursuit of business strategies that may not be as beneficial for us and which may negatively affect our anticipated profitability. If GCP fails to comply with the restrictions in the Tax Sharing Agreement and as a result the Separation was determined to be taxable for U.S. federal income tax purposes, we and our stockholders at the time of the Separation that are subject to U.S. federal income tax could incur significant U.S. federal income tax liabilities. Although the Tax Sharing Agreement provides that GCP is required to indemnify us for taxes incurred that may arise were GCP to fail to comply with its obligations under the Tax Sharing Agreement, there is no assurance that GCP will have the funds to satisfy that liability. Also, GCP will not be required to indemnify our stockholders for any tax liabilities they may incur for its violation of the Tax Sharing Agreement.

In connection with the Separation, GCP will indemnify us and we will indemnify GCP for certain liabilities. There can be no assurance that the indemnities from GCP will be sufficient to insure us against the full amount of such liabilities, or that GCP's ability to satisfy its indemnification obligation will not be impaired in the future.

Pursuant to the Separation and Distribution Agreement and other agreements we entered into in connection with the Separation, GCP agreed to indemnify us for certain liabilities, and we agreed to indemnify GCP for certain liabilities. However, third parties might seek to hold us responsible for liabilities that GCP agreed to assume or retain under these agreements, and there can be no assurance that GCP will be able to fully satisfy its indemnification obligations under these agreements.

A court could deem the Distribution in the Separation to be a fraudulent conveyance and void the transaction or impose substantial liabilities upon us.

If the transaction is challenged by a third party, notwithstanding the fact that we received an opinion from a nationally recognized financial firm that we were solvent and had adequate surplus to make the Distribution, a court could deem the distribution of GCP common stock or certain internal restructuring transactions undertaken by us in connection with the Separation to be a fraudulent conveyance or transfer. Fraudulent conveyances or transfers are defined to include transfers made or obligations incurred with the actual intent to hinder, delay or defraud current or future creditors or transfers made or obligations incurred for less than reasonably equivalent value when the debtor was insolvent, or that rendered the debtor insolvent, inadequately capitalized or unable to pay its debts as they become due. In such circumstances, a court could void the transactions or impose substantial liabilities upon us, which could adversely affect our financial condition and our results of operations. Among other things, the court could require our stockholders to return to us some or all of the shares of GCP common stock issued in the Distribution or require us to fund liabilities of other companies involved in the Separation for the benefit of creditors. Whether a transaction is a fraudulent conveyance or transfer will vary depending upon the laws of the applicable jurisdiction.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

We operate manufacturing plants and other facilities (including offices, warehouses, labs and other service facilities) throughout the world. Some of these plants and facilities are shared by our reportable segments. We consider our major operating properties to be in good operating condition and suitable for their current use. We

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believe that the productive capacity of our plants and other facilities is generally adequate for current operations. The table below summarizes our primary facilities by reportable segment and region as of December 31, 2016:

	Number of Facilities(1)				
	Europe	Middle	Asia	Latin	Total
	North America	East Africa (EMEA)	Pacific	America	
Catalysts Technologies	10	4	1	—	15
Leased	2	3	—	—	5
Owned	8	1	1	—	10
Materials Technologies	4	2	1	1	8
Leased	2	1	—	1	4
Owned	2	1	1	—	4

(1) Shared facilities are counted in all applicable reportable segments. The total number of facilities included in the above table, without regard to sharing amongst reportable segments, is 20 of which we leased 9 and owned 11. We own our principal facilities. With respect to our other facilities, we either own, lease or hold them under a land lease arrangement. Our corporate headquarters is in Columbia, Maryland, and we also lease and operate a shared services facility in Manila, Philippines. Our largest Catalysts Technologies facilities are located in Baltimore, Maryland; Lake Charles, Louisiana; and Worms, Germany. Our largest Materials Technologies facilities are located in Baltimore, Maryland; Albany, Oregon; and Worms, Germany.

For information on our net properties and equipment by region and country, see disclosure set forth in Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 17 (Segment Information) to our Consolidated Financial Statements, which disclosure is incorporated herein by reference.

In connection with our credit agreement, we executed security agreements with respect to certain of our larger United States facilities. As of December 31, 2016, mortgages or deeds of trust were in effect with respect to facilities in the following locations: Chicago, Illinois; Lake Charles, Louisiana; Baltimore and Columbia, Maryland; and Albany, Oregon. The Mount Pleasant, Tennessee facility, with respect to which Grace previously had executed a security interest, became a GCP site at the time of the Separation. For a description of our credit agreement see Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 5 (Debt) to the Consolidated Financial Statements.

Item 3. LEGAL PROCEEDINGS

CHAPTER 11 PROCEEDINGS

Disclosures provided in this Report in Item 1 (Business) and Item 8 (Financial Statements and Supplementary Data), and in the Financial Supplement under Note 1 (Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies, under the caption "Chapter 11 Proceedings"), Note 10 (Commitments and Contingent Liabilities, under the caption "Legacy Product and Environmental Liabilities"), and Note 19 (Chapter 11 and Joint Plan of Reorganization) to the Consolidated Financial Statements, are incorporated herein by reference.

ASBESTOS LITIGATION

Disclosures provided in this Report in Item 8 (Financial Statements and Supplementary Data) and in the Financial Supplement under Note 10 (Commitments and Contingent Liabilities) and Note 19 (Chapter 11 and Joint Plan of Reorganization) to the Consolidated Financial Statements are incorporated herein by reference.

ENVIRONMENTAL INVESTIGATIONS AND CLAIMS

Disclosures provided in this Report in Item 1 (Business) under the caption "Environment, Health and Safety Matters" and Item 8 (Financial Statements and Supplementary Data), and in the Financial Supplement under Note 10 (Commitments and Contingent Liabilities, under the caption "Legacy Environmental Liabilities") to the Consolidated Financial Statements, are incorporated herein by reference.

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TAX CLAIMS

Disclosures provided in this Report in Item 8 (Financial Statements and Supplementary Data) and in the Financial Supplement under Note 7 (Income Taxes) to the Consolidated Financial Statements are incorporated herein by reference.

OTHER CLAIMS RECEIVED PRIOR TO THE CHAPTER 11 CLAIMS BAR DATE

Disclosures provided in this Report in Item 8 (Financial Statements and Supplementary Data) and in the Financial Supplement under Note 10 (Commitments and Contingent Liabilities) and Note 19 (Chapter 11 and Joint Plan of Reorganization) to the Consolidated Financial Statements are incorporated herein by reference.

Item 4. MINE SAFETY DISCLOSURES

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

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EXECUTIVE OFFICERS OF THE REGISTRANT

Pursuant to General Instruction G(3) of Form 10-K, the following list of executive officers of Grace as of February 15, 2017, is included as an unnumbered Item in Part I of this report in lieu of being included in the Grace Proxy Statement relating to the Annual Meeting of Stockholders to be held on May 9, 2017. Our executive officers are elected annually.

Name and Age	Office	First Elected
Alfred E. Festa (57)	Chairman of the Board	01/01/08
	Chief Executive Officer	06/01/05
Hudson La Force III (52)	President and Chief Operating Officer	02/04/16
Thomas E. Blaser (55)	Senior Vice President and Chief Financial Officer	02/25/16
Elizabeth C. Brown (53)	Vice President and Chief Human Resources Officer	01/21/15
Keith N. Cole (58)	Vice President, Government Relations and Environmental, Health and Safety	02/10/14
Mark A. Shelnitz (58)	Vice President, General Counsel and Secretary	04/27/05

Messrs. Festa, La Force and Shelnitz have been actively engaged in Grace's business for the past five years.

Mr. Blaser joined Grace in 2016. Mr. Blaser was most recently during 2015 President of Arysta LifeScience North America, LLC, a global agricultural chemical and life science business where he also served for ten years as Chief Financial Officer.

Ms. Brown joined Grace in 2015. From 2010 until she joined Grace, Ms. Brown held leadership positions in human resources for Tyco International Limited (now Johnson Controls, Inc.).

Mr. Cole joined Grace in 2014. From 2002 until he joined Grace, Mr. Cole held leadership positions in government relations and public policy for General Motors Corporation.

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PART II

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

Except as provided below, the disclosure required by this Item appears in this Report in: Item 6 (Selected Financial Data); under the heading "Selected Financial Data" opposite the caption "Other Statistics—Common shareholders of record" in the Financial Supplement; Item 8 (Financial Statements and Supplementary Information) in the Financial Supplement in Note 14 (Shareholders' Equity) and Note 22 (Quarterly Summary and Statistical Information (Unaudited) opposite the captions "Dividends declared per share" and "Market price of common stock") to the Consolidated Financial Statements; and Item 12 (Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters), and such disclosure is incorporated herein by reference.

SHAREHOLDER RIGHTS AGREEMENT

On March 31, 1998, we paid a dividend of one Preferred Stock Purchase Right on each share of Company common stock. Subject to our prior redemption for \$.01 per right, rights will become exercisable on the earlier of:

• 10 days after an acquiring person, composed of an individual or group, has acquired beneficial ownership of 20% or more of the outstanding Company common stock or

• 10 business days (or a later date fixed by the Board of Directors) after an acquiring person commences (or announces the intention to commence) a tender offer or exchange offer for beneficial ownership of 20% or more of the outstanding Company common stock.

Until these events occur, the rights will automatically trade with the Company common stock, and separate certificates for the rights will not be distributed. The rights do not have voting or dividend rights.

Generally, each right not owned by an acquiring person:

• will initially entitle the holder to buy from Grace one hundredth of a share of the Company Junior Participating Preferred Stock, at an exercise price of \$100, subject to adjustment;

• will entitle such holder to receive upon exercise, in lieu of shares of Company junior preferred stock, that number of shares of Company common stock having a market value of two times the exercise price of the right; and

• may be exchanged by Grace for one share of Company common stock or one hundredth of a share of Company junior preferred stock, subject to adjustment.

Generally, if there is an acquiring person and we are acquired, each right not owned by an acquiring person will entitle the holder to buy a number of shares of common stock of the acquiring company having a market value equal to twice the exercise price of the right.

Each share of Company junior preferred stock will be entitled to a minimum preferential quarterly dividend payment of \$1.00 per share but will be entitled to an aggregate dividend equal to 100 times the dividend declared per share of Company common stock whenever such dividend is declared. In the event of liquidation, holders of Company junior preferred stock will be entitled to a minimum preferential liquidation payment of \$100 per share but will be entitled to an aggregate payment equal to 100 times the payment made per share of Company common stock. Each share of Company junior preferred stock will have 100 votes, voting together with the Company common stock. Finally, in the event of any business combination, each share of Company junior preferred stock will be entitled to receive an amount equal to 100 times the amount received per share of Company common stock. These rights are protected by customary antidilution provisions.

The terms of the rights may be amended by the Board of Directors without the consent of the holders of the rights.

The rights expire on March 30, 2018. The rights have been approved by the U.S. Bankruptcy Court for the District of Delaware and the Official Committee of Equity Security Holders in connection with our Chapter 11 proceedings.

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This summary of the rights does not purport to be complete and is qualified in its entirety by reference to the Rights Agreement, which has been filed with the SEC.

DIVIDENDS ON COMPANY COMMON STOCK

Prior to 2016, we had not paid a cash dividend on Company common stock since 1997. However, on January 26, 2016, we announced that our Board of Directors approved a policy of paying a regular quarterly cash dividend at an initial annual rate of \$0.68 per share of Company common stock. On February 8, 2017, we announced that our Board of Directors approved an increase to the annual cash dividend rate, raising it to \$0.84 per share of Company common stock. Although our credit agreement and indentures (as described in Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 5 (Debt) to the Consolidated Financial Statements and filed as an exhibit to this Report) contain certain restrictions on the payment of dividends on, and redemptions of, equity interests and other restricted payments, we believe that such restrictions do not currently materially limit our ability to pay dividends. Any determination to pay cash dividends in the future may be affected by business and market conditions, our views on potential future capital requirements, the restrictions noted above, covenants contained in any agreements we may enter into in the future and changes in federal income tax law.

SHARE REPURCHASES**Share Repurchase Program**

On February 5, 2015, we announced that the Board of Directors authorized a share repurchase program of up to \$500 million. On February 8, 2017, we announced that the Board of Directors authorized an additional share repurchase program of up to \$250 million. Repurchases under the program may be made through one or more open market transactions at prevailing market prices; unsolicited or solicited privately negotiated transactions; accelerated share repurchase programs; or through any combination of the foregoing, or in such other manner as determined by management. The timing of the repurchases and the actual amount repurchased will depend on a variety of factors, including the market price of Grace's shares, the strategic deployment of capital, and general market and economic conditions.

The following table presents information regarding the repurchase of Company common stock by Grace or any "affiliated purchaser" of Grace during the three months ended December 31, 2016:

	Total number of shares purchased (#)	Average price paid per share (\$/share)	Total number of shares purchased as part of publicly announced plans or programs (#)	Approximate dollar value of shares that may yet be purchased under the plans or programs (\$ in millions)
10/1/2016 - 10/31/2016	158,100	70.69	158,100	162.7
11/1/2016 - 11/30/2016	1,879,275	68.55	1,879,275	33.9
12/1/2016 - 12/31/2016	—	—	—	33.9
Total	2,037,375	68.72	2,037,375	33.9

PI Warrant Settlement

As of February 3, 2014, the effective date of the Grace Joint Plan of Reorganization, we issued to the WRG Personal Injury Trust warrants (the "PI Warrant") to acquire 10 million shares of Company common stock at a price of \$17 per share. On February 3, 2015, we repurchased the PI Warrant for a payment of \$490 million.

STOCK TRANSFER RESTRICTIONS

Under the terms of our Amended and Restated Certificate of Incorporation, as approved by the Bankruptcy Court as part of the confirmation of the Joint Plan, in order to preserve significant tax benefits which are subject to elimination or limitation, the Board of Directors has the authority to impose restrictions on the transfer of Company common

stock with respect to certain 5% shareholders. Imposing such restrictions requires at least a 25% ownership shift to occur (as determined under Internal Revenue Code regulations) and at least a two-thirds vote of all of the directors. These restrictions would generally not limit the ability of a person that holds less than 5% of Company common stock to either buy or sell stock on the open market.

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This summary does not purport to be complete and is qualified in its entirety by reference to the Amended and Restated Certificate of Incorporation, which has been filed with the SEC and is incorporated by reference as Exhibit 3.1 to this Annual Report on Form 10-K.

STOCK PERFORMANCE GRAPH

The following information in Item 5 is not deemed to be "soliciting material" or to be "filed" with the SEC or subject to Regulation 14A or 14C under the Securities Exchange Act of 1934, as amended (the "Exchange Act") or to the liabilities of Section 18 of the Exchange Act, and will not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act, except to the extent Grace specifically incorporates it by reference into such a filing.

The line graph and table below compare the cumulative total shareholder return on Company common stock with the cumulative total return of companies on the Standard & Poor's ("S&P") 500 Stock Index, the S&P Composite 1500 Specialty Chemicals Index and S&P 1500 Diversified Chemicals Index. This graph and table assume the investment of \$100 in Company common stock on December 31, 2011. Cash dividends paid in 2016 are assumed reinvested for the graph and table below.

	2011	2012	2013	2014	2015	2016
W. R. Grace & Co.(1)	\$100	\$146	\$215	\$208	\$217	\$206
S&P 500 Index	100	116	154	175	177	198
S&P 1500 Specialty Chemicals	100	138	183	216	212	238
S&P 1500 Diversified Chemicals	100	121	173	185	188	219

(1) Return on W. R. Grace & Co. stock for 2016 includes the return on GCP stock from the Distribution Date through December 31, 2016.

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Item 6. SELECTED FINANCIAL DATA

The disclosure required by this Item appears in the Financial Supplement under the heading "Selected Financial Data" which disclosure is incorporated herein by reference.

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

The disclosure required by this Item appears in the Financial Supplement under the heading "Management's Discussion and Analysis of Financial Condition and Results of Operations" which disclosure is incorporated herein by reference.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our global operations, raw materials and energy requirements, and debt obligations expose us to various market risks. We use derivative financial instruments to mitigate certain of these risks. The following is a discussion of our primary market risk exposures, how those exposures are managed, and certain quantitative data pertaining to our market risk-sensitive instruments.

Currency Exchange Rate Risk

We operate and/or sell to customers in over 60 countries and in 30 currencies; therefore, our results of operations are exposed to changes in currency exchange rates. We seek to minimize exposure to these changes by matching revenue streams in volatile currencies with expenditures in the same currencies, but it is not always possible to do so. From time to time, we use financial instruments such as currency forward contracts, options, or combinations of them to reduce the risk of certain specific transactions. However, we do not have a policy of hedging all exposures, because management does not believe that such a level of hedging would be cost-effective. Significant uses of derivatives to mitigate the effects of changes in currency exchange rates are as follows.

In May 2016, Grace entered into a fixed-to-fixed cross-currency swap maturing in October 2021 to hedge its net investment in non-U.S. subsidiaries. On every April 1 and October 1, Grace will swap interest payments. Grace will pay euro fixed at the annual rate of 3.426% on €170.0 million and receive U.S. dollars fixed at the annual rate of 5.125% on \$190.3 million. The agreement requires an exchange of the notional amounts at maturity. The following tables provide information about the cross-currency swap at December 31, 2016, specifically, the aggregate future cash flows for each of the five next years and thereafter and the fair value. The fair value represents the value of the derivative contract, and is included in "other current assets" and "other assets" in the Consolidated Balance Sheets.

(In millions)	2017	2018	2019	2020	2021	Thereafter
Payable—interest and principal in euro	€5.8	€5.8	€5.8	€5.8	€175.8	€ —
Receivable—interest and principal in U.S. dollars	\$9.8	\$9.8	\$9.8	\$9.8	\$200.1	\$ —

(In millions)	December 31, 2016
Current asset	\$ 3.6
Non-current asset	4.0
Net fair value	\$ 7.6

There were no significant currency forward exchange agreements outstanding at December 31, 2016.

Commodity Price Risk

We operate in markets where the prices of raw materials and energy are commonly affected by cyclical movements in the economy and other factors. The principal raw materials used in our products include molybdenum oxide, sodium silicate, zeolite, caustic soda, sodium aluminate, aluminum sulfate, rare earths, alumina, aluminum metal and tungsten salt. Natural gas is the largest single energy source that we purchase. These commodities are generally available to be purchased from more than one supplier. In order to minimize the

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risk of increasing prices on certain raw materials and energy, we use a centralized supply chain organization for sourcing in order to optimize procurement activities. We have a risk management committee to review proposals to hedge purchases of raw materials and energy.

We have implemented a risk management program under which we hedge natural gas and aluminum supply in a way that seeks to provide protection against price volatility in the natural gas and aluminum markets. In order to mitigate volatility in natural gas prices, we have entered into both fixed-rate swaps and options contracts to hedge a portion of our U.S. natural gas requirements. Additionally, in order to mitigate volatility in aluminum prices, we have entered into fixed-rate swaps to hedge a portion of our U.S. aluminum requirements.

The following tables provide information about our commodity fixed-rate swaps. For natural gas commodity fixed-rate swaps, contract volumes, or notional amounts, are presented in millions of MMBtu (million British thermal units), weighted average contract prices are presented in U.S. dollars per million MMBtu, and the total contract amount and fair value are presented in millions of U.S. dollars. For aluminum commodity fixed-rate swaps, contract volumes, or notional amounts, are presented in millions of pounds, weighted average contract prices are presented in U.S. dollars per pound, and the total contract amount and fair value are presented in millions of U.S. dollars. The fair values of the commodity fixed-rate swaps represent the excess of the variable price (market price) over the fixed price (pay price) multiplied by the nominal contract volumes. All commodity fixed-rate swaps mature within 15 months.

Commodity				
Derivatives—December 31, 2016				
Type of Contract	Contract Volumes	Weighted Average Price	Total Contract Amount	Fair Value
Aluminum swaps	1.3	\$ 0.77	\$ 1.0	\$ —

Commodity				
Derivatives—December 31, 2015				
Type of Contract	Contract Volumes	Weighted Average Price	Total Contract Amount	Fair Value
Natural gas swaps	1.3	\$ 1.90	\$ 2.4	\$ 0.5
Aluminum swaps	1.4	\$ 0.78	\$ 1.1	\$ —

The fair value of commodity derivative contracts is presented as other assets or other liabilities and allocated between current and non-current, as appropriate, in the Consolidated Balance Sheets.

We have also entered into forward contracts for natural gas and aluminum that qualify for the normal purchases and normal sales exception from Accounting Standards Codification ("ASC") 815 "Derivatives and Hedging," as they do not contain net settlement provisions and therefore result in physical delivery of natural gas and aluminum from suppliers. Accordingly, the fair values of these contracts are not recorded in our Consolidated Balance Sheets.

Interest Rate Risk

As of December 31, 2016, approximately \$313.0 million of our borrowings were at variable interest rates and expose us to interest rate risk. As a result, we have been and will continue to be subject to the variations on interest rates in respect of our floating-rate debt. A 100 basis point increase in the interest rates payable on our variable rate debt outstanding as of December 31, 2016, would increase our annual interest expense by approximately \$3.1 million.

In connection with our emergence financing, we entered into an interest rate swap beginning on February 3, 2015, and maturing on February 3, 2020, fixing the LIBOR component of the interest on \$250 million of Grace's term debt at a rate of 2.393%. While we have and may continue to enter into agreements intending to limit our exposure to higher interest rates, any such agreements may not offer complete protection from this risk.

See Item 8 (Financial Statements and Supplementary Data) in the Financial Supplement under Note 6 (Fair Value Measurements and Risk) to the Consolidated Financial Statements for additional disclosure around market risk, which disclosure is incorporated herein by reference.

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Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The disclosure required by this Item appears in the Financial Supplement which disclosure is incorporated herein by reference.

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

None.

Item 9A. CONTROLS AND PROCEDURES

Except as provided below, the disclosure required by this Item appears in the Financial Supplement under the headings "Management's Report on Financial Information and Internal Controls" and "Report of Independent Registered Public Accounting Firm," which disclosure is incorporated herein by reference.

There was no change in Grace's internal control over financial reporting during the quarter ended December 31, 2016, that has materially affected, or is reasonably likely to materially affect, Grace's internal control over financial reporting.

Item 9B. OTHER INFORMATION

None.

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PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Incorporated by reference to the sections entitled "Proposal One: Election of Directors," "—Nominees for Election as Directors," "—Continuing Directors," and "—Corporate Governance," "Questions and Answers—Where can I find Grace corporate governance materials?," and "Other Information—Section 16(a) Beneficial Ownership Reporting Compliance" of a definitive proxy statement that Grace will file with the SEC no later than 120 days after December 31, 2016 (the "2017 Proxy Statement"). Required information on executive officers of Grace appears at Part I after Item 4 of this report.

Item 11. EXECUTIVE COMPENSATION

Incorporated by reference to the sections entitled "Proposal One: Election of Directors—Corporate Governance," and "—Director Compensation," and "Executive Compensation" of the 2017 Proxy Statement.

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

Incorporated by reference to the sections entitled "Other Information—Stock Ownership of Certain Beneficial Owners and Management" and "—Equity Compensation Plan Information" of the 2017 Proxy Statement.

Item 13. CERTAIN RELATIONSHIPS, RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

Incorporated by reference to the sections entitled "Proposal One: Election of Directors—Corporate Governance" and "Other Information—Related Party Transactions" of the 2017 Proxy Statement.

Item 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Incorporated by reference to the sections entitled "Proposal Two: Ratification of the Appointment of Independent Registered Public Accounting Firm—Principal Accountant Fees and Services" and "—Audit Committee Pre-Approval Policies and Procedures" of the 2017 Proxy Statement.

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PART IV

Item 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

Financial Statements and Schedules. The required information is set forth in the Financial Supplement under the heading "Table of Contents" which is incorporated herein by reference.

Exhibits. The exhibits to this Report are listed below. Other than exhibits that are filed herewith, all exhibits listed below are incorporated by reference.

In reviewing the agreements included as exhibits to this and other Reports filed by Grace with the Securities and Exchange Commission, please remember they are included to provide you with information regarding their terms and are not intended to provide any other factual or disclosure information about Grace or other parties to the agreements. The agreements generally contain representations and warranties by each of the parties to the applicable agreement. These representations and warranties have been made solely for the benefit of the other parties to the applicable agreement. These representations and warranties:

are not statements of fact, but rather are used to allocate risk to one of the parties if the statements prove to be inaccurate;

may have been qualified by disclosures that were made to the other parties in connection with the negotiation of the applicable agreement, which disclosures are not necessarily reflected in the agreement;

may apply standards of materiality in a way that is different from what may be viewed as material to you or other investors; and

were made only as of the date of the applicable agreement or such other date or dates as may be specified in the agreement and do not reflect more recent developments.

Accordingly, these representations and warranties may not describe the actual state of affairs as of the date they were made or at any other time. Additional information about Grace may be found elsewhere in this report and Grace's other public filings, which are available without charge through the Securities and Exchange Commission's website at <http://www.sec.gov>.

Exhibit No.	Exhibit	Location
2.1	Joint Plan of Reorganization of W. R. Grace & Co. and its Debtor Subsidiaries.	Exhibit 2.01 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
2.2	Order Confirming Joint Plan of Reorganization.	Exhibit 2.02 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
2.3	Separation and Distribution Agreement dated as of January 27, 2016 by and among W. R. Grace & Co., W. R. Grace & Co.-Conn. and GCP Applied Technologies Inc.	Exhibit 2.1 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
3.1	Amended and Restated Certificate of Incorporation.	Exhibit 3.01 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
3.2	Amended and Restated By-laws.	

		Exhibit 3.01 to Form 8-K (filed 1/23/15) SEC File No.: 001-13953
4.1	Amended and Restated Rights Agreement dated as of March 25, 2008 between W. R. Grace & Co. and Mellon Investor Services LLC, as Rights Agent.	Exhibit 4.1 to Form 10/A (filed 3/25/08) SEC File No.: 001-13953
4.2	Receivables Purchase Agreement dated as of January 23, 2007 between Grace GmbH & Co. KG and Coface Finanz GmbH.	Exhibit 4.10 to Form 10-K (filed 3/02/07) SEC File No.: 001-13953
4.3	Credit Agreement dated as of February 3, 2014 by and among W. R. Grace & Co., W. R. Grace & Co.-Conn., Grace GmbH & Co. KG, a Federal Republic of Germany limited partnership, each lender from time to time party thereto, and Goldman Sachs Bank USA, as Administrative Agent.	Exhibit 4.01 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953

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Exhibit No.	Exhibit	Location
4.4	First Amendment and Consent to Credit Agreement and First Amendment to Security Agreement, by and among W. R. Grace & Co., W. R. Grace & Co.—Conn., Grace GmbH & Co. KG, Alltech Associates, Inc., each lender from time to time party thereto, and Goldman Sachs Bank USA, as Administrative Agent and lender.	Exhibit 10.1 to Form 8-K (filed 11/25/15) SEC File No.: 001-13953
4.5	Deferred Payment Agreement (PD) dated as of February 3, 2014 by and between W. R. Grace & Co.-Conn. and the WRG Asbestos PD Trust.	Exhibit 4.04 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
4.6	Guarantee Agreement (PD) dated as of February 3, 2014 by and between W. R. Grace & Co. and the WRG Asbestos PD Trust.	Exhibit 4.05 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
4.7	Deferred Payment Agreement (PD-ZAI) dated as of February 3, 2014 by and between W. R. Grace & Co.-Conn. and the WRG Asbestos PD Trust.	Exhibit 4.06 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
4.8	Guarantee Agreement (PD-ZAI) dated as of February 3, 2014 by and between W. R. Grace & Co. and the WRG Asbestos PD Trust.	Exhibit 4.07 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
4.9	Share Issuance Agreement dated as of February 3, 2014 by and among W. R. Grace & Co., the WRG Asbestos PD Trust and the WRG Asbestos PI Trust.	Exhibit 4.08 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
4.10	Indenture, dated as of September 16, 2014, by and among W. R. Grace & Co.—Conn., the guarantors party there to and Wilmington Trust, National Association, as trustee.	Exhibit 4.1 to Form 8-K (filed 9/19/14) SEC File No.: 001-13953
4.11	First Supplemental Indenture, dated as of September 16, 2014, by and among W. R. Grace & Co.—Conn., the guarantors party thereto and Wilmington Trust, National Association, as trustee.	Exhibit 4.2 to Form 8-K (filed 9/19/14) SEC File No.: 001-13953
4.12	Form of 5.125% Note due 2021 (included as Exhibit A-1 to Exhibit 4.11)	Exhibit 4.3 (included as Exhibit A-1 to Exhibit 4.2) to Form 8-K (filed 9/19/14) SEC File No.: 001-13953
4.13	Form of 5.625% Note due 2024 (included as Exhibit A-2 to Exhibit 4.11)	Exhibit 4.4 (included as Exhibit A-2 to Exhibit 4.2) to Form 8-K (filed 9/19/14) SEC File No.: 001-13953
10.1	WRG Asbestos Property Damage Settlement Trust Agreement dated as of February 3, 2014 by and between W. R. Grace & Co., the Asbestos PD Future Claimants' Representative, the Official Committee of Asbestos Property Damage Claimants, the Asbestos PD Trustees, Wilmington Trust Company, and the members of the Zonolite Attic Insulation Trust Advisory Committee.	Exhibit 10.02 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953
10.2	W. R. Grace & Co. 2011 Stock Incentive Plan.	Exhibit 10.1 to Form 8-K (filed 4/13/11) SEC File No.: 001-13953*
10.3	W. R. Grace & Co. Amended and Restated 2011 Stock Incentive Plan.	Exhibit 10.1 to Form 8-K (filed 5/01/13) SEC File No.: 001-13953*
10.4	W. R. Grace & Co. 2014 Stock Incentive Plan.	

10.5 Form of Stock Option Award Agreement (2013).	Exhibit 10.03 to Form 8-K (filed 2/07/14) SEC File No.: 001-13953*
10.6 Form of Performance-based Unit Agreement (2013).	Exhibit 10.1 to Form 10-Q (filed 8/02/13) SEC File No.: 001-13953*
10.7 Form of Performance-based Unit Agreement (2016).	Exhibit 10.2 to Form 10-Q (filed 8/02/13) SEC File No.: 001-13953*
10.8 Form of Stock Option Award Agreement (2011).	Exhibit 10.2 to Form 8-K (filed 2/09/16) SEC File No.: 001-13953*
10.9 Form of Stock Option Award Agreement (2016).	Exhibit 10.2 to Form 8-K (filed 4/13/11) SEC File No.: 001-13953*
	Exhibit 10.1 to Form 8-K (filed 2/09/16) SEC File No.: 001-13953*

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Exhibit No.	Exhibit	Location
10.10	Form of Restricted Stock Award Agreement (2014)	Exhibit 10.4 to Form 10-Q (filed 5/8/14) SEC File No.: 001-13953*
10.11	Form of Restricted Stock Award Agreement (2016)	Exhibit 10.3 to Form 8-K (filed 2/09/16) SEC File No.: 001-13953*
10.12	W. R. Grace & Co. Supplemental Executive Retirement Plan, as amended.	Exhibit 10.7 to Form 10-K (filed 3/28/02) SEC File No.: 001-13953*
10.13	W. R. Grace & Co. Executive Salary Protection Plan, as amended.	Exhibit 10.8 to Form 10-K (filed 3/28/02) SEC File No.: 001-13953*
10.14	Form of Executive Change in Control Severance Agreement between Grace and certain officers.	Exhibit 10.17 to Form 10-K (filed 3/13/03) SEC File No.: 001-13953*
10.15	Severance Plan for Leadership Team Officers of W. R. Grace & Co.	Exhibit 10.2 to Form 8-K (filed 2/04/16) SEC File No.: 001-13953*
10.16	Annual Incentive Compensation Program.	Exhibit 10.15 to Form 10-Q (filed 5/8/14) SEC File No.: 001-13953*
10.17	2015 Executive Annual Incentive Compensation Plan	Exhibit 10.1 to Form 8-K (filed 5/12/15) SEC File No.: 001-13953*
10.18	Tax Sharing Agreement, dated as of January 27, 2016, by and among W. R. Grace & Co., W. R. Grace & Co.–Conn. and GCP Applied Technologies Inc.	Exhibit 10.1 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
10.19	Employee Matters Agreement, dated as of January 27, 2016, by and among W. R. Grace & Co., W. R. Grace & Co.–Conn. and GCP Applied Technologies Inc.	Exhibit 10.2 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
10.20	Transition Services Agreement, dated as of January 27, 2016, by and between W. R. Grace & Co.–Conn. and GCP Applied Technologies Inc.	Exhibit 10.3 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
10.21	Cross-License Agreement, dated as of January 27, 2016, by and among GCP Applied Technologies Inc., W. R. Grace & Co.–Conn. and Grace GmbH & Co. KG.	Exhibit 10.4 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
10.22	Grace Transitional License Agreement, dated as of January 27, 2016, by and between W. R. Grace & Co.–Conn. and GCP Applied Technologies Inc.	Exhibit 10.5 to Form 8-K (filed 1/28/16) SEC File No.: 001-13953
10.23	Letter Agreement dated May 27, 2009 between John F. Akers, on behalf of Grace, and Fred Festa (includes indemnification and arbitration provisions).	Exhibit 10.1 to Form 8-K (filed 5/29/09)

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		SEC File No.: 001-13953* Exhibit 10.1 to Form 8-K (filed 3/07/08)
10.24	Letter Agreement dated February 28, 2008 between Fred Festa, on behalf of Grace, and Hudson La Force III (includes indemnification provision).	SEC File No.: 001-13953* Exhibit 10.20 to Form 10-K (filed 2/25/15) SEC File No.:
10.25	Letter Agreement dated November 13, 2013, between Fred Festa, on behalf of Grace, and Keith N. Cole (includes indemnification provision).	001-13953* Exhibit 10.1 to Form 10-Q (filed 5/07/15) SEC File No.:
10.26	Letter Agreement dated December 3, 2014, between Fred Festa, on behalf of Grace, and Elizabeth C. Brown (includes indemnification provision).	001-13953* Exhibit 10.10 to Form 10-Q (filed 5/05/16) SEC File No.:
10.27	Accepted Letter dated January 21, 2016, between Fred Festa, on behalf of Grace, and Thomas E. Blaser (includes indemnification provision).	001-13953*
12	Computation of Ratio of Earnings to Fixed Charges and Combined Fixed Charges and Preferred Stock Dividends.	Filed herewith
21	List of Subsidiaries of W. R. Grace & Co.	Filed herewith
23	Consent of Independent Registered Public Accounting Firm.	Filed herewith
24	Powers of Attorney.	Filed herewith
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Exhibit No.	Exhibit	Location
31.(i).1	Certification of Periodic Report by Chief Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002	Filed herewith
31.(i).2	Certification of Periodic Report by Chief Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002	Filed herewith
32	Certification of Periodic Report by Chief Executive Officer and Chief Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002	Filed herewith
95	Mine Safety Disclosure Exhibit	Filed herewith
101.INS	XBRL Instance Document	Filed herewith
101.SCH	XBRL Taxonomy Extension Schema	Filed herewith
101.CAL	XBRL Taxonomy Extension Calculation Linkbase	Filed herewith
101.DEF	XBRL Taxonomy Extension Definition Linkbase	Filed herewith
101.LAB	XBRL Taxonomy Extension Label Linkbase	Filed herewith
101.PRE	XBRL Taxonomy Extension Presentation Linkbase	Filed herewith

* Management contracts and compensatory plans, contracts or arrangements required to be filed as exhibits to this Report.

