

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549**

FORM 10-K

(Mark One)

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

For the fiscal year ended June 30, 2018

OR

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

For the transition period from _____ to _____

Commission File Number 1-5828

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

Delaware

(State or other jurisdiction of incorporation or organization)

23-0458500

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

1735 Market Street, 15th Floor
Philadelphia, Pennsylvania

(Address of principal executive offices)

19103

(Zip Code)

610-208-2000

(Registrant's telephone number, including area code)

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

Common Stock, \$5 Par Value

Title of each class

New York Stock Exchange

Name of each exchange on which registered

Securities registered pursuant to 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 ☒ No ☐

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

Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to the filing requirements for at least the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files)

Yes ☒ No ☐

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

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

Large accelerated filer ☒

Accelerated filer ☐

Non-accelerated filer ☐

Smaller reporting company ☐

Emerging growth company ☐

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

The aggregate market value of the registrants' voting common stock held by non-affiliates at December 31, 2017 was \$2,391,170,747, based on the closing price per share of the registrant's common stock on that date of \$50.99 as reported on the New York Stock Exchange.

As of August 8, 2018, 47,260,079 shares of the registrant's common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Selected portions of the Company's fiscal year 2018 definitive Proxy Statement are incorporated by reference into Part III of this Report.

TABLE OF CONTENTS

		Page Number
<u>PART I</u>		
	Item 1	Business
	Item 1A	Risk Factors
	Item 1B	Unresolved Staff Comments
	Item 2	Properties
	Item 3	Legal Proceedings
	Item 4	Mine Safety Disclosures
	Item 4A	Executive Officers of the Registrant
<u>PART II</u>		
	Item 5	Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities
	Item 6	Selected Financial Data
	Item 7	Management’s Discussion and Analysis of Financial Condition and Results of Operations
	Forward-Looking Statements	
	Item 7A	Quantitative and Qualitative Disclosures about Market Risk
	Item 8	Financial Statements and Supplementary Data
	Item 9	Changes in and Disagreements with Accountants on Accounting and Financial Disclosure
	Item 9A	Controls and Procedures
	Item 9B	Other Information
<u>PART III</u>		
	Item 10	Directors, Executive Officers and Corporate Governance
	Item 11	Executive Compensation
	Item 12	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters
	Item 13	Certain Relationships, Related Transactions and Director Independence
	Item 14	Principal Accounting Fees and Services
<u>PART IV</u>		
	Item 15	Exhibits and Financial Statement Schedules
	Item 16	Form 10-K Summary
<u>SIGNATURES</u>		
<u>SCHEDULE II</u>	Valuation and Qualifying Accounts	

PART I

Item 1. Business

(a) General Development of Business:

Carpenter Technology Corporation, founded in 1889, is engaged in the manufacturing, fabrication and distribution of specialty metals. As used throughout this report, unless the context requires otherwise, the terms “Carpenter”, “Company”, “Registrant”, “Issuer”, “we” and “our” refer to Carpenter Technology Corporation.

(b) Financial Information About Segments:

We are organized in two reportable business segments: Specialty Alloys Operations (“SAO”) and Performance Engineered Products (“PEP”). See Note 19 to our consolidated financial statements included in Item 8. “Financial Statements and Supplementary Data” for additional segment reporting information.

(c) Narrative Description of Business:

(1) General:

We are a recognized leader in high-performance specialty alloy-based materials and process solutions for critical applications in the aerospace, defense, transportation, energy, industrial, medical, and consumer end-use markets. We have evolved to become a pioneer in premium specialty alloys, including titanium, nickel, and cobalt, as well as alloys specifically engineered for additive manufacturing processes and soft magnetics applications. We have expanded our additive manufacturing capabilities to provide a complete “end-to-end” solution to accelerate materials innovation and streamline parts production.

Reportable Segments

The SAO segment is comprised of the Company’s major premium alloy and stainless steel manufacturing operations. This includes operations performed at mills primarily in Reading and Latrobe, Pennsylvania and surrounding areas as well as South Carolina and Alabama. The combined assets of the SAO segment are managed in an integrated manner to optimize efficiency and profitability across the total system.

The PEP segment is comprised of the Company’s differentiated operations. This segment includes the Dynamet titanium business, the Carpenter Powder Products business, the Amega West business, the CalRAM business, and the Latrobe and Mexico distribution businesses. The businesses in the PEP segment are managed with an entrepreneurial structure to promote speed and flexibility, and drive overall revenue and profit growth.

(2) Raw Materials:

Our business depends on continued receipt of critical raw materials for our day-to-day operations. These raw materials include nickel, cobalt, chromium, manganese, molybdenum, titanium, iron and scrap containing iron and nickel. Some of the sources of these raw materials, many of which are international, could be subject to potential interruptions of supply as a result of political events, labor unrest or other reasons. These potential interruptions could cause material shortages and affect availability and price. We have arrangements with certain vendors to provide consigned materials at our manufacturing facilities available for our consumption as necessary.

We have long-term relationships with major suppliers who provide availability of material at competitive prices. Purchase prices of certain raw materials have historically been volatile. We use pricing surcharges, indexing mechanisms, base price adjustments and raw material forward contracts to reduce the impact on our business of increased costs for the most significant of these materials. There can be delays between the time of the increase in the price of raw materials and the realization of the benefits of such mechanisms or actions that could have a short-term impact on our results and could affect the comparability of our results from period to period.

(3) Patents and Licenses:

We own a number of United States and international patents and have granted licenses under some of them. In addition, certain products that we produce are covered by patents held or owned by other companies from whom licenses have been obtained. The duration of a patent issued in the United States is between 14 and 20 years from the date of filing a patent application or issuance of the patents. The durations of patents issued outside of the United States varies from country to country. Generally, patent licenses are structured to match the duration of the underlying patent. Although these patents and licenses are believed to be of value, we do not consider our business to be materially dependent upon any single such item or related group of such items.

(4) Seasonality of Business:

Our sales are normally influenced by seasonal factors. Historically, our sales in the first two fiscal quarters (the respective three months ending September 30 and December 31) are typically the lowest — principally because of annual plant vacation and maintenance shutdowns by us, as well as by many of our customers. However, the timing of major changes in the general economy or the markets for certain products can alter this historical pattern.

The chart below summarizes the percent of net sales by quarter for the past three fiscal years:

Quarter Ended	2018	2017	2016
September 30,	22%	22%	25%
December 31,	22	24	25
March 31,	27	26	25
June 30,	29	28	25
	100%	100%	100%

(5) Customers:

On a consolidated basis, we are not dependent upon a single customer, or a very few customers, such that the loss of any one or more particular customers would have a materially adverse effect on our consolidated statement of income. One customer, Arconic, Inc., accounted for approximately 12 percent, 11 percent and 13 percent of net sales for the years ended June 30, 2018, 2017 and 2016, respectively. No single customer accounted for 10 percent or more of the accounts receivable outstanding at June 30, 2018 and 2017. See Note 19 to our consolidated financial statements included in Item 8. “Financial Statements and Supplementary Data” for additional information.

(6) Backlog:

As of June 30, 2018, we had a sales backlog of orders excluding surcharge, believed to be firm, of approximately \$568 million, substantially all of which is expected to be shipped within fiscal year 2019. Our backlog of orders excluding surcharge as of June 30, 2017 was approximately \$438 million.

(7) Competition:

We are leaders in specialty materials for critical applications with over 125 years of metallurgical and manufacturing expertise. Our business is highly competitive. We manufacture and supply materials to a variety of end-use market sectors and compete with various companies depending on end-use market, product or geography. A significant portion of the products we produce are highly engineered materials for demanding applications. There are less than ten companies producing one or more similar products that we consider our major competitors for our high-value products used in demanding applications, particularly in our Aerospace and Defense and Energy end-use markets. These products are generally required to meet complex customer product specifications and often require the materials to be qualified prior to supplying the customer. Our experience, technical capabilities, product offerings and research and development efforts represent barriers to existing and potential competitors.

For other products, there are several dozen smaller producing companies and converting companies that are also competitors, as well as several hundred independent distributors of products similar to those distributed by us. Additionally, numerous foreign companies produce various specialty metal products similar to those produced by us. Furthermore, a number of different products may, in certain instances, be substituted for our finished products.

(8) Research, Product and Process Development:

Our expenditures for company-sponsored research and development were \$19.3 million, \$16.9 million and \$16.3 million in fiscal years 2018, 2017 and 2016, respectively. We believe that our ability to be an innovator in special material development and manufacturing processes has been and will continue to be an important factor in the success of the Company. Our worldwide staff of expert metallurgists, research and development scientists, engineers and service professionals work closely with our customers to identify and provide innovative solutions to specific product requirements.

(9) Environmental Regulations:

We are subject to various stringent federal, state, local and international environmental laws and regulations relating to pollution, protection of public health and the environment, natural resource damages and occupational safety and health. Management evaluates the liability for future environmental remediation costs on a quarterly basis. We accrue amounts for environmental remediation costs representing management's best estimate of the probable and reasonably estimable costs relating to environmental remediation. For further information on environmental remediation, see the Contingencies section included in Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the notes to our consolidated financial statements included in Item 8. "Financial Statements and Supplementary Data".

Our costs of maintaining and operating environmental control equipment were \$13.0 million, \$12.4 million and \$13.5 million for fiscal years 2018, 2017 and 2016, respectively. The capital expenditures for environmental control equipment were \$1.2 million, \$0.8 million and \$0.7 million for fiscal years 2018, 2017 and 2016, respectively. We anticipate spending approximately \$6 million on major domestic environmental capital projects over the next five fiscal years. This includes approximately \$3 million in fiscal year 2019. Due to the possibility of future regulatory developments, the amount of future capital expenditures may vary from these estimates.

(10) Employees:

As of June 30, 2018, our total workforce consisted of approximately 4,800 employees, which included approximately 130 production employees in Washington, Pennsylvania, who are covered under a collective bargaining agreement which expires on August 31, 2019, and approximately 490 employees in Latrobe, Pennsylvania who are covered under a collective bargaining agreement which expires August 1, 2020. Our relations with our employees are generally good.

(d) Financial information about foreign and domestic operations and export sales:

Sales outside of the United States, including export sales, were \$728.3 million, \$599.3 million and \$569.9 million in fiscal years 2018, 2017 and 2016, respectively. Long-lived assets held outside of the United States were \$27.0 million and \$26.1 million as of June 30, 2018 and 2017, respectively. For further information on domestic and international sales, see Note 19 to our consolidated financial statements included in Item 8. "Financial Statements and Supplementary Data".

(e) Available Information:

Our Board of Directors has adopted a Code of Ethics for the Chief Executive Officer and Senior Financial Officer of Carpenter Technology Corporation, which is also applicable to our other executive officers. There were no waivers of the Code of Ethics in fiscal year 2018. The Code of Ethics and any information regarding any waivers of the Code of Ethics are disclosed on Carpenter's website at www.carttech.com. Our annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 are available free of charge through our website as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the Securities and Exchange Commission ("SEC"). Our website and the content contained therein or connected thereto are not intended to be incorporated into this Annual Report on Form 10-K.

The public may read and copy any materials the Company files with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet site that contains reports, proxy and other information regarding issuers that file electronically. Such information can be accessed through the Internet at www.sec.gov.

Item 1A. Risk Factors

There are inherent risks and uncertainties associated with all businesses that could adversely affect operating performances or financial conditions. The following discussion outlines the risks and uncertainties that management believes are the most material to our business. However, these are not the only risks or uncertainties that could affect our business. Certain risks are associated specifically with our business, industry or customer base, while others have a broader effect.

The demand for certain products we produce may be cyclical.

Demand in our end-use markets can be cyclical in nature and sensitive to general economic conditions, competitive influences and fluctuations in inventory levels throughout the supply chain. As such, our results of operations, financial condition, cash flows and availability of credit could fluctuate significantly from period to period.

A significant portion of our sales represents products sold to customers in the commercial aerospace and defense and energy markets. The cyclical nature of those markets can adversely affect our current business and our expansion objectives.

The commercial aerospace and defense market is historically cyclical due to both external and internal market factors. These factors include general economic conditions, airline profitability, consumer demand for air travel, varying fuel and labor costs, price competition and international and domestic political conditions such as military conflict and the threat of terrorism. The length and degree of cyclical fluctuation can be influenced by any one or combination of these factors and therefore are difficult to predict with certainty. A downturn in the commercial aerospace and defense industry would adversely affect the demand for our products and/or the prices at which we are able to sell our products; our results of operations and financial condition could be materially adversely affected.

The energy market has also been historically cyclical, principally as a result of volatile oil prices that impact demand for our products. Our future success requires us to, among other things, expand in key international energy markets by successfully adding to our customer base, distribution channels and product portfolio. The volatility of oil prices and other factors that contribute to the cyclical nature of the energy market will impact our ability to expand successfully in this area and may adversely affect our results of operations and financial condition.

Any significant delay or inability to successfully expand our operations in a timely and cost-effective manner could materially adversely affect our business, financial condition and results of operations.

Over the last few years, we have undertaken capital projects associated with expanding our production capacity and capability. These projects place a significant demand on management and operational resources. Our success in expanding our operations in a cost-effective manner depends upon numerous factors including the ability of management to ensure the necessary resources are in place to properly execute these projects, our ability to obtain the necessary internal and customer qualifications to produce material from the facilities and our ability to operate the facilities to maximize the potential opportunities with minimal impacts to our existing operations. If we are not able to achieve the anticipated results from our capital expansion projects, or if we incur unanticipated excess costs, our results of operations and financial position may be materially adversely affected.

Periods of reduced demand and excess supply as well as the availability of substitute lower cost materials can adversely affect our ability to price and sell our products at the profitability levels we require to be successful.

Additional worldwide capacity and reduced demand for our products could significantly impact future worldwide pricing which would adversely impact our results of operations and financial condition. In addition, continued availability of lower cost, substitute materials may cause significant fluctuations in future results as our customers opt for a lower cost alternative.

We change prices on our products as we deem necessary. In addition to the above general competitive impact, other market conditions and various economic factors beyond our control can adversely affect the timing of our pricing actions. The effects of any pricing actions may be delayed due to long manufacturing lead times or the terms of existing contracts. There is no guarantee that the pricing actions we implement will be effective in maintaining the Company's profit margin levels.

We rely on third parties to supply certain raw materials that are critical to the manufacture of our products and we may not be able to access alternative sources of these raw materials if the suppliers are unwilling or unable to meet our demand.

Costs of certain critical raw materials, such as nickel, cobalt, chromium, manganese, molybdenum, titanium, iron and scrap containing iron and nickel have been volatile due to factors beyond our control. We are able to mitigate most of the adverse impact of rising raw material costs through raw material surcharges, indices to customers and raw material forward contracts, but changes in business conditions could adversely affect our ability to recover rapid increases in raw material costs and may adversely affect our results of operations.

In addition, the availability of these critical raw materials is subject to factors that are not in our control. In some cases, these critical raw materials are purchased from suppliers operating in countries that may be subject to unstable political and economic conditions. At any given time, we may be unable to obtain an adequate supply of these critical raw materials on a timely basis, at prices and other terms acceptable to us, or at all.