Item 16. FORM 10-K SUMMARY

None.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

W. R. GRACE & CO.

By: /s/ A. E. FESTA

A. E. Festa

(Chairman and Chief Executive Officer)

By: /s/ THOMAS E. BLASER

Thomas E. Blaser

(Senior Vice President and Chief Financial Officer)

By: /s/ WILLIAM C. DOCKMAN

William C. Dockman

(Vice President and Controller)

Dated: February 23, 2017

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities indicated on February 23, 2017.

Signature	Title
H. F. Baldwin*	}
R. F. Cummings, Jr.*	}
J. Fasone Holder*	}
D. H. Gulyas*	} Directors
J. N. Quinn*	}
C. J. Steffen*	}
M. E. Tomkins*	}

/s/ A. E. FESTA

(A. E. Festa)

Chairman, Chief Executive Officer and Director (Principal Executive Officer)

/s/ THOMAS E. BLASER

(Thomas E. Blaser)

Senior Vice President and Chief Financial Officer

(Principal Financial Officer)

/s/ WILLIAM C. DOCKMAN

(William C. Dockman)

Vice President and Controller

(Principal Accounting Officer)

By signing his name hereto, Mark A. Shelnitz is signing this document on behalf of each of the persons indicated *above pursuant to powers of attorney duly executed by such persons and filed with the Securities and Exchange Commission.

By: /s/ MARK A. SHELNITZ

Mark A. Shelnitz

(Attorney-in-Fact)

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FINANCIAL SUPPLEMENT
W. R. GRACE & CO.
ANNUAL REPORT ON FORM 10-K
FOR THE YEAR ENDED DECEMBER 31, 2016

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The Financial Statement Schedule should be read in conjunction with the Consolidated Financial Statements and Notes thereto. Financial statements of less than majority-owned persons and other persons accounted for by the equity method have been omitted as provided in Rule 3-09 of the United States Securities and Exchange Commission's (SEC) Regulation S-X. Financial Statement Schedules not included have been omitted because they are not applicable or the required information is shown in the Consolidated Financial Statements or Notes thereto.

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Management's Report on Financial Information and Internal Controls

Responsibility For Financial Information—We are responsible for the preparation, accuracy, integrity and objectivity of the Consolidated Financial Statements and the other financial information included in this report. Such information has been prepared in conformity with accounting principles generally accepted in the United States of America and accordingly, includes certain amounts that represent management's best estimates and judgments. Actual amounts could differ from those estimates.

Responsibility For Internal Controls—We and our management are also responsible for establishing and maintaining adequate internal controls over financial reporting. These internal controls consist of policies and procedures that are designed to assess and monitor the effectiveness of the control environment including risk identification, governance structure, delegations of authority, information flow, communications and control activities. A chartered Disclosure Committee oversees Grace's public financial reporting process and key managers are required to confirm their compliance with Grace's policies and internal controls quarterly. While no system of internal controls can ensure elimination of all errors and irregularities, Grace's internal controls, which are reviewed and modified in response to changing conditions, have been designed to provide reasonable assurance that assets are safeguarded, policies and procedures are followed, transactions are properly executed and reported, and appropriate disclosures are made. The concept of reasonable assurance is based on the recognition that there are limitations in all systems of internal control and that the costs of such systems should be balanced with their benefits. The Audit Committee of the Board of Directors, which is composed solely of independent directors, meets regularly with Grace's senior financial management, internal auditors and independent registered public accounting firm to review audit plans and results, as well as the actions taken by management in discharging its responsibilities for accounting, financial reporting and internal controls. The Audit Committee is responsible for the selection and compensation of the independent registered public accounting firm. Grace's financial management, internal auditors and independent registered public accounting firm have direct and confidential access to the Audit Committee at all times.

Report On Internal Control Over Financial Reporting—We and our management have evaluated Grace's internal control over financial reporting as of December 31, 2016. This evaluation was based on criteria for effective internal control over financial reporting set forth in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, we and our management have concluded that Grace's internal control over financial reporting is effective as of December 31, 2016. Grace's independent registered public accounting firm that audited our financial statements included in Item 15 has also audited the effectiveness of Grace's internal control over financial reporting as of December 31, 2016, as stated in their report, which appears on the following page.

Report On Disclosure Controls And Procedures—As of December 31, 2016, we and our management carried out an evaluation of the effectiveness of the design and operation of Grace's disclosure controls and procedures pursuant to Rule 13a-15 under the Securities Exchange Act of 1934, as amended (the "Exchange Act"). Based upon that evaluation, we concluded that Grace's disclosure controls and procedures are effective in ensuring that information required to be disclosed in Grace's periodic filings and submissions under the Exchange Act is accumulated and communicated to us and our management to allow timely decisions regarding required disclosures, and such information is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms.

/s/ A. E. FESTA

/s/ THOMAS E. BLASER

A. E. Festa

Thomas E. Blaser

Chief Executive Officer Senior Vice President and Chief Financial Officer

February 23, 2017

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Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of W. R. Grace & Co.:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations, of comprehensive income, of equity, and of cash flows present fairly, in all material respects, the financial position of W. R. Grace & Co. and its subsidiaries (the "Company") at December 31, 2016 and 2015, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016 in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, the accompanying financial statement schedule presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements and financial statement schedule, 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 Financial Information and Internal Controls. Our responsibility is to express opinions on these financial statements, on the financial statement schedule, and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for debt issuance costs and the manner in which it accounts for stock compensation in 2016.

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 (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) 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 (iii) 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/ PricewaterhouseCoopers LLP

Baltimore, Maryland
February 23, 2017

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Consent of Independent Registered Public Accounting Firm

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (Nos. 333-194171, 333-173785) of W. R. Grace & Co. of our report dated February 23, 2017 relating to the consolidated financial statements, financial statement schedule, and the effectiveness of internal control over financial reporting, which appears in this Form 10 K.

/s/ PricewaterhouseCoopers LLP
Baltimore, Maryland
February 23, 2017

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Table of ContentsW. R. Grace & Co. and Subsidiaries
Consolidated Statements of Operations

(In millions, except per share amounts)	Year Ended December 31,		
	2016	2015	2014
Net sales	\$1,598.6	\$1,628.2	\$1,757.3
Cost of goods sold	942.7	976.5	1,093.3
Gross profit	655.9	651.7	664.0
Selling, general and administrative expenses	309.3	323.4	415.1
Research and development expenses	48.8	47.1	51.3
Interest expense and related financing costs	80.6	98.6	57.6
Interest accretion on deferred payment obligations	0.9	0.8	65.7
Restructuring and repositioning expenses	38.6	20.4	4.3
Equity in earnings of unconsolidated affiliate	(29.8	) (20.4	) (19.7
Provision for environmental remediation	28.7	6.4	13.8
Gain on termination and curtailment of postretirement plans	(0.5	) (4.5	) (39.5
Other (income) expense, net	13.3	(13.8	) 10.9
Total costs and expenses	489.9	458.0	559.5
Income (loss) from continuing operations before income taxes	166.0	193.7	104.5
(Provision for) benefit from income taxes	(59.0	) (69.8	) 12.4
Income (loss) from continuing operations	107.0	123.9	116.9
Income (loss) from discontinued operations, net of income taxes	(12.9	) 20.2	159.3
Net income (loss)	94.1	144.1	276.2
Less: Net (income) loss attributable to noncontrolling interests	—	0.1	0.1
Net income (loss) attributable to W. R. Grace & Co. shareholders	\$94.1	\$144.2	\$276.3
Amounts Attributable to W. R. Grace & Co. Shareholders:			
Income from continuing operations attributable to W. R. Grace & Co. shareholders	\$107.0	\$124.0	\$117.0
Income (loss) from discontinued operations, net of income taxes	(12.9	) 20.2	159.3
Net income attributable to W. R. Grace & Co. shareholders	\$94.1	\$144.2	\$276.3
Earnings Per Share Attributable to W. R. Grace & Co. Shareholders			
Basic earnings per share:			
Income (loss) from continuing operations	\$1.53	\$1.72	\$1.55
Income (loss) from discontinued operations, net of income taxes	(0.19	) 0.28	2.12
Net income (loss) attributable to W. R. Grace & Co. shareholders	\$1.34	\$2.00	\$3.67
Weighted average number of basic shares	70.1	72.0	75.3
Diluted earnings per share:			
Income (loss) from continuing operations	\$1.52	\$1.71	\$1.54
Income (loss) from discontinued operations, net of income taxes	(0.19	) 0.28	2.09
Net income attributable to W. R. Grace & Co. shareholders	\$1.33	\$1.99	\$3.63
Weighted average number of diluted shares	70.5	72.6	76.2
Dividends per common share	\$0.51	\$—	\$—

The Notes to Consolidated Financial Statements are an integral part of these statements.

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W. R. Grace & Co. and Subsidiaries

Consolidated Statements of Comprehensive Income

	Year Ended December 31,			
(In millions)	2016	2015	2014	
Net income (loss)	\$ 94.1	\$ 144.1	\$ 276.2	
Other comprehensive income (loss):				
Defined benefit pension and other postretirement plans, net of income taxes	(0.6)	(1.0)	(2.6)	
Currency translation adjustments	(1.8)	(43.3)	(28.0)	
Gain (loss) from hedging activities, net of income taxes	0.3	1.3	(4.5)	
Other than temporary impairment of investment	—	—	0.8	
Gain (loss) on securities available for sale, net of income taxes	—	—	(0.1)	
Total other comprehensive income (loss) attributable to noncontrolling interests	2.6	0.2	(2.2)	
Total other comprehensive income (loss)	0.5	(42.8)	(36.6)	
Comprehensive income	94.6	101.3	239.6	
Less: comprehensive (income) loss attributable to noncontrolling interests	(2.6)	(0.1)	2.3	
Comprehensive income attributable to W. R. Grace & Co. shareholders	\$ 92.0	\$ 101.2	\$ 241.9	

The Notes to Consolidated Financial Statements are an integral part of these statements.

Table of ContentsW. R. Grace & Co. and Subsidiaries
Consolidated Statements of Cash Flows

	Year Ended		
	December 31,		
(In millions)	2016	2015	2014
OPERATING ACTIVITIES			
Net income (loss)	\$94.1	\$144.1	\$276.2
Less: (income) loss from discontinued operations	12.9	(20.2)	(159.3)
Income (loss) from continuing operations	107.0	123.9	116.9
Reconciliation to net cash provided by (used for) operating activities from continuing operations:			
Depreciation and amortization	100.3	99.2	102.7
Equity in earnings of unconsolidated affiliate	(29.8)	(20.4)	(19.7)
Dividends received from unconsolidated affiliate	31.0	11.8	11.2
Costs related to Chapter 11, and legacy product and environmental	35.4	6.1	35.6
Cash paid for Chapter 11, and legacy product and environmental, net	(24.6)	(507.4)	(1,992.5)
Provision for (benefit from) income taxes	59.0	69.8	(12.4)
Cash paid for income taxes, net of refunds	(85.2)	(34.8)	(14.9)
Interest expense and accretion	81.5	99.4	123.3
Cash paid for interest on credit arrangements	(75.7)	(89.5)	(24.0)
Loss on early extinguishment of debt	11.1	—	—
Defined benefit pension expense (income)	72.6	50.9	162.1
Cash paid under defined benefit pension arrangements	(15.9)	(15.4)	(95.6)
Restructuring expenses	24.3	11.3	4.3
Cash paid for restructuring	(16.0)	(5.6)	(3.6)
Changes in assets and liabilities, excluding effect of currency translation and acquisitions:			
Trade accounts receivable	(15.7)	(18.0)	(24.8)
Inventories	(0.6)	3.8	(27.6)
Accounts payable	32.0	7.3	(22.7)
All other items, net	(23.2)	17.8	(13.6)
Net cash provided by (used for) operating activities from continuing operations	267.5	(189.8)	(1,695.3)
INVESTING ACTIVITIES			
Capital expenditures	(116.9)	(118.8)	(132.3)
Business acquired	(246.5)	—	—
Transfer (to) from restricted cash and cash equivalents	(0.6)	(9.4)	390.1
Proceeds from sale of assets	13.7	—	—
Other investing activities	5.3	16.2	3.8
Net cash provided by (used for) investing activities from continuing operations	(345.0)	(112.0)	261.6
FINANCING ACTIVITIES			
Borrowings under credit arrangements	39.4	292.4	1,096.8
Repayments under credit arrangements	(633.0)	(50.0)	(735.9)
Proceeds from issuance of bonds	—	—	1,000.0
Cash paid for debt financing costs	(0.3)	(2.5)	(46.6)
Cash paid for repurchases of common stock	(195.1)	(301.5)	(469.5)
Proceeds from exercise of stock options	17.0	26.9	23.4
Dividends paid	(36.0)	—	—
Distribution from GCP	750.0	—	—
Other financing activities	(2.2)	(5.8)	(4.0)

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Net cash provided by (used for) financing activities from continuing operations	(60.2)	(40.5)	864.2
Effect of currency exchange rate changes on cash and cash equivalents	(3.0)	(1.7)	(5.0)
Increase (decrease) in cash and cash equivalents from continuing operations	(140.7)	(344.0)	(574.5)
Cash flows from discontinued operations			
Net cash provided by (used for) operating activities	23.9	202.5	222.0
Net cash provided by (used for) investing activities	(9.5)	(32.4)	(26.3)
Net cash provided by (used for) financing activities	31.4	2.9	(13.1)
Effect of currency exchange rate changes on cash and cash equivalents	(1.0)	(56.6)	(15.4)
Increase (decrease) in cash and cash equivalents from discontinued operations	44.8	116.4	167.2
Net increase (decrease) in cash and cash equivalents	(95.9)	(227.6)	(407.3)
Less: cash and cash equivalents of discontinued operations	(143.4)	—	—
Cash and cash equivalents, beginning of period	329.9	557.5	964.8
Cash and cash equivalents, end of period	\$90.6	\$329.9	\$557.5
Supplemental disclosure of cash flow information			
Cash paid for interest	\$75.7	\$89.5	\$692.2
Net share settled stock option exercises	10.5	—	—

The Notes to Consolidated Financial Statements are an integral part of these statements.

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Table of ContentsW. R. Grace & Co. and Subsidiaries
Consolidated Balance Sheets

	December 31,	
(In millions, except par value and shares)	2016	2015
ASSETS		
Current Assets		
Cash and cash equivalents	\$90.6	\$231.3
Restricted cash and cash equivalents	10.0	9.4
Trade accounts receivable, less allowance of \$2.2 (2015—\$1.4)	273.9	254.5
Inventories	228.0	198.8
Other current assets	52.3	44.1
Assets of discontinued operations	—	446.4
Total Current Assets	654.8	1,184.5
Properties and equipment, net of accumulated depreciation and amortization of \$1,327.5 (2015—\$1,286.8)	729.6	621.7
Goodwill	394.2	336.5
Technology and other intangible assets, net	269.1	227.5
Deferred income taxes	709.4	714.3
Investment in unconsolidated affiliate	117.6	103.2
Other assets	37.1	33.9
Assets of discontinued operations	—	424.1
Total Assets	\$2,911.8	\$3,645.7
LIABILITIES AND EQUITY		
Current Liabilities		
Debt payable within one year	\$76.5	\$58.1
Accounts payable	195.4	157.8
Other current liabilities	208.9	232.9
Liabilities of discontinued operations	—	258.6
Total Current Liabilities	480.8	707.4
Debt payable after one year	1,507.6	2,111.5
Deferred income taxes	2.8	1.2
Unrecognized tax benefits	0.3	9.8
Underfunded and unfunded defined benefit pension plans	424.3	377.5
Other liabilities	123.6	115.9
Liabilities of discontinued operations	—	109.9
Total Liabilities	2,539.4	3,433.2
Commitments and Contingencies—Note 10		
Equity		
Common stock issued, par value \$0.01; 300,000,000 shares authorized; outstanding: 68,309,431 (2015—70,533,515)	0.7	0.7
Paid-in capital	487.3	496.0
Retained earnings	619.3	436.3
Treasury stock, at cost: shares: 9,147,196 (2015—6,923,110)	(804.9)	(658.4)
Accumulated other comprehensive income (loss)	66.4	(66.8)
Total W. R. Grace & Co. Shareholders' Equity	368.8	207.8
Noncontrolling interests	3.6	4.7
Total Equity	372.4	212.5
Total Liabilities and Equity	\$2,911.8	\$3,645.7

The Notes to Consolidated Financial Statements are an integral part of these statements.

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Table of ContentsW. R. Grace & Co. and Subsidiaries
Consolidated Statements of Equity

(In millions)	Common Stock and Paid-in Capital	Retained Earnings (Accumulated Deficit)	Treasury Stock	Accumulated Other Comprehensive (Loss) Income	Noncontrolling Interests	Total Equity
Balance, December 31, 2013	\$ 534.2	\$ 15.8	\$—	\$ 10.6	\$ 10.6	\$571.2
Net income (loss)	—	276.3	—	—	1.0	277.3
Repurchase of common stock	(0.1)	—	(469.4)	—	—	(469.5)
Stock based compensation	12.5	—	—	—	—	12.5
Exercise of stock options	(16.8)	—	40.2	—	—	23.4
Purchase of noncontrolling interest	(6.1)	—	—	—	(6.3)	(12.4)
Tax benefit related to stock plans	1.2	—	—	—	—	1.2
Shares issued	1.9	—	—	—	—	1.9
Other comprehensive income (loss)	—	—	—	(34.4)	(2.2)	(36.6)
Balance, December 31, 2014	526.8	292.1	(429.2)	(23.8)	3.1	369.0
Net income (loss)	—	144.2	—	—	0.7	144.9
Repurchase of common stock	—	—	(301.5)	—	—	(301.5)
Stock based compensation	13.0	—	—	—	—	13.0
Exercise of stock options	(45.4)	—	72.3	—	—	26.9
Purchase of noncontrolling interest	(0.7)	—	—	—	0.7	—
Tax benefit related to stock plans	1.9	—	—	—	—	1.9
Shares issued	1.1	—	—	—	—	1.1
Other comprehensive income (loss)	—	—	—	(43.0)	0.2	(42.8)
Balance, December 31, 2015	496.7	436.3	(658.4)	(66.8)	4.7	212.5
Net income (loss)	—	94.1	—	—	—	94.1
Repurchase of common stock	—	—	(195.1)	—	—	(195.1)
Stock based compensation	11.6	—	—	—	—	11.6
Exercise of stock options	(21.1)	—	48.6	—	—	27.5
Tax benefit related to stock plans	—	70.4	—	—	—	70.4
Shares issued	0.8	—	—	—	—	0.8
Cash dividends declared	—	(36.0)	—	—	—	(36.0)
Other comprehensive income (loss)	—	—	—	(2.1)	2.6	0.5
Distribution of GCP	—	54.5	—	135.3	(3.7)	186.1
Balance, December 31, 2016	\$ 488.0	\$ 619.3	\$(804.9)	\$ 66.4	\$ 3.6	\$372.4

The Notes to Consolidated Financial Statements are an integral part of these statements.

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Notes to Consolidated Financial Statements

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies

W. R. Grace & Co., through its subsidiaries, is engaged in specialty chemicals and specialty materials businesses on a global basis through two reportable segments: Grace Catalysts Technologies, which includes catalysts and related products and technologies used in refining, petrochemical and other chemical manufacturing applications; and Grace Materials Technologies, which includes specialty materials, including silica-based and silica-alumina-based materials, used in coatings, consumer, industrial, and pharmaceutical applications.

W. R. Grace & Co. conducts all of its business through a single wholly owned subsidiary, W. R. Grace & Co.–Conn. ("Grace–Conn."). Grace–Conn. owns all of the assets, properties and rights of W. R. Grace & Co. on a consolidated basis, either directly or through subsidiaries.

As used in these notes, the term "Company" refers to W. R. Grace & Co. The term "Grace" refers to the Company and/or one or more of its subsidiaries and, in certain cases, their respective predecessors.

Separation Transaction On January 27, 2016, Grace entered into a separation agreement with GCP Applied Technologies Inc., then a wholly-owned subsidiary of Grace ("GCP"), pursuant to which Grace agreed to transfer its Grace Construction Products operating segment and the packaging technologies business of its Grace Materials Technologies operating segment to GCP (the "Separation"). Grace and GCP completed the Separation on February 3, 2016 (the "Distribution Date"), by means of a pro rata distribution to the Company's stockholders of all of the outstanding shares of GCP common stock (the "Distribution"), with one share of GCP common stock distributed for each share of Company common stock held as of the close of business on January 27, 2016. As a result of the Distribution, GCP became an independent public company. GCP's historical financial results through the Distribution Date are reflected in Grace's Consolidated Financial Statements as discontinued operations.

Chapter 11 Proceedings On April 2, 2001, Grace and 61 of its United States subsidiaries and affiliates filed voluntary petitions for reorganization under Chapter 11 of the United States Bankruptcy Code in the United States Bankruptcy Court for the District of Delaware (the "Bankruptcy Court") in order to resolve outstanding asbestos personal injury and property damage claims, including class-action lawsuits alleging damages from Zonolite® Attic Insulation ("ZAI"), a former Grace attic insulation product. In 2008, Grace and other parties filed a joint plan of reorganization with the Bankruptcy Court (as subsequently amended, the "Joint Plan"). Following the confirmation of the Joint Plan in 2011 by the Bankruptcy Court and in 2012 by a U.S. District Court, and the resolution of all appeals, Grace emerged from bankruptcy on February 3, 2014.

Principles of Consolidation The Consolidated Financial Statements include the accounts of Grace and entities as to which Grace maintains a controlling financial interest. Intercompany transactions and balances are eliminated in consolidation. Investments in affiliated companies in which Grace can significantly influence operating and financial policies, but does not have a controlling financial interest, are accounted for under the equity method.

Grace conducts certain of its business through joint ventures with unaffiliated third parties. For joint ventures in which Grace has a controlling financial interest, Grace consolidates the results of such joint ventures in the Consolidated Financial Statements. Grace recognizes a liability for cumulative amounts due to the third parties based on the financial results of the joint ventures, and deducts the amount of income attributable to noncontrolling interests in the measurement of its consolidated net income.

Reportable Segments Grace reports financial results of each of its reportable segments that engage in business activities that generate revenues and expenses and whose operating results are regularly reviewed by Grace's Chief Executive Officer and Chief Operating Officer.

Use of Estimates The preparation of financial statements in conformity with U.S. generally accepted accounting principles ("U.S. GAAP") requires management to make estimates and assumptions that affect the reported amount of assets and liabilities and disclosure of contingent assets and liabilities at the date of the Consolidated Financial Statements, and the reported amounts of revenues and expenses for the periods presented. Actual amounts could differ from those estimates, and the differences could be material. Changes in estimates are recorded in the period identified. Grace's accounting measurements that are most affected by management's estimates of future events are:

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Notes to Consolidated Financial Statements (Continued)

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies (Continued)

Realization values of net deferred tax assets, which depend on projections of future taxable income (see Note 7);
 Pension and postretirement liabilities, which depend on assumptions regarding participant life spans, future inflation, discount rates and total returns on invested funds (see Note 8);

Carrying values of goodwill and other intangible assets, which depend on assumptions of future earnings and cash flows (see Note 4 and Note 20), and

Contingent liabilities, which depend on an assessment of the probability of loss and an estimate of ultimate obligation, such as litigation (see Note 10), income taxes (see Note 7), and environmental remediation (see Note 10).

Revenue Recognition Grace recognizes revenue when all of the following criteria are satisfied: risk of loss and title transfer to the customer; the price is fixed and determinable; persuasive evidence of a sales arrangement exists; and collectability is reasonably assured. The point at which risk of loss and title transfers to a customer is determined based on delivery terms, which are generally included in customer contracts of sale, order confirmation documents and invoices.

Cash Equivalents Cash equivalents consist of liquid instruments and investments with maturities of three months or less when purchased. The recorded amounts approximate fair value.

Inventories Inventories are stated at the lower of cost or market. The method used to determine cost is first-in/first-out, or "FIFO." Market values for raw materials are based on current cost and, for other inventory classifications, net realizable value. Inventories are evaluated regularly for salability, and slow moving and/or obsolete items are adjusted to expected salable value. Inventory values include direct and certain indirect costs of materials and production. Abnormal costs of production are expensed as incurred.

Long Lived Assets Properties and equipment are stated at cost. Depreciation of properties and equipment is generally computed using the straight-line method over the estimated useful life of the asset. Estimated useful lives range from 20 to 30 years for buildings, 3 to 7 years for information technology equipment, 3 to 10 years for operating machinery and equipment, and 5 to 10 years for furniture and fixtures. Interest is capitalized in connection with major project expenditures. Fully depreciated assets are retained in properties and equipment and related accumulated depreciation accounts until they are removed from service. In the case of disposals, assets and related accumulated depreciation are removed from the accounts and the net amount, less any proceeds from disposal, is charged or credited to earnings. Obligations for costs associated with asset retirements, such as requirements to restore a site to its original condition, are accrued at net present value and amortized along with the related asset.

Intangible assets with finite lives consist of technology, customer lists, trademarks and other intangibles and are amortized over their estimated useful lives, ranging from 1 to 30 years.

Grace reviews long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be fully recoverable. There were no impairment charges recorded in 2016, 2015 or 2014.

Goodwill Goodwill arises from business combinations, and it is reviewed for impairment on an annual basis at October 31 and whenever events or changes in circumstances indicate that the carrying amount may not be fully recoverable. Recoverability is assessed at the reporting unit level most directly associated with the business combination that generated the goodwill. For the purpose of measuring impairment under the provisions of ASC 350 "Intangibles—Goodwill and Other," Grace has identified its operating segments as reporting units. Grace has evaluated its goodwill annually with no impairment charge required in any of the periods presented.

Financial Instruments Grace uses commodity forward, swap and/or option contracts and currency forward and/or option contracts to manage exposure to fluctuations in commodity prices and currency exchange rates. Grace does not hold or issue derivative financial instruments for trading purposes. Derivative instruments

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Notes to Consolidated Financial Statements (Continued)

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies (Continued)

are recorded at fair value in the Consolidated Balance Sheets as either assets or liabilities. For derivative instruments designated as fair value hedges, changes in the fair values of the derivative instruments closely offset changes in the fair values of the hedged items in "other (income) expense, net" in the Consolidated Statements of Operations. For derivative instruments designated as cash flow hedges, if the derivative instruments qualify for hedge accounting pursuant to ASC 815, the effective portion of any hedge is reported as "accumulated other comprehensive income (loss)" in the Consolidated Balance Sheets until it is cleared to earnings during the same period in which the hedged item affects earnings. The ineffective portion of all hedges, and changes in the fair values of derivative instruments that are not designated as hedges, are recorded in current period earnings. Cash flows from derivative instruments are reported in the same category as the cash flows from the items being hedged.

Income Taxes Deferred tax assets and liabilities are recognized with respect to the expected future tax consequences of events that have been recorded in the Consolidated Financial Statements. If it is more likely than not that all or a portion of deferred tax assets will not be realized, a valuation allowance is provided against such deferred tax assets. The assessment of realization of deferred tax assets is performed based on the weight of the positive and negative evidence available to indicate whether the asset is recoverable, including tax planning strategies that are prudent and feasible.

Tax benefits from an uncertain tax position are recognized only if it is more likely than not that the tax position will be sustained upon examination by the taxing authorities based on the technical merits of the position. Tax benefits recognized in the financial statements from such a position are measured based on the largest benefit that has a greater than fifty percent likelihood of being realized upon ultimate settlement. Grace evaluates such likelihood based on relevant facts and tax law. Grace adjusts its recorded liability for income tax matters due to changes in circumstances or new uncertainties, such as amendments to existing tax law. Grace's ultimate tax liability depends upon many factors, including negotiations with taxing authorities in the jurisdictions in which it operates, outcomes of tax litigation, and resolution of disputes arising from federal, state, and foreign tax audits. Due to the varying tax laws in each jurisdiction management, with the assistance of local tax advisors as necessary, assesses individual matters in each jurisdiction on a case-by-case basis. Grace researches and evaluates its income tax positions, including why it believes they are compliant with income tax regulations, and these positions are documented as appropriate.

Pension Benefits Grace's method of accounting for actuarial gains and losses relating to its global defined benefit pension plans is referred to as "mark-to-market accounting." Under mark-to-market accounting, Grace's pension costs consist of two elements: 1) ongoing costs recognized quarterly, which include service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits; and 2) mark-to-market gains and losses recognized annually in the fourth quarter resulting from changes in actuarial assumptions, such as discount rates and the difference between actual and expected returns on plan assets. Should a significant event occur, Grace's pension obligation and plan assets are remeasured at an interim period, and the gains or losses on remeasurement are recognized in that period.

Stock-Based Compensation The Company recognizes expenses related to stock-based compensation payment transactions in which it receives employee services in exchange for (a) equity instruments of the Company or (b) liabilities that are based on the fair value of the Company's equity instruments or that may be settled by the issuance of equity instruments. Stock-based compensation cost for restricted stock units (RSUs) and share settled performance based units (PBUs) are measured based on the high/low average of the Company's common stock on the date of grant. Cash settled performance based units (CSPBU) are remeasured at the end of each reporting period based on the closing fair market value of the Company's common stock. Stock-based compensation cost for stock options is estimated at the grant date based on each option's fair value as calculated by the Black-Scholes option pricing model. The Company recognizes stock-based compensation cost as expense ratably on a straight-line basis over the requisite

service period.

Currency Translation Assets and liabilities of foreign subsidiaries (other than those located in countries with highly inflationary economies) are translated into U.S. dollars at current exchange rates, while revenues, costs and expenses are translated at average exchange rates during each reporting period. The resulting

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Notes to Consolidated Financial Statements (Continued)

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies (Continued)

translation adjustments are included in "accumulated other comprehensive income (loss)" in the Consolidated Balance Sheets. The financial statements of any subsidiaries located in countries with highly inflationary economies are remeasured as if the functional currency were the U.S. dollar; the remeasurement creates translation adjustments that are reflected in net income in the Consolidated Statements of Operations.

Reclassifications Certain amounts in prior years' Consolidated Financial Statements have been reclassified to conform to the current year presentation. Such reclassifications have not materially affected previously reported amounts in the Consolidated Financial Statements.

Recently Issued Accounting Standards In May 2014, the FASB issued ASU 2014-09 "Revenue from Contracts with Customers." This update is intended to remove inconsistencies and weaknesses in revenue requirements; provide a more robust framework for addressing revenue issues; improve comparability of revenue recognition practices across entities, industries, jurisdictions and capital markets; provide more useful information to users of financial statements through improved disclosure requirements; and simplify the preparation of financial statements by reducing the number of requirements to which an entity must refer. The new requirements are effective for fiscal years beginning after December 15, 2017, and for interim periods within those fiscal years, with early adoption permitted for fiscal years beginning after December 15, 2016. The standard allows for two methods of adoption: (a) full retrospective adoption, meaning the standard is applied to all periods presented, or (b) modified retrospective adoption, meaning the cumulative effect of applying the new standard is recognized as an adjustment to the opening retained earnings balance. Grace will adopt the standard when it becomes effective. Grace has begun its preliminary assessment and is identifying specific areas of impact on its Consolidated Financial Statements. Grace has tentatively decided to adopt this standard under the modified retrospective approach and is still evaluating the impact to its financial statements and disclosures.

In July 2015, the FASB issued ASU 2015-11 "Simplifying the Measurement of Inventory." This update is part of the FASB's Simplification Initiative and is also intended to enhance convergence with the International Accounting Standards Board's ("IASB") measurement of inventory. The update requires that inventory be measured at the lower of cost or net realizable value for entities using FIFO (first-in, first-out) or average cost methods. The new requirements are effective for fiscal years beginning after December 15, 2016, and for interim periods within those fiscal years, with early adoption permitted. Grace will adopt this standard in 2017 and does not expect it to have a material effect on the Consolidated Financial Statements.

In February 2016, the FASB issued ASU 2016-02 "Leases (Topic 842)." This update is intended to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. The core principle of Topic 842 is that a lessee should recognize the assets and liabilities that arise from leases. A lessee should recognize in the statement of financial position a liability to make lease payments (the lease liability) and a right-of-use asset representing its right to use the underlying asset for the lease term, including optional payments where they are reasonably certain to occur. The amendments in this update are effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years, with early adoption permitted. Currently, as a lessee Grace is a party to a number of leases which, under existing guidance, are classified as operating leases and not recorded on the balance sheet but are expensed as incurred (See Note 3). Under the new standard, many of these leases will be recorded on the Consolidated Balance Sheets. Grace is currently evaluating the standard's effect on the financial statements and will adopt the standard in 2019.

In August 2016, the FASB issued ASU 2016-15 "Classification of Certain Cash Receipts and Cash Payments." This update is intended to reduce diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. It addresses eight specific issues. The amendments in this update are

effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years, with early adoption permitted. Grace is currently evaluating the timing of adoption and does not expect it to have a material effect on the Consolidated Financial Statements.

In November 2016, the FASB issued ASU 2016-18 "Statement of Cash Flows (Topic 230): Restricted Cash", which requires that a statement of cash flows explain the change during the period in the total of cash, cash

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Notes to Consolidated Financial Statements (Continued)

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies (Continued)

equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The new requirements are effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years, with early adoption is permitted. Grace is currently evaluating the timing of adoption and does not expect the update to have a material effect on the Consolidated Financial Statements. As of December 31, 2016 and 2015, restricted cash included the Consolidated Balance Sheets was \$10.0 million and \$9.4 million, respectively.

In January 2017, the FASB issued ASU 2017-01 "Business Combinations (Topic 805)," which provides a screen to determine when an integrated set of assets and activities is not a business. The screen requires that when substantially all of the fair value of the gross assets acquired (or disposed of) is concentrated in a single identifiable asset or a group of similar identifiable assets, the set is not a business. This screen reduces the number of transactions that need to be further evaluated. If the screen is not met, the amendments in this Update (1) require that to be considered a business, a set must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create output and (2) remove the evaluation of whether a market participant could replace missing elements. The amendments in this Update also narrow the definition of the term output so that the term is consistent with how outputs are described in Topic 606. Public business entities are required to apply the amendments in this Update to annual periods beginning after December 15, 2017, including interim periods within those periods. Early application is permitted. Grace is currently evaluating the date of application.

In January 2017, the FASB issued ASU 2017-04 "Intangibles—Goodwill and Other (Topic 350)." This Update modifies the concept of impairment from the condition that exists when the carrying amount of goodwill exceeds its implied fair value to the condition that exists when the carrying amount of a reporting unit exceeds its fair value. An entity no longer will determine goodwill impairment by calculating the implied fair value of goodwill by assigning the fair value of a reporting unit to all of its assets and liabilities as if that reporting unit had been acquired in a business combination. Because these amendments eliminate Step 2 from the goodwill impairment test, they should reduce the cost and complexity of evaluating goodwill for impairment. Public business entities are required to adopt the amendments in this Update for annual or any interim goodwill impairment tests in fiscal years beginning after December 15, 2019. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017.

Recently Adopted Accounting Standards In April 2014, the FASB issued ASU 2014-08 "Reporting Discontinued Operations and Disclosures of Disposals of Components of an Entity." This update is intended to change the requirements for reporting discontinued operations and enhance convergence of the FASB's and the IASB's reporting requirements for discontinued operations. Grace adopted this standard in the 2016 first quarter.

In April 2015, the FASB issued ASU 2015-03 "Simplifying the Presentation of Debt Issuance Costs." This update is part of the FASB's Simplification Initiative and is also intended to enhance convergence with the IASB's treatment of debt issuance costs. The update requires that debt issuance costs related to a recognized debt liability be presented in the balance sheet as a direct deduction from the carrying amount of that debt liability, consistent with debt discounts.

In August 2015, the FASB issued ASU 2015-15 "Presentation and Subsequent Measurement of Debt Issuance Costs Associated with Line-of-Credit Arrangements." The update clarifies ASU 2015-03, allowing debt issuance costs related to line of credit arrangements to be deferred and presented as an asset and subsequently amortized ratably over the term of the line-of-credit arrangement, regardless of whether there are any outstanding borrowings on the line-of-credit arrangement. Grace adopted these standards in the 2016 first quarter and reclassified \$30.3 million of capitalized financing fees from other assets to debt payable after one year in the Consolidated Balance Sheet as of

December 31, 2015.

In September 2015, the FASB issued ASU 2015-16 "Simplifying the Accounting for Measurement-Period Adjustments," which is part of the FASB's Simplification Initiative. The update requires that adjustments to provisional amounts that are identified during the measurement period following a business combination be recognized in the reporting period in which the adjustment amounts are determined. Acquirers must also

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Notes to Consolidated Financial Statements (Continued)

1. Basis of Presentation and Summary of Significant Accounting and Financial Reporting Policies (Continued)

recognize, in the same period's financial statements, the effect on earnings of changes in depreciation, amortization, or other income effects resulting from the change to the provisional amounts, calculated as if the accounting had been completed at the acquisition date. Grace adopted this standard in the 2016 third quarter. See Note 20.

Accounting for Stock Compensation

In March 2016, the FASB issued ASU 2016-09 "Compensation—Stock Compensation," which is part of the FASB's Simplification Initiative. The update requires that excess tax benefits and deficiencies be recorded in the income statement when the awards vest or are settled. It also eliminates the requirement that excess tax benefits be realized (reduce cash taxes payable) before being recognized. Previously, an entity could not recognize excess tax benefits if the tax deduction increased a net operating loss ("NOL") or tax credit carryforward. The updated standard no longer requires cash flows related to excess tax benefits to be presented as a financing activity separate from other income tax cash flows. The update also allows Grace to repurchase more of an employee's shares for tax withholding purposes without triggering liability accounting, clarifies that all cash payments to taxing authorities made on an employee's behalf for withheld shares should be presented as a financing activity on the statement of cash flows, and provides for an accounting policy election to account for forfeitures as they occur.

Grace elected to early adopt this update in the 2016 second quarter, which requires any adjustments to be reflected as of January 1, 2016. This resulted in the recognition of excess tax benefits on the Consolidated Balance Sheet that were previously not recognized, as the benefits would have increased Grace's NOL or tax credit carryforwards. The recognition increased Grace's net deferred tax asset by \$70.4 million (\$90.9 million net of a \$20.5 million valuation allowance) as of January 1, 2016.

In addition, Grace will recognize excess tax benefits in the provision for income taxes rather than paid-in capital for 2016 and future periods. Grace has elected to continue to estimate forfeitures expected to occur to determine the amount of compensation expense to be recognized each period.

2. Inventories

Inventories are stated at the lower of cost or market, and cost is determined using FIFO. Inventories consisted of the following at December 31, 2016 and 2015:

	December 31,	
(In millions)	2016	2015
Raw materials	\$57.7	\$47.1
In process	33.4	33.4
Finished products	115.8	98.2
Other	21.1	20.1
	\$228.0	\$198.8

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Notes to Consolidated Financial Statements (Continued)

3. Properties and Equipment

(In millions)	December 31,	
	2016	2015
Land	\$10.0	\$9.8
Buildings	375.4	369.9
Information technology and equipment	125.3	119.4
Machinery, equipment and other	1,445.8	1,329.5
Projects under construction	100.6	79.9
Properties and equipment, gross	2,057.1	1,908.5
Accumulated depreciation and amortization	(1,327.5)	(1,286.8)
Properties and equipment, net	\$729.6	\$621.7

Capitalized interest costs amounted to \$1.3 million, \$1.0 million, and \$1.2 million in 2016, 2015, and 2014, respectively. Depreciation and lease amortization expense relating to properties and equipment was \$85.7 million, \$81.8 million, and \$83.9 million in 2016, 2015, and 2014, respectively. Grace's rental expense for operating leases was \$10.0 million, \$10.6 million, and \$10.5 million in 2016, 2015, and 2014, respectively.

At December 31, 2016, minimum future non-cancelable payments for operating leases are:

	(In millions)
2017	\$ 9.0
2018	6.0
2019	3.9
2020	2.6
2021	2.1
Thereafter	4.4
	\$ 28.0

4. Goodwill and Other Intangible Assets

The carrying amount of goodwill attributable to each reportable segment and the changes in those balances during the years ended December 31, 2016 and 2015, are as follows:

(In millions)	Catalysts	Materials	Total
	Technologies	Technologies	Grace
Balance, December 31, 2014	\$ 293.8	\$ 45.1	\$338.9
Foreign currency translation	(1.1)	(1.3)	(2.4)
Balance, December 31, 2015	292.7	43.8	336.5
Goodwill acquired during the year	63.8	—	63.8
Foreign currency translation	(3.0)	(0.6)	(3.6)
Write-off related to exited product lines	—	(2.5)	(2.5)
Balance, December 31, 2016	\$ 353.5	\$ 40.7	\$394.2

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Notes to Consolidated Financial Statements (Continued)

4. Goodwill and Other Intangible Assets (Continued)

Grace's net book value of other intangible assets at December 31, 2016 and 2015, was \$269.1 million and \$227.5 million, respectively, detailed as follows:

(In millions)	December 31, 2016		December 31, 2015	
	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Technology	\$222.3	\$ 38.9	\$237.5	\$ 51.0
Customer lists	69.6	20.3	43.0	29.3
Trademarks	25.3	1.5	22.8	9.4
Other	15.7	3.1	16.6	2.7
Total	\$332.9	\$ 63.8	\$319.9	\$ 92.4

Amortization expense related to intangible assets was \$13.9 million, \$16.2 million, and \$17.0 million in 2016, 2015, and 2014, respectively.

At December 31, 2016, estimated future annual amortization expense for intangible assets is:

	(In millions)
2017	\$ 15.2
2018	15.1
2019	15.1
2020	14.9
2021	14.7
Thereafter	194.1
	\$ 269.1

5. Debt

Components of Debt

(In millions)	December 31,		
	2016	2015	
5.125% senior notes due 2021, net of unamortized debt issuance costs of \$7.3 at December 31, 2016 (2015—\$8.9)	\$692.7	\$691.1	
U.S. dollar term loan, net of unamortized debt issuance costs and discounts of \$5.7 at December 31, 2016 (2015—\$15.6)	402.7	919.3	
5.625% senior notes due 2024, net of unamortized debt issuance costs of \$4.0 at December 31, 2016 (2015—\$4.5)	296.0	295.5	
Euro term loan, net of unamortized debt issuance costs and discounts of \$1.3 at December 31, 2016 (2015—\$3.4)	82.5	158.7	
Debt payable—unconsolidated affiliate	39.5	33.4	
Deferred payment obligation	30.0	29.1	
Other borrowings(1)	40.7	42.5	
Total debt	1,584.1	2,169.6	
Less debt payable within one year	76.5	58.1	
Debt payable after one year	\$1,507.6	\$2,111.5	
Weighted average interest rates on total debt	4.6	% 4.1	%

(1) Represents borrowings under various lines of credit and other borrowings, primarily by non-U.S. subsidiaries.

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Notes to Consolidated Financial Statements (Continued)

5. Debt (Continued)

See Note 6 for a discussion of the fair value of Grace's debt.

The principal maturities of debt outstanding at December 31, 2016, were as follows:

	(In millions)
2017	\$ 76.5
2018	7.9
2019	7.3
2020	6.0
2021	1,182.5
Thereafter	303.9
Total debt	\$ 1,584.1

Credit Agreement

On February 3, 2014, Grace entered into a Credit Agreement (the "Credit Agreement") in connection with its exit financing. The Credit Agreement provides for:

- (a) a \$700 million term loan due in 2021, with interest at LIBOR +225 bps with a 75 bps floor;
- (b) a €150 million term loan due in 2021, with interest at EURIBOR +250 bps with a 75 bps floor;
- (c) a \$400 million revolving credit facility due in 2019, with interest at LIBOR +175 bps; and
- (d) a \$250 million delayed draw term loan facility available for 12 months, with amounts drawn due in 2021, with interest at LIBOR +225 bps with a 75 bps floor.

The Credit Agreement contains customary affirmative covenants, including, but not limited to (i) maintenance of legal existence and compliance with laws and regulations; (ii) delivery of consolidated financial statements and other information; (iii) payment of taxes; (iv) delivery of notices of defaults and certain other material events; and (v) maintenance of adequate insurance. The Credit Agreement also contains customary negative covenants, including but not limited to restrictions on (i) dividends on, and redemptions of, equity interests and other restricted payments; (ii) liens; (iii) loans and investments; (iv) the sale, transfer or disposition of assets and businesses; (v) transactions with affiliates; and (vii) a maximum total leverage ratio. The Credit Agreement contains conditions that would require mandatory principal payments in advance of the term loan maturity date; none of these conditions had been triggered as of December 31, 2016.

Events of default under the Credit Agreement include, but are not limited to: (i) failure to pay principal, interest, fees or other amounts under the Credit Agreement when due, taking into account any applicable grace period; (ii) any representation or warranty proving to have been incorrect in any material respect when made; (iii) failure to perform or observe covenants or other terms of the Credit Agreement subject to certain grace periods; (iv) a cross-default and cross-acceleration with certain other material debt; (v) bankruptcy events; (vi) certain defaults under ERISA; and (vii) the invalidity or impairment of security interests.

To secure its obligations under the Credit Agreement, the Company has granted security interests in the shares of its Grace-Conn. and Alltech Associates, Inc. subsidiaries, substantially all of its U.S. non-real estate assets and property, and certain U.S. real estate.

On January 30, 2015, Grace borrowed on its \$250 million delayed draw term loan facility and used the funds, together with cash on hand, to repurchase the warrant issued to the asbestos personal injury trust (the "PI Trust") for \$490 million. (See Note 10 for Chapter 11 information.)

Grace had no outstanding draws on its revolving credit facility as of December 31, 2016; however, the available credit under that facility was reduced to \$257.2 million by outstanding letters of credit.

During the 2015 fourth quarter, to permit the Separation, Grace entered into an amendment to the Credit Agreement. The amendment, which became effective upon completion of the Separation, revised certain

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Notes to Consolidated Financial Statements (Continued)

5. Debt (Continued)

covenants, reduced the revolving credit facility limit to \$300 million and extended the facility's term to November 1, 2020. The Separation had no impact on payment or other terms of the senior notes, which remained obligations of Grace.

In connection with the Separation, GCP distributed \$750 million to Grace. Grace used \$600 million of those funds to repay \$526.9 million of its U.S. dollar term loan and €67.3 million of its euro term loan. As a result, Grace recorded a loss on early extinguishment of \$11.1 million, which is included in "other (income) expense" in the Consolidated Statements of Operations. See Note 21 for information related to the Separation.

Senior Notes

On September 16, 2014, Grace-Conn. (the "Issuer") issued \$1,000.0 million of senior unsecured notes (the "Notes") in two tranches:

(a) \$700 million in aggregate principal amount of Notes due 2021 at a coupon rate of 5.125%, and

(b) \$300 million in aggregate principal amount of Notes due 2024 at a coupon rate of 5.625%.

The Notes were priced at 100% of par and were offered and sold pursuant to exemptions from registration under the Securities Act of 1933, as amended, (the "Securities Act"). The net proceeds received from issuance were \$985.5 million, a portion of which was used to terminate Grace's obligations under the deferred payment agreement with the PI Trust for \$632.0 million and to repay amounts outstanding under Grace's revolving credit facility. The remaining proceeds from the Notes were used to partially fund the settlement of the warrant issued to the PI Trust (as defined in Note 10) and for other general corporate purposes. Interest is payable on the Notes on each April 1 and October 1. Grace may redeem some or all of the Notes at any time at a price equal to the greater of (i) 100% of the principal amount of the Notes redeemed plus accrued and unpaid interest and (ii) the sum, as determined by an independent investment banker, of the present values of the remaining scheduled payments of principal and interest (exclusive of interest accrued to the date of redemption) discounted to the redemption date on a semiannual basis (assuming a 360-day year consisting of twelve 30-day months) at the treasury rate plus 50 basis points, in each case, accrued and unpaid interest. In the event of a change in control, Grace will be required to offer to purchase the Notes at a price equal to 101% of the aggregate principal amount outstanding plus accrued and unpaid interest.

The Notes are jointly and severally guaranteed on a full and unconditional senior unsecured basis by the Company and Alltech Associates, Inc., a wholly-owned subsidiary of the Issuer (the "Guarantors"). The Notes and guarantees are senior obligations of the Issuer and the Guarantors, respectively, and will rank equally with all of the existing and future unsubordinated obligations of the Issuer and the Guarantors, respectively. The Notes are effectively subordinated to any secured indebtedness to the extent of the value of the assets securing such indebtedness, and structurally subordinated to the debt and other liabilities of Grace's non-guarantor subsidiaries.

The Notes were issued subject to covenants that limit the Issuer's and certain of its subsidiaries' ability, subject to certain exceptions and qualifications, to (i) create or incur liens on assets, (ii) enter into any sale and leaseback transaction and (iii) in the case of the Issuer, merge or consolidate with another company.

The Notes were also issued subject to customary events of default which include (subject in certain cases to customary grace and cure periods), among others, nonpayment of principal or interest; breach of other agreements in the Indenture; failure to pay certain other indebtedness; failure to discharge a final judgment for payment of \$75 million or more (excluding any amounts covered by insurance or indemnities) rendered against the Issuer or any of its significant subsidiaries; and certain events of bankruptcy or insolvency. Generally, if any event of default occurs, the trustee or the holders of at least 25% in aggregate principal amount of the then outstanding series of Notes may declare all the Notes of such series to be due and payable immediately.

The Separation had no impact on the payment terms or other terms of the Notes, and they remain obligations of Grace.

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Notes to Consolidated Financial Statements (Continued)

5. Debt (Continued)

This summary of the Credit Agreement, the amendment to the Credit Agreement, the indentures and the Notes does not purport to be complete and is qualified in its entirety by reference to the full text of such agreements, copies of which have been filed with the SEC.

6. Fair Value Measurements and Risk

Certain of Grace's assets and liabilities are reported at fair value on a gross basis. ASC 820 "Fair Value Measurements and Disclosures" defines fair value as the value that would be received at the measurement date in the principal or "most advantageous" market. Grace uses principal market data, whenever available, to value assets and liabilities that are required to be reported at fair value.

Grace has identified the following financial assets and liabilities that are subject to the fair value analysis required by ASC 820:

Fair Value of Debt and Other Financial Instruments Debt payable is recorded at carrying value. Fair value is determined based on Level 2 inputs, including expected future cash flows (discounted at market interest rates), estimated current market prices and quotes from financial institutions.

At December 31, 2016, the carrying amounts and fair values of Grace's debt were as follows:

(In millions)	December 31, 2016		December 31, 2015	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
5.125% senior notes due 2021(1)	\$692.7	\$721.3	\$691.1	\$701.5
U.S. dollar term loan(2)	402.7	408.2	919.3	907.2
5.625% senior notes due 2024(1)	296.0	311.5	295.5	298.1
Euro term loan(2)	82.5	82.0	158.7	157.3
Other borrowings	110.2	110.2	105.0	105.0
Total debt	\$1,584.1	\$1,633.2	\$2,169.6	\$2,169.1

Carrying amounts are net of unamortized debt issuance costs of \$7.3 million and \$4.0 million at December 31, (1)2016, and \$8.9 million and \$4.5 million at December 31, 2015, related to the 5.125% senior notes due 2021 and 5.625% senior notes due 2024, respectively.

Carrying amounts are net of unamortized debt issuance costs and discounts of \$5.7 million and \$1.3 million at (2)December 31, 2016 and \$15.6 million and \$3.4 million at December 31, 2015, related to the U.S. dollar term loan and euro term loan, respectively.

At December 31, 2016, the recorded values of other financial instruments such as cash equivalents and trade receivables and payables approximated their fair values, based on the short-term maturities and floating rate characteristics of these instruments.

Commodity Derivatives From time to time, Grace enters into commodity derivatives such as fixed-rate swaps or options with financial institutions to mitigate the risk of volatility of prices of natural gas or other commodities. Under fixed-rate swaps, Grace locks in a fixed rate with a financial institution for future purchases, purchases its commodity from a supplier at the prevailing market rate, and then settles with the bank for any difference in the rates, thereby swapping a variable rate for a fixed rate.

The valuation of Grace's fixed-rate natural gas swaps was determined using a market approach, based on natural gas futures trading prices quoted on the New York Mercantile Exchange. Commodity fixed-rate swaps with maturities of not more than 15 months are used and designated as cash flow hedges of forecasted purchases of natural gas. The effective portion of the gain or loss on the commodity contracts is recorded in "accumulated other comprehensive

income (loss)" and reclassified into income in the same period or periods that the underlying commodity purchase affects income. At December 31, 2016, there were no open fixed-rate natural gas swaps.

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Notes to Consolidated Financial Statements (Continued)

6. Fair Value Measurements and Risk (Continued)

The valuation of Grace's fixed-rate aluminum swaps was determined using a market approach, based on aluminum futures trading prices quoted on the London Metal Exchange. Commodity fixed-rate swaps with maturities of not more than 15 months are used and designated as cash flow hedges of forecasted purchases of aluminum. Current open contracts hedge forecasted transactions until November 2017. The effective portion of the gain or loss on the commodity contracts is recorded in "accumulated other comprehensive income (loss)" and reclassified into income in the same period or periods that the underlying commodity purchase affects income. At December 31, 2016, the contract volume, or notional amount, of the commodity contracts was 1.3 million pounds with a total contract value of \$1.0 million.

Currency Derivatives Because Grace operates and/or sells to customers in over 60 countries and in 30 currencies, results are exposed to fluctuations in currency exchange rates. Grace seeks to minimize exposure to these fluctuations by matching sales in volatile currencies with expenditures in the same currencies, but it is not always possible to do so. From time to time, Grace will use financial instruments such as currency forward contracts, options, swaps, or combinations thereof to reduce the risk of certain specific transactions. However, Grace does not have a policy of hedging all exposures, because management does not believe that such a level of hedging would be cost-effective. The valuation of Grace's currency exchange rate forward contracts and swaps is determined using both a market approach and an income approach. Inputs used to value currency exchange rate forward contracts consist of: (1) spot rates, which are quoted by various financial institutions; (2) forward points, which are primarily affected by changes in interest rates; and (3) discount rates used to present value future cash flows, which are based on the London Interbank Offered Rate (LIBOR) curve or overnight indexed swap rates.

Debt and Interest Rate Swap Agreements Grace uses interest rate swaps designated as cash flow hedges to manage fluctuations in interest rates on variable rate debt. The effective portion of gains and losses on these interest rate cash flow hedges is recorded in "accumulated other comprehensive income (loss)" and reclassified into "interest expense and related financing costs" during the hedged interest period.

In connection with its emergence financing, Grace entered into an interest rate swap beginning on February 3, 2015, and maturing on February 3, 2020, fixing the LIBOR component of the interest on \$250 million of Grace's term debt at a rate of 2.393%. The valuation of this interest rate swap is determined using both a market approach and an income approach, using prevailing market interest rates and discount rates to present value future cash flows based on the forward LIBOR yield curves.

The following tables present the fair value hierarchy for financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2016 and 2015:

(In millions)	Fair Value Measurements at December 31, 2016, Using			
	Quoted Prices in Active Markets	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	
	Total for Identical Assets or Liabilities (Level 1)			
Assets				
Currency derivatives	\$8.8	\$ —	\$ 8.8	\$ —

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Total Assets	\$8.8 \$	—\$ 8.8	\$	—
Liabilities				
Currency derivatives	\$0.9 \$	—\$ 0.9	\$	—
Interest rate derivatives	6.0 —	6.0	—	
Total Liabilities	\$6.9 \$	—\$ 6.9	\$	—

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Notes to Consolidated Financial Statements (Continued)

6. Fair Value Measurements and Risk (Continued)

(In millions)	Fair Value Measurements at December 31, 2015, Using			
	Quoted Prices in Active Markets	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total for Identical Assets or Liabilities (Level 1)
Assets				
Currency derivatives	\$1.0	\$ —	\$ 1.0	\$ —
Commodity derivatives	0.6	—	0.6	—
Total Assets	\$1.6	\$ —	\$ 1.6	\$ —
Liabilities				
Currency derivatives	\$0.5	\$ —	\$ 0.5	\$ —
Interest rate derivatives	7.9	—	7.9	—
Commodity derivatives	0.1	—	0.1	—
Total Liabilities	\$8.5	\$ —	\$ 8.5	\$ —

The following tables present the location and fair values of derivative instruments included in the Consolidated Balance Sheets as of December 31, 2016 and 2015:

December 31, 2016 (In millions)	Asset Derivatives		Liability Derivatives	
	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
Derivatives designated as hedging instruments under ASC 815:				
Currency contracts	Other current assets	\$ 4.0	Other current liabilities	\$ —
Interest rate contracts	Other current assets	—	Other current liabilities	2.8
Currency contracts	Other assets	4.0	Other liabilities	—
Interest rate contracts	Other assets	—	Other liabilities	3.2
Derivatives not designated as hedging instruments under ASC 815:				
Currency contracts	Other current assets	0.8	Other current liabilities	0.9
Total derivatives		\$ 8.8		\$ 6.9
December 31, 2015 (In millions)	Asset Derivatives		Liability Derivatives	
	Balance Sheet Location	Fair Value	Balance Sheet Location	Fair Value
Derivatives designated as hedging instruments under ASC 815:				

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Commodity contracts	Other current assets	\$ 0.6	Other current liabilities	\$ 0.1
Currency contracts	Other current assets	0.7	Other current liabilities	0.3
Interest rate contracts	Other current assets	—	Other current liabilities	4.1
Currency contracts	Other assets	0.2	Other liabilities	—
Interest rate contracts	Other assets	—	Other liabilities	3.8
Derivatives not designated as hedging instruments under ASC 815:				
Currency contracts	Other current assets	0.1	Other current liabilities	0.2
Total derivatives		\$ 1.6		\$ 8.5

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Notes to Consolidated Financial Statements (Continued)

6. Fair Value Measurements and Risk (Continued)

The following tables present the location and amount of gains and losses on derivative instruments included in the Consolidated Statements of Operations or, when applicable, gains and losses initially recognized in other comprehensive income (loss) ("OCI") for the years ended December 31, 2016, 2015, and 2014:

Year Ended December 31, 2016 (In millions)	Amount of Gain (Loss) Recognized in OCI on Derivatives (Effective Portion)	Location of Gain (Loss) Reclassified from Accumulated OCI into Income (Effective Portion)	Amount of Gain (Loss) Reclassified from OCI into Income (Effective Portion)
Derivatives in ASC 815 cash flow hedging relationships:			
Interest rate contracts	\$ (2.2)	Interest expense	\$ (4.1)
Currency contracts	(0.1)	Other expense	0.8
Commodity contracts	(0.3)	Cost of goods sold	0.1
Total derivatives	\$ (2.6)		\$ (3.2)
Derivatives not designated as hedging instruments under ASC 815:			
Currency contracts		Other expense	\$ (0.8)
Year Ended December 31, 2015 (In millions)	Amount of Gain (Loss) Recognized in OCI on Derivatives (Effective Portion)	Location of Gain (Loss) Reclassified from Accumulated OCI into Income (Effective Portion)	Amount of Gain (Loss) Reclassified from OCI into Income (Effective Portion)
Derivatives in ASC 815 cash flow hedging relationships:			
Interest rate contracts	\$ (5.6)	Interest expense	\$ (3.8)
Currency contracts	1.4	Other expense	0.7
Commodity contracts	(1.4)	Cost of goods sold	(4.6)
Total derivatives	\$ (5.6)		\$ (7.7)

	Location of Gain (Loss) Recognized in Income on Derivatives	Amount of Gain (Loss) Recognized in Income on Derivatives
Derivatives not designated as hedging instruments under ASC 815:		
Currency contracts	Other expense	\$ (0.5)
Year Ended December 31, 2014 (In millions)	Amount of Gain (Loss) Recognized in OCI on Derivatives (Effective Portion)	Amount of Gain (Loss) Reclassified from OCI into Income (Effective Portion)
Derivatives in ASC 815 cash flow hedging relationships:		
Interest rate contracts	\$ (5.4) Other expense	\$ —
Currency contracts	0.4 Other expense	0.2
Commodity contracts	(2.2) Cost of goods sold	0.3
Total derivatives	\$ (7.2)	\$ 0.5

Net Investment Hedges Grace uses cross-currency swaps as derivative hedging instruments in certain net investment hedges of our non-U.S. subsidiaries. The effective portion of gains and losses attributable to these net investment hedges is recorded net of tax to "currency translation adjustments" within "accumulated other comprehensive income (loss)" to offset the change in the carrying value of the net investment being hedged.

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Notes to Consolidated Financial Statements (Continued)

6. Fair Value Measurements and Risk (Continued)

Recognition in earnings of amounts previously recorded to "currency translation adjustments" is limited to circumstances such as complete or substantially complete liquidation of the net investment in the hedged foreign operation. At December 31, 2016, the notional amount of €170.0 million of Grace's cross-currency swaps was designated as a hedging instrument of its net investment in European subsidiaries.

Grace also uses foreign currency denominated debt and deferred intercompany royalties as non-derivative hedging instruments in certain net investment hedges. The effective portion of gains and losses attributable to these net investment hedges is recorded to "currency translation adjustments" within "accumulated other comprehensive income (loss)." Recognition in earnings of amounts previously recorded to "currency translation adjustments" is limited to circumstances such as complete or substantially complete liquidation of the net investment in the hedged foreign operation. At December 31, 2016, €80.1 million of Grace's term loan principal was designated as a hedging instrument of its net investment in European subsidiaries. At December 31, 2016, €56.2 million of Grace's deferred intercompany royalties was designated as a hedging instrument of its net investment in European subsidiaries.

The following tables present the location and amount of gains and losses on derivative and non-derivative instruments designated as net investment hedges. There were no reclassifications of the effective portion of net investment hedges out of OCI and into earnings for the periods presented in the tables below.