If suppliers increase the price of critical raw materials or are unwilling or unable to meet our demand, we may not have alternative sources of supply. In addition, to the extent that we have quoted prices to customers and accepted customer orders for products prior to purchasing necessary raw materials, or have existing contracts, we may be unable to raise the price of products to cover all or part of the increased cost of the raw materials to our customers.

The manufacture of some of our products is a complex process and requires long lead times. As a result, we may experience delays or shortages in the supply of raw materials. If unable to obtain adequate and timely receipts of required raw materials, we may be unable to timely manufacture sufficient quantities of products. This could cause us to lose sales, incur additional costs, delay new product introductions or suffer harm to our reputation.

We provide benefits to active and retired employees throughout most of our Company, most of which are not covered by insurance; and thus, our financial condition can be adversely affected if our investment returns are insufficient to meet these obligations.

We have obligations to provide substantial benefits to active and retired employees, and most of the associated costs are paid by the Company and are not covered by insurance. In addition, certain employees are covered by defined benefit pension plans, with the majority of our plans covering employees in the United States. Benefits accrued to eligible participants of our largest qualified defined benefit pension plan and certain non-qualified pension plans were frozen effective December 31, 2016. Many domestic and international competitors do not provide defined benefit plans and/or retiree health care plans, and other international competitors operate in jurisdictions with government sponsored health care plans that may offer them a cost advantage. A decline in the value of plan investments in the future, an increase in costs or liabilities or unfavorable changes in laws or regulations that govern pension plan funding could materially change the timing and amount of required pension funding. A requirement to accelerate or increase pension contributions in the future could have a material adverse effect on our results of operations and financial condition.

The extensive environmental, health and safety regulatory regimes applicable to our manufacturing operations create potential exposure to significant liabilities.

The nature of our manufacturing business subjects our operations to numerous and varied federal, state, local and international laws and regulations relating to pollution, protection of public health and the environment, natural resource damages and occupational safety and health. We have used, and currently use and manufacture, substantial quantities of substances that are considered hazardous, extremely hazardous or toxic under worker safety and health laws and regulations. Although we implement controls and procedures designed to reduce continuing risk of adverse impacts and health and safety issues, we could incur substantial cleanup costs, fines and civil or criminal sanctions, third party property damage or personal injury claims as a result of violations, non-compliance or liabilities under these regulatory regimes required at our facilities.

We have environmental remediation liabilities at some of our owned operating facilities and have been designated as a potentially responsible party (“PRP”) with respect to certain third party Superfund or similar waste disposal sites and other third party owned sites. Additionally, we have been notified that we may be a PRP with respect to other Superfund sites as to which no proceedings have been instituted against us. From time to time, we are a party to lawsuits and other proceedings involving alleged violations of, or liabilities arising from, environmental laws.

When our liability is probable and we can reasonably estimate our costs, we record environmental liabilities in our financial statements. However, in many cases, we are not able to determine whether we are liable, or if liability is probable, in order to reasonably estimate the loss or range of loss which could result from such environmental liabilities. Estimates of our liability remain subject to additional uncertainties, including the nature and extent of site contamination, available remediation alternatives, the extent of corrective actions that may be required, and the number and financial condition of other PRPs, as well as the extent of their responsibility for the remediation. We adjust our accruals to reflect new information as appropriate. Future adjustments could have a material adverse effect on our results of operations in a given period, but we cannot reliably predict the amounts of such future adjustments. Future developments, administrative actions or liabilities relating to environmental matters could have a material adverse effect on our financial condition, cash flows or results of operations.

Our manufacturing processes, and the manufacturing processes of many of our suppliers and customers, are energy intensive and generate carbon dioxide and other “Greenhouse Gases”, and pending legislation or regulation of Greenhouse Gases, if enacted or adopted in an onerous form, could have a material adverse impact on our results of operations, financial condition and cash flows.

Political and scientific debates related to the impacts of greenhouse gas emissions on the global climate are prevalent. Regulation or some form of legislation aimed at reducing the greenhouse gas emissions is currently being considered both in the United States and globally. As a specialty alloy manufacturer, we will be affected, both directly and indirectly, if climate change legislation, such as use of a “cap and trade” and the signed Paris climate accord, is enacted and implemented. Such legislation could have a material adverse impact on our results of operations, financial condition and cash flows.

Product liability and product quality claims could adversely affect our operating results.

We produce ultra-high strength, high temperature and corrosion-resistant alloys designed for our customers' demanding applications particularly in our Aerospace and Defense, Energy and Medical end-use markets. Failure of the materials that are included in our customers' applications could give rise to substantial product liability claims. There can be no assurance that our insurance coverage will be adequate or continue to be available on terms acceptable to us. We have a complex manufacturing process necessary to meet our customers' stringent product specifications. We are also required to adhere to various third party quality certifications and perform sufficient internal quality reviews to ensure compliance with established standards. If we fail to meet the customer specifications for their products, we may be subject to product quality costs and claims. These costs are generally not insured. The impacts of product liability and quality claims could have a material adverse impact on the results of our operations, financial condition and cash flows.

Our business subjects us to risks of litigation claims, as a routine matter, and this risk increases the potential for a loss that might not be covered by insurance.

Litigation claims relate to the conduct of our currently and formerly owned businesses, including claims pertaining to product liability, commercial disputes, employment actions, employee benefits, compliance with domestic and federal laws, personal injury, patent infringement and tax issues. Due to the uncertainties of litigation, we can give no assurance that we will prevail on claims made against us in the lawsuits that we currently face or that additional claims will not be made against us in the future. The outcome of litigation cannot be predicted with certainty, and some of these lawsuits, claims or proceedings may be determined adversely to us. The resolution in any reporting period of one or more of these matters could have a material adverse effect on our results of operations for that period. We can give no assurance that any other matters brought in the future will not have a material effect on our results of operations, financial condition and cash flows.

A portion of our workforce is covered by collective bargaining agreements and union attempts to organize our other employees may cause work interruptions or stoppages.

Approximately 130 production employees at our Dynamet business unit located in Washington, Pennsylvania are covered by a collective bargaining agreement. This agreement expires in August 2019. Approximately 490 production employees at our Latrobe business unit located in Latrobe, Pennsylvania are covered by a collective bargaining agreement. This agreement expires in August 2020. There can be no assurance that we will succeed in concluding collective bargaining agreements with the unions to replace those that expire which could result in work interruptions and stoppages. From time to time, the employees at our manufacturing facility in Reading, Pennsylvania, participate in election campaigns or union organizing attempts. There is no guarantee that future organization attempts will not result in union representation.

Our manufacturing processes are complex and depend upon critical, high cost equipment for which there may be only limited or no production alternatives.

It is possible that we could experience prolonged periods of reduced production due to unplanned equipment failures, and we could incur significant repair or replacement costs in the event of those failures. It is also possible that operations could be disrupted due to other unforeseen circumstances such as power outages, explosions, fires, floods, accidents and severe weather conditions. We must make regular, substantial capital investments and changes to our manufacturing processes to lower production costs, improve productivity, manufacture new or improved products and remain competitive. We may not be in a position to take advantage of business opportunities or respond to competitive pressures if we fail to update, replace or make additions to our equipment or our manufacturing processes in a timely manner. The cost to repair or replace much of our equipment or facilities would be significant. We cannot be certain that we will have sufficient internally generated cash or acceptable external financing to make necessary capital expenditures in the future.

A significant portion of our manufacturing and production facilities are located in Reading and Latrobe, Pennsylvania and Athens, Alabama, which increases our exposure to significant disruption to our business as a result of unforeseeable developments in these geographic areas.

It is possible that we could experience prolonged periods of reduced production due to unforeseen catastrophic events occurring in or around our manufacturing facilities in Reading and Latrobe, Pennsylvania and Athens, Alabama. As a result, we may be unable to shift manufacturing capabilities to alternate locations, accept materials from suppliers, meet customer shipment needs or address other severe consequences that may be encountered. Our financial condition, cash flows and results of operations could be materially adversely affected.

We rely on third parties to supply energy consumed at each of our energy-intensive production facilities.

The prices for and availability of electricity, natural gas, oil and other energy resources are subject to volatile market conditions. These market conditions often are affected by political and economic factors beyond our control. Disruptions or lack of availability in the supply of energy resources could temporarily impair the ability to operate our production facilities. Further, increases in energy costs, or changes in costs relative to energy costs paid by competitors, has affected and may continue to adversely affect our profitability. To the extent that these uncertainties cause suppliers and customers to be more cost sensitive, increased energy prices may have an adverse effect on our results of operations, financial condition and cash flows.

We consider acquisitions, joint ventures and other business combination opportunities, as well as possible business unit dispositions, as part of our overall business strategy, that involve uncertainties and potential risks that we cannot predict or anticipate fully.

From time to time, management holds discussions with management of other companies to explore such aforementioned opportunities. As a result, the relative makeup of the businesses comprising our Company is subject to change. Acquisitions, joint ventures and other business combinations involve various inherent risks. Such risks include difficulties in integrating the operations, technologies, products and personnel of the acquired companies, diversion of management's attention from existing operations, difficulties in entering markets in which we have limited or no direct prior experience, dependence on unfamiliar supply chains, insufficient revenues to offset increased expenses associated with acquisitions, loss of key employees of the acquired companies, inaccurate assessment of undisclosed liabilities, difficulties in realizing projected efficiencies, synergies and cost savings, and increases in our debt or limitation on our ability to access additional capital when needed.

Regulations related to conflict minerals could adversely impact our business.

The SEC has promulgated final rules mandated by the Dodd-Frank Act regarding disclosure of the use of tin, tantalum, tungsten and gold, known as conflict minerals, in products manufactured by public companies. These rules require due diligence to determine whether such minerals originated from the Democratic Republic of Congo (the "DRC") or an adjoining country and whether such minerals helped finance the armed conflict in the DRC. The Company timely filed its latest annual conflict minerals report required by the rules on May 10, 2018. There are costs associated with complying with these disclosure requirements going forward, including costs to determine the origin of conflict minerals used in our products. In addition, the implementation of these rules could adversely affect the sourcing, supply and pricing of materials used in our products. Also, we may face disqualification as a supplier for customers and reputational challenges if the due diligence procedures we continue to implement do not enable us to verify the origins for all conflict minerals or to determine that such minerals are DRC conflict-free.

Our business may be impacted by external factors that we may not be able to control.

War, civil conflict, terrorism, natural disasters and public health issues including domestic or international pandemic have caused and could cause damage or disruption to domestic or international commerce by creating economic or political uncertainties. Additionally, the volatility in the financial markets could negatively impact our business. These events could result in a decrease in demand for our products, affect the availability of credit facilities to us, our customers or other members of the supply chain necessary to transact business, make it difficult or impossible to deliver orders to customers or receive materials from suppliers, affect the availability or pricing of energy sources or result in other severe consequences that may or may not be predictable. As a result, our business, financial condition and results of operations could be materially adversely affected.

We believe that international sales, which are associated with various risks, will continue to account for a significant percentage of our future revenues .

Risks associated with international sales include without limitation: political and economic instability, including weak conditions in the world's economies; difficulty in collecting accounts receivable; unstable or unenforced export controls; changes in legal and regulatory requirements; policy changes affecting the markets for our products; changes in duties, quotas, tariffs and taxes; and exchange rate fluctuations (which may affect sales to international customers and the value of profits earned on international sales when converted into dollars). In addition, we will need to invest in building our capabilities and infrastructure to meet our international growth goals. Any of these factors could materially adversely affect our results for the period in which they occur.

We value most of our inventory using the LIFO method, which could be repealed resulting in adverse effects on our cash flows and financial condition.

The cost of our inventories is primarily determined using the Last-In, First-Out (“LIFO”) method. Under the LIFO inventory valuation method, changes in the cost of raw materials and production activities are recognized in cost of sales in the current period even though these materials and other costs may have been incurred at significantly different values due to the length of time of our production cycle. Generally, in a period of rising prices, LIFO recognizes higher costs of goods sold, which both reduces current income and assigns a lower value to the year-end inventory. From time to time, there have been proposals aimed at repealing the election to use the LIFO method for income tax purposes. According to these proposals, generally taxpayers that currently use the LIFO method would be required to revalue their LIFO inventory to its First-In, First-Out (“FIFO”) value. As of June 30, 2018, if the FIFO method of inventory had been used instead of the LIFO method, our inventories would have been approximately \$210 million higher. This increase in inventory would result in a one-time increase in taxable income which may be taken into account over the following several taxable years. The repeal of the LIFO method could result in a substantial tax liability which could adversely impact our cash flows and financial condition.

We depend on the retention of key personnel.

Much of our future success depends on the continued service and availability of skilled personnel, including members of our executive management team, management, metallurgists and production positions. The loss of key personnel could adversely affect our ability to perform until suitable replacements are found.

We could be adversely impacted if our information technology (“IT”) and computer systems do not perform properly or if we fail to protect the integrity of confidential data.

Management relies extensively on IT infrastructure, including hardware, network, software, people and processes, to provide useful information to conduct our business and support assessments and conclusions about operating performance. Our inability to produce relevant and/or reliable measures of operating performance in an efficient, cost-effective and well-controlled fashion may have significant negative impacts on our future operations. In addition, any material failure, interruption of service, or compromised data security could adversely affect our operations. Security breaches in our information technology could result in theft, destruction, loss, misappropriation or release of confidential data or intellectual property which could adversely impact our future results.

We are in the process of implementing a new enterprise resource planning system and problems with the design or implementation of this system could interfere with our business and operations.

We are engaged in a multi-year implementation of a global enterprise resource planning (ERP) system which is planned to be deployed in phases. The new ERP system will replace multiple current business systems and is being designed to improve manufacturing planning, development and processes, accurately maintain books and records, record transactions and provide important information of the operations of our business to our management. The implementation of the new ERP system has required, and will continue to require, the investment of significant financial resources as well as a considerable allocation of personnel for the project. While we have invested, and continue to invest, significant resources in planning and project management, implementation issues may arise during the course of implementing the ERP system, and it is possible that we may experience significant delays, increased costs and other difficulties that are not presently contemplated. Any disruptions, delays or deficiencies in the design and implementation of the new ERP system could adversely affect our financial condition and results of operations.

The carrying value of goodwill and other intangible assets may not be recoverable.

Goodwill and other long-lived assets including property, plant and equipment and other intangible assets are recorded at fair value on the date of acquisition. We review these assets at least annually for impairment. Impairment may result from, among other things, deterioration in performance, adverse market conditions, adverse changes in applicable laws or regulations and a variety of other factors. Any future impairment of goodwill or other long-lived assets could have a material adverse effect on our results of operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The principal locations of our primary domestic integrated mills in our SAO segment are located in Reading and Latrobe, Pennsylvania and Athens, Alabama. In addition, SAO manufactures large diameter hollow bar in Orwigsburg, Pennsylvania and Elyria, Ohio and operates a mini mill manufacturing stainless steel bar and wire in Hartsville, South Carolina. The principal locations for PEP businesses include titanium alloy production facilities located in Washington, Pennsylvania and Clearwater, Florida, powder products manufacturing facilities in Bridgeville, Pennsylvania, Athens, Alabama, Woonsocket, Rhode Island and Bruceton Mills, West Virginia, additive manufacturing facility in Camarillo, California and a facility in Houston, Texas for manufacturing of machined components used in the drilling, exploration and production of oil and gas. The PEP segment also includes domestic leased warehouses and service centers located in Houston, Texas; San Antonio, Texas; Midland, Texas; Oklahoma City, Oklahoma; Casper, Wyoming; Lafayette, Louisiana; West Alexander, Pennsylvania; Vienna, Ohio and Chicago, Illinois. The PEP segment includes one owned service center in White House, Tennessee.

The Reading, Hartsville, Washington, Bridgeville, Orwigsburg, Elyria, Woonsocket, Latrobe, Houston and Athens facilities are owned. The Clearwater facility is owned, but the land is leased.

We also own or lease manufacturing facilities, distribution centers, service centers and sales offices in a number of foreign countries, including Sweden, Canada, Singapore, China, Mexico, Taiwan, the United Arab Emirates and Belgium.

Our corporate offices, located in Philadelphia, Pennsylvania, are leased.

Our plants, customer service centers and distribution centers were acquired or leased at various times over several years. There is an active maintenance program to ensure a safe operating environment and to keep facilities in good condition. In addition, we have an active capital spending program to replace equipment as needed to keep it technologically competitive on a worldwide basis. We believe our facilities are in good condition and suitable for our business needs.

Item 3. Legal Proceedings

From time to time, we are a party to lawsuits and other proceedings involving alleged violations of, or liabilities arising from, environmental laws. We have environmental remediation liabilities at some of our owned operating facilities and have been designated as a PRP with respect to certain third party Superfund or similar waste disposal sites and other third party owned sites. Additionally, we have been notified that we may be a PRP with respect to other Superfund sites as to which no proceedings have been instituted against us. Estimates of the amount and timing of future costs of environmental remediation requirements are inherently imprecise because of the continuing evolution of environmental laws and regulatory requirements, the availability and application of technology, the identification of currently unknown remediation sites and the allocation of costs among the PRP's. Based upon information currently available, such future costs are not expected to have a material effect on our financial position, results of operations or cash flows over the long-term. However, such costs could be material to our financial position, results of operations or cash flows in a particular future quarter or year.

In addition, from time to time, we are a party to certain routine claims and legal actions and other contingent liabilities incident to the normal course of business which pertain to litigation, product claims, commercial disputes, employment actions, employee benefits, compliance with domestic and foreign laws, personal injury claims, patent infringement and tax issues. Based on information currently available, the ultimate resolution of our known contingencies, individually or in the aggregate and including the matters described in Note 11 to the consolidated financial statements in this Form 10-K, is not expected to have a material adverse effect on our financial position, cash flows or results of operations. However, there can be no assurance that an increase in the scope of pending matters or that any future lawsuits, claims, proceedings or investigations will not be material to our financial position, results of operations or cash flows in a particular future quarter or year.

See the "Contingencies" section included in Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operation", and the "Contingencies and Commitments" section included in Note 11 to our consolidated financial statements included in Item 8. "Financial Statements and Supplementary Data", included in this Form 10-K, the contents of which are incorporated by reference to this Item 3.

Item 4. Mine Safety Disclosures

Not applicable.

Item 4A. Executive Officers of the Registrant

Listed below are the names of our corporate executive officers, including those required to be listed as executive officers for SEC purposes, each of whom assumes office after the annual organization meeting of the Board of Directors which immediately follows the Annual Meeting of Stockholders.

Tony R. Thene was appointed President and Chief Executive Officer effective July 1, 2015. Mr. Thene joined Carpenter in January 2013 and served as the Senior Vice President and Chief Financial Officer. Prior to joining Carpenter, Mr. Thene was employed for 23 years by Alcoa Inc., a leading producer of primary and fabricated aluminum, holding various management positions.

Damon J. Audia was appointed Senior Vice President and Chief Financial Officer effective October 19, 2015. Mr. Audia joined Carpenter from The Goodyear Tire & Rubber Company where he worked for ten years and most recently served as Senior Vice President of Finance for the company's North America division. On August 8, 2018 it was announced that Mr. Audia would be leaving the Company for another role effective September 14, 2018.

Joseph E. Haniford was appointed Senior Vice President and Chief Operating Officer effective June 30, 2016. Mr. Haniford joined Carpenter in July 2015 and served as Senior Vice President - Specialty Alloys Operations. Prior to Carpenter, Mr. Haniford was employed by EnTrans International where he was responsible for all operations as the company's Chief Operating Officer and was a member of the Board of Directors. Prior to EnTrans International, Mr. Haniford worked for Alcoa, Inc. for more than 30 years in various executive leadership positions. Effective July 1, 2018, Mr. Haniford assumed the role of Vice President, Business Management Office and Global Advanced Engineering.

James D. Dee was appointed Vice President, General Counsel and Secretary effective September 13, 2010. Mr. Dee joined Carpenter from C&D Technologies where he last served as Senior Vice President, General Counsel, Secretary and Chief Administrative Officer at C&D Technologies. Prior to his tenure at C&D Technologies, Mr. Dee was employed by the law firm of Montgomery, McCracken, Walker & Rhodes, LLP. Mr. Dee also worked 16 years at SPS Technologies, Inc., where he last served as Vice President, General Counsel and Secretary.

Name	Age	Position	Assumed Present Position
Tony R. Thene	57	President and Chief Executive Officer	July 2015
Damon J. Audia	47	Senior Vice President and Chief Financial Officer	October 2015
Joseph E. Haniford	59	Senior Vice President and Chief Operating Officer	June 2016
James D. Dee	61	Vice President, General Counsel and Secretary	September 2010

PART II**Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities**

Our common stock is listed on the New York Stock Exchange (“NYSE”) and traded under the symbol “CRS”. The following table sets forth, for the periods indicated, the high and low prices for our common stock as reported by the NYSE:

Quarter Ended:	Fiscal Year 2018		Fiscal Year 2017	
	High	Low	High	Low
September 30,	\$ 48.19	\$ 36.20	\$ 42.25	\$ 32.44
December 31,	\$ 53.61	\$ 44.08	\$ 42.27	\$ 30.37
March 31,	\$ 54.61	\$ 42.44	\$ 45.34	\$ 34.50
June 30,	\$ 61.49	\$ 41.75	\$ 41.50	\$ 34.24
Annual	\$ 61.49	\$ 36.20	\$ 45.34	\$ 30.37

The range of our common stock price on the NYSE from July 2, 2018 to August 8, 2018 was \$53.07 to \$58.99. The closing price of the common stock was \$58.35 on August 8, 2018.

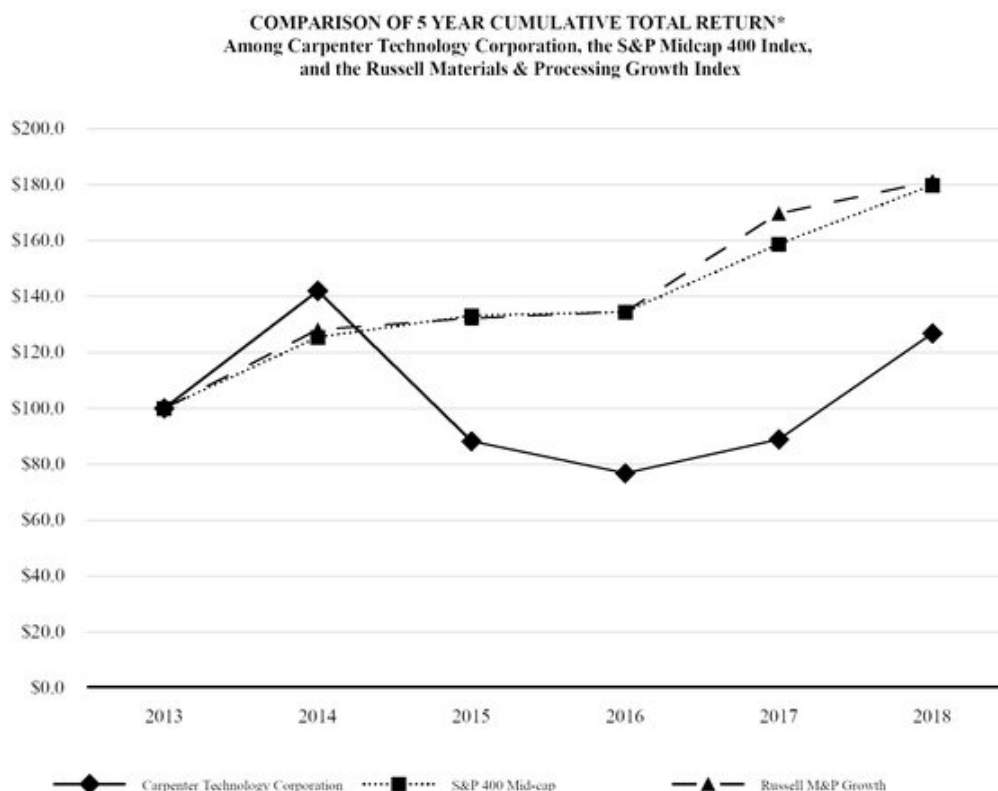
We have paid quarterly cash dividends on our common stock since 1906. We paid a quarterly dividend of \$0.18 per share of common stock during each quarter of fiscal years 2018 and 2017.

As of August 8, 2018, there were 2,061 common stockholders of record.

Information regarding Securities Authorized for Issuance under Equity Compensation Plans is set forth in Item 12 hereto “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters”.

Cumulative Total Stockholder Return

The graph below compares the cumulative total stockholder return on our common stock to the cumulative total return of the S&P MidCap 400 Index, the most widely used index for mid-sized companies, and our Peer Group, for each of the last five fiscal years ended June 30, 2018. The cumulative total return assumes an investment of \$100 on June 30, 2013 and the reinvestment of any dividends during the period. Our Peer Group consists of the companies in the Russell RSCC Materials & Processing Growth Index. We believe the companies included in our Peer Group, taken as a whole, provide a more meaningful comparison in terms of product offerings, markets served, competition and other relevant factors. The total stockholder return for the peer group is weighted according to the respective issuer's stock market capitalization at the beginning of each period.



* \$100 invested on June 30, 2013 in stock or index, including reinvestment of dividends. Fiscal year ending June 30.

Data Sourced from Bloomberg

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	2013	2014	2015	2016	2017	2018
Carpenter Technology Corporation	\$ 100.00	\$ 142.00	\$ 88.20	\$ 76.80	\$ 88.90	\$ 126.80
S&P Midcap 400	\$ 100.00	\$ 125.50	\$ 133.10	\$ 134.50	\$ 158.80	\$ 179.90
Russell Materials & Processing Growth	\$ 100.00	\$ 128.20	\$ 132.20	\$ 134.60	\$ 169.70	\$ 181.20

Issuer Purchases of Equity Securities

Employees surrendered 16,463 shares to the Company, at an average purchase price of \$53.40, during the fourth quarter of fiscal year 2018, for the payment of the minimum tax liability withholding obligations upon the vesting of shares of restricted stock and the exercise of options. We do not consider this a share buyback program.

Item 6. Selected Financial Data

Five-Year Financial Summary
in millions, except per share data
(Fiscal years ended June 30,)

	2018 (a)	2017(b)	2016(c)(e)	2015(d)(e)	2014
Summary of Operations:					
Net sales	\$ 2,157.7	\$ 1,797.6	\$ 1,813.4	\$ 2,226.7	\$ 2,173.0
Operating income	\$ 187.1	\$ 97.2	\$ 51.6	\$ 111.5	\$ 212.0
Net income	\$ 188.5	\$ 47.0	\$ 11.3	\$ 58.7	\$ 132.8
Financial Position at Year-End:					
Cash and cash equivalents	\$ 56.2	\$ 66.3	\$ 82.0	\$ 70.0	\$ 120.0
Total assets	\$ 3,007.0	\$ 2,878.1	\$ 2,794.3	\$ 2,902.6	\$ 3,053.7
Long-term debt, net of current portion	\$ 545.7	\$ 550.0	\$ 611.3	\$ 603.8	\$ 600.5
Per Common Share:					
Net earnings:					
Basic	\$ 3.96	\$ 0.99	\$ 0.23	\$ 1.11	\$ 2.48
Diluted	\$ 3.92	\$ 0.99	\$ 0.23	\$ 1.11	\$ 2.47
Cash dividend-common	\$ 0.72	\$ 0.72	\$ 0.72	\$ 0.72	\$ 0.72
Weighted Average Common Shares Outstanding:					
Basic	47.2	47.0	48.1	52.6	53.3
Diluted	47.6	47.1	48.2	52.7	53.6

(a) Fiscal year 2018 included \$68.3 million of discrete income tax net benefits related to the U.S. tax reform and other legislative changes. See Note 17 in the Notes to the Consolidated Financial Statements included in Item 8 “Financial Statements and Supplementary Data” of this report.

(b) Fiscal year 2017 included \$3.2 million of loss on divestiture of business. See Note 2 in the Notes to the Consolidated Financial Statements included in Item 8 “Financial Statements and Supplementary Data” of this report.

(c) Fiscal year 2016 included \$22.5 million of excess inventory write-down charges, \$12.5 million of goodwill impairment charges and \$18.0 million of restructuring and impairment charges including \$7.6 million of impairment of intangible assets and property, plant and equipment and \$10.4 million of restructuring costs related primarily to an early retirement incentive and other severance related costs. See Note 3 in the Notes to the Consolidated Financial Statements included in Item 8 “Financial Statements and Supplementary Data” of this report.

(d) Fiscal year 2015 included \$29.1 million of restructuring costs related principally to workforce reduction, facility closures and write-down of certain assets.

(e) The weighted average common shares outstanding for fiscal years 2016 and 2015 included 5.5 million and 0.9 million less shares, respectively, related to the share repurchase program authorized in October 2014. During the fiscal years ended June 30, 2016 and 2015, we repurchased 3,762,200 shares and 2,995,272 shares, respectively, of common stock for \$123.9 million and \$124.5 million, respectively.

See Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” for discussion of factors that affect the comparability of the “Selected Financial Data”.

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

Background and General

Our discussions below in this Item 7 should be read in conjunction with our consolidated financial statements, including the notes thereto, included in this annual report on Form 10-K.

We are a producer and distributor of premium specialty alloys, including titanium alloys, powder metals, stainless steels, alloy steels, and tool steels as well as drilling tools. We are a recognized leader in high-performance specialty alloy-based materials and process solutions for critical applications in the aerospace, defense, transportation, energy, medical, industrial, and consumer markets. We have evolved to become a pioneer in premium specialty alloys, including titanium, nickel, and cobalt, as well as alloys specifically engineered for additive manufacturing (AM) processes and soft magnetism applications. We have expanded our AM capabilities to provide a complete “end-to-end” solution to accelerate materials innovation and streamline parts production. We primarily process basic raw materials such as nickel, cobalt, titanium, manganese, chromium, molybdenum, iron scrap and other metal alloying elements through various melting, hot forming and cold working facilities to produce finished products in the form of billet, bar, rod, wire and narrow strip in many sizes and finishes. We also produce certain metal powders and parts. Our sales are distributed directly from our production plants and distribution network as well as through independent distributors. Unlike many other specialty steel producers, we operate our own worldwide network of service and distribution centers. These service centers, located in the United States, Canada, Mexico, Europe and Asia allow us to work more closely with customers and to offer various just-in-time stocking programs.