Year Ended December 31, 2016 (In millions)	Amount of Gain (Loss) Recognized in OCI in Currency Translation Adjustments (Effective Portion)
Derivatives in ASC 815 net investment hedging relationships:	
Cross-currency swap	\$ 5.6
Non-derivatives in ASC 815 net investment hedging relationships:	
Foreign currency denominated debt	\$ 4.6
Foreign currency denominated deferred intercompany royalties	2.5
	\$ 7.1
Year Ended December 31, 2015 (In millions)	Amount of Gain (Loss) Recognized in OCI in Currency Translation Adjustments (Effective Portion)
Non-derivatives in ASC 815 net investment hedging relationships:	
Foreign currency denominated debt	\$ 18.3
Year Ended December 31, 2014 (In millions)	Amount of Gain (Loss)

Recognized
in OCI in
Currency
Translation
Adjustments
(Effective
Portion)

Non-derivatives in ASC 815 net investment hedging relationships:

Foreign currency denominated debt \$ 22.7

Credit Risk Grace is exposed to credit risk in its trade accounts receivable. Customers in the petroleum refining industry represent the greatest exposure. Grace's credit evaluation policies and history of minimal credit losses mitigate credit risk exposures. Grace does not generally require collateral for its trade accounts receivable, but may require a bank letter of credit in certain instances, particularly when selling to customers in cash-restricted countries.

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Notes to Consolidated Financial Statements (Continued)

6. Fair Value Measurements and Risk (Continued)

Grace may also be exposed to credit risk in its derivatives contracts. Grace monitors counterparty credit risk and currently does not anticipate nonperformance by counterparties to its derivatives. Grace's derivative contracts are with internationally recognized commercial financial institutions.

7. Income Taxes

Provision for Income Taxes

The components of income from continuing operations before income taxes and the related provision for income taxes for 2016, 2015, and 2014 are as follows:

(In millions)	2016	2015	2014
Income from continuing operations before income taxes:			
Domestic	\$72.7	\$97.1	\$77.2
Foreign	93.3	96.6	27.3
Total	\$166.0	\$193.7	\$104.5
Benefit from (provision for) income taxes:			
Federal—current	\$—	\$—	\$59.4
Federal—deferred	(11.8)	(35.4)	(23.6)
State and local—current	(0.7)	4.1	3.3
State and local—deferred	(17.7)	(6.4)	(18.0)
Foreign—current	(36.6)	(23.5)	(19.8)
Foreign—deferred	7.8	(8.6)	11.1
Total	\$(59.0)	\$(69.8)	\$12.4

The difference between the benefit from (provision for) income taxes on continuing operations at the U.S. federal income tax rate of 35% and Grace's overall income tax provision is summarized as follows:

(In millions)	2016	2015	2014
Tax provision at U.S. federal income tax rate	\$(58.1)	\$(67.8)	\$(36.6)
Change in benefit (provision) resulting from:			
Effect of tax rates in foreign jurisdictions	6.8	3.0	3.0
Stock option exercises (ASU 2016-09)	6.7	—	—
State and local income taxes, net	(4.7)	(2.9)	(9.6)
Adjustments to unrecognized tax benefits	2.6	(1.7)	57.9
Decrease (increase) in valuation allowance	(2.5)	1.6	—
Nontaxable income/non-deductible expenses	(2.5)	(0.9)	(4.1)
U.S. tax on foreign earnings	(0.9)	(1.7)	5.1
Other	(6.4)	0.6	(3.3)
Benefit from (provision for) income taxes	\$(59.0)	\$(69.8)	\$12.4

The increase in state and local income tax expense in 2016 is attributable to the recording of additional valuation allowance to reduce its net state deferred tax assets resulting from a Louisiana tax law change and the Separation.

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Notes to Consolidated Financial Statements (Continued)

7. Income Taxes (Continued)

Deferred Tax Assets and Liabilities

At December 31, 2016 and 2015, the tax attributes giving rise to deferred tax assets and liabilities consisted of the following items:

(In millions)	December 31,	
	2016	2015
Deferred tax assets:		
U.S. net operating loss carryforwards	\$293.6	\$359.7
Federal tax credit carryforwards	183.2	124.3
Pension liabilities	120.1	102.1
State net operating loss carryforwards	50.9	52.5
Research and development	35.4	32.9
Reserves and allowances	31.1	40.9
Liability for environmental remediation	24.6	20.6
Prepaid royalties	20.8	—
Liability for asbestos-related litigation	11.1	10.8
Foreign net operating loss carryforwards	5.9	4.2
Other	29.0	36.0
Total deferred tax assets	\$805.7	\$784.0
Deferred tax liabilities:		
Properties and equipment	\$(38.5)	\$(33.8)
Intangible assets	(18.4)	(17.6)
Pension assets	(6.1)	(5.4)
Other	(4.7)	(5.7)
Total deferred tax liabilities	\$(67.7)	\$(62.5)
Valuation allowance:		
Federal tax credit carryforwards	\$(17.7)	\$(2.2)
State net operating loss carryforwards	(11.2)	(3.5)
Foreign net operating loss carryforwards	(2.5)	(2.7)
Total valuation allowance	(31.4)	(8.4)
Net deferred tax assets	\$706.6	\$713.1

Grace's deferred tax assets decreased by \$6.5 million from December 31, 2015, to December 31, 2016. As discussed in Notes 1 and 21, the Separation was completed on February 3, 2016. In conjunction with the Separation, \$58.9 million of Grace's deferred tax assets were transferred to GCP in 2016. This decrease was offset by the adoption of ASU 2016-09, which resulted in the recognition of excess tax benefits in the Consolidated Balance Sheets which had not previously been recognized. This increased Grace's deferred tax assets as of January 1, 2016, by \$70.4 million, which is net of a \$20.5 million valuation allowance.

Grace has recorded a valuation allowance to reduce its net deferred tax assets to the amount that is more likely than not to be realized. Grace considers forecasted earnings, recent past and future taxable income, the mix of earnings in the jurisdictions in which it operates and, where applicable, prudent and feasible tax planning strategies in determining the need for these valuation allowances. The valuation allowance increased by \$23.0 million from December 31, 2015, to December 31, 2016, due to \$20.5 million for deferred tax assets recognized upon adoption of ASU 2016-09 and \$2.5 million for a change in the ability to utilize NOL carryforwards as a result of the Separation.

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Notes to Consolidated Financial Statements (Continued)

7. Income Taxes (Continued)

The realization of deferred tax assets is dependent on the generation of sufficient taxable income in the appropriate tax jurisdictions. Grace believes it is more likely than not that the remaining deferred tax assets will be realized. If Grace were to determine that it would not be able to realize a portion of its net deferred tax assets in the future, for which there is currently no valuation allowance, an adjustment to the net deferred tax assets would be charged to earnings in the period such determination was made. Conversely, if Grace were to make a determination that it is more likely than not that deferred tax assets, for which there is currently a valuation allowance, would be realized, the related valuation allowance would be reduced and a benefit to earnings would be recorded.

U.S. Federal and State Net Operating Losses and Credit Carryforwards

Grace generated approximately \$1,800 million in U.S. federal tax deductions relating to its emergence from bankruptcy. The deductions generated a U.S. federal and state net operating loss in 2014, which Grace has carried forward and expects to utilize in subsequent years. Under U.S. federal income tax law, a corporation is generally permitted to carry forward NOLs for a 20-year period for deduction against future taxable income. Grace also generated U.S. federal tax deductions of \$30 million upon payment of the ZAI PD deferred payment obligation on February 3, 2017. (See Note 10). As of December 31, 2016, Grace had U.S. federal NOLs of approximately \$857 million expiring between 2034 and 2035 and state NOLs of approximately \$733 million on a post apportioned basis expiring between 2017 and 2035. Grace will need to generate approximately \$1,800 million of U.S. federal taxable income by 2035 (or approximately \$95 million per year during the carryforward period) to fully realize the U.S. federal and a majority of the U.S. state net deferred tax assets. Grace believes that it will generate taxable income during this period sufficient to use all available NOL carryforwards and future tax deductions prior to expiration. Grace has recorded a valuation allowance of \$17.3 million (before federal benefit) on the state NOLs that it believes will not be utilized prior to expiration.

Included in Grace's U.S. federal tax credit carryforwards (\$183.2 million as of December 31, 2016) are \$144.4 million of foreign tax credits, which expire between 2018 and 2026. Grace has recorded a valuation allowance of \$17.7 million on the credit carryforwards that it believes will not be utilized prior to expiration.

Unrepatriated Foreign Earnings

Grace has not provided for U.S. federal, state and foreign deferred income taxes on \$536.6 million of undistributed earnings of foreign subsidiaries. Grace expects that these earnings will be permanently reinvested by such subsidiaries except in certain instances where repatriation attributable to current earnings results in minimal or no U.S. tax consequences. The unrecorded deferred tax liability associated with these earnings is \$27.4 million. Grace repatriated earnings of \$5.1 million, \$173.1 million, and \$38.9 million from its non-U.S. subsidiaries in 2016, 2015, and 2014, respectively, incurring an insignificant amount of U.S. income tax expense or benefit in 2014. The tax effect of the repatriation of foreign earnings in 2015 and 2016 is discussed in detail below.

As of December 31, 2014, Grace had the intent and ability to indefinitely reinvest undistributed earnings of its foreign subsidiaries outside the U.S. However, in connection with the Separation, during 2015 Grace repatriated a total of \$173.1 million of foreign earnings from foreign subsidiaries transferred to GCP pursuant to the Separation. Such amount was determined based on an analysis of each non-U.S. subsidiary's requirements for working capital, debt repayment and strategic initiatives. Grace also considered local country legal and regulatory restrictions. Grace included tax expense in discontinued operations of \$19.0 million in 2015 for repatriation and \$1.3 million in 2016 for deemed repatriation attributable to both current and prior years' earnings. The tax effect of the repatriation is determined by several variables including the tax rate applicable to the entity making the distribution, the cumulative earnings and associated foreign taxes of the entity and the extent to which those earnings may have already been taxed in the U.S.

Grace believes that the Separation was a one-time, non-recurring event and that recognition of deferred taxes on undistributed earnings would not have occurred if not for the Separation. Subsequent to the Separation, Grace expects undistributed prior-year earnings of its foreign subsidiaries to remain permanently reinvested

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Notes to Consolidated Financial Statements (Continued)

7. Income Taxes (Continued)

except in certain instances where repatriation of such earnings would result in minimal or no tax. Grace bases this assertion on:

- (1) the expectation that it will satisfy its U.S. cash obligations in the foreseeable future without requiring the repatriation of prior-year foreign earnings;
- (2) plans for significant and continued reinvestment of foreign earnings in organic and inorganic growth initiatives outside the U.S.; and
- (3) remittance restrictions imposed by local governments.

Grace will continually analyze and evaluate its cash needs to determine the appropriateness of its indefinite reinvestment assertion.

Unrecognized Tax Benefits

The balance of unrecognized tax benefits at December 31, 2016, was \$18.7 million (\$18.7 million excluding interest and penalties). The balance of unrecognized tax benefits at December 31, 2015, was \$27.0 million (\$23.1 million excluding interest and penalties). The balance of unrecognized tax benefits at December 31, 2014, was \$29.7 million (\$26.5 million excluding interest and penalties). As of December 31, 2016 and 2015, unrecognized tax benefits which resulted in the reduction of a deferred tax asset were \$18.4 million and \$6.1 million, respectively. A reconciliation of the unrecognized tax benefits, excluding interest and penalties, for the three years ended December 31, 2016, follows:

(In millions)	Unrecognized Tax Benefits
Balance, January 1, 2014	\$ 80.3
Additions for current year tax positions	0.9
Additions for prior year tax positions	11.0
Reductions for prior year tax positions and reclassifications	(5.7)
Reductions for expirations of statute of limitations	(0.4)
Settlements(1)	(59.6)
Balance, December 31, 2014	26.5
Additions for current year tax positions	0.1
Additions for prior year tax positions	0.8
Reductions for prior year tax positions and reclassifications	(1.6)
Reductions for expirations of statute of limitations	(1.5)
Settlements	(1.2)
Balance, December 31, 2015	23.1
Additions for current year tax positions	6.8
Additions for prior year tax positions	0.2
Reductions for prior year tax positions and reclassifications	(0.2)
Settlements	(3.3)
Transferred to GCP upon Separation	(7.9)
Balance, December 31, 2016	\$ 18.7

(1) In 2014, \$59.6 million of benefits associated with reserves for unrecognized tax benefits were recognized based on the status of examinations in taxing jurisdictions.

The entire balance of unrecognized tax benefits as of December 31, 2016, of \$18.7 million, if recognized, would reduce the effective tax rate. The balance of unrecognized tax benefits as of December 31, 2016, includes \$18.4 million for tax positions with an indirect tax benefit that results in a corresponding deferred tax asset as of

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Notes to Consolidated Financial Statements (Continued)

7. Income Taxes (Continued)

December 31, 2016. Grace accrues potential interest and any associated penalties related to unrecognized tax benefits in "benefit from (provision for) income taxes" in the Consolidated Statements of Operations. The total amount of interest and penalties accrued on unrecognized tax benefits as of December 31, 2016, 2015, and 2014 was \$0.0 million, \$3.9 million and \$3.2 million, respectively. Upon the Separation, \$7.9 million of unrecognized tax benefits and \$3.1 million of accrued penalties and interest on those benefits were transferred to GCP.

Grace files U.S. federal income tax returns as well as income tax returns in various state and foreign jurisdictions. Grace's unrecognized tax benefits are related to income tax returns for tax years that remain subject to examination by the relevant taxing authorities. The following table summarizes these open tax years by major jurisdiction:

Tax Jurisdiction(1)	Examination in Progress	Examination Not Initiated
United States—Federal	None	2010-2015
United States—States	2010-2014	2015
Germany	None	2014
Sweden	None	2012-2015
France	2014	2015

(1)Includes federal, state, provincial or local jurisdictions, as applicable.

Grace notes that there are attributes generated in prior years that are otherwise closed by statute and were carried forward into years that are open to examination. Those attributes may still be subject to adjustment to the extent utilized in open years.

As a multinational taxpayer, Grace is under continual audit by various tax authorities. Grace believes that the amount of the liability for unrecognized tax benefits will be unchanged in the next 12 months.

8. Pension Plans and Other Postretirement Benefit Plans

Pension Plans The following table presents the funded status of Grace's underfunded and unfunded pension plans:

(In millions)	December 31,	
	2016	2015
Underfunded defined benefit pension plans	\$(83.1)	\$(73.2)
Unfunded defined benefit pension plans	(341.2)	(304.3)
Total underfunded and unfunded defined benefit pension plans	(424.3)	(377.5)
Pension liabilities included in other current liabilities	(14.4)	(14.2)
Net funded status	\$(438.7)	\$(391.7)

Underfunded plans include a group of advance-funded plans that are underfunded on a projected benefit obligation ("PBO") basis. Unfunded plans include several plans that are funded on a pay-as-you-go basis, and therefore, the entire PBO is unfunded. The combined balance of the underfunded and unfunded plans was \$438.7 million as of December 31, 2016.

Grace maintains defined benefit pension plans covering current and former employees of certain business units and divested business units who meet age and service requirements. Benefits are generally based on final average salary and years of service. Grace funds its U.S. qualified pension plans ("U.S. qualified pension plans") in accordance with U.S. federal laws and regulations. Non-U.S. pension plans ("non-U.S. pension plans") are funded under a variety of methods, as required under local laws and customs. U.S. salaried employees and certain U.S. hourly employees that are hired on or after January 1, 2017, and employees in Germany that are hired on or after January 1, 2016, will participate in defined contribution plans instead of defined benefit pension plans.

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

Grace also provides, through nonqualified plans, supplemental pension benefits in excess of U.S. qualified pension plan limits imposed by federal tax law. These plans cover officers and higher-level employees and serve to increase the combined pension amount to the level that they otherwise would have received under the U.S. qualified pension plans in the absence of such limits. The nonqualified plans are unfunded and Grace pays the costs of benefits as they are due to the participants.

At the December 31, 2016, measurement date for Grace's defined benefit pension plans, the PBO was \$1,543.3 million as measured under U.S. GAAP compared with \$1,477.6 million as of December 31, 2015. The PBO basis reflects the present value (using a 4.06% weighted average discount rate for U.S. plans and a 1.91% weighted average discount rate for non-U.S. plans as of December 31, 2016) of vested and non-vested benefits earned from employee service to date, based upon current services and estimated future pay increases for active employees.

On an annual basis a full remeasurement of pension assets and pension liabilities is performed based on Grace's estimates and actuarial valuations. These valuations reflect the terms of the plan and use participant-specific information as well as certain key assumptions provided by management.

Postretirement Benefits Other Than Pensions Grace has provided postretirement health care and life insurance benefits for retired employees of certain U.S. business units and certain divested business units. These plans are unfunded and Grace pays a portion of the costs of benefits under these plans as they are incurred. Grace applies ASC 715 "Compensation—Retirement Benefits" to these plans, which requires that the future costs of postretirement health care and life insurance benefits be accrued over the employees' years of service. Actuarial gains and losses are recognized in the Consolidated Balance Sheets as a component of Shareholders' Equity, with amortization of the net actuarial gains and losses that exceed 10 percent of the accumulated postretirement benefit obligation recognized each quarter in the Consolidated Statements of Operations over the average future service period of active employees. In June 2014, Grace announced that it would discontinue its postretirement medical plan for all U.S. employees effective October 31, 2014, and eliminate certain postretirement life insurance benefits. As a result of these actions, Grace recognized a gain of \$41.9 million in other comprehensive income in the 2014 second quarter. Grace amortized \$39.5 million from accumulated other comprehensive income into the Consolidated Statement of Operations during the five-month period from June to October 2014.

The postretirement plan was further remeasured as of September 30, 2015, and December 31, 2016, due to plan amendments to eliminate certain other postretirement life insurance benefits, which resulted in curtailment gains of \$4.5 million and \$0.5 million, respectively.

Defined Contribution Retirement Plan Grace sponsors a defined contribution retirement plan for its employees in the United States. This plan is qualified under section 401(k) of the U.S. tax code. Currently, Grace contributes an amount equal to 100% of employee contributions, up to 6% of an individual employee's salary or wages. Grace's cost related to this benefit plan was \$11.1 million, \$10.4 million, and \$9.3 million for the years ended December 31, 2016, 2015, and 2014, respectively.

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

Analysis of Plan Accounting and Funded Status The following table summarizes the changes in benefit obligations and fair values of retirement plan assets during 2016 and 2015:

(In millions)	Defined Benefit Pension Plans						Other Post-Retirement Plans	
	U.S.		Non-U.S.		Total		2016	2015
	2016	2015	2016	2015	2016	2015	2016	2015
Change in Projected Benefit Obligation (PBO):								
Benefit obligation at beginning of year	\$1,238.8	\$1,437.3	\$238.8	\$590.4	\$1,477.6	\$2,027.7	\$0.6	\$2.4
Service cost	17.8	25.7	6.8	11.7	24.6	37.4	—	—
Interest cost	40.5	55.1	5.1	16.1	45.6	71.2	—	0.1
Plan participants' contributions	—	—	—	0.5	—	0.5	—	—
Amendments	(1.3)	(3.6)	—	—	(1.3)	(3.6)	(0.1)	(2.1)
Settlements/curtailments	—	—	(2.3)	(1.0)	(2.3)	(1.0)	—	—
Actuarial (gain) loss	62.3	(63.0)	39.9	(11.4)	102.2	(74.4)	—	0.4
Medicare subsidy receipts	—	—	—	—	—	—	—	1.0
Benefits paid	(83.9)	(87.0)	(7.5)	(20.7)	(91.4)	(107.7)	—	(1.1)
Currency exchange translation adjustments	—	—	(11.7)	(49.9)	(11.7)	(49.9)	—	—
Less: discontinued operations	—	(125.7)	—	(296.9)	—	(422.6)	—	(0.1)
Benefit obligation at end of year	\$1,274.2	\$1,238.8	\$269.1	\$238.8	\$1,543.3	\$1,477.6	\$0.5	\$0.6
Change in Plan Assets:								
Fair value of plan assets at beginning of year	\$1,067.2	\$1,262.6	\$18.7	\$336.1	\$1,085.9	\$1,598.7	\$—	\$—
Actual return on plan assets	95.6	(34.6)	(0.5)	2.9	95.1	(31.7)	—	—
Employer contributions	7.5	7.3	8.4	10.5	15.9	17.8	—	0.1
Plan participants' contributions	—	—	—	0.5	—	0.5	—	—
Settlements	—	—	(1.3)	(1.5)	(1.3)	(1.5)	—	—
Medicare subsidy receipts	—	—	—	—	—	—	—	1.0
Benefits paid	(83.9)	(87.0)	(7.5)	(20.7)	(91.4)	(107.7)	—	(1.1)
Currency exchange translation adjustments	—	—	0.4	(21.6)	0.4	(21.6)	—	—
Less: discontinued operations	—	(81.1)	—	(287.5)	—	(368.6)	—	—
Fair value of plan assets at end of year	\$1,086.4	\$1,067.2	\$18.2	\$18.7	\$1,104.6	\$1,085.9	\$—	\$—
Funded status at end of year (PBO basis)	\$(187.8)	\$(171.6)	\$(250.9)	\$(220.1)	\$(438.7)	\$(391.7)	\$(0.5)	\$(0.6)
Amounts recognized in the Consolidated Balance Sheets consist of:								
Current liabilities	\$(7.4)	\$(7.0)	\$(7.0)	\$(7.2)	\$(14.4)	\$(14.2)	\$—	\$—
Noncurrent liabilities	(180.4)	(164.6)	(243.9)	(212.9)	(424.3)	(377.5)	(0.5)	(0.6)
Net amount recognized	\$(187.8)	\$(171.6)	\$(250.9)	\$(220.1)	\$(438.7)	\$(391.7)	\$(0.5)	\$(0.6)
Amounts recognized in Accumulated Other Comprehensive (Income) Loss								

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consist of:

Accumulated actuarial loss	\$—	\$—	\$—	\$—	\$—	\$—	\$4.3	\$5.9
Prior service credit	(4.3)	(3.1)	(0.1)	(0.3)	(4.4)	(3.4)	(3.3)	(7.1)
Net amount recognized	\$(4.3)	\$(3.1)	\$(0.1)	\$(0.3)	\$(4.4)	\$(3.4)	\$1.0	\$(1.2)

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

(In millions)	Defined Benefit Pension Plans						Other Post-Retirement Plans	
	U.S.		Non-U.S.		Total		2016	2015
	2016	2015	2016	2015	2016	2015		
Weighted Average Assumptions Used to Determine Benefit Obligations as of December 31:								
Discount rate	4.06%	4.28%	1.91%	2.67%	NM	NM	4.36%	4.40%
Rate of compensation increase	4.60%	4.70%	3.09%	3.09%	NM	NM	NM	NM
Weighted Average Assumptions Used to Determine Net Periodic Benefit Cost for Years Ended December 31:								
Discount rate	4.28%	3.95%	2.67%	2.97%	NM	NM	4.40%	4.18%
Expected return on plan assets	5.50%	5.75%	5.08%	4.11%	NM	NM	NM	NM
Rate of compensation increase	4.70%	4.70%	3.09%	3.24%	NM	NM	NM	NM

NM—Not meaningful

Components of Net Periodic Benefit Cost (Income) and Other Amounts Recognized in Other Comprehensive (Income) Loss (In millions)	2016			2015			2014		
	U.S.	Non-U.S.	Other	U.S.	Non-U.S.	Other	U.S.	Non-U.S.	Other
Net Periodic Benefit Cost (Income)									
Service cost	\$17.8	\$6.8	\$—	\$25.7	\$11.7	\$—	\$23.5	\$10.7	\$0.1
Interest cost	40.5	5.1	—	55.1	16.1	0.1	60.0	22.2	1.1
Expected return on plan assets	(56.7)	(1.0)	—	(70.4)	(13.0)	—	(69.9)	(15.2)	—
Amortization of prior service cost (credit)	(0.2)	—	(2.2)	0.3	—	(3.4)	0.7	—	(2.4)
Amortization of net deferred actuarial loss	—	—	0.5	—	—	0.7	—	—	—
Annual mark-to-market adjustment	23.3	40.1	—	42.0	(0.1)	—	89.2	45.4	—
Gain on termination and curtailment of postretirement plans	—	—	(0.5)	—	—	(4.5)	—	—	(39.5)
Net curtailment and settlement gain	—	(1.0)	—	—	—	—	—	—	—
Net periodic benefit cost (income)	24.7	50.0	(2.2)	52.7	14.7	(7.1)	103.5	63.1	(40.7)
Less: discontinued operations	—	—	—	(4.0)	(16.8)	1.4	(13.7)	14.8	0.7
Net periodic benefit cost (income) from continuing operations	\$24.7	\$50.0	\$(2.2)	\$48.7	\$(2.1)	\$(5.7)	\$89.8	\$77.9	\$(40.0)
Other Changes in Plan Assets and Benefit Obligations Recognized in Other Comprehensive (Income) Loss									
Net deferred actuarial loss (gain)	\$—	\$—	\$—	\$—	\$—	\$0.4	\$—	\$—	\$(1.0)
Net prior service credit	(1.3)	—	(0.1)	(3.6)	—	(2.1)	—	—	(13.6)
Amortization of prior service cost (credit)	0.2	—	2.2	(0.3)	—	3.4	(0.7)	—	2.4

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Amortization of net deferred actuarial loss	—	—	(0.5)	—	—	(0.7)	—	—	—
Loss on termination and curtailment of postretirement plans	—	—	0.5	—	—	4.5	—	—	12.2
Total recognized in other comprehensive (income) loss	(1.1)	—	2.1	(3.9)	—	5.5	(0.7)	—	—
Total recognized in net periodic benefit cost (income) and other comprehensive (income) loss	\$23.6	\$ 50.0	\$(0.1)	\$44.8	\$(2.1)	\$(0.2)	\$89.1	\$ 77.9	\$(40.0)

The estimated prior service credit for the defined benefit pension plans that will be amortized from accumulated other comprehensive (income) loss into net periodic benefit cost (income) over the next fiscal year is \$0.4 million. The estimated net deferred actuarial loss and prior service credit for the other postretirement plan that will be amortized from accumulated other comprehensive (income) loss into net periodic benefit cost (income) over the next fiscal year are \$0.5 million and \$1.9 million, respectively.

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

Funded Status of U.S. Pension Plans (In millions)	Underfunded U.S. Qualified Pension Plans(1)		Unfunded Pay-As-You-Go U.S. Nonqualified Plans(2)	
	2016	2015	2016	2015
Projected benefit obligation	\$1,167.9	\$1,139.2	\$106.3	\$99.6
Fair value of plan assets	1,086.4	1,067.2	—	—
Funded status (PBO basis)	\$(81.5)	\$(72.0)	\$(106.3)	\$(99.6)
Funded Status of Non-U.S. Pension Plans (In millions)	Underfunded Non-U.S. Pension Plans(1)		Unfunded Pay-As-You-Go Non-U.S. Pension Plans(2)	
	2016	2015	2016	2015
Projected benefit obligation	\$19.8	\$19.9	\$249.3	\$218.9
Fair value of plan assets	18.2	18.7	—	—
Funded status (PBO basis)	\$(1.6)	\$(1.2)	\$(249.3)	\$(218.9)

(1) Plans intended to be advance-funded.

(2) Plans intended to be pay-as-you-go.

The accumulated benefit obligation for all defined benefit pension plans was approximately \$1,478 million and \$1,416 million as of December 31, 2016 and 2015, respectively.

Pension Plans with Underfunded or Unfunded Accumulated Benefit Obligation (In millions)	U.S.		Non-U.S.		Total	
	2016	2015	2016	2015	2016	2015
Projected benefit obligation	\$1,274.2	\$1,238.8	\$249.3	\$220.5	\$1,523.5	\$1,459.3
Accumulated benefit obligation	1,238.8	1,205.6	222.6	195.6	1,461.4	1,401.2
Fair value of plan assets	1,086.4	1,067.2	—	0.8	1,086.4	1,068.0
Estimated Expected Future Benefit Payments Reflecting Future Service for the Fiscal Years Ending (In millions)	Pension Plans		Other Post-Retirement Plans		Total Payments	
	U.S. Benefit Payments	Non-U.S.(1) Benefit Payments	U.S. Benefit Payments	Non-U.S.(1) Benefit Payments	U.S. Benefit Payments	Non-U.S.(1) Benefit Payments
2017	\$82.1	\$ 7.7	\$	\$	\$ 89.8	\$
2018	82.4	8.1	—	—	90.5	—
2019	83.1	8.2	—	—	91.3	—
2020	83.4	8.6	—	—	92.0	—
2021	83.8	8.8	—	—	92.6	—
2022 - 2026	419.0	46.5	0.1	—	465.6	—

(1) Non-U.S. estimated benefit payments for 2017 and future periods have been translated at the applicable December 31, 2016, exchange rates.

Discount Rate Assumption The assumed discount rate for pension plans reflects the market rates for high-quality corporate bonds currently available and is subject to change based on changes in overall market interest rates. For the U.S. qualified pension plans, the assumed weighted average discount rate of 4.06% as of December 31, 2016, was selected by Grace, in consultation with its independent actuaries, based on a yield curve constructed from a portfolio of high quality bonds for which the timing and amount of cash outflows approximate the estimated payouts of the plan.

As of December 31, 2016 and 2015, the German pension plans represented approximately 92% and 90%, respectively, of the benefit obligation of the non-U.S. pension plans. The assumed weighted average discount rate as of December 31, 2016, for Germany (1.78%) was selected by Grace, in consultation with its independent actuaries, based on a yield curve constructed from a portfolio of euro-denominated high quality bonds for which

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

the timing and amount of cash outflows approximate the estimated payouts of the plans. The assumed discount rates for the remaining non-U.S. pension plans were determined based on the nature of the liabilities, local economic environments and available bond indices.

As of December 31, 2015, Grace changed the approach used to determine the service and interest cost components of defined benefit pension expense. Previously, Grace estimated service and interest costs using a single weighted average discount rate derived from the same yield curve used to measure the projected benefit obligation. For 2016, Grace elected to measure service and interest costs by applying the specific spot rates along that yield curve to the plans' liability cash flows. Grace believes the new approach provides a more precise measurement of service and 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 projected benefit obligation as of December 31, 2015. Grace considers this a change in accounting estimate, which is being accounted for prospectively as of January 1, 2016.

Investment Guidelines for Advance-Funded Pension Plans The investment goal for the U.S. qualified pension plans subject to advance funding is to earn a long-term rate of return consistent with the related cash flow profile of the underlying benefit obligation. The plans are pursuing a well-defined risk management strategy designed to reduce investment risks as their funded status improves.

The U.S. qualified pension plans have adopted a diversified set of portfolio management strategies to optimize the risk reward profile of the plans:

- **Liability hedging portfolio:** primarily invested in intermediate-term and long-term investment grade corporate bonds in actively managed strategies.

- **Growth portfolio:** invested in a diversified set of assets designed to deliver performance in excess of the underlying liabilities with controls regarding the level of risk.

- **U.S. equity securities:** the portfolio contains domestic equities that are passively managed to the S&P 500 and Russell 2000 benchmark and an allocation to an active portfolio benchmarked to the Russell 2000.

- **Non-U.S. equity securities:** the portfolio contains non-U.S. equities in an actively managed strategy. Currency futures and forward contracts may be held for the sole purpose of hedging existing currency risk in the portfolio.

- **Other investments:** may include (a) high yield bonds: fixed income portfolio of securities below investment grade including up to 30% of the portfolio in non-U.S. issuers; and (b) global real estate securities: portfolio of diversified REIT and other liquid real estate related securities. These portfolios combine income generation and capital appreciation opportunities from developed markets globally.

- **Liquidity portfolio:** invested in short-term assets intended to pay periodic plan benefits and expenses.

For 2016, the expected long-term rate of return on assets for the U.S. qualified pension plans was 5.50%. Average annual returns over one-, three-, five-, and ten-year periods were approximately 9%, 5%, 7%, and 5%, respectively. The expected return on plan assets for the U.S. qualified pension plans for 2016 was selected by Grace, in consultation with its independent actuaries, using an expected return model. The model determines the weighted average return for an investment portfolio based on the target asset allocation and expected future returns for each asset class, which were developed using a building block approach based on observable inflation, available interest rate information, current market characteristics, and historical results.

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

The target allocation of investment assets at December 31, 2016, and the actual allocation at December 31, 2016 and 2015, for Grace's U.S. qualified pension plans are as follows:

U.S. Qualified Pension Plans Asset Category	Target Allocation		Percentage of Plan Assets	
	2016		December 31, 2016	2015
U.S. equity securities	9	%	8	% 10
Non-U.S. equity securities	6	%	6	% 6
Short-term debt securities	4	%	4	% 7
Intermediate-term debt securities	31	%	32	% 28
Long-term debt securities	48	%	48	% 47
Other investments	2	%	2	% 2
Total	100	%	100	% 100

The following tables present the fair value hierarchy for the U.S. qualified pension plan assets measured at fair value as of December 31, 2016 and 2015.

(In millions)	Fair Value Measurements at December 31, 2016, Using			
	Total	Quoted Prices in Active Markets for Identical Assets or Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
U.S. equity group trust funds	\$91.5	\$	—\$ 91.5	\$
Non-U.S. equity group trust funds	62.6	—	62.6	—
Corporate bond group trust funds—intermediate-term	342.6	—	342.6	—
Corporate bond group trust funds—long-term	521.5	—	521.5	—
Other fixed income group trust funds	22.4	—	22.4	—
Common/collective trust funds	27.4	—	27.4	—
Annuity and immediate participation contracts	18.4	—	18.4	—
Total Assets	\$1,086.4	\$	—\$ 1,086.4	\$

(In millions)	Fair Value Measurements at December 31, 2015, Using			
	Total	Quoted Prices in Active Markets for Identical Assets or	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)

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		Liabilities (Level 1)			
U.S. equity group trust funds	\$101.2	\$	—\$ 101.2	\$	—
Non-U.S. equity group trust funds	68.9	—	68.9	—	
Corporate bond group trust funds—intermediate-term	303.2	—	303.2	—	
Corporate bond group trust funds—long-term	498.0	—	498.0	—	
Other fixed income group trust funds	21.5	—	21.5	—	
Common/collective trust funds	56.7	—	56.7	—	
Annuity and immediate participation contracts	17.7	—	17.7	—	
Total Assets	\$1,067.2	\$	—\$ 1,067.2	\$	—

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

Non-U.S. pension plans accounted for approximately 2% of total global pension assets at December 31, 2016 and 2015. Each of these plans, where applicable, follows local requirements and regulations. Some of the local requirements include the establishment of a local pension committee, a formal statement of investment policy and procedures, and routine valuations by plan actuaries.

The target allocation of investment assets for non-U.S. pension plans varies depending on the investment goals of the individual plans. The plan assets of the Canadian pension plan represent approximately 97% and 92% of the total non-U.S. pension plan assets at December 31, 2016 and 2015, respectively. The expected long-term rate of return on assets for the Canadian pension plan was 5.25% for 2016.

The target allocation of investment assets at December 31, 2016, and the actual allocation at December 31, 2016 and 2015, for the Canadian pension plan are as follows:

Canadian Pension Plan Asset Category	Target Allocation	Percentage of Plan Assets	
		December 31,	
	2016	2016	2015
Equity securities	27 %	28 %	28 %
Bonds	58 %	57 %	57 %
Other investments	15 %	15 %	15 %
Total	100 %	100 %	100 %

The plan assets of the other country plans represent approximately 3% and 8% in the aggregate of total non-U.S. pension plan assets at December 31, 2016 and 2015, respectively.

The following table presents the fair value hierarchy for the non-U.S. pension plan assets measured at fair value as of December 31, 2016.

(In millions)	Fair Value Measurements at December 31, 2016, Using			
	Total	Quoted Prices in Active Markets for Identical Assets or Liabilities (Level 1)	Significant Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Common/collective trust funds	\$17.6	\$	—\$ 17.6	\$
Corporate bonds	0.3	—	0.3	—
Insurance contracts and other investments	0.3	—	0.3	—
Total Assets	\$18.2	\$	—\$ 18.2	\$

The following table presents the fair value hierarchy for the non-U.S. pension plan assets measured at fair value as of December 31, 2015.

(In millions)	Fair Value Measurements at December 31, 2015, Using			
	Total	Quoted Prices in	Significant Other	Significant Unobservable

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		Active Markets for Identical Assets or Liabilities (Level 1)	Observable Inputs (Level 2)	Inputs (Level 3)	
Common/collective trust funds	\$17.2	\$	—\$ 17.2	\$	—
Corporate bonds	0.3	—	0.3	—	
Insurance contracts and other investments	1.2	—	1.2	—	
Total Assets	\$18.7	\$	—\$ 18.7	\$	—

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Notes to Consolidated Financial Statements (Continued)

8. Pension Plans and Other Postretirement Benefit Plans (Continued)

Plan Contributions and Funding Grace intends to satisfy its funding obligations under the U.S. qualified pension plans and to comply with all of the requirements of the Employee Retirement Income Security Act of 1974 ("ERISA"). For ERISA purposes, funded status is calculated on a different basis than under U.S. GAAP. Based on the U.S. qualified pension plans' status as of December 31, 2016, there are no minimum required payments under ERISA for 2017.

Grace intends to fund non-U.S. pension plans based on applicable legal requirements and actuarial and trustee recommendations. Grace expects to contribute approximately \$8 million to its non-U.S. pension plans in 2017.

9. Other Balance Sheet Accounts

(In millions)	December 31,	
	2016	2015
Other Current Liabilities		
Accrued compensation	\$49.6	\$51.5
Environmental contingencies	32.5	21.4
Deferred revenue	27.2	24.7
Accrued interest	16.2	18.9
Pension liabilities	14.4	14.2
Income taxes payable	5.7	25.8
Other accrued liabilities	63.3	76.4
	\$208.9	\$232.9

Accrued compensation includes salaries and wages as well as estimated current amounts due under the annual and long-term incentive programs.

10. Commitments and Contingent Liabilities

Over the years, Grace operated numerous types of businesses that are no longer part of its business portfolio. As Grace divested or otherwise ceased operating these businesses, it retained certain liabilities and obligations, which we refer to as legacy liabilities. The principal legacy liabilities are product and environmental liabilities. Although the outcome of each of the matters discussed below cannot be predicted with certainty, Grace has assessed its risk and has made accounting estimates as required under U.S. GAAP.

Legacy Product and Environmental Liabilities

Legacy Product Liabilities Grace emerged from an asbestos-related Chapter 11 bankruptcy on February 3, 2014 (the "Effective Date"). Under its plan of reorganization, all pending and future asbestos-related claims are channeled for resolution to either a personal injury trust (the "PI Trust") or a property damage trust (the "PD Trust"). The trusts are the sole recourse for holders of asbestos-related claims. The channeling injunctions issued by the bankruptcy court prohibit holders of asbestos-related claims from asserting such claims directly against Grace.

Grace has satisfied all of its financial obligations to the PI Trust. Grace has fixed and contingent obligations remaining to the PD Trust. With respect to property damage claims related to Grace's former attic insulation product installed in the U.S. ("ZAI PD Claims"), the PD Trust was funded with \$34.4 million on the Effective Date and with \$30.0 million on February 3, 2017. The \$30.0 million liability was included in "debt payable within one year" in the accompanying Consolidated Balance Sheets as of December 31, 2016. Grace is also obligated to make up to 10 contingent deferred payments of \$8 million each per year to the PD Trust in respect of ZAI PD Claims during the 20-year period beginning on the fifth anniversary of the Effective Date, with each such payment due only if the assets of the PD Trust in respect of ZAI PD Claims fall below \$10 million during the preceding year. Grace has not accrued for the 10 additional payments as Grace does not currently believe they are probable.

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Notes to Consolidated Financial Statements (Continued)

10. Commitments and Contingent Liabilities (Continued)

Grace is not obligated to make additional payments to the PD Trust in respect of ZAI PD Claims beyond the payments described above. Grace has satisfied all of its financial obligations with respect to Canadian ZAI PD Claims.

With respect to other asbestos property damage claims ("Other PD Claims"), claims unresolved as of the Effective Date are to be litigated in the bankruptcy court and any future claims are to be litigated in a federal district court, in each case pursuant to procedures approved by the bankruptcy court. To the extent any such Other PD Claims are determined to be allowed claims, they are to be paid in cash by the PD Trust. Grace is obligated to make a payment to the PD Trust every six months in the amount of any Other PD Claims allowed during the preceding six months plus interest (if applicable) and the amount of PD Trust expenses for the preceding six months (the "PD Obligation"). The aggregate amount to be paid under the PD Obligation is not capped and Grace may be obligated to make additional payments to the PD Trust in respect of the PD Obligation. Grace has accrued for those unresolved Other PD Claims that it believes are probable and estimable. Grace has not accrued for other unresolved or unasserted Other PD Claims as it does not believe that payment is probable.

All payments to the PD Trust required after the Effective Date are secured by the Company's obligation to issue 77,372,257 shares of Company common stock to the PD Trust in the event of default, subject to customary anti-dilution provisions.

In the 2015 first quarter, Grace finalized its accounting for emergence from bankruptcy and recorded a gain of \$9.0 million reflecting the final resolution of certain bankruptcy liabilities.

This summary of the commitments and contingencies related to the Chapter 11 proceeding does not purport to be complete and is qualified in its entirety by reference to the plan of reorganization and the exhibits and documents related thereto, which have been filed with the SEC.

Legacy Environmental Liabilities Grace is subject to loss contingencies resulting from extensive and evolving federal, state, local and foreign environmental laws and regulations relating to its manufacturing operations. Grace has procedures in place to minimize such contingencies; nevertheless, it has liabilities associated with past operations and additional claims may arise in the future. To address its legacy liabilities, Grace accrues for anticipated costs of response efforts where an assessment has indicated that a probable liability has been incurred and the cost can be reasonably estimated. These accruals do not take into account any discounting for the time value of money.

Grace's environmental liabilities are reassessed regularly and adjusted when circumstances become better defined or response efforts and their costs can be better estimated, typically as a matter moves through the life-cycle of environmental investigation and remediation. These liabilities are evaluated based on currently available information, relating to the nature and extent of contamination, risk assessments, feasibility of response actions, and apportionment amongst other potentially responsible parties, all evaluated in light of prior experience.

At December 31, 2016, Grace's estimated liability for legacy environmental response costs totaled \$66.3 million, compared with \$55.2 million at December 31, 2015, and was included in "other current liabilities" and "other liabilities" in the Consolidated Balance Sheets. These amounts are based on agreements in place or on Grace's estimate of costs where no formal remediation plan exists, yet there is sufficient information to estimate response costs.

Grace recorded pre-tax charges of \$29.2 million, \$6.4 million, and \$14.7 million for environmental matters in 2016, 2015, and 2014, respectively, which is included in "provision for environmental remediation" in the Consolidated Statements of Operations. Net cash paid against previously established reserves in 2016, 2015, and 2014 were \$18.1 million, \$12.3 million, and \$11.7 million, respectively. During 2014, claim payments of \$76.5 million were made in connection with Grace's emergence from Chapter 11.

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Notes to Consolidated Financial Statements (Continued)

10. Commitments and Contingent Liabilities (Continued)

Vermiculite-Related Matters

Grace purchased a vermiculite mine in Libby, Montana, in 1963 and operated it until 1990. Vermiculite concentrate from the Libby mine was used in the manufacture of attic insulation and other products. Some of the vermiculite ore contained naturally occurring asbestos.

Grace is engaged with the U.S. Environmental Protection Agency (the "EPA") and other federal, state and local governmental agencies in a remedial investigation and feasibility study ("RI/FS") of the Libby mine and the surrounding area. This RI/FS will determine the specific areas requiring remediation and will identify possible remedial action alternatives. Possible remedial actions are wide-ranging, from institutional controls such as land use restrictions, to more active measures involving soil removal, containment projects, or other protective measures. Grace expects the RI/FS and a record of decision to be completed in 2018 or 2019. When meaningful new information becomes available, Grace will reevaluate estimated liability for the costs for remediation of the mine and surrounding area and adjust its reserves accordingly.

The EPA is also investigating or remediating formerly owned or operated sites that processed Libby vermiculite into finished products. Grace is cooperating with the EPA on these investigation and remediation activities, and has recorded a liability to the extent that its review has indicated that a probable liability has been incurred and the cost is estimable. These liabilities cover the estimated cost of investigations and, to the extent an assessment has indicated that remediation is necessary, the estimable cost of response actions. Response actions typically involve soil excavation and removal, and replacement with clean fill. The EPA may commence additional investigations in the future at other sites that processed Libby vermiculite, but Grace does not believe, based on its knowledge of prior and current operations and site conditions, that liability for remediation at such other sites is probable.

Grace accrued \$24.8 million, \$6.0 million, and \$7.5 million in 2016, 2015, and 2014, respectively, for future costs related to vermiculite-related matters. More than half of the 2016 amount was for the completion of the RI/FS of the Libby mine and surrounding area, which is expected to be spent over the next three years. Grace's total estimated liability for response costs that are currently estimable for the Libby mine and surrounding area, and at vermiculite processing sites outside of Libby at December 31, 2016 and 2015, was \$31.2 million and \$18.7 million, respectively. It is probable that Grace's ultimate liability for these vermiculite-related matters will exceed current estimates by material amounts.

Non-Vermiculite-Related Matters

At December 31, 2016 and 2015, Grace's estimated legacy environmental liability for response costs at sites not related to its former vermiculite mining and processing activities was \$35.1 million and \$36.5 million, respectively. This liability relates to Grace's former businesses or operations, including its share of liability at off-site disposal facilities. Grace's estimated liability is based upon regulatory requirements and environmental conditions at each site. As Grace receives new information, its estimated liability may change materially.

Commercial and Financial Commitments and Contingencies

Purchase Commitments Grace uses purchase commitments to ensure supply and to minimize the volatility of major components of direct manufacturing costs including natural gas, certain metals, rare earths, and other materials. Such commitments are for quantities that Grace fully expects to use in its normal operations.

Guarantees and Indemnification Obligations Grace is a party to many contracts containing guarantees and indemnification obligations. These contracts primarily consist of:

Product warranties with respect to certain products sold to customers in the ordinary course of business. These warranties typically provide that products will conform to specifications. Grace accrues a warranty liability on a transaction-specific basis depending on the individual facts and circumstances related to each sale. Both the liability and annual expense related to product warranties are immaterial to the Consolidated Financial Statements.

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Notes to Consolidated Financial Statements (Continued)

10. Commitments and Contingent Liabilities (Continued)

• Performance guarantees offered to customers under certain licensing arrangements. Grace has not established a liability for these arrangements based on past performance.

• Licenses of intellectual property by Grace to third parties in which Grace has agreed to indemnify the licensee against third party infringement claims.

• Contracts providing for the sale of a former business unit or product line in which Grace has agreed to indemnify the buyer against liabilities related to activities prior to the closing of the transaction, including environmental liabilities.

• Contracts related to the Separation in which Grace has agreed to indemnify GCP against liabilities related to activities prior to the closing of the transaction, including tax, employee, and environmental liabilities.

• Guarantees of real property lease obligations of third parties, typically arising out of (a) leases entered into by former subsidiaries of Grace, or (b) the assignment or sublease of a lease by Grace to a third party.

Financial Assurances Financial assurances have been established for a variety of purposes, including insurance and environmental matters, trade-related commitments and other matters. At December 31, 2016, Grace had gross financial assurances issued and outstanding of \$124.3 million, composed of \$37.2 million of surety bonds issued by various insurance companies and \$87.1 million of standby letters of credit and other financial assurances issued by various banks.

11. Restructuring Expenses and Repositioning Expenses

Restructuring Expenses

In 2016, Grace incurred costs from restructuring actions, primarily related to workforce reductions and asset write-offs due to the exit of certain non-strategic product lines in Materials Technologies. In 2015 and 2014, Grace incurred costs from restructuring actions as a result of changes in the business environment and its business structure; costs in 2015 were in part due to the Separation.

	Year Ended		
	December 31,		
(In millions)	2016	2015	2014
Catalysts Technologies	\$3.4	\$4.8	\$2.1
Materials Technologies	15.1	0.8	0.2
Corporate	5.8	5.7	2.0
Total restructuring expenses	\$24.3	\$11.3	\$4.3

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Notes to Consolidated Financial Statements (Continued)

11. Restructuring Expenses and Repositioning Expenses (Continued)

Restructuring Liability (In millions)	Total
Balance, December 31, 2013	\$1.1
Accruals for severance and other costs	4.3
Payments	(3.6)
Currency translation adjustments and other	0.3
Balance, December 31, 2014	\$2.1
Accruals for severance and other costs	11.3
Payments	(5.6)
Currency translation adjustments and other	(0.2)
Balance, December 31, 2015	\$7.6
Accruals for severance and other costs	17.8
Payments	(16.0)
Currency translation adjustments and other	0.2
Balance, December 31, 2016	\$9.6

Repositioning Expenses

Pretax repositioning expenses included in continuing operations for the years ended December 31, 2016 and 2015, were \$14.3 million and \$9.1 million, respectively. These expenses primarily related to the Separation. Substantially all of these costs have been or are expected to be settled in cash.

12. Other (Income) Expense, net

Components of other (income) expense, net are as follows:

(In millions)	Year Ended		
	December 31,		
	2016	2015	2014
Loss on early extinguishment of debt	\$11.1	\$—	\$—
Chapter 11 expenses, net	3.4	5.1	11.0
Third-party acquisition-related costs	2.5	—	—
Net (gain) loss on sales of investments and disposals of assets	(1.4)	(10.6)	(2.5)
Interest income	(1.0)	(0.3)	(1.4)
Currency transaction effects	(1.0)	(1.5)	(1.5)
Bankruptcy-related charges, net	—	(8.7)	7.1
Other miscellaneous expense (income)	(0.3)	2.2	(1.8)
Total other (income) expense, net	\$13.3	\$(13.8)	\$10.9

See Note 5 for more information related to Grace's 2016 early extinguishment of debt.

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Notes to Consolidated Financial Statements (Continued)

13. Other Comprehensive Income (Loss)

The following tables present the pre-tax, tax, and after-tax components of Grace's other comprehensive income (loss) for the years ended December 31, 2016, 2015, and 2014:

Year Ended December 31, 2016 (In millions)	Pre-Tax Amount	Tax Benefit/ (Expense)	After-Tax Amount
Defined benefit pension and other postretirement plans:			
Amortization of net prior service credit included in net periodic benefit cost	\$ (2.4)	\$ 0.9	\$ (1.5)
Amortization of net deferred actuarial loss included in net periodic benefit cost	0.5	(0.2)	0.3
Net prior service credit arising during period	1.4	(0.5)	0.9
Loss on curtailment of postretirement plans	(0.5)	0.2	(0.3)
Benefit plans, net	(1.0)	0.4	(0.6)
Currency translation adjustments	(1.8)	—	(1.8)
Gain (loss) from hedging activities	0.6	(0.3)	0.3
Other comprehensive income (loss) attributable to W. R. Grace & Co. shareholders	\$ (2.2)	\$ 0.1	\$ (2.1)
Year Ended December 31, 2015 (In millions)	Pre-Tax Amount	Tax Benefit/ (Expense)	After-Tax Amount
Defined benefit pension and other postretirement plans:			
Amortization of net prior service credit included in net periodic benefit cost	\$ (3.1)	\$ 1.0	\$ (2.1)
Amortization of net deferred actuarial loss included in net periodic benefit cost	0.7	(0.2)	0.5
Net prior service credit arising during period	5.7	(1.9)	3.8
Net deferred actuarial gain (loss) arising during period	(0.4)	0.1	(0.3)
Loss on curtailment of postretirement plans	(4.5)	1.6	(2.9)
Benefit plans, net	(1.6)	0.6	(1.0)
Currency translation adjustments	(43.3)	—	(43.3)
Gain (loss) from hedging activities	2.1	(0.8)	1.3
Other comprehensive income (loss) attributable to W. R. Grace & Co. shareholders	\$ (42.8)	\$ (0.2)	\$ (43.0)
Year Ended December 31, 2014 (In millions)	Pre-Tax Amount	Tax Benefit/ (Expense)	After-Tax Amount
Defined benefit pension and other postretirement plans:			
Amortization of net prior service credit included in net periodic benefit cost	\$ (1.7)	\$ 0.6	\$ (1.1)
Net prior service credit arising during period	13.6	(4.8)	8.8
Net deferred actuarial gain (loss) arising during period	1.0	(0.4)	0.6
Loss on termination of postretirement plans	(12.2)	1.3	(10.9)
Benefit plans, net	0.7	(3.3)	(2.6)
Currency translation adjustments	(28.0)	—	(28.0)
Gain (loss) from hedging activities	(7.1)	2.6	(4.5)
Other than temporary impairment of investment	0.8	—	0.8
Gain (loss) on securities available for sale	(0.1)	—	(0.1)
Other comprehensive income (loss) attributable to W. R. Grace & Co. shareholders	\$ (33.7)	\$ (0.7)	\$ (34.4)

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Notes to Consolidated Financial Statements (Continued)

13. Other Comprehensive Income (Loss) (Continued)

The following table presents the changes in accumulated other comprehensive income (loss), net of tax, for the years ended December 31, 2016, 2015, and 2014:

	Defined Benefit Pension and Other Postretirement Plans	Currency Translation Adjustments	Gain (Loss) from Hedging Activities	Unrealized Loss on Investment	Gain (Loss) on Securities Available for Sale	Total
Balance, December 31, 2013	\$ 6.6	\$ 5.2	\$ (0.5)	\$ (0.8)	\$ 0.1	\$10.6
Other comprehensive income (loss) before reclassifications	9.4	(28.0)	(3.2)	—	(0.7)	(22.5)
Amounts reclassified from accumulated other comprehensive income (loss)	(12.0)	—	(1.3)	0.8	0.6	(11.9)
Net current-period other comprehensive income (loss)	(2.6)	(28.0)	(4.5)	0.8	(0.1)	(34.4)
Balance, December 31, 2014	\$ 4.0	\$ (22.8)	\$ (5.0)	\$ —	\$ —	\$(23.8)
Other comprehensive income (loss) before reclassifications	3.5	(43.3)	0.6	—	—	(39.2)
Amounts reclassified from accumulated other comprehensive income (loss)	(4.5)	—	0.7	—	—	(3.8)
Net current-period other comprehensive income (loss)	(1.0)	(43.3)	1.3	—	—	(43.0)
Balance, December 31, 2015	\$ 3.0	\$ (66.1)	\$ (3.7)	\$ —	\$ —	\$(66.8)
Other comprehensive income (loss) before reclassifications	0.9	(1.8)	(1.8)	—	—	(2.7)
Amounts reclassified from accumulated other comprehensive income (loss)	(1.5)	—	2.1	—	—	0.6
Net current-period other comprehensive income (loss)	(0.6)	(1.8)	0.3	—	—	(2.1)
Distribution of GCP	(0.2)	135.5	—	—	—	135.3
Balance, December 31, 2016	\$ 2.2	\$ 67.6	\$ (3.4)	\$ —	\$ —	\$66.4

Grace is a global enterprise operating in many countries with local currency generally deemed to be the functional currency for accounting purposes. The currency translation amount represents the adjustments necessary to translate the balance sheets valued in local currencies to the U.S. dollar as of the end of each period presented, and to translate revenues and expenses at average exchange rates for each period presented.

See Note 6 for a discussion of hedging activities. See Note 8 for a discussion of pension plans and other postretirement benefit plans.

14. Shareholders' Equity

Under its Amended and Restated Certificate of Incorporation, the Company is authorized to issue 300,000,000 shares of common stock, \$0.01 par value per share. As of December 31, 2016, the W. R. Grace & Co. 2014 Stock Incentive Plan (together with the 2011 Stock Incentive Plan and the Amended and Restated 2011 Stock Incentive Plan, collectively, the "Stock Incentive Plans") had 2,951,387 shares of unissued stock reserved for issuance in the event of the exercise of stock options or settlement of stock based awards. Historically all stock options exercised were covered by reissuing treasury stock. During 2014, stock options exercises exceeded the shares available in treasury stock and therefore the Company issued new shares, which were reserved for issuance under the Stock Incentive Plans. For the years ended December 31, 2016, 2015, and 2014, 745,938, 728,408, and 793,359 stock options were

exercised for aggregate proceeds of \$17.0 million, \$26.9 million, and \$23.4 million, respectively. Additionally in 2016, 7,844 common shares were issued to members of the Board of

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Notes to Consolidated Financial Statements (Continued)

14. Shareholders' Equity (Continued)

Directors, 86,045 shares were issued through net share settlement, 16,974 shares were issued to settle the 2013 PBU's, and 90 restricted shares were issued.

The following table sets forth information relating to common stock activity for 2016 and 2015:

Balance of outstanding shares, December 31, 2014	72,922,565
Stock options exercised	728,408
Shares issued	9,378
Shares forfeited	(3,120)
Shares repurchased	(3,123,716)
Balance of outstanding shares, December 31, 2015	70,533,515
Stock options exercised	745,938
Shares issued	110,953
Shares forfeited through net share exercise	(305,678)
Shares repurchased	(2,775,297)
Balance of outstanding shares, December 31, 2016	68,309,431

15. Stock Incentive Plans

The Company has granted nonstatutory stock options to certain key employees under the Stock Incentive Plans. The Stock Incentive Plans are administered by the Compensation Committee of the Board of Directors. Stock options are generally non-qualified and are at exercise prices not less than 100% of the average per share fair market value on the date of grant. Stock-based compensation awards granted under the Company's stock incentive plans are generally subject to a vesting period from the date of the grant ranging from 1 - 3 years. Currently outstanding options expire on various dates through May 2021.

Previously outstanding stock-based compensation awards granted under equity compensation programs prior to the Separation and held by certain executives and employees were adjusted in 2016 to reflect the impact of the Separation on these awards. To preserve the aggregate intrinsic value of awards held prior to the Separation, as measured immediately before and immediately after the Separation, each holder of stock-based compensation awards generally received an adjusted award consisting of either (i) both a stock-based compensation award denominated in Company equity as it existed subsequent to the Separation and a stock-based compensation award denominated in GCP equity or (ii) solely a stock-based compensation award denominated in Company equity. In the Separation, the determination as to which type of adjustment applied to a holder's previously outstanding award was based upon the date on which the award was originally granted under the equity compensation programs prior to the Separation. The adjustment of the original awards resulted in \$0.6 million of incremental compensation cost.

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Notes to Consolidated Financial Statements (Continued)

15. Stock Incentive Plans (Continued)

The following table sets forth information relating to such options during 2016, 2015, and 2014:

Stock Option Activity	Number Of Shares	Average Exercise Price	Weighted- Average Grant Date Fair Value
Balance, January 1, 2014	2,885,055	\$ 42.60	
Options exercised	(793,359)	29.53	
Options forfeited	(42,424)	68.07	
Options granted	474,518	74.70	\$ 20.12
Balance, December 31, 2014	2,523,790	55.77	
Options exercised	(728,408)	36.85	
Options forfeited	(25,000)	92.57	
Options terminated	(500)	100.29	
Options granted	550,805	77.31	19.28
Balance, December 31, 2015	2,320,687	71.01	
Options exercised	(745,938)	36.97	
Options forfeited	(9,458)	73.40	
Options terminated	(2,426)	67.06	
Options granted	377,920	68.32	12.90
Balance, December 31, 2016	1,940,785		

The following is a summary of nonvested option activity for the year ended December 31, 2016:

Stock Option Activity	Number Of Shares	Weighted- Average Grant Date Fair Value
Nonvested options outstanding at beginning of year	974,001	\$ 20.43
Granted	377,920	12.90
Vested	(462,006)	19.01
Forfeited	(11,884)	27.70
Nonvested options outstanding at end of year	878,031	

As of December 31, 2016, the intrinsic value (the difference between the exercise price and the market price) for options outstanding was \$10.1 million and for options exercisable was \$10.1 million. The total intrinsic value of all options exercised during the years ended December 31, 2016, 2015 and 2014 was \$25.9 million, \$46.1 million and \$53.6 million, respectively. A summary of our stock options outstanding and exercisable at December 31, 2016, follows:

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Notes to Consolidated Financial Statements (Continued)

15. Stock Incentive Plans (Continued)

Exercise Price Range	Number Outstanding	Number Exercisable	Outstanding Average Remaining Contractual Life (Years)	Weighted-Average Exercise Price
\$30 - \$40	286,495	286,495	0.49	39.02
\$50 - \$60	7,455	7,455	0.97	54.63
\$60 - \$70	688,735	316,889	2.85	61.77
\$70 - \$80	931,510	438,600	2.92	75.81
\$80 - \$90	26,590	13,315	2.16	80.76
	1,940,785	1,062,754		

At December 31, 2016, the weighted-average remaining contractual term of all options outstanding and exercisable was 2.54 years.

Options Granted The Company granted approximately 0.4 million, 0.6 million, and 0.5 million nonstatutory stock options in 2016, 2015, and 2014, respectively, under the Stock Incentive Plans.

For the years ended December 31, 2016, 2015 and 2014, the Company recognized non-cash stock-based compensation expense of \$6.0 million, \$9.9 million and \$12.0 million, respectively, which is included in "selling, general and administrative expenses" in the Consolidated Statements of Operations. The actual tax benefit realized from stock options exercised totaled \$11.2 million, \$3.3 million, and \$2.5 million for the year ended December 31, 2016, 2015 and 2014, respectively.

The Company values options using the Black-Scholes option-pricing model, which was developed for use in estimating the fair value of traded options. The risk-free rate is based on the U.S. Treasury yield curve published as of the grant date, with maturities approximating the expected term of the options. The expected term of the options is estimated using the simplified method as allowed by ASC 718-20, whereby the average between the vesting period and contractual term is used. The expected volatility was estimated using both actual stock volatility and the volatility of an industry peer group. The Company believes its actual stock volatility was not representative of future volatility during the time it was in Chapter 11. The following summarizes the assumptions used for estimating the fair value of stock options granted during 2016, 2015 and 2014, respectively.

	2016	2015	2014
Expected volatility	26.2% - 27.5%	23.0% - 27.2%	28.2% - 28.7%
Weighted average expected volatility	26.6%	24.5%	28.6%
Expected term	3.00 - 4.00 years	3.00 - 4.00 years	3.00 - 4.00 years
Risk-free rate	1.01%	1.30%	1.25%
Dividend yield	1.0%	—%	—%

Total unrecognized stock-based compensation expense at December 31, 2016, was \$4.3 million and the weighted-average period over which this expense will be recognized is 1.0 year.

Restricted Stock and Performance Based Units During 2016 the Company granted 77,358 Restricted Stock Units (RSUs) and 124,952 Performance Based Units (PBUs) under the Company's Long-term Incentive Plan (LTIP). During 2015 the Company granted 123,846 RSUs and 1,864 PBUs under the LTIP. During 2014 the Company granted 110,993 PBUs under the LTIP. The PBUs that were granted in 2014 were converted to RSUs in 2016 as a result of the Separation. During 2016, 2015, and 2014, 15,197, 10,641, and 8,570 awards were forfeited, respectively. The awards cliff vest on December 31, 2018, 2017, and 2016, subject to continued employment through the payment date, and have a weighted average grant date fair value of \$68.65, \$67.95, and \$67.95 respectively. The Company anticipates

that approximately 67% of the awards granted in 2016 will be settled in common stock, and approximately 33% will be settled in cash, assuming full vesting. The Company anticipates that approximately 53% of the PBUs granted in 2015 will be settled in common stock and

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Notes to Consolidated Financial Statements (Continued)

15. Stock Incentive Plans (Continued)

approximately 47% will be settled in cash, assuming full vesting. The Company anticipates that approximately 53% of the PBUs granted in 2014 will be settled in common stock and approximately 47% will be settled in cash, assuming full vesting.

PBUs and RSUs are recorded at fair value at the date of grant. The common stock settled portion is considered an equity award with the payout being valued based on the Company's stock price on the grant date. The cash settled portion of the award is considered a liability award with payout being remeasured each reporting period based on the Company's current stock price. PBU equity and cash awards are remeasured each reporting period based on the expected payout of the award, which may range from 0% to 200% of the targets for such awards; therefore, these portions of the awards are subject to volatility until the payout is finally determined at the end of the performance period. During 2016, 2015, and 2014, the Company recognized \$8.6 million, \$5.8 million, and \$3.5 million in compensation expense for these awards. As of December 31, 2016, \$12.7 million of total unrecognized compensation expense related to the awards is expected to be recognized over the remaining weighted-average service period of 1.7 years.

16. Earnings Per Share

The following table shows a reconciliation of the numerators and denominators used in calculating basic and diluted earnings per share.

(In millions, except per share amounts)	2016	2015	2014
Numerators			
Income (loss) from continuing operations attributable to W. R. Grace & Co. shareholders	\$107.0	\$124.0	\$117.0
Income (loss) from discontinued operations, net of income taxes	(12.9)	20.2	159.3
Net income (loss) attributable to W. R. Grace & Co. shareholders	\$94.1	\$144.2	\$276.3
Denominators			
Weighted average common shares—basic calculation	70.1	72.0	75.3
Dilutive effect of employee stock options	0.4	0.6	0.9
Weighted average common shares—diluted calculation	70.5	72.6	76.2
Basic earnings per share attributable to W. R. Grace & Co. shareholders			
Income (loss) from continuing operations	\$1.53	\$1.72	\$1.55
Income (loss) from discontinued operations, net of income taxes	(0.19)	0.28	2.12
Net income (loss)	\$1.34	\$2.00	\$3.67
Diluted earnings per share attributable to W. R. Grace & Co. shareholders			
Income (loss) from continuing operations	\$1.52	\$1.71	\$1.54
Income (loss) from discontinued operations, net of income taxes	(0.19)	0.28	2.09
Net income (loss)	\$1.33	\$1.99	\$3.63

There were approximately 1.3 million, 0.4 million and 0.3 million anti-dilutive options outstanding for the years ended December 31, 2016, 2015 and 2014, respectively.