As part of our overall business strategy, we have sought out and considered opportunities related to strategic acquisitions, divestitures and joint collaborations as well as possible business unit dispositions aimed at broadening our offering to the marketplace. We have participated with other companies to explore potential terms and structures of such opportunities and expect that we will continue to evaluate these opportunities.

While we prepare our financial statements in accordance with U.S. generally accepted accounting principles (“U.S. GAAP”), we also utilize and present certain financial measures that are not based on or included in U.S. GAAP (we refer to these as “Non-GAAP financial measures”). Please see the section “Non-GAAP Financial Measures” below for further discussion of these financial measures, including the reasons why we use such financial measures and reconciliations of such financial measures to the nearest U.S. GAAP financial measures.

Business Trends

Selected financial results for the past three fiscal years are summarized below:

(\$ in millions, except per share data)	Years Ended June 30,		
	2018	2017	2016
Net sales	\$ 2,157.7	\$ 1,797.6	\$ 1,813.4
Net sales excluding surcharge revenue (1)	\$ 1,792.3	\$ 1,558.4	\$ 1,572.6
Operating income	\$ 187.1	\$ 97.2	\$ 51.6
Operating income excluding pension earnings, interest and deferrals (“pension EID”) expense (1)	\$ 189.2	\$ 121.0	\$ 70.9
Net income	\$ 188.5	\$ 47.0	\$ 11.3
Diluted earnings per share	\$ 3.92	\$ 0.99	\$ 0.23
Purchases of property, equipment and software	\$ 135.0	\$ 98.5	\$ 95.2
Free cash flow (1)	\$ 34.7	\$ (16.8)	\$ 139.1
Pounds sold (in thousands) (2)	265,620	236,346	242,560

(1) See the section “Non-GAAP Financial Measures” below for further discussion of these financial measures.

(2) Includes pounds from Specialty Alloys Operations segment, and certain Performance Engineered Products segment businesses namely Dynamet and Carpenter Powder Products.

Our sales are across a diversified list of end-use markets. The table below summarizes our sales by end-use market over the past three fiscal years:

(\$ in millions)	Years Ended June 30,					
	2018		2017		2016	
	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total
Aerospace and Defense	\$ 1,182.3	55%	\$ 973.3	54%	\$ 981.5	54%
Energy	146.5	7	138.0	8	130.6	7
Transportation	157.0	7	143.9	8	160.6	8
Medical	175.3	8	125.5	7	121.5	7
Industrial and Consumer	364.9	17	298.2	17	300.9	17
Distribution	131.7	6	118.7	6	118.3	7
Total net sales	\$ 2,157.7	100%	\$ 1,797.6	100%	\$ 1,813.4	100%

Impact of Raw Material Prices and Product Mix

We value most of our inventory utilizing LIFO inventory costing methodology. Under the LIFO inventory costing method, changes in the cost of raw materials and production activities are recognized in cost of sales in the current period even though these materials may have been acquired at potentially significantly different values due to the length of time from the acquisition of the raw materials to the sale of the processed finished goods to the customers. In a period of rising raw material costs, the LIFO inventory valuation normally results in higher cost of sales. Conversely, in a period of decreasing raw material costs, the LIFO inventory valuation normally results in lower cost of sales.

The volatility of the costs of raw materials has impacted our operations over the past several years. We, and others in our industry, generally have been able to pass cost increases on major raw materials through to our customers using surcharges that are structured to recover increases in raw material costs. Generally, the formula used to calculate a surcharge is based on published prices of the respective raw materials for the previous month which correlates to the prices we pay for our raw material purchases. However, a portion of our surcharges to customers may be calculated using a different surcharge formula or may be based on the raw material prices at the time of order, which creates a lag between surcharge revenue and corresponding raw material costs recognized in cost of sales. The surcharge mechanism protects our net income on such sales except for the lag effect discussed above. However, surcharges have had a dilutive effect on our gross margin and operating margin percentages as described later in this report.

Approximately 30 percent of our net sales are sales to customers under firm price sales arrangements. Firm price sales arrangements involve a risk of profit margin fluctuations, particularly when raw material prices are volatile. In order to reduce the risk of fluctuating profit margins on these sales, we enter into commodity forward contracts to purchase certain critical raw materials necessary to produce the related products sold. Firm price sales arrangements generally include certain annual purchasing commitments and consumption schedules agreed to by the customers at selling prices based on raw material prices at the time the arrangements are established. If a customer fails to meet the volume commitments (or the consumption schedule deviates from the agreed-upon terms of the firm price sales arrangements), the Company may need to absorb the gains or losses associated with the commodity forward contracts on a temporary basis. Gains or losses associated with commodity forward contracts are reclassified to earnings/loss when earnings are impacted by the hedged transaction. Because we value most of our inventory under the LIFO costing methodology, changes in the cost of raw materials and production activities are recognized in cost of sales in the current period attempting to match the most recently incurred costs with revenues. Gains and/or losses on the commodity forward contracts are reclassified from other comprehensive income together with the actual purchase price of the underlying commodities when the underlying commodities are purchased and recorded in inventory. To the extent that the total purchase price of the commodities, inclusive of the gains or losses on the commodity forward contracts, are higher or lower relative to the beginning of year costs, our cost of goods sold reflects such amounts. Accordingly, the gains and/or losses associated with commodity forward contracts may not impact the same period that the firm price sales arrangements revenue is recognized, and comparisons of gross profit from period to period may be impacted. These firm price sales arrangements are expected to continue as we look to strengthen our long-term customer relationships by expanding, renewing and in certain cases extending to a longer term, our customer long-term arrangements.

We produce hundreds of grades of materials, with a wide range of pricing and profit levels depending on the grade. In addition, our product mix within a period is subject to the fluctuating order patterns of our customers as well as decisions we may make on participation in certain products based on available capacity including the impacts of capacity commitments we may have under existing customer agreements. While we expect to see positive contribution from a more favorable product mix in our margin performance over time, the impact by period may fluctuate, and period-to-period comparisons may vary.

Net Pension Expense

Net pension expense, as we define it below, includes the net periodic benefit costs related to both our pension and other postretirement plans. The net periodic benefit costs are determined annually based on beginning of year balances and are recorded ratably throughout the fiscal year, unless a significant re-measurement event occurs. The following is a summary of the net periodic benefit costs for the years ended June 30, 2018, 2017 and 2016:

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Pension plans	\$ 11.3	\$ 45.8	\$ 50.9
Other postretirement plans	2.9	2.6	2.9
Net periodic benefit costs	\$ 14.2	\$ 48.4	\$ 53.8

In September 2016, we announced changes to retirement plans we offer to certain employees. Benefits accrued to eligible participants of our largest qualified defined benefit pension plan and certain non-qualified pension plans were frozen effective December 31, 2016. Approximately 1,900 affected employees were transitioned to the Company's 401(k) plan that has been in effect for eligible employees since 2012, when the pension plan was closed to new entrants. We recognized the plan freeze during fiscal year 2017 as a curtailment, since it eliminated the accrual for a significant number of participants for all of their future services. We also made a voluntary pension contribution of \$ 100.0 million to the affected plan in October 2016.

The service cost component of net pension expense represents the estimated cost of future pension liabilities earned associated with active employees. The pension earnings, interest and deferrals ("pension EID") is comprised of the expected return on plan assets, interest costs on the projected benefit obligations of the plans and amortization of actuarial gains and losses and prior service costs.

Net pension expense is recorded in accounts that are included in both the cost of sales and selling, general and administrative expenses based on the function of the associated employees. The following is a summary of the classification of net pension expense for the years ended June 30, 2018, 2017 and 2016 :

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Cost of sales			
Service cost	\$ 10.5	\$ 20.2	\$ 28.1
Pension earnings, interest and deferrals	—	16.5	13.2
Total cost of sales	10.5	36.7	41.3
Selling, general and administrative expenses			
Service cost	1.6	3.9	6.4
Pension earnings, interest and deferrals	2.1	7.3	6.1
Curtailment charge	—	0.5	—
Total selling, general and administrative expenses	3.7	11.7	12.5
Net pension expense	\$ 14.2	\$ 48.4	\$ 53.8

As of June 30, 2018 and 2017, amounts capitalized in gross inventory were \$1.7 million and \$3.4 million, respectively.

Operating Performance Overview

Fiscal year 2018 was a successful year as strong execution of our commercial and manufacturing strategy combined with growing market demand resulted in our best operating income performance in four years. We made significant progress in the following areas:

- We expanded customer relationships through market share gains with new and existing customers based on the strength of our solutions focused customer approach.
- Through the ongoing implementation of the Carpenter Operating Model, we have unlocked incremental capacity through efficiency and productivity improvements across our SAO and PEP businesses.
- We submitted majority of Aerospace Vendor Approved Processes for Athens, AL facility and received certain approvals.
- We increased our focus and investment in core growth areas such as additive manufacturing and soft magnetics.

Results of Operations — Fiscal Year 2018 Compared to Fiscal Year 2017

For fiscal year 2018, we reported net income of \$188.5 million, or \$3.92 per diluted share. Excluding special items, earnings per share would have been \$2.50 per diluted share for fiscal year 2018. This compares with net income of \$47.0 million, or \$0.99 per diluted share, a year earlier. Excluding special items, earnings per share would have been \$1.08 per diluted share for fiscal year 2017. Our fiscal year 2018 results reflect strong market conditions combined with our solutions focused approach that drove increasing sales in all of our end-use markets and further implementation of the Carpenter Operating Model.

Net Sales

Net sales for fiscal year 2018 were \$2,157.7 million, which was a 20 percent increase from fiscal year 2017. Excluding surcharge revenue, sales were 15 percent higher than fiscal year 2017 on 12 percent higher volume. The results reflect stronger demand and improved product mix across certain end-use markets demonstrating our focus on high-value solutions and market share gain by deepening our existing relationships and adding new customers.

Geographically, sales outside the United States increased 22 percent from fiscal year 2017 to \$728.3 million. The increase is primarily due to stronger product demand in the Aerospace and Defense, Medical and Industrial and Consumer end-use markets in Europe and Asia Pacific. In addition, the Energy end-use market had stronger demand for oil and gas materials in Asia Pacific and Canada partially offset by weaker demand in Europe for power generation materials. A portion of our sales outside the United States are denominated in foreign currencies. The impact of fluctuations in foreign currency exchange rates resulted in a \$9.3 million increase in sales during the fiscal year 2018 compared to fiscal year 2017. International sales as a percentage of our total net sales represented 34 percent and 33 percent for fiscal year 2018 and fiscal year 2017, respectively.

Sales by End-Use Markets

We sell to customers across diversified end-use markets. The following table includes comparative information for our net sales, which includes surcharge revenue, by principal end-use markets. We believe this is helpful supplemental information in analyzing the performance of the business from period to period.

(\$ in millions)	Fiscal Year		\$ Increase	% Increase
	2018	2017		
Aerospace and Defense	\$ 1,182.3	\$ 973.3	\$ 209.0	21%
Energy	146.5	138.0	8.5	6%
Transportation	157.0	143.9	13.1	9%
Medical	175.3	125.5	49.8	40%
Industrial and Consumer	364.9	298.2	66.7	22%
Distribution	131.7	118.7	13.0	11%
Total net sales	\$ 2,157.7	\$ 1,797.6	\$ 360.1	20%

The following table includes comparative information for our net sales by the same principal end-use markets, but excluding surcharge revenue:

(\$ in millions)	Fiscal Year		\$ Increase	% Increase
	2018	2017		
Aerospace and Defense	\$ 957.1	\$ 817.1	\$ 140.0	17%
Energy	131.3	124.2	7.1	6%
Transportation	127.9	122.7	5.2	4%
Medical	149.3	115.7	33.6	29%
Industrial and Consumer	295.9	260.7	35.2	14%
Distribution	130.8	118.0	12.8	11%
Total net sales excluding surcharge revenue	\$ 1,792.3	\$ 1,558.4	\$ 233.9	15%

Sales to the Aerospace and Defense market increased 21 percent from fiscal year 2017 to \$1,182.3 million . Excluding surcharge revenue, sales increased 17 percent on 18 percent higher shipment volume. The results reflect the impact of stronger demand for materials used in aerospace engine and structural applications, the distribution sub-market and defense applications driven by specific programs partially offset by lower fastener sales.

Sales to the Energy market of \$146.5 million reflected a 6 percent increase from fiscal year 2017 . Excluding surcharge revenue, sales increased 6 percent. The results were driven by an increase in the oil and gas sub-market, particularly rental and replacement activity through our Amega West Services (“Amega West”) business offset by weaker demand for materials used in power generation applications, which has been significantly impacted by depressed industrial gas turbine industry conditions.

Transportation market sales increased 9 percent from fiscal year 2017 to \$157.0 million . Excluding surcharge revenue, sales increased 4 percent on 1 percent higher shipment volume. The results reflect a strengthening mix of medium and heavy-duty truck applications, partially offset by softer demand in light duty vehicles applications.

Sales to the Medical market increased 40 percent to \$175.3 million from fiscal year 2017 . Excluding surcharge revenue, sales increased 29 percent on 19 percent higher shipment volume. The results reflect improved product mix for higher value solutions, market share gains with key customers and the positive impact of supply chain inventory rebuilding for titanium materials within the orthopedic and cardiology sub-markets.

Industrial and Consumer market sales increased 22 percent to \$364.9 million for fiscal year 2018 . Excluding surcharge revenue, sales increased 14 percent on 7 percent higher shipment volume. The results reflect the impact of stronger demand for materials used in industrial applications due in part to a moderate increase in recovery of oil and gas activity.

Gross Profit

Gross profit in fiscal year 2018 increased to \$382.2 million , or 17.7 percent of net sales from \$284.3 million , or 15.8 percent of net sales for fiscal year 2017 . Excluding the impact of the surcharge revenue, our gross margin in fiscal year 2018 was 21.3 percent compared to 18.2 percent in fiscal year 2017. The results reflect the impact of stronger demand and improved product mix coupled with operating cost improvements compared to the same period a year ago.

Our surcharge mechanism is structured to recover increases in raw material costs, although in certain cases with a lag effect as discussed above. While the surcharge generally protects the absolute gross profit dollars, it does have a dilutive effect on gross margin as a percent of sales. The following represents a summary of the dilutive impact of the surcharge on gross margin. We present and discuss these financial measures because management believes removing the impact of surcharge provides a more consistent and meaningful basis for comparing results of operations from period to period. See the section “Non-GAAP Financial Measures” below for further discussion of these financial measures.

(\$ in millions)	Fiscal Year	
	2018	2017
Net sales	\$ 2,157.7	\$ 1,797.6
Less: surcharge revenue	365.4	239.2
Net sales excluding surcharge revenue	\$ 1,792.3	\$ 1,558.4
Gross profit	\$ 382.2	\$ 284.3
Gross margin	17.7%	15.8%
Gross margin excluding surcharge revenue	21.3%	18.2%

Selling, General and Administrative Expenses

Selling, general and administrative expenses in fiscal year 2018 were \$195.1 million , or 9.0 percent of net sales (10.9 percent of net sales excluding surcharge revenue), compared to \$183.9 million , or 10.2 percent of net sales (11.8 percent of net sales excluding surcharge revenue), in fiscal year 2017 . Selling, general and administrative expenses increased in fiscal year 2018 primarily due to higher variable compensation expense partially offset by lower pension expense compared to fiscal year 2017.

Operating Income

Our operating income in fiscal year 2018 increased to \$187.1 million , or 8.7 percent of net sales as compared with \$97.2 million , or 5.4 percent of net sales in fiscal year 2017 . Excluding surcharge revenue, pension EID and special items, operating margin was 10.6 percent for the fiscal year 2018 and 8.0 percent for the same period a year ago. The increase in the operating margin reflects the stronger demand and improved product mix coupled with operating cost improvements partially offset by higher variable compensation expense compared to the same period a year ago.

Operating income has been significantly impacted by our pension EID, which may be volatile based on conditions in the financial markets, as well as special items. The following presents our operating income and operating margin, in each case excluding the impact of surcharge on net sales, pension EID and special items. We present and discuss these financial measures because management believes removing the impact of these items provides a more consistent and meaningful basis for comparing results of operations from period to period. See the section “Non-GAAP Financial Measures” below for further discussion of these financial measures.

(\$ in millions)	Fiscal Year	
	2018	2017
Net sales	\$ 2,157.7	\$ 1,797.6
Less: surcharge revenue	365.4	239.2
Net sales excluding surcharge revenue	\$ 1,792.3	\$ 1,558.4
Operating income	\$ 187.1	\$ 97.2
Pension EID	2.1	23.8
Operating income excluding pension EID	189.2	121.0
Special items:		
Loss on divestiture of business	—	3.2
Pension curtailment charge	—	0.5
Operating income excluding pension EID and special items	\$ 189.2	\$ 124.7
Operating margin	8.7%	5.4%
Operating margin excluding surcharge revenue, pension EID and special items	10.6%	8.0%

Interest Expense

Fiscal year 2018 interest expense was \$28.3 million compared to \$29.8 million in fiscal year 2017 . We have used interest rate swaps to achieve a level of floating rate debt to fixed rate debt. Interest expense for fiscal year 2018 includes net gains from interest rate swaps of \$0.4 million compared with \$1.8 million of net gains from interest rate swaps for the fiscal year 2017. Capitalized interest reduced interest expense by \$2.8 million for fiscal year 2018 compared to \$1.3 million in fiscal year 2017.

Other Income, Net

Other income, net for fiscal year 2018 was \$1.4 million as compared with other expense of \$2.8 million a year ago.

Income Taxes

Our effective tax rate (income tax (benefit) expense as a percent of income before taxes) for fiscal year 2018 was negative 17.7 percent as compared to positive 33.0 percent in fiscal year 2017. Excluding the discrete tax benefits recorded in connection with U.S. Tax reform of \$68.3 million that are discussed below, our effective tax rate for fiscal year 2018 would have been 25.0 percent.

An Act to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018 (the “Act”) was enacted on December 22, 2017. The Act includes provisions that reduce the federal corporate income tax rate, create a territorial tax system with a one-time mandatory tax on previously deferred foreign earnings (i.e transition tax), and change certain business deductions including allowing for immediate expensing of certain qualified capital expenditures and limitations on deductions of interest expense. The permanent reduction to the U.S. federal corporate income tax rate from 35 percent to 21 percent was effective January 1, 2018. Due to our fiscal year end, the lower U.S. statutory federal income tax rate resulted in a blended U.S. federal statutory rate of 28.1 percent for our fiscal year ending June 30, 2018. For fiscal year 2019, the U.S. federal statutory tax rate will be 21 percent.

As of the date of enactment of the Act, we re-measured our deferred tax assets and liabilities and recorded a provisional net tax benefit of \$74.6 million. While we were able to make a reasonable estimate of the impact of the reduction in the corporate tax rate, changes to estimates the Company has made to calculate existing temporary differences, among other items, may result in further adjustments to the amounts recorded.

During fiscal year 2018 in connection with the Act, we also recorded a provisional tax charge of \$5.0 million for the transition tax. The Company determined that the amounts recorded for the transition tax are provisional because various components of the computation are not yet finalized as of June 30, 2018, including the following significant items: the actual aggregate foreign cash position and the earnings and profits of the foreign entities as of June 30, 2018, the interpretation and identification of cash positions as of June 30, 2018, and computations of accumulated earnings and profits balances as of November 2, 2017 and December 31, 2017. Under the Act, the transition tax will be paid over an eight-year period beginning in fiscal year 2019.

Fiscal year 2018 tax expense also includes a tax charge of \$1.3 million for increases in certain state valuation allowances for deferred tax assets resulting from the impact of a state law change that will limit the Company’s ability to utilize state net operating loss carryforwards partially offset by the impact of limitations on interest expense as a result of the Act.

Future adjustments to the provisional amounts related to the Act will be recorded as discrete adjustments to income tax expense in the period in which those adjustments are determined.

As a result of the voluntary pension contribution, income tax expense for fiscal year 2017 includes a tax charge of \$2.1 million due to reduced tax benefits for domestic manufacturing claimed in prior periods. The fiscal year 2017 tax rate also includes tax benefits of \$0.9 million associated with the repatriation of earnings from one of our foreign subsidiaries and a tax charge of \$0.9 million for prior year adjustments in various tax jurisdictions.

Prior to the “Act”, undistributed earnings of our foreign subsidiaries, totaling \$93.8 million were considered permanently reinvested. We have accrued \$5.0 million for the transition tax on these earnings. We are still in the process of evaluating our assertion for indefinite reinvestment.

See Note 17 to the consolidated financial statements in Item 8, “Financial Statements and Supplementary Data” for a full reconciliation of the statutory federal tax rate to the effective tax rates.

Business Segment Results

Summary information about our operating results on a segment basis is set forth below. For more detailed segment information, see Note 19 to the consolidated financial statements included in Item 8, “Financial Statements and Supplementary Data”.

The following table includes comparative information for volumes by business segment:

(Pounds sold, in thousands)	Fiscal Year		Increase (Decrease)	% Increase (Decrease)
	2018	2017		
Specialty Alloys Operations	258,326	227,744	30,582	13 %
Performance Engineered Products	12,388	10,902	1,486	14 %
Intersegment	(5,094)	(2,300)	(2,794)	(121)%
Consolidated pounds sold	265,620	236,346	29,274	12 %

* Pounds sold data for PEP segment includes Dynamet and Carpenter Powder Products businesses only.

The following table includes comparative information for net sales by business segment:

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2018	2017		
Specialty Alloys Operations	\$ 1,803.8	\$ 1,461.6	\$ 342.2	23 %
Performance Engineered Products	429.7	366.6	63.1	17 %
Intersegment	(75.8)	(30.6)	(45.2)	(148)%
Total net sales	\$ 2,157.7	\$ 1,797.6	\$ 360.1	20 %

The following table includes comparative information for our net sales by business segment, but excluding surcharge revenue:

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2018	2017		
Specialty Alloys Operations	\$ 1,434.1	\$ 1,221.8	\$ 212.3	17 %
Performance Engineered Products	426.3	365.7	60.6	17 %
Intersegment	(68.1)	(29.1)	(39.0)	(134)%
Total net sales excluding surcharge revenue	\$ 1,792.3	\$ 1,558.4	\$ 233.9	15 %

Specialty Alloys Operations Segment

Net sales in fiscal year 2018 for the SAO segment increased 23 percent to \$1,803.8 million , as compared with \$1,461.6 million in fiscal year 2017 . Excluding surcharge revenue, net sales increased 17 percent from a year ago. The fiscal year 2018 net sales reflected 13 percent higher shipment volume as compared to fiscal year 2017 . The results reflect the impact of stronger product demand driven by improving market conditions across our end-use markets compared to the prior year same period.

Operating income for the SAO segment in fiscal year 2018 was \$232.4 million , or 12.9 percent of net sales (16.2 percent of net sales excluding surcharge revenue), compared to \$172.3 million , or 11.8 percent of net sales (14.1 percent of net sales excluding surcharge revenue), for fiscal year 2017 . The increase in operating income reflects the impact of higher product demand and stronger product mix driven by improving market conditions across our end-use markets compared to the prior year same period.

Performance Engineered Products Segment

Net sales for fiscal year 2018 for the PEP segment were \$429.7 million as compared with \$366.6 million for fiscal year 2017 . Excluding surcharge revenue, net sales increased 17 percent from a year ago. The results reflect an increase in sales primarily in the Energy and Medical end-use markets.

Operating income for the PEP segment for fiscal year 2018 was \$ 26.1 million , or 6.1 percent of net sales, as compared with operating income of \$ 8.5 million , or 2.3 percent of net sales for fiscal year 2017 . The results reflect the increasing demand for titanium products combined with ongoing improvements in our oil and gas businesses and cost reduction initiatives.

Results of Operations — Fiscal Year 2017 Compared to Fiscal Year 2016

For fiscal year 2017, we reported net income of \$47.0 million, or \$0.99 per diluted share, compared with net income of \$11.3 million, or \$0.23 per diluted share, a year earlier. Our fiscal year 2017 results reflect operating cost improvements driven by the implementation of the Carpenter Operating Model and improving market conditions in many of our end-use markets. In the Aerospace and Defense end-use market, we experienced increasing demand for our products across our diversified sub-markets, especially engines, where we saw strong order flows related to the next generation engines. We experienced similar momentum across other markets, such as the oil and gas sub-market, where our Amega West business continues to benefit from our investments in new products over the last several years. In addition, we saw stronger demand in both the Aerospace and Medical end-use markets for our titanium solutions. Our fiscal year 2016 results reflect non-cash impairment charges consisting of excess inventory write-down totaling \$22.5 million, goodwill impairment charges totaling \$12.5 million and impairment of intangible assets and property, plant and equipment charges totaling \$7.6 million.

Net Sales

Net sales for fiscal year 2017 were \$1,797.6 million, which was a 1 percent decrease from fiscal year 2016. Excluding surcharge revenue, sales were 1 percent lower than fiscal year 2016 on 3 percent lower volume. The results reflect demand challenges in the first half of fiscal year 2017 offset by the improving demand conditions in the second half of fiscal year 2017 driven by the Aerospace and Defense end-use market. The year over year performance was also impacted by reduced ongoing weakness in demand for material used in the Transportation end-use market.

Geographically, sales outside the United States increased 5 percent from fiscal year 2016 to \$599.3 million. The increase is primarily due to sales to Europe in the Aerospace and Defense end-use market. A portion of our sales outside the United States are denominated in foreign currencies. The impact of fluctuations in foreign currency exchange rates resulted in a \$5.1 million decrease in sales during the fiscal year 2017 compared to fiscal year 2016. International sales as a percentage of our total net sales represented 33 percent and 31 percent for fiscal year 2017 and fiscal year 2016, respectively.

Sales by End-Use Markets

We sell to customers across diversified end-use markets. The following table includes comparative information for our net sales, which includes surcharge revenue, by principal end-use markets. We believe this is helpful supplemental information in analyzing the performance of the business from period to period.

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2017	2016		
Aerospace and Defense	\$ 973.3	\$ 981.5	\$ (8.2)	(1)%
Energy	138.0	130.6	7.4	6 %
Transportation	143.9	160.6	(16.7)	(10)%
Medical	125.5	121.5	4.0	3 %
Industrial and Consumer	298.2	300.9	(2.7)	(1)%
Distribution	118.7	118.3	0.4	— %
Total net sales	\$ 1,797.6	\$ 1,813.4	\$ (15.8)	(1)%

The following table includes comparative information for our net sales by the same principal end-use markets, but excluding surcharge revenue:

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2017	2016		
Aerospace and Defense	\$ 817.1	\$ 823.1	\$ (6.0)	(1)%
Energy	124.2	115.3	8.9	8 %
Transportation	122.7	136.8	(14.1)	(10)%
Medical	115.7	114.5	1.2	1 %
Industrial and Consumer	260.7	265.2	(4.5)	(2)%
Distribution	118.0	117.7	0.3	— %
Total net sales excluding surcharge revenue	\$ 1,558.4	\$ 1,572.6	\$ (14.2)	(1)%

Sales to the Aerospace and Defense market decreased 1 percent from fiscal year 2016 to \$973.3 million. Excluding surcharge revenue, sales were decreased 1 percent on 2 percent lower shipment volume. The results reflect the impact of increased new engine platform demand offset by a decrease in sales of material used for fasteners, structural and distribution applications due to supply chain consolidation.

Sales to the Energy market of \$138.0 million reflected a 6 percent increase from fiscal year 2016. Excluding surcharge revenue, sales increased 8 percent on 8 percent higher shipment volume. The results reflect strong demand for power generation materials during the first half of fiscal year 2017. In addition, we experienced an increase in demand during the second half of fiscal year 2017 driven by improved rental activity within the oil and gas businesses. The North American quarterly average directional and horizontal rig count, an indicator of drilling activity, increased 123 percent from fiscal year 2016.

Transportation market sales decreased 10 percent from fiscal year 2016 to \$143.9 million. Excluding surcharge revenue, sales decreased 10 percent on 14 percent lower shipment volume. The results reflect the impact of weaker demand as a result of ongoing weakness in production of passenger cars and heavy duty on-road and off-road trucks.

Sales to the Medical market sales increased 3 percent to \$125.5 million from fiscal year 2016. Excluding surcharge revenue, sales increased 1 percent on 2 percent higher shipment volume. The results reflect improving demand for materials used in cardiology and orthopedics applications in addition to more normalized buying patterns by distributors and OEMs as supply chain inventory levels appear to be stabilizing.

Industrial and Consumer market sales decreased 1 percent to \$298.2 million for fiscal year 2017. Excluding surcharge revenue, sales decreased 2 percent on flat shipment volume. The results reflect the impact of strong demand for materials used in consumer electronics, pumps, valves and fittings during the second half of fiscal year 2017 offset by weaker demand for industrial tooling.

Gross Profit

Gross profit in fiscal year 2017 increased to \$284.3 million, or 15.8 percent of net sales from \$255.9 million, or 14.1 percent of net sales for fiscal year 2016. During the year ended June 30, 2016, we recorded a \$22.5 million excess inventory adjustment in our oil and gas businesses within the PEP segment due to the prolonged weakness in oil and gas businesses. Excluding the impacts of the excess inventory write-down and surcharge revenue, our gross margin in fiscal year 2017 was 18.2 percent compared to 17.7 percent in fiscal year 2016. The results reflect the impact of weaker demand across all end-use markets during the first half of fiscal year 2017 offset by improving demand conditions in the second half of fiscal year 2017 and operating cost improvements compared to fiscal year 2016.

Our surcharge mechanism is structured to recover increases in raw material costs, although in certain cases with a lag effect as discussed above. While the surcharge generally protects the absolute gross profit dollars, it does have a dilutive effect on gross margin as a percent of sales. The following represents a summary of the dilutive impact of the surcharge on gross margin excluding the impact of the excess inventory write-down. We present and discuss these financial measures because management believes removing the impact of these items provides a more consistent and meaningful basis for comparing results of operations from period to period. See the section “Non-GAAP Financial Measures” below for further discussion of these financial measures.