On February 4, 2014, the Company announced that its Board of Directors authorized a share repurchase program of up to \$500 million expected to be completed over the following 12 to 24 months at the discretion of management. The Company completed this initial share repurchase program on January 15, 2015. On February 5, 2015, the Company announced that its Board of Directors authorized an additional share repurchase program of up to \$500 million. As of December 31, 2016, \$33.9 million remained under this authorization. On February 8, 2017, the Company announced that its Board of Directors authorized a new share repurchase program of up to \$250 million expected to be completed over the next 24 to 36 months at the discretion of management. The timing

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Notes to Consolidated Financial Statements (Continued)

16. Earnings Per Share (Continued)

of the repurchases and the actual amount repurchased will depend on a variety of factors, including the market price of the Company's shares, the strategic deployment of capital, and general market and economic conditions. During 2016 and 2015, the Company repurchased 2,775,297 shares and 3,123,716 shares of Company common stock for \$195.1 million and \$301.5 million, respectively, pursuant to the terms of the share repurchase program.

17. Segment Information

Grace is a global producer of specialty chemicals and specialty materials. Grace's two reportable business segments are Grace Catalysts Technologies and Grace Materials Technologies. Grace Catalysts Technologies includes catalysts and related products and technologies used in refining, petrochemical and other chemical manufacturing applications. Advanced Refining Technologies (ART), Grace's joint venture with Chevron Products Company, a division of Chevron U.S.A. Inc. ("Chevron"), is managed in this segment. (See Note 18.) Grace Catalysts Technologies comprises two operating segments, Grace Refining Technologies and Grace Specialty Catalysts, which are aggregated into one reportable segment based upon similar economic characteristics, the nature of the products and production processes, type and class of customer, and channels of distribution. Grace Materials Technologies includes specialty materials, including silica-based and silica-alumina-based materials, used in coatings, consumer, industrial, and pharmaceutical applications. The table below presents information related to Grace's reportable segments. Only those corporate expenses directly related to the reportable segments are allocated for reporting purposes. All remaining corporate items are reported separately and labeled as such.

Grace excludes defined benefit pension expense from the calculation of segment operating income. Grace believes that the exclusion of defined benefit pension expense provides a better indicator of its reportable segment performance as defined benefit pension expense is not managed at a reportable segment level.

Grace defines Adjusted EBIT to be income from continuing operations attributable to W. R. Grace & Co. shareholders adjusted for interest income and expense; income taxes; costs related to Chapter 11, and legacy product and environmental; restructuring and repositioning expenses and asset impairments; pension costs other than service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits; income and expense items related to divested businesses, product lines, and certain other investments; gains and losses on sales of businesses, product lines, and certain other investments; third-party acquisition-related costs and the amortization of acquired inventory fair value adjustment; and certain other items that are not representative of underlying trends.

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Notes to Consolidated Financial Statements (Continued)

17. Segment Information (Continued)

Reportable Segment Data

(In millions)	Year Ended December 31,		
	2016	2015	2014
Net Sales			
Catalysts Technologies	\$1,163.7	\$1,162.1	\$1,246.8
Materials Technologies	434.9	466.1	510.5
Total	\$1,598.6	\$1,628.2	\$1,757.3
Adjusted EBIT			
Catalysts Technologies segment operating income	\$367.8	\$347.3	\$378.3
Materials Technologies segment operating income	104.0	96.9	101.7
Corporate costs	(59.4)	(79.9)	(95.3)
Gain on termination and curtailment of postretirement plans related to current businesses	0.2	1.9	23.6
Certain pension costs	(12.3)	(20.4)	(24.5)
Total	\$400.3	\$345.8	\$383.8
Depreciation and Amortization			
Catalysts Technologies	\$77.4	\$68.1	\$66.3
Materials Technologies	19.5	23.2	26.2
Corporate	3.4	7.9	10.2
Total	\$100.3	\$99.2	\$102.7
Capital Expenditures			
Catalysts Technologies	\$84.9	\$66.3	\$81.6
Materials Technologies	24.0	24.6	30.1
Corporate	8.0	27.9	20.6
Total	\$116.9	\$118.8	\$132.3

(In millions)	December 31,	
	2016	2015
Total Assets		
Catalysts Technologies	\$1,675.1	\$1,390.8
Materials Technologies	313.1	333.4
Corporate	923.6	1,051.0
Assets of discontinued operations	—	870.5
Total	\$2,911.8	\$3,645.7

Corporate costs include corporate support function costs and other corporate costs such as professional fees and insurance premiums. Certain pension costs include only ongoing costs recognized quarterly, which include service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits.

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Notes to Consolidated Financial Statements (Continued)

17. Segment Information (Continued)

Reconciliation of Reportable Segment Data to Financial Statements

Grace Adjusted EBIT for the years ended December 31, 2016, 2015 and 2014 is reconciled below to income from continuing operations before income taxes presented in the accompanying Consolidated Statements of Operations.

(In millions)	Year Ended December 31,		
	2016	2015	2014
Grace Adjusted EBIT	\$400.3	\$345.8	\$383.8
Pension MTM adjustment and other related costs, net	(60.3)	(30.5)	(137.6)
Restructuring and repositioning expenses	(38.6)	(20.4)	(4.3)
Costs related to Chapter 11, and legacy product and environmental, net	(35.4)	(6.1)	(35.6)
Amortization of acquired inventory fair value adjustment	(8.0)	—	—
Third-party acquisition-related costs	(2.5)	—	—
Gain (loss) on sale of product line	1.7	—	0.2
Gain on termination and curtailment of postretirement plans related to divested businesses	0.3	2.6	15.9
Income and expense items related to divested businesses	0.1	1.5	4.1
Loss on early extinguishment of debt	(11.1)	—	—
Interest expense, net	(80.5)	(99.1)	(121.9)
Net income (loss) attributable to noncontrolling interests	—	(0.1)	(0.1)
Income (loss) from continuing operations before income taxes	\$166.0	\$193.7	\$104.5

The table below presents sales of similar products within each reportable segment.

(In millions)	Year Ended December 31,		
	2016	2015	2014
Catalysts Technologies:			
Refining Catalysts	\$724.9	\$764.5	\$845.5
Polyolefin and Chemical Catalysts	438.8	397.6	401.3
Total	\$1,163.7	\$1,162.1	\$1,246.8
Materials Technologies:			
Coatings and print media	\$136.5	\$133.6	\$151.5
Consumer/Pharma	121.9	125.1	136.8
Chemical process and other	176.5	207.4	222.2
Total	\$434.9	\$466.1	\$510.5

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Notes to Consolidated Financial Statements (Continued)

17. Segment Information (Continued)

Geographic Area Data

The table below presents information related to the geographic areas in which Grace operates. Sales are attributed to geographic areas based on customer location.

(In millions)	Year Ended December 31,		
	2016	2015	2014
Net Sales			
United States	\$446.2	\$444.7	\$465.9
Canada and Puerto Rico	44.5	45.3	43.2
Total North America	490.7	490.0	509.1
Europe Middle East Africa	647.8	621.2	706.4
Asia Pacific	348.9	390.9	397.2
Latin America	111.2	126.1	144.6
Total	\$1,598.6	\$1,628.2	\$1,757.3

(In millions)	December 31,	
	2016	2015
Long-Lived Assets		
United States	\$564.5	\$464.1
Canada and Puerto Rico	13.9	13.0
Total North America	578.4	477.1
Germany	109.7	110.9
Rest of Europe Middle East Africa	39.5	17.4
Total Europe Middle East Africa	149.2	128.3
Asia Pacific	21.5	25.9
Latin America	7.5	5.5
Total	\$756.6	\$636.8

18. Unconsolidated Affiliate

Grace accounts for its 50% ownership interest in ART, its joint venture with Chevron, using the equity method of accounting. Grace's investment in ART amounted to \$117.6 million and \$103.2 million as of December 31, 2016 and 2015, respectively, and the amount included in "equity in earnings of unconsolidated affiliate" in the accompanying Consolidated Statements of Operations totaled \$29.8 million, \$20.4 million and \$19.7 million for the years ended December 31, 2016, 2015 and 2014, respectively. ART is a private company and accordingly does not have a quoted market price available. The following summary lists ART's assets, liabilities and results of operations.

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Notes to Consolidated Financial Statements (Continued)

18. Unconsolidated Affiliate (Continued)

(In millions)	December 31,	
	2016	2015
Summary Balance Sheet information:		
Current assets	\$249.2	\$244.1
Noncurrent assets	84.8	69.7
Total assets	\$334.0	\$313.8
Current liabilities	\$102.0	\$111.0
Noncurrent liabilities	0.3	—
Total liabilities	\$102.3	\$111.0

(In millions)	Year Ended December 31,		
	2016	2015	2014
Summary Statement of Operations information:			
Net sales	\$388.9	\$415.3	\$409.9
Costs and expenses applicable to net sales	322.1	366.6	358.1
Income before income taxes	60.8	42.8	41.2
Net income	59.3	41.1	39.7

Grace and ART transact business on a regular basis and maintain several agreements in order to operate the joint venture. These agreements are treated as related party activities with an unconsolidated affiliate. Sales to ART are accounted for on a net basis, with a mark-up, in "cost of goods sold" in the Consolidated Statements of Operations. Grace also receives reimbursement from ART for fixed costs, research and development, selling, general and administrative services and depreciation. Grace records reimbursements against the respective line items on Grace's Consolidated Statement of Operations. The table below presents summary financial data related to transactions between Grace and ART.

(In millions)	Year Ended December 31,		
	2016	2015	2014
Grace sales of catalysts to ART	\$210.4	\$258.9	\$266.4
Mark-up of Grace's sales to ART included in Grace's cost of goods sold	4.2	5.1	5.3
Charges for fixed costs, research and development and selling, general and administrative services, and depreciation to ART	33.8	31.6	35.1

The table below lists Grace balances related to ART.

(in millions)	December 31,	
	2016	2015
Trade accounts receivable	\$14.9	\$6.6
Noncurrent asset	27.0	11.9
Accounts payable	28.7	18.2
Debt payable within one year	7.6	7.2
Debt payable after one year	31.9	26.2
Noncurrent liability	27.0	11.9

The noncurrent asset and noncurrent liability in the table above represent spending to date related to a planned residue hydroprocessing catalyst production plant in Lake Charles, Louisiana. Grace manages the

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Notes to Consolidated Financial Statements (Continued)

18. Unconsolidated Affiliate (Continued)

design and construction of the plant, and the asset will be included in "other assets" in Grace's Consolidated Balance Sheets until construction is completed. Grace has likewise recorded a liability for the transfer of the asset to ART upon completion, included in "other liabilities" in the Consolidated Balance Sheets.

Grace and Chevron provide lines of credit in the amount of \$15.0 million each at a commitment fee of 0.1% of the credit amount. These agreements expire on February 24, 2017, and are expected to be renewed. No amounts were outstanding at December 31, 2016 and 2015.

19. Chapter 11 and Joint Plan of Reorganization

Grace emerged from an asbestos-related Chapter 11 bankruptcy on February 3, 2014 (the "Effective Date"). Under Grace's plan of reorganization (the "Joint Plan"), two asbestos trusts were established and funded. The court order that confirmed the Joint Plan channels all pending and future asbestos-related personal injury claims and demands ("PI Claims") for resolution to an asbestos personal injury trust (the "PI Trust") and all pending and future asbestos-related property damage claims and demands ("PD Claims"), including PD Claims related to Grace's former attic insulation product ("ZAI PD Claims"), to a separate asbestos property damage trust (the "PD Trust"). The trusts are the sole recourse for holders of asbestos-related claims; the channeling injunctions prohibit holders of asbestos-related claims from asserting such claims directly against Grace.

Under the terms of the Joint Plan, claims under the Grace Chapter 11 cases were satisfied as follows:

Asbestos-Related Personal Injury Claims On the Effective Date, the PI Trust was funded with:

- \$557.7 million in cash from Grace (includes \$464.1 million of cash from Grace and \$93.6 million of cash from insurance proceeds that were held in escrow);

- A warrant to acquire 10 million shares of Company common stock at an exercise price of \$17.00 per share and expiring one year after the Effective Date (the "PI Warrant") (The Company repurchased the PI Warrant for a payment of \$490 million in cash on February 3, 2015);

- Rights to all proceeds under all of Grace's insurance policies that are available for payment of asbestos-related personal injury claims and demands;

- \$42.1 million in cash from a subsidiary of Fresenius AG, pursuant to the terms of a settlement agreement resolving asbestos-related, successor liability and fraudulent transfer claims against Fresenius; and

- \$856.8 million in cash and 18 million shares of Sealed Air Corporation common stock paid by Cryovac, Inc., a wholly owned subsidiary of Sealed Air, pursuant to the terms of a settlement agreement resolving asbestos-related, successor liability and fraudulent transfer claims against Cryovac and Sealed Air.

Under the Joint Plan, Grace was also obligated to make deferred payments to the PI Trust of \$110 million per year for 5 years beginning in 2019 and \$100 million per year for 10 years beginning in 2024, which obligation was secured by the Company's obligation to issue 77,372,257 shares of Company common stock to the asbestos trusts in the event of default, subject to customary anti-dilution provisions. In September 2014, Grace paid the PI Trust \$632 million in settlement of Grace's deferred payment obligations. Grace has no further financial obligations to the PI Trust.

Asbestos-Related Property Damage Claims The PD Trust contains two accounts that cannot be commingled, the PD Account and the ZAI PD Account. U.S. ZAI PD Claims are to be paid from the ZAI PD Account and non-ZAI PD Claims are to be paid from the PD Account. On the Effective Date, the PD Account was funded with \$39.9 million in cash from Grace and \$111.4 million in cash from Cryovac and Fresenius to pay allowed non-ZAI PD Claims settled as of the Effective Date, a separate Canadian ZAI PD Claims fund was funded with CDN\$8.6 million in cash from Grace, and the ZAI PD Account was funded with \$34.4 million in cash from Cryovac and Fresenius. On February 3, 2017, Grace made an additional payment of \$30.0 million to the ZAI PD Account.

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Notes to Consolidated Financial Statements (Continued)

19. Chapter 11 and Joint Plan of Reorganization (Continued)

Other Claims As provided for in the Joint Plan, Grace paid substantially all other allowed pre-petition claims in full on or within 10 days after the Effective Date. All allowed administrative claims and all allowed priority claims were paid in cash with interest as provided in the Joint Plan. Secured claims were paid in cash with interest or by reinstatement. Allowed general unsecured claims were paid in cash. The Joint Plan further provided that Grace, subject to certain non-bankruptcy limitations, satisfy all pension, retirement medical, and similar employee-related obligations and pay workers' compensation claims.

See Note 10 for more information on Grace's remaining legacy product and environmental liabilities.

20. Acquisitions

On June 30, 2016, Grace acquired the assets of BASF's polyolefin catalysts business for total consideration of \$250.6 million, including an estimated \$3.3 million holdback liability. The business is included in the Specialty Catalysts operating segment of the Catalysts Technologies reportable segment. The acquisition purchase price has been allocated to the tangible and identifiable intangible assets acquired based on their estimated fair values at the acquisition date in accordance with ASC 805 "Business Combinations." The excess of the purchase price over the fair value of the tangible and intangible assets acquired was recorded as goodwill. The goodwill recognized is attributable to the expected growth and operating synergies that Grace expects to realize from this acquisition. Approximately \$43 million of goodwill generated from the acquisition will be deductible for U.S. income tax purposes over a period of 15 years.

	(In millions)
Inventories	\$ 30.2
Properties and equipment	95.0
Goodwill	63.8
Intangible assets	61.6
Net assets acquired	\$ 250.6

The table below presents the intangible assets acquired as part of the acquisition of the assets of BASF's polyolefin catalysts business and the periods over which they will be amortized.

	Amount (In millions)	Weighted Average Amortization Period (in years)
Customer Lists	\$ 39.9	20.0
Trademarks	13.4	20.0
Technology	8.3	20.0
Total	\$ 61.6	20.0

21. Discontinued Operations

As a result of the Separation and Distribution, GCP is now an independent public company and its common stock is listed under the symbol "GCP" on the New York Stock Exchange. Grace does not beneficially own any shares of GCP common stock and will not consolidate the financial results of GCP in its future financial reporting, as GCP is no longer a related party to Grace subsequent to the Separation. GCP's historical financial results through the Distribution Date are reflected in Grace's Consolidated Financial Statements as discontinued operations.

Separation and Distribution Agreement Prior to the completion of the Separation and the Distribution, W. R. Grace & Co., Grace-Conn. and GCP entered into a Separation and Distribution Agreement and certain related agreements that govern the post-Separation relationship between Grace and GCP. The Separation and

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Notes to Consolidated Financial Statements (Continued)

21. Discontinued Operations (Continued)

Distribution Agreement identifies the transfer of Grace's assets and liabilities that are specifically identifiable or otherwise allocable to GCP, the elimination of Grace's equity interest in GCP, the removal of certain non-recurring separation costs directly related to the Separation and Distribution, the cash distribution from GCP to Grace, the reduction in Grace's debt using the cash received from GCP, and it provides for when and how these transfers, assumptions and assignments have occurred or will occur.

Tax Sharing Agreement W. R. Grace & Co., Grace-Conn. and GCP entered into a Tax Sharing Agreement that generally governs the parties' respective rights, responsibilities and obligations after the Distribution with respect to taxes (including taxes arising in the ordinary course of business and taxes, if any, incurred as a result of any failure of the Distribution and certain related transactions to qualify under Sections 355 and certain other relevant provisions of the Internal Revenue Code (the "Code")), tax attributes, the preparation and filing of tax returns, tax elections, tax contests, and certain other tax matters.

In addition, the Tax Sharing Agreement imposes certain restrictions on GCP and its subsidiaries (including restrictions on share issuances, business combinations, sales of assets and similar transactions) that are designed to preserve the qualification of the Distribution and certain related transactions under Sections 355 and certain other relevant provisions of the Code. The Tax Sharing Agreement provides special rules that allocate tax liabilities in the event the Distribution, together with certain related transactions, does not so qualify. In general, under the Tax Sharing Agreement, each party is expected to be responsible for any taxes imposed on, and certain related amounts payable by, GCP or Grace that arise from the failure of the Distribution and certain related transactions, to qualify under Sections 355 and certain other relevant provisions of the Code, to the extent that the failure to so qualify is attributable to actions, events or transactions relating to such party's respective stock, assets or business, or a breach of the relevant representations or covenants made by that party in the Tax Sharing Agreement.

The foregoing is a summary of the Separation and Distribution Agreement and the Tax Sharing Agreement. Grace has filed the full texts of the Separation and Distribution Agreement and the Tax Sharing Agreement with the SEC, which are readily available on the Internet at www.sec.gov.

GCP's historical financial results through the Distribution Date and other effects of the Separation are presented as discontinued operations as summarized below:

(In millions)	Year Ended December 31,		
	2016	2015	2014
Net sales	\$99.6	\$1,423.3	\$1,485.7
Cost of goods sold	62.6	907.5	957.2
Gross profit	37.0	515.8	528.5
Selling, general and administrative expenses	21.6	251.2	248.8
Research and development expenses	1.7	22.5	28.1
Loss in Venezuela	—	59.6	—
Repositioning expenses	22.0	55.1	—
Interest expense and related financing costs	0.7	1.5	3.9
Other expense, net	3.9	9.9	17.8
Total costs and expenses	49.9	399.8	298.6
(Loss) Income from discontinued operations before income taxes	(12.9)	116.0	229.9
Benefit from (provision for) income taxes	0.1	(95.0)	(69.4)
(Loss) Income from discontinued operations after income taxes	(12.8)	21.0	160.5
Less: Net income attributable to noncontrolling interests	(0.1)	(0.8)	(1.2)
Net (loss) income from discontinued operations	\$(12.9)	\$20.2	\$159.3

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Notes to Consolidated Financial Statements (Continued)

21. Discontinued Operations (Continued)

The carrying amounts of the major classes of assets and liabilities classified as assets and liabilities of discontinued operations as of December 31, 2015, related to GCP consisted of the following:

(In millions)	December 31, 2015
ASSETS	
Current Assets	
Cash and cash equivalents	\$ 98.6
Trade accounts receivable, net	203.6
Inventories	105.3
Other current assets	38.9
Total Current Assets	446.4
Properties and equipment, net of accumulated depreciation and amortization	220.7
Goodwill	102.5
Technology and other intangible assets, net	33.3
Deferred income taxes	32.0
Overfunded defined benefit pension plans	26.1
Other assets	9.5
Total Assets	\$ 870.5
LIABILITIES AND EQUITY	
Current Liabilities	
Debt payable within one year	\$ 26.4
Accounts payable	109.0
Other current liabilities	123.2
Total Current Liabilities	258.6
Deferred income taxes	8.7
Unrecognized tax benefits	11.1
Underfunded and unfunded defined benefit pension plans	79.0
Other liabilities	11.1
Total Liabilities	\$ 368.5

In January 2016, GCP completed the sale of \$525.0 million aggregate principal amount of 9.500% Senior Notes due in 2023. GCP used a portion of these proceeds to fund a \$500.0 million distribution to Grace in connection with the Separation and the Distribution.

In February 2016, GCP entered into a credit agreement that provides for new senior secured credit facilities in an aggregate principal amount of \$525.0 million, consisting of term loans in an aggregate principal amount of \$275.0 million maturing in 2022 and of revolving loans in an aggregate principal amount of \$250.0 million maturing in 2021, which were undrawn at closing. GCP used a portion of these proceeds to fund a \$250.0 million distribution to Grace in connection with the Separation and the Distribution.

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Notes to Consolidated Financial Statements (Continued)

22. Quarterly Summary and Statistical Information (Unaudited)

(In millions, except per share amounts)	March 31	June 30	September 30	December 31
2016				
Net sales	\$ 362.8	\$ 390.5	\$ 404.5	\$ 440.8
Gross profit	152.7	173.2	168.2	161.8
Net income (loss)	0.3	38.5	39.7	15.6
Net income (loss) attributable to W. R. Grace & Co. shareholders	0.5	38.7	39.6	15.3
Net income (loss) per share:(1)				
Basic earnings (loss) per share:				
Net income (loss)	\$ 0.01	\$ 0.55	\$ 0.56	\$ 0.22
Diluted earnings (loss) per share:				
Net income (loss)	0.01	0.55	0.56	0.22
Dividends declared per share	—	0.17	0.17	0.17
Market price of common stock:(2)(3)				
High	\$ 98.15	(4)\$ 80.39	\$ 80.56	\$ 74.38
Low	63.84	70.59	71.47	63.37
Close	71.18	73.21	73.80	67.64

(1) Per share results for the four quarters may differ from full-year per share results, as a separate computation of the weighted average number of shares outstanding is made for each quarter presented.

(2) Principal market: New York Stock Exchange.

(3) Share prices subsequent to February 3, 2016, reflect the Separation and exclude separate trading of GCP common stock.

(4) Price is a pre-Separation market price of common stock.

(In millions, except per share amounts)	March 31	June 30	September 30	December 31
2015				
Net sales	\$ 397.0	\$ 407.2	\$ 399.2	\$ 424.8
Gross profit	147.0	167.8	166.1	170.8
Net income (loss)	52.7	57.4	13.7	20.3
Net income (loss) attributable to W. R. Grace & Co. shareholders	52.7	57.4	13.8	20.3
Net income (loss) per share:(1)				
Basic earnings (loss) per share:				
Net income (loss)	\$ 0.72	\$ 0.79	\$ 0.19	\$ 0.29
Diluted earnings (loss) per share:				
Net income (loss)	0.72	0.78	0.19	0.29
Market price of common stock:(2)(3)				
High	\$ 104.90	\$ 103.72	\$ 104.94	\$ 101.99
Low	84.25	95.03	90.84	92.66
Close	98.87	100.30	93.05	99.59

(1) Per share results for the four quarters may differ from full-year per share results, as a separate computation of the weighted average number of shares outstanding is made for each quarter presented.

(2)Principal market: New York Stock Exchange.

(3)Prices are pre-Separation market prices of common stock.

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SELECTED FINANCIAL DATA(1)

(In millions, except per share amounts)

	2016	2015	2014	2013	2012
Statement of Operations					
Net sales	\$1,598.6	\$1,628.2	\$1,757.3	\$1,609.5	\$1,737.8
Income (loss) from continuing operations(2)	107.0	123.9	116.9	120.5	(71.7)
Financial Position					
Total assets	2,911.8	3,645.7	4,057.1	5,390.1	5,082.5
Debt payable after one year(3)	1,507.6	2,111.5	1,882.5	25.1	24.4
Liabilities subject to compromise (a subset of total liabilities)	—	—	—	3,776.1	3,619.9
Shareholders' equity	372.4	212.5	369.0	571.2	319.8
Data Per Common Share					
Income (loss) from continuing operations - basic	\$1.53	\$1.72	\$1.55	\$1.58	\$(0.96)
Income (loss) from continuing operations - diluted	1.52	1.71	1.54	1.55	(0.96)
Cash dividends declared	0.51	—	—	—	—
Other Statistics					
Common shareholders of record	4,895	5,142	5,839	7,077	7,591

(1) Certain prior-year amounts have been reclassified to conform to the 2016 presentation.

Adjustments related to our asbestos-related liability, Chapter 11, and pension mark-to-market accounting are (2) included in and affect the period-to-period comparability of "Income (loss) from continuing operations" and the related data per common share. See Note 17 to the Consolidated Financial Statements for a detail of these items.

Amounts for the years 2012 and 2013 exclude amounts classified within "Liabilities subject to compromise." In (3) connection with its emergence from bankruptcy in 2014, Grace entered into a Credit Agreement. Grace also issued \$1,000 million of senior unsecured notes in 2014.

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Management's Discussion and Analysis of Financial Condition and Results of Operations

See "Analysis of Operations" for a discussion of our non-GAAP performance measures. Our references to "advanced economies" and "emerging regions" refer to classifications established by the International Monetary Fund.

Results of Operations

2016 Performance Summary

Following is a summary of our financial performance for the year ended December 31, 2016, compared with the prior year.

Net sales decreased 1.8% to \$1,598.6 million.

Income from continuing operations attributable to Grace decreased 13.7% to \$107.0 million or \$1.52 per diluted share. Adjusted EPS increased 42.2% to \$3.10 per diluted share.

Adjusted EBIT increased 15.8% to \$400.3 million.

Adjusted EBITDA increased 12.5% to \$500.6 million.

2016 Events

On June 30, 2016, we completed the acquisition of the assets of the BASF Polyolefin Catalysts business (the "polyolefin catalysts acquisition"), which included technologies, patents, trademarks, and production plants in Pasadena, Texas, and Tarragona, Spain. We added the following technologies to our catalysts portfolio: (1) LYNX[®] high-activity polyethylene (PE) catalyst technologies used commercially in slurry processes for the production of high-density PE resins such as bimodal film and pipe, and (2) LYNX[®] polypropylene (PP) catalyst technologies used commercially in all major PP process technologies including slurry, bulk loop, stirred gas, fluid gas, and stirred bulk. The acquisition also will provide us with significant additional flexibility and capacity for our global polyolefin catalysts manufacturing network.

In 2016, we exited certain product lines that were previously part of our Discovery Sciences product group included in our Grace Materials Technologies operating segment, as these product lines no longer fit into our strategic growth plans. As part of the exit, we sold certain assets to unaffiliated buyers for aggregate proceeds of \$12.9 million.

On January 27, 2016, we entered into a separation agreement with GCP Applied Technologies Inc., then a wholly-owned subsidiary of Grace ("GCP"), pursuant to which we agreed to transfer our Grace Construction Products operating segment and the packaging technologies business of our Grace Materials Technologies operating segment to GCP (the "Separation"). We completed the Separation on February 3, 2016, by means of a pro rata distribution to Company stockholders of all of the outstanding shares of GCP common stock (the "Distribution"), with one share of GCP common stock distributed for each share of Company common stock held as of the close of business on January 27, 2016. As a result of the Distribution, GCP became an independent public company. GCP's historical financial results through the Distribution Date are reflected in our Consolidated Financial Statements as discontinued operations.

Summary Description of Business

We are engaged in specialty chemicals and specialty materials businesses on a worldwide basis through our two reportable segments, Grace Catalysts Technologies and Grace Materials Technologies. See Item 1 (Business—Business Overview) of this Report for a summary description of our core business.

Analysis of Operations

We have set forth in the table below our key operating statistics with percentage changes for the years ended December 31, 2016, 2015, and 2014. Please refer to this Analysis of Operations when reviewing this Management's Discussion and Analysis of Financial Condition and Results of Operations. In the table we present financial information in accordance with U.S. GAAP, as well as the non-GAAP financial information described below. We believe that the non-GAAP financial information provides useful supplemental information about the performance of our businesses, improves period-to-period comparability and provides clarity on the information

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our management uses to evaluate the performance of our businesses. In the table, we have provided reconciliations of these non-GAAP financial measures to the most directly comparable financial measure calculated and presented in accordance with U.S. GAAP. The non-GAAP financial measures should not be considered as a substitute for financial measures calculated in accordance with U.S. GAAP, and the financial results calculated in accordance with U.S. GAAP and reconciliations from those results should be evaluated carefully.

We define Adjusted EBIT (a non-GAAP financial measure) to be income from continuing operations attributable to W. R. Grace & Co. shareholders adjusted for interest income and expense; income taxes; costs related to Chapter 11, and legacy product and environmental; restructuring and repositioning expenses and asset impairments; pension costs other than service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits; income and expense items related to divested businesses, product lines, and certain other investments; gains and losses on sales of businesses, product lines, and certain other investments; third-party acquisition-related costs and the amortization of acquired inventory fair value adjustment; and certain other items that are not representative of underlying trends.

We define Adjusted EBITDA (a non-GAAP financial measure) to be Adjusted EBIT adjusted for depreciation and amortization.

We define Adjusted EBIT Return On Invested Capital (a non-GAAP financial measure) to be Adjusted EBIT (on a trailing four quarters basis) divided by the sum of net working capital, properties and equipment and certain other assets and liabilities.

We define Adjusted Gross Margin (a non-GAAP financial measure) to be gross margin adjusted for pension-related costs included in cost of goods sold and the amortization of acquired inventory fair value adjustment.

We define Adjusted Earnings Per Share (EPS) (a non-GAAP financial measure) to be diluted EPS from continuing operations adjusted for costs related to Chapter 11, and legacy product and environmental; restructuring and repositioning expenses and asset impairments; pension costs other than service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits; income and expense items related to divested businesses, product lines, and certain other investments; gains and losses on sales of businesses, product lines and certain other investments; third-party acquisition-related costs and the amortization of acquired inventory fair value adjustment; certain other items that are not representative of underlying trends; and certain discrete tax items.

We use Adjusted EBIT as a performance measure in significant business decisions and in determining certain incentive compensation. We use Adjusted EBIT as a performance measure because it provides improved period-to-period comparability for decision making and compensation purposes, and because it better measures the ongoing earnings results of our strategic and operating decisions by excluding the earnings effects of our Chapter 11 proceedings, legacy product and environmental matters, restructuring and repositioning activities, divested businesses, and the effects of acquisitions.

We use Adjusted EBITDA, Adjusted EBIT Return On Invested Capital, Adjusted Gross Margin, and Adjusted EPS as performance measures and may use these measures in determining certain incentive compensation.

Adjusted EBIT, Adjusted EBITDA, Adjusted EBIT Return On Invested Capital, Adjusted Gross Margin, and Adjusted EPS do not purport to represent income measures as defined under U.S. GAAP, and should not be used as alternatives to such measures as an indicator of our performance. These measures are provided to investors and others to improve the period-to-period comparability and peer-to-peer comparability of our financial results, and to ensure that investors understand the information we use to evaluate the performance of our businesses. These measures may have material limitations due to the exclusion or inclusion of amounts that are included or excluded, respectively, in the most directly comparable measures calculated and presented in accordance with U.S. GAAP and thus investors and others should review carefully the financial results calculated in accordance with U.S. GAAP.

Adjusted EBIT has material limitations as an operating performance measure because it excludes costs related to Chapter 11 and legacy product and environmental matters and may exclude income and expenses from restructuring and repositioning activities and divested businesses, which historically have been material components of our net income. Adjusted EBITDA also has material limitations as an operating performance measure because it excludes the impact of depreciation and amortization expense. Our business is substantially

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dependent on the successful deployment of capital, and depreciation and amortization expense is a necessary element of our costs. We compensate for the limitations of these measurements by using these indicators together with net income as measured under U.S. GAAP to present a complete analysis of our results of operations. Adjusted EBIT and Adjusted EBITDA should be evaluated together with net income measured under U.S. GAAP for a complete understanding of our results of operations.