(\$ in millions)	Fiscal Year	
	2017	2016
Net sales	\$ 1,797.6	\$ 1,813.4
Less: surcharge revenue	239.2	240.8
Net sales excluding surcharge revenue	\$ 1,558.4	\$ 1,572.6
Gross profit	\$ 284.3	\$ 255.9
Excess inventory write-down	—	22.5
Gross profit excluding the excess inventory write-down	\$ 284.3	\$ 278.4
Gross margin	15.8%	14.1%
Gross margin excluding surcharge revenue and excess inventory write-down	18.2%	17.7%

Selling, General and Administrative Expenses

Selling, general and administrative expenses in fiscal year 2017 were \$183.9 million, or 10.2 percent of net sales (11.8 percent of net sales excluding surcharge revenue), compared to \$173.8 million, or 9.6 percent of net sales (11.1 percent of net sales excluding surcharge revenue), in fiscal year 2016. Selling, general and administrative expenses increased in fiscal year 2017 primarily due to higher variable compensation expense compared to fiscal year 2016.

Restructuring and Asset Impairment Charges

During fiscal year 2016, we incurred \$18.0 million of restructuring and asset impairment charges. This included \$7.6 million of non-cash impairment charges to write down property, plant and equipment and other intangible assets. The remaining \$10.4 million consisted primarily of an early retirement incentive that resulted in a reduction of approximately 130 production and maintenance positions. No restructuring and asset impairment charges were incurred during the fiscal year 2017.

Activities undertaken in connection with the fiscal year 2016 restructuring plan are complete.

Goodwill Impairment Charge

The Company's Amega West and Specialty Steel Supply ("SSS"), prior to its divestiture, reporting units within the PEP Segment were significantly impacted by the prolonged weakness in oil and gas drilling and exploration activity driven by depressed oil prices. As a result, during the fiscal year 2016 we recorded an impairment charge of \$12.5 million, which represented the entire balance of the goodwill recorded for these reporting units. No goodwill impairment charges were incurred during the fiscal year ended June 30, 2017.

Operating Income

Our operating income in fiscal year 2017 increased to \$97.2 million, or 5.4 percent of net sales as compared with \$51.6 million, or 2.8 percent in net sales in fiscal year 2016. Excluding surcharge revenue, pension EID and special items, operating margin was 8.0 percent for the fiscal year 2017 and 8.5 percent for the same period a year ago. The decrease in the operating margin reflects the impact of weaker demand during the first half of fiscal year 2017 and higher variable compensation accruals partially offset by improving demand conditions in the second half of fiscal year 2017 and operating cost efficiencies compared to fiscal year 2016.

[Table of Contents](#)

Operating income has been significantly impacted by our pension EID, which may be volatile based on conditions in the financial markets, as well as other special items. The following presents our operating income and operating margin, in each case excluding the impact of surcharge on net sales, pension EID, the loss on divestiture of business, the excess inventory write-down, restructuring and asset impairment charges, goodwill impairment and other special items. We present and discuss these financial measures because management believes removing the impact of these items provides a more consistent and meaningful basis for comparing results of operations from period to period. See the section “Non-GAAP Financial Measures” below for further discussion of these financial measures.

(\$ in millions)	Fiscal Year	
	2017	2016
Net sales	\$ 1,797.6	\$ 1,813.4
Less: surcharge revenue	239.2	240.8
Net sales excluding surcharge revenue	<u>\$ 1,558.4</u>	<u>\$ 1,572.6</u>
Operating income	\$ 97.2	\$ 51.6
Pension EID	23.8	19.3
Operating income excluding pension EID	<u>121.0</u>	<u>70.9</u>
Special items:		
Loss on divestiture of business	3.2	—
Pension curtailment charge	0.5	—
Excess inventory write-down	—	22.5
Restructuring and asset impairment charges	—	18.0
Goodwill impairment	—	12.5
Consulting costs	—	9.3
Operating income excluding pension EID and special items	<u>\$ 124.7</u>	<u>\$ 133.2</u>
Operating margin	<u>5.4%</u>	<u>2.8%</u>
Operating margin excluding surcharge revenue, pension EID and special items	<u>8.0%</u>	<u>8.5%</u>

Interest Expense

Fiscal year 2017 interest expense was \$29.8 million compared to \$28.0 million in fiscal year 2016. We have used interest rate swaps to achieve a level of floating rate debt to fixed rate debt. Interest expense for fiscal year 2017 includes net gains from interest rate swaps of \$1.8 million compared with \$2.6 million for fiscal year 2016.

Other Income (Expense), Net

Other income for fiscal year 2017 was \$2.8 million as compared with other expense of \$2.1 million for fiscal year 2016. The results reflect positive impacts in foreign exchange gains of \$2.0 million and favorable market return on investments used to fund company-owned life insurance contracts and investments held in rabbi trusts of \$2.2 million for fiscal year 2017 compared to fiscal year 2016.

Income Taxes

Our effective tax rate (income tax expense as a percent of income before taxes) for fiscal year 2017 was 33.0 percent as compared to 47.4 percent in fiscal year 2016. As a result of the voluntary pension contribution, income tax expense for fiscal year 2017 includes a tax charge of \$2.1 million due to reduced tax benefits for domestic manufacturing claimed in prior periods. The fiscal year 2017 tax rate also includes tax benefits of \$0.9 million associated with the repatriation of earnings from one of our foreign subsidiaries and a tax charge of \$0.9 million for prior year adjustments in various tax jurisdictions. The fiscal year 2016 tax rate includes the impact of non-cash goodwill impairment charges, a portion of which is non-deductible for tax purposes, as well as a tax charge of \$2.8 million recorded as a result of a decision to sell our equity method investment in India. The fiscal year 2016 tax rate also includes net tax benefits of \$0.8 million primarily for additional research and development credits as a result of the December 2015 enactment of the Protecting Americans from Tax Hikes Act of 2015.

As of June 30, 2017, we had \$99.1 million of indefinitely reinvested foreign earnings for which we had not provided deferred income taxes. Due to a change in foreign cash requirements for one of our foreign subsidiaries, we changed our intent with regard to indefinite reinvestment of foreign earnings of this subsidiary. As a result of this change, we repatriated \$11.5 million of foreign earnings during fiscal year 2017 and recognized associated tax benefits of \$0.9 million. The remaining balance of unremitted foreign earnings continues to be indefinitely reinvested.

See Note 17 to the consolidated financial statements in Item 8, “Financial Statements and Supplementary Data” for a full reconciliation of the statutory federal tax rate to the effective tax rates.

Business Segment Results

Summary information about our operating results on a segment basis is set forth below. For more detailed segment information, see Note 19 to the consolidated financial statements included in Item 8, “Financial Statements and Supplementary Data”.

The following table includes comparative information for volumes by business segment:

(Pounds sold, in thousands)	Fiscal Year		Increase (Decrease)	% Increase (Decrease)
	2017	2016		
Specialty Alloys Operations	227,744	234,296	(6,552)	(3)%
Performance Engineered Products	10,902	11,626	(724)	(6)%
Intersegment	(2,300)	(3,362)	1,062	32 %
Consolidated pounds sold	236,346	242,560	(6,214)	(3)%

* Pounds sold data for PEP segment includes Dynamet and Carpenter Powder Products businesses only.

The following table includes comparative information for net sales by business segment:

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2017	2016		
Specialty Alloys Operations	\$ 1,461.6	\$ 1,481.0	\$ (19.4)	(1)%
Performance Engineered Products	366.6	358.7	7.9	2 %
Intersegment	(30.6)	(26.3)	(4.3)	(16)%
Total net sales	\$ 1,797.6	\$ 1,813.4	\$ (15.8)	(1)%

The following table includes comparative information for our net sales by business segment, but excluding surcharge revenue:

(\$ in millions)	Fiscal Year		\$ Increase (Decrease)	% Increase (Decrease)
	2017	2016		
Specialty Alloys Operations	\$ 1,221.8	\$ 1,239.6	\$ (17.8)	(1)%
Performance Engineered Products	365.7	357.9	7.8	2 %
Intersegment	(29.1)	(24.9)	(4.2)	(17)%
Total net sales excluding surcharge revenue	\$ 1,558.4	\$ 1,572.6	\$ (14.2)	(1)%

Specialty Alloys Operations Segment

Net sales in fiscal year 2017 for the SAO segment decreased 1 percent to \$1,461.6 million, as compared with \$1,481.0 million in fiscal year 2016. Excluding surcharge revenue, net sales decreased 1 percent from a year ago. The fiscal year 2017 net sales reflected 3 percent lower shipment volume as compared to fiscal year 2016. The results reflect the impact of lower demand primarily in the Aerospace and Defense and Transportation end-use markets in the first half of fiscal year 2017 partially offset by improving demand conditions during the second half of fiscal year 2017 compared to fiscal year 2016.

Operating income for the SAO segment in fiscal year 2017 was \$172.3 million, or 11.8 percent of net sales (14.1 percent of net sales excluding surcharge revenue), compared to \$176.9 million, or 11.9 percent of net sales (14.3 percent of net sales excluding surcharge revenue), for fiscal year 2016. The decrease in operating income reflects lower demand in the first half of the fiscal year 2017 partially offset by improving demand conditions during the second half of fiscal year 2017 and cost improvements driven by the implementation of the Carpenter Operating Model compared to fiscal year 2016.

Performance Engineered Products Segment

Net sales for fiscal year 2017 for the PEP segment were \$366.6 million as compared with \$358.7 million for fiscal year 2016. Excluding surcharge revenue, net sales were increased 2 percent from a year ago. The results reflect the increased net sales in the second half of fiscal year 2017 as a result of improved rental activity within the oil and gas businesses partially offset by lower shipment volume primarily in the Aerospace and Defense end-use market.

Operating income for the PEP segment for fiscal year 2017 was \$8.5 million, or 2.3 percent of net sales, as compared with operating loss of \$5.5 million, or 1.5 percent of net sales for fiscal year 2016. The results reflect the improved rental activity within the oil and gas businesses in the second half of fiscal year 2017 and the positive impact of cost reduction initiatives partially offset by lower shipment volume primarily in the Aerospace and Defense end-use market.

Liquidity and Financial Resources

We ended fiscal year 2018 with \$56.2 million of cash and cash equivalents, a decrease of \$10.1 million from fiscal year 2017. During fiscal year 2018 our cash provided from operating activities was \$209.2 million as compared with \$130.3 million in fiscal year 2017. Our free cash flow, which we define under “Non-GAAP Financial Measures” below, was positive \$34.7 million as compared to negative \$16.8 million for the same period a year ago. The improvement in cash provided from operating activities in fiscal year 2018 compared to fiscal year 2017 was driven by higher income levels partially offset by associated working capital investments. Additionally, during fiscal year 2018, we made \$6.7 million of required minimum pension contributions as compared with a voluntary pension contribution of \$100.0 million, which was offset by cash tax benefits realized with the contribution of approximately \$39.0 million, in the same period last year. Included in the free cash flow results during the current period, we acquired a business, MB CalRAM LLC, for a cash purchase price of \$13.3 million. In the same period last year, we acquired a business, Puris LLC, for a cash purchase price of \$35.3 million and received \$12.0 from the divestiture of the SSS business. The free cash flow results also reflect higher capital spending levels in the current period as we increased our investment in key growth initiatives during fiscal year 2018.

Capital expenditures for property, equipment and software were \$135.0 million for fiscal year 2018 as compared to \$98.5 million for fiscal year 2017. In fiscal year 2019, we expect capital expenditures to be approximately \$190 million.

Dividends for fiscal year 2018 were \$34.4 million, as compared with \$34.1 million in the prior year and were paid at the same quarterly rate of \$0.18 per share of common stock in both periods.

For the fiscal years ended June 30, 2018 , 2017 and 2016 , interest costs totaled \$31.1 million , \$31.1 million and \$29.9 million , respectively, of which \$2.8 million , \$1.3 million and \$1.9 million , respectively, were capitalized as part of the cost of property, plant, equipment and software.

During fiscal year 2018 , we made required minimum pension contribution of \$6.7 million to one our qualified pension plans, and are required to make cash contributions of \$5.5 million during fiscal year 2019. Over the next five years, current estimates indicate that we will be required to make about \$92.4 million of cash contributions to our pension plans, based on the laws in effect for pension funding as of June 30, 2018 , and subject to market returns and interest rate assumptions.

We have demonstrated the ability to generate cash to meet our needs through cash flows from operations, management of working capital and the availability of outside sources of financing to supplement internally generated funds. We generally target minimum liquidity, consisting of cash and cash equivalents added to available borrowing capacity under our credit agreement, of \$150.0 million. On March 31, 2017, we entered into a new \$400.0 million Credit Agreement (the “Credit Agreement”) that extends to March 2022. As of June 30, 2018 , we had \$6.0 million of issued letters of credit. The balance of the Credit Agreement (\$394.0 million as of June 30, 2018) remains available to us. As of June 30, 2018 , we had total liquidity of \$450.2 million, including \$56.2 million of cash and cash equivalents. The Credit Agreement provides flexibility to fund our ongoing cash requirements as needed. From time to time during the year ended June 30, 2018 we have borrowed under our Credit Agreement and subsequently repaid any outstanding borrowings prior to June 30, 2018 . The weighted average daily borrowing under the Credit Agreement during the year ended June 30, 2018 was \$9.8 million with daily outstanding borrowings ranging from \$0.0 million to \$32.2 million.

We evaluate liquidity needs for alternative uses including funding external growth opportunities, share repurchases as well as funding consistent dividend payments to stockholders. Over the last several years, we declared and paid quarterly cash dividends of \$0.18 per share.

As of June 30, 2018 , we had cash and cash equivalents of approximately \$20.0 million held at various foreign subsidiaries. Our global cash deployment considers, among other things, the geographic location of our subsidiaries’ cash balances, the locations of our anticipated liquidity needs and the cost to access international cash balances, as necessary. The Act requires a one-time tax on previously deferred foreign earnings and generally provides for tax-free repatriations of these earnings beginning January 1, 2018. During the fiscal year ended June 30, 2018, we repatriated cash of \$9.2 million from foreign jurisdictions. From time to time, we may make short-term intercompany borrowings against our cash held outside the United States in order to reduce or eliminate any required borrowing under our Credit Agreement.

We are subject to certain financial and restrictive covenants under the Credit Agreement, which, among other things, require the maintenance of a minimum interest coverage ratio (3.50 to 1.00 as of June 30, 2018). The interest coverage ratio is defined in the Credit Agreement as, for any period, the ratio of consolidated earnings before interest, taxes, depreciation and amortization and non-cash net pension expense (“EBITDA”) to consolidated interest expense for such period. The Credit Agreement also requires the Company to maintain a debt to capital ratio of less than 55 percent. The debt to capital ratio is defined in the Credit Agreement as the ratio of consolidated indebtedness, as defined therein, to consolidated capitalization, as defined therein. As of June 30, 2018 , the Company was in compliance with all of the covenants of the Credit Agreement.

The following table shows our actual ratio performance with respect to the financial covenants, as of June 30, 2018 :

Covenant	Covenant Requirement	Actual Ratio
Consolidated interest coverage	3.50 to 1.00 (minimum)	11.86 to 1.00
Consolidated debt to capital	55% (maximum)	27%

We continue to believe that we will maintain compliance with the financial and restrictive covenants in future periods. To the extent that we do not comply with the covenants under the Credit Agreement, this could reduce our liquidity and flexibility due to potential restrictions on borrowings available to us unless we are able to obtain waivers or modifications of the covenants .

Non-GAAP Financial Measures

The following provides additional information regarding certain non-GAAP financial measures that we use in this report. Our definitions and calculations of these items may not necessarily be the same as those used by other companies.

Net Sales and Gross Margin Excluding Surcharge Revenue and Special Items

This report includes discussions of net sales as adjusted to exclude the impact of raw material surcharge and the resulting impact on gross margins, as well as the excess inventory write-down, which represent financial measures that have not been determined in accordance with U.S. GAAP. We present and discuss these financial measures because management believes removing the impact of raw material surcharge from net sales and cost of sales provides a more consistent basis for comparing results of operations from period to period for the reasons discussed earlier in this report. In addition, management believes that excluding the excess inventory write-down from gross profit and gross margin is helpful in analyzing our operating performance as the excess inventory write-down is not indicative of ongoing operating performance. Management uses its results excluding these amounts to evaluate its operating performance and to discuss its business with investment institutions, the Company's board of directors and others. See our earlier discussions of "Gross Profit" for reconciliations of net sales and gross margin, excluding surcharge revenue and the excess inventory write-down, to net sales as determined in accordance with U.S. GAAP. Net sales and gross margin excluding surcharge revenue and the excess inventory write-down is not a U.S. GAAP financial measure and should not be considered in isolation of, or as a substitute for, net sales and gross margin calculated in accordance with U.S. GAAP.

Operating Income and Operating Margin Excluding Surcharge Revenue, Pension EID and Special Items

This report includes discussions of operating income and operating margin as adjusted to exclude the impact of raw material surcharge revenue, pension EID and special items which represent financial measures that have not been determined in accordance with U.S. GAAP. We present and discuss these financial measures because management believes removing the impact of raw material surcharge from net sales and cost of sales provides a more consistent and meaningful basis for comparing results of operations from period to period for the reasons discussed earlier in this report. In addition, management believes that excluding pension EID and special items from operating income and operating margin is helpful in analyzing our operating performance particularly as pension EID may be volatile due to changes in the financial markets and special items are not indicative of ongoing operating performance. Management uses its results excluding these amounts to evaluate its operating performance and to discuss its business with investment institutions, the Company's board of directors and others. See our earlier discussion of operating income for a reconciliation of operating income and operating margin excluding pension EID and special items to operating income and operating margin determined in accordance with U.S. GAAP. Operating income and operating margin excluding surcharge revenue, pension EID and special items is not a U.S. GAAP financial measure and should not be considered in isolation of, or as a substitute for, operating income and operating margin calculated in accordance with U.S. GAAP.

Adjusted Earnings Per Share

The following provides a reconciliation of adjusted earnings per share, to its most directly comparable U.S. GAAP financial measures:

(\$ in millions, except per share data)	Income Before Income Taxes	Income Tax Benefit (Expense)	Net Income	Earnings Per Diluted Share*
Year ended June 30, 2018, as reported	\$ 160.2	\$ 28.3	\$ 188.5	\$ 3.92
Special items:				
Impact of U.S. tax reform and other legislative changes	—	(68.3)	(68.3)	(1.42)
Year ended June 30, 2018, as adjusted	\$ 160.2	\$ (40.0)	\$ 120.2	\$ 2.50

* Impact per diluted share calculated using weighted average common shares outstanding of 47.6 million for the year ended June 30, 2018.

(\$ in millions, except per share data)	Income Before Income Taxes	Income Tax Benefit (Expense) (a)	Net Income	Earnings Per Diluted Share*
Year ended June 30, 2017, as reported	\$ 70.2	\$ (23.2)	\$ 47.0	\$ 0.99
Special items:				
Loss on divestiture of business	3.2	(1.1)	2.1	0.04
Pension curtailment	0.5	(0.1)	0.4	0.01
Income tax item (b)	—	2.1	2.1	0.04
Total impact of special items	3.7	0.9	4.6	0.09
Year ended June 30, 2017, as adjusted	\$ 73.9	\$ (22.3)	\$ 51.6	\$ 1.08

* Impact per diluted share calculated using weighted average common shares outstanding of 47.1 million for the year ended June 30, 2017.

(a) The income tax effect of the special items during fiscal year 2017 was determined using a normalized effective income tax rate at the time of 35 percent.

(b) Discrete income tax charge recorded as a result of reduced tax benefits claimed in prior years in connection with the Company's \$100 million voluntary pension contribution made in October 2016.

Management believes that the presentation of earnings per share adjusted to exclude the impacts of special items is helpful in analyzing the operating performance of the Company, as these items are not indicative of ongoing operating performance. Management uses its results excluding these amounts to evaluate its operating performance and to discuss its business with investment institutions, the Company's board of directors and others. Our definitions and calculations of these items may not necessarily be the same as those used by other companies. Adjusted earnings per share is not a U.S. GAAP financial measure and should not be considered in isolation of, or as a substitute for, earnings per share calculated in accordance with U.S. GAAP.

Free Cash Flow

The following provides a reconciliation of free cash flow, as used in this annual report, to its most directly comparable U.S. GAAP financial measures:

(\$ in millions)	Fiscal Year		
	2018	2017	2016
Net cash provided from operating activities	\$ 209.2	\$ 130.3	\$ 257.4
Purchases of property, equipment and software	(135.0)	(98.5)	(95.2)
Purchase of business	(13.3)	(35.3)	—
Proceeds from divestiture of business	—	12.0	—
Dividends paid	(34.4)	(34.1)	(34.8)
Proceeds from disposals of property and equipment and assets held for sale	1.9	2.5	1.4
Proceeds from note receivable from the sale of equity method investment	6.3	6.3	—
Proceeds from sale of equity method investment	—	—	6.3
Other	—	—	4.0
Free cash flow	\$ 34.7	\$ (16.8)	\$ 139.1

Management believes that the presentation of free cash flow provides useful information to investors regarding our financial condition because it is a measure of cash generated which management evaluates for alternative uses. It is management's current intention to use excess cash to fund investments in capital equipment, acquisition opportunities and consistent dividend payments. Free cash flow is not a U.S. GAAP financial measure and should not be considered in isolation of, or as a substitute for, cash flows calculated in accordance with U.S. GAAP.

Critical Accounting Policies and Estimates

The preparation of the consolidated financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. On an on-going basis, we evaluate our estimates, including those related to bad debts, customer claims, inventories, goodwill, intangible assets, income taxes, pensions and other postretirement benefits, contingencies and litigation, environmental liabilities and derivative instruments and hedging activities.

We believe the following are the critical accounting policies and areas affected by significant judgments and estimates impacting the preparation of our consolidated financial statements.

Allowance for Doubtful Accounts

We maintain an allowance for doubtful accounts for estimated losses resulting from the failure of our customers to make required payments. We perform ongoing credit evaluations of our customers and monitor their payment patterns. Should the financial condition of our customers deteriorate, resulting in an impairment of their ability to make payments, additional allowances may be required.

Inventories

Inventories are stated at the lower of cost or market. The cost of inventories is primarily determined using the LIFO method. We also use the FIFO and average cost methods. As of June 30, 2018 and 2017, \$138.6 million and \$107.3 million of inventory, respectively, was accounted for using a method other than the LIFO method.

Costs include direct materials, direct labor, applicable manufacturing overhead and other direct costs. Under the LIFO inventory valuation method, changes in the cost of raw materials and production activities are recognized in cost of sales in the current period even though these materials and other costs may have been incurred at significantly different values due to the length of time of our production cycle. The prices for many of the raw materials we use have been volatile. Since we value most of our inventory utilizing the LIFO inventory costing methodology, rapid changes in raw material costs have an impact on our operating results. In a period of rising prices, cost of sales expense recognized under LIFO is generally higher than the cash costs incurred to acquire the inventory sold. Conversely, in a period of declining raw material prices, cost of sales recognized under LIFO is generally lower than cash costs incurred to acquire the inventory sold.

Since the LIFO inventory valuation methodology is designed for annual determination, interim estimates of the annual LIFO valuation are required. We recognize the effects of the LIFO inventory valuation method on an interim basis by estimating the expected annual LIFO cost based on cost changes to date. These projections of annual LIFO inventory valuation reserve changes are updated quarterly and are evaluated based upon material, labor and overhead costs.

Pension and Other Postretirement Benefits

The amount of the pension expense, which is determined annually, is based upon the value of the assets in the pension trusts at the beginning of the fiscal year as well as actuarial assumptions, such as the discount rate and the expected long-term rate of return on plan assets. The assumed long-term rate of return on pension plan assets is reviewed at each year-end based on the plan's investment policies, an analysis of the historical returns of the capital markets and current interest rates. Based on the current funding level, the allocation policy for pension plan assets is to have approximately 60 percent in return seeking assets and 40 percent in liability matching assets. Return seeking assets include domestic and international equities and diversified loan funds. Liability matching assets include long duration bond funds. As the funding level of the plans improves in increments of 5 percent, assets will be shifted from return seeking to liability matching in increments of 4 percent as a de-risking strategy. The plan discount rate is determined by reference to the Bond.Link interest rate model based upon a portfolio of highly rated U.S. corporate bonds with individual bonds that are theoretically purchased to settle the plan's anticipated cash outflows. The fluctuations in stock and bond markets could cause actual investment results to be significantly different from those assumed, and therefore, significantly impact the valuation of the assets in our pension trusts. Changes in actuarial assumptions could significantly impact the accounting for the pension assets and liabilities. If the assumed long-term rate of return on plan assets was changed by 0.25 percent, the net pension expense would change by \$2.6 million. If the discount rate was changed by 0.25 percent, the net pension expense would change by \$0.8 million.

Long-Lived Assets

Long-lived assets are reviewed for impairment and written down to fair value whenever events or changes in circumstances indicate that the carrying value may not be recoverable through estimated future undiscounted cash flows. The amount of the impairment loss is the excess of the carrying amount of the impaired assets over the fair value of the assets based upon estimated future discounted cash flows. We evaluate long-lived assets for impairment by individual business unit. Changes in estimated cash flows could have a significant impact on whether or not an asset is impaired and the amount of the impairment.

Goodwill

Goodwill is not amortized but instead is at least annually tested for impairment as of June 30, or more frequently if events or circumstances indicate that the carrying amount of goodwill may be impaired. Potential impairment is identified by comparing the fair value of a reporting unit to its carrying value. The fair value is estimated using discounted cash flows and the use of market multiples valuation techniques. If the carrying value of the reporting unit exceeds its fair value, any impairment loss is measured by comparing the carrying value of the reporting unit's goodwill to its implied fair value. The discounted cash flow analysis for each reporting unit tested requires significant estimates and assumptions related to cash flow forecasts, discount rates, terminal values and income tax rates. The cash flow forecasts are developed based on assumptions about each reporting unit's markets, product offerings, pricing, capital expenditure and working capital requirements as well as cost performance. The discount rates used in the discounted cash flow are estimated based on a market participant's perspective of each reporting unit's weighted average cost of capital. The terminal value, which represents the value attributed to the reporting unit beyond the forecast period, is estimated using a perpetuity growth rate assumption. The income tax rates used in the discounted cash flow analysis represent estimates of the long-term statutory income tax rates for each reporting unit based on the jurisdictions in which the reporting units operate.

As of June 30, 2018, we had five remaining reporting units with goodwill recorded. Goodwill associated with our SAO reporting unit is tested at the SAO segment level and represents approximately 73 percent of our total goodwill. All other goodwill is associated with our PEP segment, which includes four reporting units with goodwill recorded.

As of June 30, 2018, the fair value of the SAO reporting unit exceeded the carrying value by approximately 41 percent. The goodwill recorded related to the SAO reporting unit as of June 30, 2018 was \$195.5 million. The discounted cash flows analysis for the SAO reporting unit includes assumptions related to our ability to increase volume, improve mix, expand product offerings and continue to implement opportunities to reduce costs over the next several years. For purposes of the discounted cash flow analysis for SAO's fair value, we used a weighted average cost capital of 9.5 percent and a terminal growth rate assumption of 3 percent.

The estimate of fair value requires significant judgment. We based our fair value estimates on assumptions that we believe to be reasonable but that are unpredictable and inherently uncertain, including estimates of future growth rates and operating margins and assumptions about the overall economic climate and the competitive environment for our business units. There can be no assurance that our estimates and assumptions made for purposes of our goodwill and identifiable intangible asset testing as of the time of testing will prove to be accurate predictions of the future. If our assumptions regarding business projections, competitive environments or anticipated growth rates are not correct, we may be required to record goodwill and/or intangible asset impairment charges in future periods, whether in connection with our next annual impairment testing or earlier, if an indicator of an impairment is present before our next annual evaluation.

Environmental Expenditures

Environmental expenditures that pertain to current operations or to future revenues are expensed or capitalized consistent with Carpenter's capitalization policy for property, plant and equipment. Expenditures that result from the remediation of an existing condition caused by past operations and that do not contribute to current or future revenues are expensed. Liabilities are recognized for remedial activities when the remediation is probable and the cost can be reasonably estimated. Most estimated liabilities are not discounted to present value due to the uncertainty as to the timing and duration of expected costs. For one former operating facility site, due to the routine nature of the expected costs, the liability for future costs is discounted to present value over 20 years assuming a discount rate of approximately 3 percent as of June 30, 2018 and 2017.

Income Taxes

Deferred income taxes result from temporary differences in the recognition of income and expense for financial and income tax reporting purposes, or differences between the fair value of assets acquired in business combinations accounted for as purchases for financial reporting purposes and their corresponding tax bases. Deferred income taxes represent future tax benefits (assets) or costs (liabilities) to be recognized when those temporary differences reverse. We evaluate on a quarterly basis whether, based on all available evidence, we believe that our deferred income tax assets will be realizable. Valuation allowances are established when it is estimated that it is more likely than not that the tax benefit of the deferred tax assets will not be realized. The evaluation includes the consideration of all available evidence, both positive and negative, regarding historical operating results including recent years with reported losses, the estimated timing of future reversals of existing taxable temporary differences, estimated future taxable income exclusive of reversing temporary differences and carryforwards, and potential tax planning strategies which may be employed to prevent an operating loss or tax credit carryforward from expiring unused. Future realization of deferred income tax assets ultimately depends upon the existence of sufficient taxable income within the carryback or carryforward period available under tax law.

Management determines whether a tax position should be recognized in the financial statements by evaluating whether it is more likely than not that the tax position will be sustained upon examination by the tax authorities based upon the technical merits of the position. For those tax positions which should be recognized, the measurement of a tax position is determined as being the largest amount of benefit that is greater than 50 percent likely of being realized upon ultimate settlement. Interest and penalties on estimated liabilities for uncertain tax positions are recorded as components of the provision for income taxes.