Analysis of Operations (In millions, except per share amounts)	2016	2015	% Change	2014	% Change
Net sales:					
Catalysts Technologies	\$1,163.7	\$1,162.1	0.1 %	\$1,246.8	(6.8)%
Materials Technologies	434.9	466.1	(6.7)%	510.5	(8.7)%
Total Grace net sales	\$1,598.6	\$1,628.2	(1.8)%	\$1,757.3	(7.3)%
Net sales by region:					
North America	\$490.7	\$490.0	0.1 %	\$509.1	(3.8)%
Europe Middle East Africa	647.8	621.2	4.3 %	706.4	(12.1)%
Asia Pacific	348.9	390.9	(10.7)%	397.2	(1.6)%
Latin America	111.2	126.1	(11.8)%	144.6	(12.8)%
Total net sales by region	\$1,598.6	\$1,628.2	(1.8)%	\$1,757.3	(7.3)%
Performance measures:					
Adjusted EBIT(A):					
Catalysts Technologies segment operating income	\$367.8	\$347.3	5.9 %	\$378.3	(8.2)%
Materials Technologies segment operating income	104.0	96.9	7.3 %	101.7	(4.7)%
Corporate costs	(59.4)	(79.9)	25.7 %	(95.3)	16.2 %
Gain on termination and curtailment of postretirement plans related to current businesses	0.2	1.9	NM	23.6	NM
Certain pension costs(B)	(12.3)	(20.4)	39.7 %	(24.5)	16.7 %
Adjusted EBIT	400.3	345.8	15.8 %	383.8	(9.9)%
Pension MTM adjustment and other related costs, net	(60.3)	(30.5)		(137.6)	
Restructuring and repositioning expenses	(38.6)	(20.4)		(4.3)	
Costs related to Chapter 11, and legacy product and environmental, net	(35.4)	(6.1)		(35.6)	
Amortization of acquired inventory fair value adjustment	(8.0)	—		—	
Third-party acquisition-related costs	(2.5)	—		—	
Gain (loss) on sale of product line	1.7	—		0.2	
Gain on termination and curtailment of postretirement plans related to divested businesses	0.3	2.6		15.9	
Income and expense items related to divested businesses	0.1	1.5		4.1	
Loss on early extinguishment of debt	(11.1)	—		—	
Interest expense, net	(80.5)	(99.1)	18.8 %	(121.9)	18.7 %
(Provision for) benefit from income taxes	(59.0)	(69.8)	15.5 %	12.4	NM
Income (loss) from continuing operations attributable to W. R. Grace & Co. shareholders	\$107.0	\$124.0	(13.7)%	\$117.0	6.0 %
Diluted EPS from continuing operations	\$1.52	\$1.71	(11.1)%	\$1.54	11.0 %
Adjusted EPS	\$3.10	\$2.18	42.2 %	\$2.32	(6.0)%

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Analysis of Operations (In millions)	2016	2015	% Change	2014	% Change
Adjusted performance measures:					
Gross Margin:					
Catalysts Technologies	44.4	% 42.2	% 2.2 pts	42.8	% (0.6) pts
Materials Technologies	39.6	% 38.8	% 0.8 pts	37.9	% 0.9 pts
Adjusted Gross Margin	43.1	% 41.2	% 1.9 pts	41.4	% (0.2) pts
Amortization of acquired inventory fair value adjustment	(0.5)	)% —	% NM	—	% NM
Pension costs in cost of goods sold	(1.6)	)% (1.2)	)% (0.4) pts	(3.6)	)% 2.4 pts
Total Grace	41.0	% 40.0	% 1.0 pts	37.8	% 2.2 pts
Adjusted EBIT:					
Catalysts Technologies	\$367.8	\$347.3	5.9	% \$378.3	(8.2) %
Materials Technologies	104.0	96.9	7.3	% 101.7	(4.7) %
Corporate, pension, and other	(71.5)	) (98.4)	) 27.3	% (96.2)	) (2.3) %
Total Grace	400.3	345.8	15.8	% 383.8	(9.9) %
Depreciation and amortization:					
Catalysts Technologies	\$77.4	\$68.1	13.7	% \$66.3	2.7 %
Materials Technologies	19.5	23.2	(15.9)	)% 26.2	(11.5) %
Corporate	3.4	7.9	(57.0)	)% 10.2	(22.5) %
Total Grace	100.3	99.2	1.1	% 102.7	(3.4) %
Adjusted EBITDA:					
Catalysts Technologies	\$445.2	\$415.4	7.2	% \$444.6	(6.6) %
Materials Technologies	123.5	120.1	2.8	% 127.9	(6.1) %
Corporate, pension, and other	(68.1)	) (90.5)	) 24.8	% (86.0)	) (5.2) %
Total Grace	500.6	445.0	12.5	% 486.5	(8.5) %
Adjusted EBIT margin:					
Catalysts Technologies	31.6	% 29.9	% 1.7 pts	30.3	% (0.4) pts
Materials Technologies	23.9	% 20.8	% 3.1 pts	19.9	% 0.9 pts
Total Grace	25.0	% 21.2	% 3.8 pts	21.8	% (0.6) pts
Adjusted EBITDA margin:					
Catalysts Technologies	38.3	% 35.7	% 2.6 pts	35.7	% 0.0 pts
Materials Technologies	28.4	% 25.8	% 2.6 pts	25.1	% 0.7 pts
Total Grace	31.3	% 27.3	% 4.0 pts	27.7	% (0.4) pts

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Analysis of Operations (In millions)	2016	2015	2014
Calculation of Adjusted EBIT Return On Invested Capital (trailing four quarters):			
Adjusted EBIT	\$400.3	\$345.8	\$383.8
Invested Capital:			
Trade accounts receivable	273.9	254.5	255.3
Inventories	228.0	198.8	210.0
Accounts payable	(195.4)	(157.8)	(142.9)
	306.5	295.5	322.4
Other current assets (excluding income taxes)	32.0	43.2	39.5
Properties and equipment, net	729.6	621.7	636.0
Goodwill	394.2	336.5	338.9
Technology and other intangible assets, net	269.1	227.5	244.0
Investment in unconsolidated affiliate	117.6	103.2	113.2
Other assets (excluding capitalized financing fees)	34.9	31.8	14.5
Other current liabilities (excluding income taxes, legacy environmental matters, accrued interest, and restructuring)	(144.4)	(158.5)	(163.6)
Other liabilities (excluding legacy environmental matters)	(89.3)	(81.4)	(72.8)
Total invested capital	\$1,650.2	\$1,419.5	\$1,472.1
Adjusted EBIT Return On Invested Capital	24.3 %	24.4 %	26.1 %

Amounts may not add due to rounding.

(A) Grace's segment operating income includes only Grace's share of income of consolidated and unconsolidated joint ventures.

Certain pension costs include only ongoing costs recognized quarterly, which include service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits. Catalysts Technologies and Materials Technologies segment operating income and corporate costs do not include any amounts for pension expense. Other pension related costs including annual mark-to-market adjustments and actuarial gains and losses are excluded from Adjusted EBIT. These amounts are not used by management to evaluate the performance of Grace's businesses and significantly affect the peer-to-peer and period-to-period comparability of our financial results. Mark-to-market adjustments and actuarial gains and losses relate primarily to changes in financial market values and actuarial assumptions and are not directly related to the operation of Grace's businesses.

NM—Not Meaningful

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Grace Overview

Following is an overview of our financial performance for the years ended December 31, 2016, 2015, and 2014.

Net Sales and Gross Margin

Sales were \$1,598.6 million, \$1,628.2 million, and \$1,757.3 million for the years ended December 31, 2016, 2015, and 2014. Gross margin was 41.0%, 40.0%, and 37.8% for the years ended December 31, 2016, 2015, and 2014.

Adjusted Gross Margin was 43.1%, 41.2%, and 41.4% for the years ended December 31, 2016, 2015, and 2014.

The following tables identify the year-over-year increase or decrease in sales attributable to changes in sales volume and/or mix, product price, and the impact of currency translation.

2016 as a Percentage Increase
(Decrease) from 2015

Net Sales Variance Analysis	Volume	Price	Currency Translation	Total
Catalysts Technologies	1.6 %	(1.2)%	(0.3)%	0.1 %
Materials Technologies	(5.6)%	0.1 %	(1.2)%	(6.7)%
Net sales	(0.5)%	(0.8)%	(0.5)%	(1.8)%
By Region:				
North America	2.5 %	(2.4)%	— %	0.1 %
Europe Middle East Africa	4.9 %	0.2 %	(0.8)%	4.3 %
Asia Pacific	(9.4)%	(1.1)%	(0.2)%	(10.7)%
Latin America	(10.6)%	1.4 %	(2.6)%	(11.8)%

Sales for 2016 decreased 1.8% overall compared with the prior year. Weaker demand in Asia Pacific negatively impacted sales volumes for both businesses compared with the prior-year period. In addition, Catalysts Technologies sales volumes benefited from the polyolefin catalysts acquisition, and Materials Technologies sales volumes decreased due to the exit of certain product lines earlier in the year. Lower sales volumes in Latin America were primarily due to order timing in Catalysts Technologies during the fourth quarter. Currency translation negatively impacted both reportable segments.

Gross margin increased 100 basis points to 41.0% from 40.0% for the prior year. Adjusted Gross Margin increased 190 basis points to 43.1% from 41.2% for the prior year. The increases were primarily due to lower manufacturing costs, including 200 basis points related to lower raw materials costs and improved productivity.

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Net Sales Variance Analysis(1)	2015 as a Percentage Increase (Decrease) from 2014			
	Volume	Price	Currency Translation	Total
Catalysts Technologies	(1.7)%	(0.3)%	(4.8)%	(6.8)%
Materials Technologies	0.5 %	0.7 %	(9.9)%	(8.7)%
Net sales	(1.0)%	— %	(6.3)%	(7.3)%
By Region:				
North America	(3.4)%	(0.4)%	— %	(3.8)%
Europe Middle East Africa	1.5 %	0.5 %	(14.1)%	(12.1)%
Asia Pacific	0.1 %	(0.8)%	(0.9)%	(1.6)%
Latin America	(8.9)%	1.0 %	(4.9)%	(12.8)%

Percentage changes have been revised consistent with a change in methodology made during 2016. Mix is an (1)important factor in determining average price in the FCC catalyst business. Mix is included in "price" in the new methodology, but was included in "volume" in the previous methodology.

Sales for 2015 decreased 7.3% overall compared with the prior year. Unfavorable currency translation against the dollar, primarily in Europe, impacted both reportable segments.

Gross margin increased 220 basis points to 40.0% from 37.8% for the prior year, due primarily to the unfavorable 2014 pension mark-to-market adjustment. Adjusted Gross Margin decreased 20 basis points to 41.2% from 41.4% for the prior year.

Grace Income From Continuing Operations

Income from continuing operations was \$107.0 million for 2016, a decrease of 13.7% compared with \$124.0 million for the prior year. The decrease was primarily due to a higher pension mark-to-market adjustment, a higher provision for environmental remediation primarily related to vermiculite-related matters, higher restructuring and repositioning expenses, and a loss on early extinguishment of debt due to the accelerated amortization of capitalized financing costs associated with the pay down of \$600 million of debt in the 2016 first quarter, partially offset by lower corporate costs, higher segment operating income, and lower net interest expenses resulting from the pay-down of debt. Income in the prior year included a \$9.0 million gain reflecting the final resolution of certain bankruptcy liabilities, as well as a gain on the sale of an operating asset.

Income from continuing operations was \$124.0 million for 2015, an increase of 6.0% compared with \$117.0 million for the prior year. The increase was primarily due to a lower pension mark-to-market adjustment, a lower provision for environmental remediation, and lower Chapter 11-related expenses, partially offset by a provision for income taxes in 2015 compared with a benefit from income taxes in 2014, lower segment operating income, higher restructuring and repositioning expenses, and a lower gain related to the termination and curtailment of postretirement benefit plans.

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Adjusted EBIT

Adjusted EBIT was \$400.3 million for 2016, an increase of 15.8% compared with the prior year primarily due to higher Adjusted Gross Margin, lower operating expenses including lower corporate costs, and increased income from our ART joint venture, partially offset by the effect of lower sales volumes, lower pricing and unfavorable currency translation. The prior year, prepared on a discontinued operations basis, includes certain costs which were either assumed by GCP at the time of the Separation or eliminated through restructuring or other cost reduction actions. Adjusted EBIT was \$345.8 million for 2015, a decrease of 9.9% compared with the prior year primarily due to unfavorable currency translation in both reportable segments and lower sales volumes in Catalysts Technologies.

Adjusted EPS

The following table reconciles our Diluted EPS (GAAP) to our Adjusted EPS (non-GAAP):

(In millions, except per share amounts)	2016			Per Share
	Pre-Tax	Tax Effect	After-Tax	
Diluted Earnings Per Share (GAAP)				\$1.52
Pension MTM adjustment and other related costs, net	\$60.3	\$19.8	\$40.5	0.57
Restructuring and repositioning expenses	38.6	11.6	27.0	0.38
Costs related to Chapter 11, and legacy product and environmental, net	35.4	13.2	22.2	0.31
Amortization of acquired inventory fair value adjustment	8.0	3.0	5.0	0.07
Third-party acquisition-related costs	2.5	0.7	1.8	0.03
(Gain) loss on sale of product line	(1.7)	(0.6)	(1.1)	(0.02)
Gain on termination and curtailment of postretirement plans related to divested businesses	(0.3)	(0.1)	(0.2)	—
Income and expense items related to divested businesses	(0.1)	—	(0.1)	—
Loss on early extinguishment of debt	11.1	4.1	7.0	0.10
Discrete tax items:				
Discrete tax items, including adjustments to uncertain tax positions		(9.8)	9.8	0.14
Adjusted EPS (non-GAAP)				\$3.10

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	2015			
(In millions, except per share amounts)	Pre-Tax	Tax Effect	After-Tax	Per Share
Diluted Earnings Per Share (GAAP)				\$1.71
Pension MTM adjustment and other related costs, net	\$30.5	\$12.1	\$18.4	0.25
Restructuring and repositioning expenses	20.4	7.2	13.2	0.18
Costs related to Chapter 11, and legacy product and environmental, net	6.1	2.2	3.9	0.05
Gain on termination and curtailment of postretirement plans related to divested businesses	(2.6)	(1.0)	(1.6)	(0.02)
Income and expense items related to divested businesses	(1.5)	(0.6)	(0.9)	(0.01)
Discrete tax items:				
Discrete tax items, including adjustments to uncertain tax positions		(1.3)	1.3	0.02
Adjusted EPS (non-GAAP)				\$2.18
	2014			
(In millions, except per share amounts)	Pre-Tax	Tax Effect	After-Tax	Per Share
Diluted Earnings Per Share (GAAP)				\$1.54
Pension MTM adjustment and other related costs, net	\$137.6	\$46.6	\$91.0	1.19
Costs related to Chapter 11, and legacy product and environmental, net	35.6	9.6	26.0	0.34
Gain on termination and curtailment of postretirement plans related to divested businesses	(15.9)	(5.7)	(10.2)	(0.13)
Restructuring and repositioning expenses	4.3	1.6	2.7	0.04
Income and expense items related to divested businesses	(4.1)	(1.4)	(2.7)	(0.04)
(Gain) loss on sale of product line	(0.2)	—	(0.2)	—
Discrete tax items:				
Discrete tax items, including adjustments to uncertain tax positions		47.4	(47.4)	(0.62)
Adjusted EPS (non-GAAP)				\$2.32

Adjusted EBIT Return On Invested Capital

Adjusted EBIT Return On Invested Capital for 2016 was 24.3% on a trailing four quarters basis, a decrease from 24.4% and 26.1% on the same basis for 2015 and 2014, respectively. The decrease in 2016 was primarily due to the polyolefin catalysts acquisition. The acquisition, which was completed on June 30, 2016, increased invested capital at that date, but Adjusted EBIT includes only two quarters of earnings from the acquired business. The decrease in 2015 was primarily due to lower Adjusted EBIT.

We manage our operations with the objective of maximizing sales, earnings and cash flow over time. Doing so requires that we successfully balance our growth, profitability and working capital and other investments to support sustainable, long-term financial performance. We use Adjusted EBIT Return On Invested Capital as a performance measure in evaluating operating results, in making operating and investment decisions and in balancing the growth and profitability of our operations.

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Segment Overview—Grace Catalysts Technologies

Following is an overview of the financial performance of Catalysts Technologies for the years ended December 31, 2016, 2015, and 2014.

Net Sales—Grace Catalysts Technologies

Sales were \$1,163.7 million for 2016, an increase of 0.1% compared with the prior year. The increase was due to higher sales volumes (+1.6%), partially offset by lower pricing (-1.2%) and unfavorable currency translation (-0.3%). Specialty catalysts sales volumes increased in all regions except Latin America, with the majority of the increase coming from Europe. Sales volumes were higher in Asia despite declines in China as customers reduced inventories to align with lower projected growth rates and decreased demand for chemical catalysts. The higher specialty catalyst sales volumes reflect a favorable impact related to the polyolefin catalysts acquisition. In January 2016, we reduced 10,000 tons of our least efficient capacity at our Curtis Bay plant, which contributed to the decline in refining catalysts sales volumes. Reductions in customer trials and higher refinery turnarounds also impacted sales volumes of refining catalysts. Unfavorable currency translation primarily affected refining catalysts.

Sales were \$1,162.1 million for 2015, a decrease of 6.8% compared with the prior year. The decrease was due to unfavorable currency translation (-4.8%), lower sales volumes (-1.7%) and lower pricing (-0.3%). Refining catalysts sales volumes decreased primarily due to the transition in commercial positions undertaken earlier in the year to strengthen our business in North America, the Middle East, and Asia, and the delayed timing of some new and existing customers increasing order volumes. Specialty catalysts sales volumes increased due to increased order volumes at new customers and new product penetration. Unfavorable currency translation was due to the strength of the U.S. dollar against the other currencies in which we do business, primarily the euro.

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Segment Operating Income (SOI) and Margin—Grace Catalysts Technologies

Gross profit was \$516.8 million for 2016, an increase of 5.4% compared with the prior year. Gross margin was 44.4% compared with 42.2% for the prior year. Gross margin increased as lower manufacturing costs, including 250 basis points related to lower raw materials costs, and improved productivity more than offset the effect of the polyolefin catalysts acquisition.

Segment operating income was \$367.8 million for 2016, an increase of 5.9% compared with the prior year, primarily due to improved gross margins, higher ART income, and the polyolefin catalysts acquisition, partially offset by higher operating expenses. The ART joint venture contributed \$29.8 million to operating income, an increase of \$9.4 million from the prior-year period. Segment operating margin for 2016 increased to 31.6%, an improvement of 170 basis points compared with the prior year.

Gross profit was \$490.2 million for 2015, a decrease of 8.2% compared with the prior year. Gross margin was 42.2% compared with 42.8% for the prior year. Gross profit decreased due to unfavorable currency translation, lower refining catalysts sales volumes and lower polypropylene licensing sales, partially offset by lower manufacturing costs, including lower raw materials costs. Gross margin decreased primarily due to unfavorable product mix, including lower sales from the licensing business, which carries higher gross margins than catalysts, partially offset by lower manufacturing costs including approximately 80 basis points from lower raw materials costs.

Segment operating income was \$347.3 million for 2015, a decrease of 8.2% compared with the prior year. Segment operating margin for 2015 decreased to 29.9%, a decline of 40 basis points compared with the prior year. Segment operating income decreased due to lower gross profit, partially offset by lower operating expenses and higher earnings from the ART joint venture. The ART joint venture contributed \$20.4 million to operating income, an increase of \$0.7 million from the prior-year period.

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Segment Overview—Grace Materials Technologies

Following is an overview of the financial performance of Materials Technologies for the years ended December 31, 2016, 2015, and 2014.

Net Sales—Grace Materials Technologies

Sales were \$434.9 million for 2016, a decrease of 6.7% compared with the prior year. The decrease was due to lower sales volumes (-5.6%) and unfavorable currency translation (-1.2%), partially offset by improved pricing (+0.1%). Sales volumes declined in all regions, including a 4.8% impact related to the exit of certain product lines. Lower sales volumes in North America were also impacted by lower demand compared to the prior year, and Asia sales volumes declined as customers reduced inventory levels in the 2016 first quarter.

Sales were \$466.1 million for 2015, a decrease of 8.7% compared with the prior year. The decrease was due to unfavorable currency translation (-9.9%), partially offset by improved pricing (+0.7%) and higher sales volumes (+0.5%). Unfavorable currency translation was primarily in Europe and the emerging regions, as the dollar strengthened against the euro and other currencies. Sales volumes increased as growth in EMEA offset declines in other regions.

Segment Operating Income (SOI) and Margin—Grace Materials Technologies

Gross profit was \$172.4 million for 2016, a decrease of 4.7% compared with the prior year, primarily due to the exited product lines. Gross margin was 39.6% compared with 38.8% for the prior year. The increase in gross margin was primarily due to lower manufacturing costs including improved productivity, and improved pricing.

Segment operating income was \$104.0 million for 2016, an increase of 7.3% compared with the prior year, primarily due to lower operating expenses, partially offset by lower gross profit related to the exited product lines.

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Segment operating margin for 2016 increased to 23.9%, an improvement of 310 basis points compared with the prior year, primarily due to lower operating expenses and the effect of exiting lower margin product lines.

Gross profit was \$180.9 million for 2015, a decrease of 6.6% compared with the prior year. Gross margin was 38.8% compared with 37.9% for the prior year, primarily due to improved pricing.

Segment operating income was \$96.9 million for 2015, a decrease of 4.7% compared with the prior year, primarily due to unfavorable currency translation, partially offset by improved pricing. Segment operating margin for 2015 increased to 20.8%, an improvement of 90 basis points compared with the prior year.

Corporate Overview

Corporate costs include corporate functional costs and other corporate costs such as professional fees and insurance premiums. Corporate costs for 2016 decreased 25.7% compared with the prior year. Certain costs included in the prior years were either assumed by GCP at the time of the Separation or have been eliminated through restructuring or other cost reduction actions.

Corporate costs for 2015 decreased 16.2% compared with the prior year primarily due to the sale of an operating asset in 2015 and lower operating expenses in 2015 compared with 2014.

Defined Benefit Pension Expense

Defined benefit pension expense includes costs under U.S. and non-U.S. defined benefit pension plans that provide benefits to business segment and corporate employees, as well as retirees and former employees of divested businesses where we retained these obligations.

Under mark-to-market accounting, our pension costs consist of two elements: 1) "certain pension costs"—ongoing costs recognized quarterly, which include service and interest costs, expected returns on plan assets, and amortization of prior service costs/credits; and 2) "pension mark-to-market adjustment and other related costs, net"—mark-to-market gains and losses recognized annually in the fourth quarter, or at an interim period should a significant event occur, resulting from changes in actuarial assumptions, such as discount rates and the difference between actual and expected returns on plan assets.

Certain pension costs were \$12.3 million, \$20.4 million and \$24.5 million for 2016, 2015 and 2014, respectively. As of December 31, 2015, we changed the approach used to determine the service and interest cost components of defined benefit pension expense. Previously, we estimated service and interest costs using a single weighted average discount rate derived from the same yield curve used to measure the projected benefit obligation. For 2016, we elected to measure service and interest costs by applying the specific spot rates along that yield curve to the plans' liability cash flows. We believe the new approach provides a more precise measurement of service and 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 projected benefit obligation as of December 31, 2015. We consider this a change in accounting estimate, which is being accounted for prospectively as of January 1, 2016.

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Pension mark-to-market adjustment and other related costs, net were \$60.3 million, \$30.5 million and \$137.6 million for 2016, 2015 and 2014, respectively. These costs are reported in "cost of goods sold" and in "selling, general and administrative expenses" in our Consolidated Financial Statements based upon the functions of the employees to which the pension costs relate. The 2016 mark-to-market pension expense of \$60.3 million was primarily due to the decrease in discount rates used to value the projected benefit obligations of our plans from year-end 2015 to year-end 2016, partially offset by higher than expected return on assets in the U.S. The 2015 mark-to-market pension expense of \$30.5 million was primarily due to lower than expected return on assets in the U.S., partially offset by the increase in discount rates from year-end 2014 to year-end 2015. The 2014 mark-to-market pension expense of \$137.6 million was primarily due to the decrease in discount rates from year-end 2013 to year-end 2014 and the impact of adopting new mortality assumptions, partially offset by higher than expected return on assets in the U.S.

Interest and Financing Expenses

Net interest and financing expenses were \$80.5 million for 2016, a decrease of 18.8% compared with 2015, primarily due to voluntary prepayments related to our term loans in February and March 2016. Interest and financing expenses were \$99.1 million for 2015, a decrease of 18.7% compared with 2014, due to reduced interest accretion on deferred payment obligations due to the settlement of the PI deferred payment obligation during the 2014 third quarter, partially offset by higher interest expense in 2015 for new debt incurred in 2014 in connection with our emergence from Chapter 11.

Income Taxes

Income tax expense (benefit) for 2016, 2015 and 2014 was \$59.0 million, \$69.8 million and \$(12.4) million, respectively, on income from continuing operations before income taxes of \$166.0 million, \$193.7 million and \$104.5 million in 2016, 2015 and 2014, respectively.

Our 2016 effective tax rate of approximately 36% was higher than the 35% U.S. statutory rate primarily due to \$4.7 million in charges for local and state income taxes, a \$2.5 million increase in valuation allowance, and \$2.5 million related to non-deductible expenses, partially offset by \$6.8 million of lower taxes in non-U.S. jurisdictions, \$6.7 million in share based compensation deductions, and \$2.6 million in adjustments to unrecognized tax benefits.

Our 2015 effective tax rate of approximately 36% was higher than the 35% U.S. statutory rate primarily due to \$2.9 million in charges for local and state income taxes, \$1.7 million for adjustments to unrecognized tax benefits, \$1.7 million related to repatriated foreign earnings, and \$0.9 million related to non-deductible expenses, partially offset by \$3.0 million due to lower taxes in non-U.S. jurisdictions and \$1.6 million for the release of a state valuation allowance.

Our 2014 effective tax rate of approximately (12)% was lower than the 35% U.S. statutory rate primarily due to benefits recognized during the year including \$57.9 million of benefits associated with the release of reserves for unrecognized tax benefits, \$5.1 million related to repatriated foreign earnings, and \$3.0 million due to lower taxes in non-U.S. jurisdictions, partially offset by \$9.6 million in charges for state and local income taxes and \$4.1 million related to non-deductible expenses.

See Note 7 to the Consolidated Financial Statements for additional information regarding income taxes.

Financial Condition, Liquidity, and Capital Resources

Following is an analysis of our financial condition, liquidity and capital resources at December 31, 2016.

Our principal uses of cash are generally capital investments and acquisitions, working capital investments, contributions to our defined benefit pension plans, the repayment of debt, and the return of cash to shareholders through repurchase of shares and dividends.

In January 2015, we completed the initial \$500 million share repurchase program authorized by our Board of Directors following emergence from bankruptcy, and the Board of Directors authorized an additional share repurchase program of up to \$500 million. Under this additional program, during 2016 we repurchased 2,775,297 shares of Company common stock for \$195.1 million. As of December 31, 2016, \$33.9 million remained under this authorization. On February 8, 2017, we announced that the Board of Directors had authorized a new share repurchase program of up to \$250 million.

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In the 2016 second quarter, we began to pay a quarterly cash dividend, at an annual rate of \$0.68 per share of Company common stock. We paid cash dividends of \$36.0 million during 2016. On February 8, 2017, we announced that the Board of Directors had approved an increase in the annual dividend rate, to \$0.84 per share of Company common stock.

We believe that the cash we expect to generate during 2017 and thereafter, together with other available liquidity and capital resources, are sufficient to finance our operations, growth strategy, share repurchase program and dividend payments, and meet our debt and pension obligations.

During the 2015 fourth quarter, to permit the Separation, we entered into an amendment to the Credit Agreement. The amendment, which became effective upon completion of the Separation, also reduced the revolving credit facility to \$300 million and extended its term to November 1, 2020. In connection with the Separation, GCP distributed \$750 million to Grace. Using a portion of those proceeds, we repaid \$600 million of our euro and U.S. dollar term loans. The Separation had no impact on payment or other terms of the Notes, and they remain our obligations.

Cash Resources and Available Credit Facilities

At December 31, 2016, we had available liquidity of \$384.4 million, consisting of \$90.6 million in cash and cash equivalents (\$23.9 million in the U.S.), \$257.2 million available under the revolving credit facility, and \$36.6 million of available liquidity under various non-U.S. credit facilities. The \$300 million revolving credit facility includes a \$150 million sublimit for letters of credit.

Our non-U.S. credit facilities are extended to various subsidiaries that use them primarily to issue bank guarantees supporting trade activity and to provide working capital during occasional cash shortfalls. Our credit facility in Germany is secured by third-party accounts receivable, with availability determined on the basis of eligible outstanding receivables. We generally renew these credit facilities as they expire.

The following table summarizes our non-U.S. credit facilities as of December 31, 2016:

(In millions)	Maximum Borrowing Amount	Available Liquidity	Expiration Date
Germany	\$ 52.3	\$ 13.1	Various through 2017
Other countries	51.3	23.5	Various through 2018
Total	\$ 103.6	\$ 36.6	

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Analysis of Cash Flows

The following table summarizes our cash flows for the years ended December 31, 2016, 2015, and 2014:

(In millions)	Year Ended December 31,		
	2016	2015	2014
Net cash provided by (used for) operating activities from continuing operations	\$267.5	\$(189.8)	\$(1,695.3)
Net cash provided by (used for) investing activities from continuing operations	(345.0)	(112.0)	261.6
Net cash provided by (used for) financing activities from continuing operations	(60.2)	(40.5)	864.2
Effect of currency exchange rate changes on cash and cash equivalents	(3.0)	(1.7)	(5.0)
Increase (decrease) in cash and cash equivalents from continuing operations	(140.7)	(344.0)	(574.5)
Increase (decrease) in cash and cash equivalents from discontinued operations	44.8	116.4	167.2
Net increase (decrease) in cash and cash equivalents	(95.9)	(227.6)	(407.3)
Less: cash and cash equivalents of discontinued operations	(143.4)	—	—
Cash and cash equivalents, beginning of period	329.9	557.5	964.8
Cash and cash equivalents, end of period	\$90.6	\$329.9	\$557.5

Net cash provided by operating activities in 2016 was \$267.5 million, compared with net cash used for operating activities of \$189.8 million in the prior year. The year-over-year change in cash flow was primarily due to the 2015 first quarter payment of \$490.0 million to repurchase the warrant issued at emergence, partially offset by higher net cash paid for income taxes in 2016.

Net cash used for operating activities in 2015 was \$189.8 million compared with \$1,695.3 million in the prior year. The year-over-year change in cash flow was primarily due to the 2014 payments of \$1,316.5 million to resolve liabilities subject to Chapter 11 and \$632.0 million to settle the deferred payment obligation to the PI Trust, partially offset by the 2015 payment of \$490.0 million to cash settle the PI Warrant.

Net cash used for investing activities in 2016 was \$345.0 million compared with \$112.0 million in the prior year. Net cash used for investing activities primarily includes the net cash paid for capital expenditures, businesses acquired, and transfers in/out of restricted cash. Our capital expenditures include investments in new capacity, improved productivity, information technology, and maintenance of our manufacturing and office facilities. We expect to fund our capital expenditures from net cash provided by operating activities. Net cash used for investing activities in 2015 was \$112.0 million compared with cash provided by investing activities of \$261.6 million in the prior year. In 2016, we completed the polyolefin catalysts acquisition for \$246.5 million in cash.

Net cash used for financing activities in 2016 was \$60.2 million compared with \$40.5 million in the prior year. In 2016, we received a \$750 million distribution of cash from GCP, of which \$600 million was used to pay down our euro and U.S. dollar term loans in the first quarter. Cash paid for repurchases of common stock in 2016 was \$195.1 million, compared with \$301.5 million in 2015. In 2016, we also paid cash dividends of \$36.0 million.

Net cash used for financing activities in 2015 was \$40.5 million compared with net cash provided by financing activities of \$864.2 million in the prior year. The change in cash provided by financing activities is primarily due to new debt issued in 2014, partially offset by lower 2015 payments to repurchase common stock under our share repurchase program.

Included in net cash provided by (used for) operating activities from continuing operations are Chapter 11 and legacy product and environmental expenses paid of \$24.6 million, \$507.4 million and \$1,992.5 million; and restructuring expenses paid of \$16.0 million, \$5.6 million, and \$3.6 million for 2016, 2015 and 2014, respectively; repositioning expenses paid of \$35.5 million and \$38.6 million and cash paid for taxes related to repositioning of \$5.0 million and \$6.1 million for 2016 and 2015, respectively; cash paid for third-party acquisition-related costs of \$2.3 million for 2016; and accelerated defined benefit pension plan contributions of \$74.2 million for 2014. Included in capital expenditures are \$2.0 million and \$7.5 million related to repositioning for 2016 and 2015.

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These cash flows totaled \$85.4 million, \$565.2 million and \$2,070.3 million for 2016, 2015 and 2014, respectively. We do not include these cash flows when evaluating the performance of our businesses.

Debt and Other Contractual Obligations

Total debt outstanding at December 31, 2016, was \$1,584.1 million. Set forth below are our contractual obligations as of December 31, 2016:

(In millions)	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	4-5 Years	More Than 5 Years
Debt	\$1,584.1	\$76.5	\$15.2	\$1,188.5	\$303.9
Expected interest payments on debt(1)	451.6	72.2	141.5	130.0	107.9
Operating lease obligations	28.0	9.0	9.9	4.7	4.4
Operating commitments(2)	30.1	22.9	7.2	—	—
Capital lease obligations	0.2	0.1	0.1	—	—
Pension funding requirements per ERISA(3)	4.7	—	0.5	4.2	—
Pension funding requirements for non-U.S. pension plans(4)	42.2	8.0	16.6	17.6	—
Total Contractual Obligations	\$2,140.9	\$188.7	\$191.0	\$1,345.0	\$416.2

(1) Amounts are based on current interest rates as of December 31, 2016, for principal debt outstanding as of December 31, 2016.

(2) Amounts do not include open purchase commitments, which are routine in nature and normally settle within 90 days, or obligations to employees under annual or long-term incentive programs.

(3) Based on the U.S. qualified pension plans' status as of December 31, 2016, minimum funding requirements under ERISA have been estimated for the next five years. Amounts in subsequent years or additional payments have not yet been determined.

(4) Based on the non-U.S. pension plans' status as of December 31, 2016, funding requirements have been estimated for the next five years. Amounts in subsequent years have not yet been determined.

See Note 10 to the Consolidated Financial Statements for a discussion of Financial Assurances.

Employee Benefit Plans

See Note 8 to the Consolidated Financial Statements for further discussion of Pension Plans and Other Postretirement Benefit Plans.

Defined Contribution Retirement Plan

We sponsor a defined contribution retirement plan for our employees in the United States. This plan is qualified under section 401(k) of the U.S. tax code. Currently, we contribute an amount equal to 100% of employee contributions, up to 6% of an individual employee's salary or wages. Our costs related to this benefit plan were \$11.1 million, \$10.4 million and \$9.3 million for the years ended December 31, 2016, 2015 and 2014, respectively.

Defined Benefit Pension Plans

We sponsor defined benefit pension plans for our employees in the U.S., Canada, Germany and a number of other countries, and fund government-sponsored programs in other countries where we operate. Certain of our defined benefit pension plans are advance-funded and others are pay-as-you-go. The advance-funded plans are administered by trustees who direct the management of plan assets and arrange to have obligations paid when due. Our most significant advance-funded plans cover current and former salaried employees in the U.S. and employees covered by collective bargaining agreements at certain of our U.S. facilities. Our U.S. advance-funded plans are qualified under the U.S. tax code.

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The following table presents the funded status of our underfunded and unfunded pension plans:

Funded Status of Pension Plans (In millions)	Underfunded Pension Plans(1)		Unfunded Pension Plans(2)	
	2016	2015	2016	2015
Projected benefit obligation	\$1,187.7	\$1,159.1	\$355.6	\$318.5
Fair value of plan assets	1,104.6	1,085.9	—	—
Funded status (PBO basis)	\$(83.1)	\$(73.2)	\$(355.6)	\$(318.5)

(1) Plans intended to be advance-funded.

(2) Plans intended to be pay-as-you-go.

Underfunded plans include a group of advance-funded plans that are underfunded on a PBO basis by a total of \$83.1 million as of December 31, 2016. Additionally, we have several plans that are funded on a pay-as-you-go basis, and therefore, the entire PBO of \$355.6 million at December 31, 2016, is unfunded. The combined balance of the underfunded and unfunded plans was \$438.7 million as of December 31, 2016, and is presented as a liability on the Consolidated Balance Sheets as follows: \$14.4 million in "other current liabilities," and \$424.3 million included in "underfunded and unfunded defined benefit pension plans."

At the December 31, 2016, measurement date for the U.S. advance-funded plans, the PBO was approximately \$1,168 million as measured under U.S. GAAP. The PBO is measured as the present value (using a 4.06% weighted average discount rate as of December 31, 2016) of vested and non-vested benefits earned from employee service to date, based upon current services and estimated future pay increases for active employees. Of the participants in the U.S. advance-funded plans, approximately 87% are retired or former employees or employees of our former businesses, which shortens the duration of the PBO. Assets available to fund the PBO for the U.S. advance-funded plans at December 31, 2016, were approximately \$1,086 million, or approximately \$82 million less than the measured obligation.

The following table presents the components of cash contributions for the advance-funded and pay-as-you-go plans:

Cash Contributions to Defined Benefit Pension Plans (In millions)	2016	2015	2014
U.S. advance-funded plans	\$—	\$—	\$74.2
U.S. pay-as-you-go plans(1)	7.5	7.3	6.9
Non-U.S. advance-funded plans	1.3	1.5	6.6
Non-U.S. pay-as-you-go plans	7.1	6.6	7.9
Total Cash Contributions	\$15.9	\$15.4	\$95.6

(1) Excludes benefit payments of approximately \$28 million which were paid in 2014 from a U.S. nonqualified pension plan in connection with our emergence from bankruptcy.

Based on the U.S. advance-funded plans' status as of December 31, 2016, there are no minimum required payments under ERISA for 2017.

We intend to fund non-U.S. pension plans based upon applicable legal requirements and actuarial and trustee recommendations. We contributed \$8.4 million to these plans in 2016.

Tax Matters

We generated approximately \$1,800 million in U.S. federal tax deductions relating to our emergence from bankruptcy. These deductions generated U.S. federal and state NOL carryforwards in 2014, which we will carry forward and expect to utilize in subsequent years. Under U.S. federal income tax law, a corporation is generally permitted to carry forward NOLs for a 20-year period for deduction against future taxable income. We generated additional U.S. federal tax deductions of \$30 million upon payment of the ZAI PD deferred payment obligation on February 3, 2017. (See Note 10 to the Consolidated Financial Statements for Chapter 11 information.)

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We pay cash taxes in foreign jurisdictions and a limited number of states. In 2016, income taxes paid in cash, net of refunds, which includes payments related to the Separation, certain true-up payments made to foreign jurisdictions, and a prepayment of foreign taxes, were \$85.2 million or approximately 51% of income before income taxes.

As of December 31, 2014, we had the intent and ability to indefinitely reinvest undistributed earnings of our foreign subsidiaries outside the United States. In 2015, in connection with the Separation, we repatriated a total of \$173.1 million of foreign earnings from foreign subsidiaries transferred to GCP pursuant to the Separation. Such amount was determined based on an analysis of each non-U.S. subsidiary's requirements for working capital, debt repayment and strategic initiatives. We also considered local country legal and regulatory restrictions. We included tax expense of \$19.0 million in discontinued operations in 2015 for repatriation and \$1.3 million in the 2016 first quarter for deemed repatriation attributable to both current and prior years' earnings.

We believe that the Separation was a one-time, non-recurring event, and such recognition of deferred taxes on undistributed earnings would not have occurred if not for the Separation. Subsequent to the Separation, we expect undistributed prior-year earnings of our foreign subsidiaries to remain permanently reinvested except in certain instances where repatriation of such earnings would result in minimal or no tax. We base this assertion on:

- (1) the expectation that we will satisfy our U.S. cash obligations in the foreseeable future without requiring the repatriation of prior-year foreign earnings;
- (2) plans for significant and continued reinvestment of foreign earnings in organic and inorganic growth initiatives outside the U.S.; and
- (3) remittance restrictions imposed by local governments.

We will continually analyze and evaluate our cash needs to determine the appropriateness of our indefinite reinvestment assertion.

See Note 7 to the Consolidated Financial Statements and "Income Taxes" above for additional discussion of our tax accounting matters including unrecognized tax benefits.

Other Contingencies

See Note 10 to the Consolidated Financial Statements for a discussion of our other contingent matters.

Inflation

We recognize that inflationary pressures may have an adverse effect on us through higher asset replacement costs and higher raw materials and other operating costs. We try to minimize these impacts through effective control of operating expenses and productivity improvements as well as price increases to customers.

We estimate that the cost of replacing our property and equipment today is greater than its historical cost.

Accordingly, our depreciation expense would be greater if the expense were stated on a current cost basis.

Critical Accounting Estimates

The preparation of financial statements in conformity with U.S. GAAP requires that we make estimates and assumptions affecting the assets and liabilities reported at the date of the Consolidated Financial Statements, and the revenues and expenses reported for the periods presented. We believe that our accounting estimates are appropriate and the related balances are reasonable; however, actual amounts could differ from the original estimates, requiring adjustments in future periods. Changes in estimates are recorded in the period in which the change is identified. Our accounting policies are described in Note 1 to the Consolidated Financial Statements. Critical accounting estimates are described in this section.

An accounting estimate is considered critical if the estimate requires management to make assumptions and judgments about matters that were highly uncertain at the time the estimate was made, if different estimates reasonably could have been used, or if changes in the estimate are reasonably likely to occur from period to period that could have a material impact on our financial condition or results of operations. As part of our quarterly disclosure controls and procedures, management has discussed the development, selection and disclosure of the critical accounting estimates with the Audit Committee of the Board of Directors.

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Contingent Liabilities

We have recorded a liability for the resolution of contingencies related to asbestos property damage, environmental remediation, income taxes and litigation. We record a liability if we have determined that a loss is probable and we are able to reasonably estimate the amount of the loss or have another reasonable basis for recording a liability. We have determined that each of the contingencies discussed below involves an accounting judgment that is material to our Consolidated Financial Statements.

Asbestos Property Damage Lawsuits

We were a defendant in property damage and personal injury lawsuits relating to previously sold asbestos-containing products. As discussed in Note 10 to the Consolidated Financial Statements, we emerged from Chapter 11 on February 3, 2014.

Under the plan of reorganization, all pending and future asbestos-related claims are channeled for resolution to either the PI Trust or the PD Trust. The trusts are the sole recourse for holders of asbestos-related claims. The channeling injunctions issued by the bankruptcy court prohibit holders of asbestos-related claims from asserting such claims directly against us.

We have satisfied all of our financial obligations to the PI Trust. We have fixed and contingent obligations remaining to the PD Trust. With respect to property damage claims related to ZAI PD Claims, the PD Trust was funded with \$34.4 million on the Effective Date and \$30 million on February 3, 2017. The liability of \$30.0 million was included in "debt payable within one year" in the Consolidated Financial Statements as of December 31, 2016. We are also obligated to make up to 10 contingent deferred payments of \$8 million each per year to the PD Trust in respect of ZAI PD Claims during the 20 year period beginning on the fifth anniversary of the Effective Date, with each such payment due only if the assets of the PD Trust in respect of ZAI PD Claims fall below \$10 million during the preceding year. We have not accrued for the 10 additional payments as we do not currently believe they are probable. We are not obligated to make additional payments to the PD Trust in respect of ZAI PD Claims beyond the payments described above. We have satisfied all of our financial obligations with respect to Canadian ZAI PD Claims.

With respect to Other PD Claims, claims unresolved as of the Effective Date are to be litigated in the bankruptcy court and any future claims are to be litigated in a federal district court, in each case pursuant to procedures approved by the bankruptcy court. To the extent any such Other PD Claims are determined to be allowed claims, they are to be paid in cash by the PD Trust. We are obligated to make a payment to the PD Trust every six months in the amount of any Other PD Claims allowed during the preceding six months plus interest (if applicable) and the amount of PD Trust expenses for the preceding six months. The aggregate amount to be paid under the PD Obligation is not capped and we may be obligated to make additional payments to the PD Trust in respect of the PD Obligation. We have accrued for those unresolved Other PD Claims that we believe are probable and estimable. We have not accrued for other unresolved or unasserted Other PD Claims as we do not believe that payment is probable.

All payments to the PD Trust required after the Effective Date are secured by our obligation to issue 77,372,257 shares of Company common stock to the PD Trust in the event of default, subject to customary anti-dilution provisions.

We generated approximately \$1,800 million in U.S. federal tax deductions in 2014 relating to our emergence from bankruptcy, including approximately \$670 million relating to payments made upon emergence, \$632 million upon payment of the PI deferred payment obligation, and \$490 million upon repurchase of the warrant held by the PI Trust. The deferred payment to the ZAI PD Account is expected to be deductible at the time of payment. See Note 7 to the Consolidated Financial Statements for a discussion of tax deductions generated in connection with emergence from Chapter 11.

Environmental Remediation

We are obligated under applicable law to remediate certain properties related to our business or former businesses. At some sites we outsource all or a portion of the remediation to third parties and at others, we perform the required remediation ourselves. Our environmental remediation obligation has a significant impact on our Consolidated Financial Statements. See disclosure in this Report in Item 1 (Business—Environment, Health

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and Safety Matters) and in Note 10 to the Consolidated Financial Statements for a discussion of our environmental remediation liabilities.

At sites where third parties conduct remediation, we estimate our obligations from information available to us, including actual costs incurred, expected future costs and time to completion. At sites where we conduct remediation, we work with regulatory authorities to define compliance requirements and then estimate the cost required to meet those requirements. We base our estimates on our historical knowledge and engineering assessments specific to conditions at each site, and we update our estimates as necessary.

Our estimates can fluctuate significantly due to the extended duration of some remediation projects. The accuracy of our estimates is dependent on the validity of assumptions regarding regulatory approaches and such matters as labor rates, indirect costs and capital costs, which are each difficult to forecast over extended periods. It is not practicable to estimate the impact on our Consolidated Financial Statements of using other reasonably possible assumptions. Future changes in estimates, if required, will more than likely lead to material adjustments to our Consolidated Financial Statements, and we expect the ultimate resolution of these obligations to have a material impact on our liquidity and capital resources.

We purchased a vermiculite mine in Libby, Montana, in 1963 and operated it until 1990. Some of the vermiculite ore that was mined at the Libby mine contained naturally occurring asbestos. We are engaged with the EPA and other federal, state and local governmental agencies in a remedial investigation and feasibility study of the Libby mine and the surrounding area. We do not have sufficient information to estimate the cost of any required remediation of the Libby mine or surrounding area. The EPA is also investigating sites where vermiculite concentrate from the Libby mine may have been used, stored or processed. We are cooperating with the EPA on these investigations and have remediated, or paid for remediation, at several of these facilities. We have specific reserves for each site where an assessment has indicated that a probable liability has been incurred and the cost can be reasonably estimated. The EPA may request additional remediation at other facilities. A liability will be recorded in the future should Grace determine that an obligation is probable and reasonably estimable.

Our estimates of our environmental remediation obligations do not include the cost to remediate the Libby vermiculite mine and surrounding area or costs related to any additional EPA claims, whether resulting from the EPA's investigation of former vermiculite processing sites or otherwise, which may be material but are not currently estimable. It is probable that our ultimate liability for environmental remediation will exceed our current estimates by material amounts.

Litigation

We are subject to legal proceedings and claims arising out of the normal course of business. To estimate the cost to resolve our legal obligations, we review the facts of each matter to determine the merits of the case and the corresponding probability of a loss. If we determine that a loss is probable, we determine if there is sufficient information to make a reasonable estimate of the loss amount. Our estimates regarding the outcome of our legal proceedings and claims involve substantial uncertainties that could cause our actual losses to differ materially from our estimates. In estimating the likely outcome of a legal proceeding, we consider the nature of the specific claim (or unasserted claim), our experience with similar claims, the jurisdiction in which the proceeding is filed, court rulings, the status of any settlement negotiations, the likelihood of resolution through settlement or alternative dispute resolution, the proceeding's current status and other relevant information and events. We adjust our recorded liability for litigation contingencies as necessary to reflect our current evaluation of these and other factors.

Goodwill

We review our goodwill for impairment on an annual basis at October 31 and whenever events or a change in circumstances indicate that the carrying amount may not be fully recoverable. We have identified our operating segments as reporting units for goodwill impairment testing. Our Catalysts Technologies reportable segment has two reporting units for goodwill impairment testing, which are the Refining Technologies and Specialty Catalysts operating segments. Our Materials Technologies operating segment represents a single reporting unit for goodwill impairment testing.

We performed a quantitative analysis as of October 31, 2016, and concluded that the estimated fair value of all of our reporting units substantially exceeded their carrying values.

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Table of Contents**Pension Expenses and Liabilities**

We sponsor defined benefit pension plans for our employees in the United States and a number of other countries, including Canada and Germany, and fund government-sponsored programs in other countries where we operate. See Note 8 to the Consolidated Financial Statements for a detailed discussion of our pension plans and other postretirement benefit plans.

In order to estimate our pension expenses and liabilities we evaluate the range of possible assumptions to be used in the calculation of pension expenses and liabilities. We select the assumptions that we believe to be most indicative of factors such as participant demographics, past experiences and market indices, and provide the assumptions to independent actuaries. These assumptions are updated annually and primarily include factors such as discount rates, expected return on plan assets, mortality rates, retirement rates, and rate of compensation increase. The independent actuaries review our assumptions for reasonableness, and use the assumptions to calculate our estimated liability and future pension expense. We review the actuarial reports for reasonableness and adjust our expenses, assets and liabilities to reflect the amounts calculated in the actuarial reports.

The two key assumptions used in determining our pension benefit obligations and pension expense are the discount rate and expected return on plan assets. Our most significant pension assets and pension liabilities relate to U.S. pension plans.

The assumed discount rate for pension plans reflects the market rates for high-quality corporate bonds currently available and is subject to change based on changes in overall market interest rates. For the U.S. pension plans, the assumed weighted average discount rate was selected in consultation with our independent actuaries, based on a yield curve constructed from a portfolio of high quality bonds for which the timing and amount of cash outflows approximate the estimated payouts of the plan.

We selected the expected return on plan assets for the U.S. qualified pension plans for 2016 in consultation with our independent actuaries, using an expected return model. The model determines the weighted average return for an investment portfolio based on the target asset allocation and expected future returns for each asset class, which were developed using a building block approach based on observable inflation, available interest rate information, current market characteristics, and historical results.

The following table reflects the sensitivity of 2017 pre-tax expense (excluding the effects of the annual mark-to-market adjustment) and our year-end projected benefit obligation, or PBO, to a change in the discount rate and expected rate of return on plan assets assumptions for the U.S. pension plans:

Change in Assumption (In millions)	Effect	
	on 2017 Pre-Tax Pension Expense	Effect on December 31, 2016 PBO
25 basis point decrease in discount rate	\$ (1)	\$ 34
25 basis point increase in discount rate	1	(33)
25 basis point decrease in expected return on plan assets	3	—
25 basis point increase in expected return on plan assets	(3)	—

Income Taxes

Our global reach results in a complexity of tax regulations, which require assessments of applicable tax law and judgments in estimating our ultimate income tax liability. See Note 7 to the Consolidated Financial Statements for additional details regarding our estimates used in accounting for income tax matters including unrecognized tax benefits.

We recognize the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained upon examination by the taxing authorities, based on the technical merits of the position. We measure tax benefits in our financial statements from such a position as the largest benefit that has a greater than fifty percent likelihood of being realized upon ultimate settlement. Unrecognized tax benefits are tax benefits claimed in our tax returns that do not meet these recognition and measurement standards.

We record a liability for unrecognized tax benefits when it is more likely than not that a tax position we have taken will not be sustained upon audit. We evaluate such likelihood based on relevant facts and tax law. We

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adjust our recorded liability for income tax matters due to changes in circumstances or new uncertainties, such as amendments to existing tax law. Our ultimate tax liability depends upon many factors, including negotiations with taxing authorities in the jurisdictions in which we operate, outcomes of tax litigation, and resolution of disputes arising from federal, state, and foreign tax audits. Due to the varying tax laws in each jurisdiction, management, with the assistance of local tax advisors as necessary, assesses individual matters in each jurisdiction on a case-by-case basis. We research and evaluate our income tax positions, including why we believe they are compliant with income tax regulations, and these positions are documented as appropriate.

Deferred income taxes result from the differences between the financial and tax basis of our assets and liabilities and are adjusted for changes in tax rates and tax laws when changes are enacted. If it is more likely than not that all or a portion of deferred tax assets will not be realized, a valuation allowance is provided for such deferred tax assets. As of December 31, 2016, we have recorded a valuation allowance of \$31.4 million on net deferred tax assets of \$738.0 million, of which \$17.7 million is related to U.S. federal credits, \$11.2 million to U.S. state NOLs, and \$2.5 million to foreign NOLs. The balance of net deferred tax assets, net of valuation allowance, is \$706.6 million.

The following table summarizes the balance of deferred tax assets, net of deferred tax liabilities, at December 31, 2016, of \$706.6 million:

(In millions)	Deferred Tax Asset (Net of Liabilities)	Valuation Allowance	Net Deferred Tax Asset
United States—Federal	\$ 640.4	\$ (17.7)	\$ 622.7
United States—States	150.9	(11.2)	39.7
Germany	39.2	—	39.2
Other foreign	7.5	(2.5)	5.0
Total	\$ 738.0	\$ (31.4)	\$ 706.6

(1) The U.S. federal deductions generated relating to emergence of \$1,800 million, plus the \$30 million ZAI PD deferred payment obligation, account for a majority of the U.S. federal and state deferred tax assets.

We will need to generate approximately \$1,800 million of U.S. federal taxable income by 2035 (or approximately \$95 million per year during the carryforward period) to fully realize the U.S. federal and a majority of the U.S. state net deferred tax assets.

The following table summarizes expiration dates in jurisdictions where we have, or will have, material tax loss carryforwards:

	Expiration Dates
United States—Federal (NOLs)	2033 - 2035
United States—Federal (Credits)	2019 - 2026
United States—States (NOLs)	2017 - 2035

In evaluating our ability to realize our deferred tax assets, we consider all reasonably available positive and negative evidence, including recent earnings experience, expectations of future taxable income and the tax character of that income, the extended period of time over which the temporary differences become deductible and the carryforward and/or carryback periods available to us for tax reporting purposes in the related jurisdiction. In estimating future taxable income, we develop assumptions, including the amount of future federal, state and international pretax operating income that we can reasonably expect to generate, the reversal of temporary differences and the implementation of feasible and prudent tax planning strategies. We record a valuation allowance to reduce deferred tax assets to the amount that we believe is more likely than not to be realized.

U.S. federal deferred tax assets associated with certain credit carryforwards have expiration dates through 2021 and are projected to expire before they can be utilized. We have recorded a valuation allowance of \$17.7 million on these credits. We concluded that a valuation allowance is not required with respect to the remaining U.S. federal deferred tax assets of \$622.7 million because we believe we will have sufficient U.S. taxable income to realize all future

available tax deductions and remaining credits prior to their expiration.

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We also considered the need for a valuation allowance on state deferred tax assets. We have considered forecasted earnings, recent past and future taxable income and allowable carryforward periods of net operating losses in each state taxing jurisdiction in which we operate. We believe that we will generate sufficient domestic income in most state and local jurisdictions to utilize future deductions.

There are certain states where a portion of the NOLs generated in prior years will not be utilized prior to their expiration and for which, as of December 31, 2016, a valuation allowance in the aggregate of \$11.2 million remains in place.

The realization of deferred tax assets is dependent on the generation of sufficient taxable income in the appropriate tax jurisdictions. We believe it is more likely than not that the net deferred tax assets as of December 31, 2016, will be realized. If we were to determine that we would not be able to realize a portion of our net deferred tax assets in the future, for which there is currently no valuation allowance, an adjustment to the net deferred tax assets would be charged to earnings in the period such determination was made. Conversely, if we were to make a determination that it is more likely than not that deferred tax assets, for which there is currently a valuation allowance, would be realized, the related valuation allowance would be reduced and a benefit to earnings would be recorded.

Recent Accounting Pronouncements

See Note 1 to the Consolidated Financial Statements for a discussion of recent accounting pronouncements and their effect on us.

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W. R. GRACE & CO. AND SUBSIDIARIES

FINANCIAL STATEMENT SCHEDULE II—VALUATION AND QUALIFYING ACCOUNTS AND RESERVES

(In millions)

For the Year Ended December 31, 2016

Description	Balance at beginning of period	Additions charged to costs and expenses	Deductions	Other, net(1)	Balance at end of period
Valuation and qualifying accounts deducted from assets:					
Allowances for notes and accounts receivable	\$ 1.4	\$ 2.4	\$ (1.1)	\$ 0.1	\$ 2.8
Valuation allowance for deferred tax assets(2)	8.4	11.6	(9.1)	20.5	31.4
Reserves:					
Reserves for environmental remediation	55.2	29.2	(18.1)	—	66.3
Reserves for retained obligations of divested businesses	13.5	—	(1.8)	—	11.7

For the Year Ended December 31, 2015

Description	Balance at beginning of period	Additions charged to costs and expenses	Deductions	Other, net(1)	Balance at end of period
Valuation and qualifying accounts deducted from assets:					
Allowances for notes and accounts receivable	\$ 1.0	\$ 0.5	\$ (0.1)	\$ —	\$ 1.4
Valuation allowance for deferred tax assets(3)	10.7	0.4	(2.6)	(0.1)	8.4
Reserves:					
Reserves for environmental remediation	61.1	6.4	(12.3)	—	55.2
Reserves for retained obligations of divested businesses	13.5	—	—	—	13.5

For the Year Ended December 31, 2014

Description	Balance at beginning of period	Additions charged to costs and expenses	Deductions	Other, net(1)	Balance at end of period
Valuation and qualifying accounts deducted from assets:					
Allowances for notes and accounts receivable	\$ 2.7	\$ 0.4	\$ (2.1)	\$ —	\$ 1.0
Valuation allowance for deferred tax assets(4)	16.7	1.2	(7.0)	(0.2)	10.7
Reserves:					
Reserves for asbestos-related litigation	2,092.4	—	(2,092.4)	—	—
Reserves for environmental remediation	134.5	14.7	(88.1)	—	61.1
Reserves for retained obligations of divested businesses	35.0	—	(21.5)	—	13.5

(1) Effects of currency translation and the Separation.

The valuation allowance increased \$23.0 million from December 31, 2015, to December 31, 2016. The increase (2) was primarily due to adoption of ASU 2016-06 as well as the ability to utilize NOL carryforwards as a result of the Separation.

(3) The valuation allowance decreased \$2.3 million from December 31, 2014, to December 31, 2015. The decrease was primarily due to a reduction in the valuation allowance on state NOL carryforwards.

(4) The valuation allowance decreased \$6.0 million from December 31, 2013, to December 31, 2014. The decrease was primarily due to a reduction in the valuation allowance on state NOL carryforwards, partially offset by an increase in the valuation allowance on NOLs in certain foreign jurisdictions.

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EXHIBIT 12

W. R. GRACE & CO. AND SUBSIDIARIES

COMPUTATION OF RATIO OF EARNINGS TO FIXED CHARGES AND
COMBINED FIXED CHARGES AND PREFERRED STOCK DIVIDENDS(1)(2)

(In millions, except ratios)

(Unaudited)

	Year Ended December 31,				
	2016	2015	2014	2013	2012
Net income attributable to W. R. Grace & Co. shareholders	\$94.1	\$144.2	\$276.3	\$256.1	\$40.0
Provision for (benefit from) income taxes	59.0	69.8	(12.4)	29.2	(119.9)
Equity in earnings of unconsolidated affiliate	(29.8)	(20.4)	(19.7)	(22.9)	(18.5)
Distributed income of earnings of unconsolidated affiliate	31.0	11.8	11.2	2.8	6.3
Interest expense and related financing costs, including amortization of capitalized interest, less interest capitalized	92.1	99.8	123.5	40.7	45.2
Estimated amount of rental expense deemed to represent the interest factor	8.0	7.9	8.2	7.6	7.4
Income as adjusted	\$254.4	\$313.1	\$387.1	\$313.5	\$(39.5)
Combined fixed charges and preferred stock dividends:					
Interest expense and related financing costs, including capitalized interest	\$93.2	\$100.5	\$124.8	\$41.8	\$45.2
Estimated amount of rental expense deemed to represent the interest factor	8.0	7.9	8.2	7.6	7.4
Fixed charges	101.2	108.4	133.0	49.4	52.6
Combined fixed charges and preferred stock dividends	\$101.2	\$108.4	\$133.0	\$49.4	\$52.6
Ratio of earnings to fixed charges	2.51	2.89	2.91	6.35	—
Ratio of earnings to fixed charges and preferred stock dividends	2.51	2.89	2.91	6.35	—

(1) Grace did not have preferred stock from 2012 through 2016.

(2) The 2012 ratio of earnings to fixed charges is below a one-to-one ratio. An additional \$92.1 million in earnings would be needed to attain a one-to-one ratio.

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EXHIBIT 31.(i).1

CERTIFICATION OF PERIODIC REPORT UNDER SECTION 302 OF
THE SARBANES-OXLEY ACT OF 2002

I, A. E. Festa, certify that:

1. I have reviewed this annual report on Form 10-K of W. R. Grace & Co.;

Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a
2. material fact necessary to make the statements made, in light of the circumstances under which such statements
were made, not misleading with respect to the period covered by this report;

Based on my knowledge, the financial statements, and other financial information included in this report, fairly
3. present in all material respects the financial condition, results of operations and cash flows of the registrant as of,
and for, the periods presented in this report;

The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls
4. and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial
reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed
(a) under our supervision, to ensure that material information relating to the registrant, including its consolidated
subsidiaries, is made known to us by others within those entities, particularly during the period in which this report
is being prepared;

designed such internal control over financial reporting, or caused such internal control over financial reporting to
(b) be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting
and the preparation of financial statements for external purposes in accordance with generally accepted accounting
principles;

evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our
(c) conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered
by this report based on such evaluation; and

disclosed in this report any change in the registrant's internal control over financial reporting that occurred during
(d) the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that
has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial
reporting; and

The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal
5. control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of
directors (or persons performing the equivalent functions):

all significant deficiencies and material weaknesses in the design or operation of internal control over financial
(a) reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and
report financial information; and

(b) any fraud, whether or not material, that involves management or other employees who have a significant role in the
registrant's internal control over financial reporting.

Date: February 23, 2017
/s/ A. E. FESTA
A. E. Festa
Chief Executive Officer

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EXHIBIT 31.(i).2

CERTIFICATION OF PERIODIC REPORT UNDER SECTION 302 OF
THE SARBANES-OXLEY ACT OF 2002

I, Thomas E. Blaser, certify that:

1. I have reviewed this annual report on Form 10-K of W. R. Grace & Co.;

Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a
2. material fact necessary to make the statements made, in light of the circumstances under which such statements
were made, not misleading with respect to the period covered by this report;

Based on my knowledge, the financial statements, and other financial information included in this report, fairly
3. present in all material respects the financial condition, results of operations and cash flows of the registrant as of,
and for, the periods presented in this report;

The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls
4. and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial
reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed
(a) under our supervision, to ensure that material information relating to the registrant, including its consolidated
subsidiaries, is made known to us by others within those entities, particularly during the period in which this report
is being prepared;

designed such internal control over financial reporting, or caused such internal control over financial reporting to
(b) be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting
and the preparation of financial statements for external purposes in accordance with generally accepted accounting
principles;

evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our
(c) conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered
by this report based on such evaluation; and

disclosed in this report any change in the registrant's internal control over financial reporting that occurred during
(d) the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that
has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial
reporting; and

The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal
5. control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of
directors (or persons performing the equivalent functions):

all significant deficiencies and material weaknesses in the design or operation of internal control over financial
(a) reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and
report financial information; and

(b) any fraud, whether or not material, that involves management or other employees who have a significant role in the
registrant's internal control over financial reporting.

Date: February 23, 2017

/s/ THOMAS E. BLASER

Thomas E. Blaser

Senior Vice President and Chief Financial Officer

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EXHIBIT 32

CERTIFICATION UNDER SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (18 U.S.C. Section 1350), the undersigned certifies that (1) this Annual Report of W. R. Grace & Co. (the "Company") on Form 10-K for the period ended December 31, 2016, as filed with the Securities and Exchange Commission on the date hereof (this "Report"), fully complies with the requirements of Sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, and (2) the information contained in this Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ A. E. FESTA

Chief Executive Officer

/s/ THOMAS E. BLASER

Senior Vice President and Chief Financial Officer

Date: 2/23/2017

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.