Derivative Financial Instruments

Our current risk management strategies include the use of derivative instruments to reduce certain risks. The critical strategies include: (1) the use of commodity forward contracts to fix the price of a portion of anticipated future purchases of certain raw materials and energy to offset the effects of changes in the costs of those commodities; and (2) the use of foreign currency forward contracts to hedge a portion of anticipated future sales denominated in foreign currencies, principally the Euro and Pound Sterling, in order to offset the effect of changes in exchange rates. The commodity forwards and foreign currency forwards have been designated as cash flow hedges and unrealized net gains and losses are recorded in the accumulated other comprehensive loss component of stockholders' equity. The unrealized gains or losses are reclassified to the income statement when the hedged transaction affects earnings or if the anticipated transactions are no longer expected to occur. We use interest rate swaps to maintain a certain level of floating rate debt relative to fixed rate debt. Interest rate swaps have been designated as fair value hedges. Accordingly, the mark-to-market values of both the interest rate swap and the underlying debt obligations are recorded as equal and offsetting gains and losses in the interest expense component of the consolidated statement of income. We have also used forward interest rate swaps to manage the risk of cash flow variability associated with fixed interest debt expected to be issued. We evaluate all derivative instruments each quarter to determine that they are highly effective. Any ineffectiveness is recorded in our consolidated statement of income. We also use foreign currency forward contracts to protect certain short-term asset or liability positions denominated in foreign currencies against the effect of changes in exchange rates. These positions do not qualify for hedge accounting and accordingly are marked-to-market at each reporting date through charges to other income and expense.

New Accounting Pronouncements

For information with respect to new accounting pronouncements and the impact of these pronouncements on our consolidated financial statements, see Note 20 to Notes to Consolidated Financial Statements included in Item 8, "Financial Statements and Supplementary Data".

Off Balance Sheet Arrangements

We had no off balance sheet arrangements during the periods presented.

Contractual Obligations

At June 30, 2018, we had the following contractual obligations and other commercial commitments and contingencies:

(\$ in millions)	Total	Fiscal Year					Thereafter
		2019	2020	2021	2022	2023	
Long-term debt (1)	\$ 550.0	\$ —	\$ —	\$ —	\$ 250.0	\$ 300.0	\$ —
Estimated interest payments (2)	102.0	26.4	26.4	26.4	13.9	8.9	—
Operating leases	28.5	9.1	7.0	3.9	2.9	2.7	2.9
Qualified pension plan contributions (3)	169.9	5.5	6.2	5.7	27.8	47.2	77.5
Accrued post-retirement benefits (4)	151.5	15.4	15.4	15.4	15.4	15.3	74.6
Purchase obligations (5)	172.2	170.7	1.5	—	—	—	—
Non-qualified pension benefits (6)	33.4	3.3	3.4	3.5	3.5	3.4	16.3
Total	\$ 1,207.5	\$ 230.4	\$ 59.9	\$ 54.9	\$ 313.5	\$ 377.5	\$ 171.3

- (1) Refer to Note 9 to our Notes to Consolidated Financial Statements included in Item 8. “Financial Statements and Supplementary Data”.
- (2) Estimated interest payments for long-term debt were calculated based on the applicable rates and payment dates. No interest payments are included for any potential borrowings under our revolving credit facility.
- (3) Qualified pension plan contributions represent required minimum contributions for plan years beginning January 1, 2017 and thereafter. The amounts were calculated based on actuarial valuations as prescribed by pension funding regulations in the United States effective June 30, 2018. Estimated fiscal year contributions have been included through fiscal year 2028. The actual required pension contributions in future periods may be different.
- (4) Postretirement benefits for certain plans may be paid from corporate assets or certain designated plan assets maintained in a Voluntary Employee Benefit Association (“VEBA”) Trust. During fiscal years 2018 and 2017, benefit payments were funded using assets in the VEBA Trust. Prior to fiscal year 2017, benefit payments for these plans were funded by corporate assets. Estimated fiscal year postretirement benefit payments have been included through fiscal year 2028.
- (5) We have entered into purchase commitments primarily for various key raw materials at market related prices, all made in the normal course of business. The commitments include both fixed and variable price provisions. We used June 30, 2018 raw material prices for commitments with variable pricing.
- (6) Pension benefits for certain non-qualified plans are paid from corporate assets. There is no guarantee that future payments will be paid from corporate assets rather than plan assets.

Market Sensitive Instruments and Risk Management

See “Item 7A. Quantitative and Qualitative Disclosures About Market Risk” for discussion of market sensitive instruments and associated market risk for Carpenter.

Contingencies

Environmental

We are subject to various federal, state, local and international environmental laws and regulations relating to pollution, protection of public health and the environment, natural resource damages and occupational safety and health. Although compliance with these laws and regulations may affect the costs of our operations, compliance costs to date have not been material. We have environmental remediation liabilities at some of our owned operating facilities and have been designated as a potentially responsible party (“PRP”) with respect to certain third party Superfund waste-disposal sites and other third party-owned sites. Additionally, we have been notified that we may be a PRP with respect to other Superfund sites as to which no proceedings have been instituted against us. Neither the exact amount of remediation costs nor the final method of their allocation among all designated PRPs at these Superfund sites have been determined. Accordingly, at this time, we cannot reasonably estimate expected costs for such matters. The liability for future environmental remediation costs that can be reasonably estimated is evaluated on a quarterly basis. We accrue amounts for environmental remediation costs that represent our best estimate of the probable and reasonably estimable future costs related to environmental remediation. The liabilities recorded for environmental remediation costs at Superfund sites, other third party-owned sites and Carpenter-owned current or former operating facilities remaining at June 30, 2018 and 2017 were \$16.1 million and \$16.1 million , respectively.

Estimates of the amount and timing of future costs of environmental remediation requirements are inherently imprecise because of the continuing evolution of environmental laws and regulatory requirements, the availability and application of technology, the identification of currently unknown remediation sites and the allocation of costs among the PRPs. Based upon information currently available, such future costs are not expected to have a material effect on our financial position, results of operations or cash flows over the long-term. However, such costs could be material to our financial position, results of operations or cash flows in a particular future quarter or year.

Other

We are defending various routine claims and legal actions that are incidental to our business, and that are common to our operations, including those pertaining to product claims, commercial disputes, patent infringement, employment actions, employee benefits, compliance with domestic and foreign laws, personal injury claims and tax issues. Like many other manufacturing companies in recent years we, from time to time, have been named as a defendant in lawsuits alleging personal injury as a result of exposure to chemicals and substances in the workplace. We provide for costs relating to these matters when a loss is probable and the amount of the loss is reasonably estimable. The effect of the outcome of these matters on our future results of operations and liquidity cannot be predicted because any such effect depends on future results of operations and the amount and timing (both as to recording future charges to operations and cash expenditures) of the resolution of such matters. While it is not feasible to determine the outcome of these matters, we believe that the total liability from these matters will not have a material effect on our financial position, results of operations or cash flows over the long-term. However, there can be no assurance that an increase in the scope of pending matters or that any future lawsuits, claims, proceedings or investigations will not be material to our financial position, results of operations or cash flows in a particular future quarter or year.

Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Act of 1995. These forward-looking statements are subject to risks and uncertainties that could cause actual results to differ from those projected, anticipated or implied. The most significant of these uncertainties are described in this Form 10-K. They include but are not limited to: (1) the cyclical nature of the specialty materials business and certain end-use markets, including aerospace, defense, industrial, transportation, consumer, medical, and energy, or other influences on Carpenter's business such as new competitors, the consolidation of competitors, customers, and suppliers or the transfer of manufacturing capacity from the United States to foreign countries; (2) the ability of Carpenter to achieve cash generation, growth, earnings, profitability, operating income, cost savings and reductions, qualifications, productivity improvements or process changes; (3) the ability to recoup increases in the cost of energy, raw materials, freight or other factors; (4) domestic and foreign excess manufacturing capacity for certain metals; (5) fluctuations in currency exchange rates; (6) the effect of government trade actions; (7) the valuation of the assets and liabilities in Carpenter's pension trusts and the accounting for pension plans; (8) possible labor disputes or work stoppages; (9) the potential that our customers may substitute alternate materials or adopt different manufacturing practices that replace or limit the suitability of our products; (10) the ability to successfully acquire and integrate acquisitions; (11) the availability of credit facilities to Carpenter, its customers or other members of the supply chain; (12) the ability to obtain energy or raw materials, especially from suppliers located in countries that may be subject to unstable political or economic conditions; (13) Carpenter's manufacturing processes are dependent upon highly specialized equipment located primarily in facilities in Reading and Latrobe, Pennsylvania and Athens, Alabama for which there may be limited alternatives if there are significant equipment failures or a catastrophic event; (14) the ability to hire and retain key personnel, including members of the executive management team, management, metallurgists and other skilled personnel; and (15) fluctuations in oil and gas prices and production. Any of these factors could have an adverse and/or fluctuating effect on Carpenter's results of operations. The forward-looking statements in this document are intended to be subject to the safe harbor protection provided by Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended. Carpenter undertakes no obligation to update or revise any forward-looking statements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

We use derivative financial instruments to reduce certain types of financial risk. Firm price sales arrangements involve a risk of profit margin fluctuations particularly as raw material prices have been volatile. Firm price sales arrangements generally include certain annual purchasing commitments and consumption schedules agreed to by the customers at selling prices based on raw material prices at the time the arrangements are established. As discussed in Note 16 to the consolidated financial statements included in Part II, Item 8. "Financial Statements and Supplementary Data", in order to reduce the risk of fluctuating profit margins on these sales, we enter into commodity forward contracts to purchase certain critical raw materials necessary to produce the products sold under the firm price sales arrangements. If a customer fails to perform its obligations under the firm price sales arrangements, we may realize losses as a result of the related commodity forward contracts. Our customers have historically performed under these arrangements and we believe that they will honor such obligations in the future.

We are actively involved in managing risks associated with energy resources. Risk containment strategies include interaction with primary and secondary energy suppliers as well as obtaining adequate insurance coverage to compensate us for potential business interruption related to lack of availability of energy resources. In addition, we have used forwards to fix the price of a portion of our anticipated future purchases of certain energy requirements to protect against the impact of significant increases in energy costs. We also use surcharge mechanisms to offset a portion of these charges where appropriate.

Fluctuations in foreign currency exchange rates could subject us to risk of losses on anticipated future cash flows from our international operations or customers. Foreign currency forward contracts are used to hedge certain foreign exchange risk.

We use interest rate swaps to achieve a level of floating rate debt relative to fixed rate debt where appropriate. Historically, we have entered into forward swap contracts to manage the risk of cash flow variability associated with fixed interest debt expected to be issued.

All hedging strategies are reviewed and approved by senior financial management before being implemented. Senior financial management has established policies regarding the use of derivative instruments that prohibit the use of speculative or leveraged derivatives. Market valuations are performed at least quarterly to monitor the effectiveness of our risk management programs.

Based on the current funding level, the allocation policy for our largest pension plan assets is to have approximately 60 percent in return seeking assets and 40 percent in liability matching assets. Return seeking assets include domestic and international equities and diversified loan funds. Liability matching assets include long duration bond funds. As the funding level of the plans improves in increments of 5 percent, assets will be shifted from return seeking to liability matching in increments of 4 percent as a de-risking strategy.

The status of our financial instruments as of June 30, 2018 is provided in Note 16 to the consolidated financial statements included in Item 8, “Financial Statements and Supplementary Data”. Assuming on June 30, 2018 , (a) an instantaneous 10 percent decrease in the price of raw materials and energy for which we have commodity forward contracts, and (b) a 10 percent strengthening of the U.S. dollar versus foreign currencies for which foreign exchange forward contracts existed, our results of operations would not have been materially affected in either scenario.

Item 8. Financial Statements and Supplementary Data

Index to Consolidated Financial Statements and Supplementary Data

	Page
Consolidated Financial Statements:	
Management’s Responsibilities for Financial Reporting	43
Management’s Report on Internal Control Over Financial Reporting	43
Report of Independent Registered Public Accounting Firm	44
Consolidated Statements of Income for the Years Ended June 30, 2018, 2017 and 2016	46
Consolidated Statements of Comprehensive Income (Loss) for the Years Ended June 30, 2018, 2017 and 2016	47
Consolidated Statements of Cash Flows for the Years Ended June 30, 2018, 2017 and 2016	48
Consolidated Balance Sheets as of June 30, 2018 and 2017	49
Consolidated Statements of Changes in Equity for the Years Ended June 30, 2018, 2017 and 2016	50
Notes to Consolidated Financial Statements	52
Supplementary Data:	
Quarterly Financial Data (Unaudited)	84
Schedule II. Valuation and Qualifying Accounts	92

Management's Responsibilities for Financial Reporting

Management prepared the financial statements included in this Annual Report on Form 10-K and is responsible for their integrity and objectivity. The statements were prepared in conformity with accounting principles generally accepted in the United States of America and, as such, include amounts based on management's best judgments and estimates. Financial information elsewhere in this Annual Report is consistent with that in the financial statements.

Carpenter maintains a system of internal controls, supported by a code of conduct, designed to provide reasonable assurance that assets are safeguarded and transactions are properly executed and recorded for the preparation of financial information. We believe Carpenter's system of internal controls provides this appropriate balance. The system of internal controls and compliance is continually monitored by Carpenter's internal audit staff.

The Audit/Finance Committee of the Board of Directors, composed of independent directors, meets regularly with management, Carpenter's internal auditors and our independent registered public accounting firm to consider audit results and to discuss significant internal control, auditing and financial reporting matters. Both the independent registered public accounting firm and internal auditors have unrestricted access to the Audit/Finance Committee.

Management's Report on Internal Control Over Financial Reporting

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

Management assessed the effectiveness of Carpenter's internal control over financial reporting as of June 30, 2018. In making this assessment, it used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) (COSO) in *Internal Control — Integrated Framework*. Based on its assessment, management concluded that, as of June 30, 2018, Carpenter's internal control over financial reporting is effective based on those criteria.

The effectiveness of Carpenter's internal control over financial reporting as of June 30, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report appearing herein.

/s/ Tony R. Thene

Tony R. Thene

President and Chief Executive Officer

/s/ Damon J. Audia

Damon J. Audia

Senior Vice President and Chief Financial Officer

Report of Independent Registered Public Accounting Firm

To the Board of Directors and
Shareholders of Carpenter Technology Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Carpenter Technology Corporation and its subsidiaries as of June 30, 2018 and June 30, 2017, and the related consolidated statements of income, consolidated statements of comprehensive (loss) income, consolidated statements of cash flows, and consolidated statements of changes in equity for each of the three years in the period ended June 30, 2018, including the related notes and financial statement schedule listed in the accompanying index (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of June 30, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of June 30, 2018 and June 30, 2017, and the results of their operations and their cash flows for each of the three years in the period ended June 30, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of June 30, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. 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.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (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

Philadelphia, PA
August 14, 2018

We have served as the Company's auditor since 1918.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED STATEMENTS OF INCOME
For the Years Ended June 30, 2018 , 2017 and 2016

(\$ in millions, except per share data)	2018	2017	2016
Net sales	\$ 2,157.7	\$ 1,797.6	\$ 1,813.4
Cost of sales	1,775.5	1,513.3	1,535.0
Cost of sales - excess inventory write-down	—	—	22.5
Gross profit	382.2	284.3	255.9
Selling, general and administrative expenses	195.1	183.9	173.8
Loss on divestiture of business	—	3.2	—
Restructuring and asset impairment charges	—	—	18.0
Goodwill impairment	—	—	12.5
Operating income	187.1	97.2	51.6
Interest expense	(28.3)	(29.8)	(28.0)
Other income (expense), net	1.4	2.8	(2.1)
Income before income taxes	160.2	70.2	21.5
Income tax (benefit) expense	(28.3)	23.2	10.2
Net income	\$ 188.5	\$ 47.0	\$ 11.3
EARNINGS PER COMMON SHARE:			
Basic	\$ 3.96	\$ 0.99	\$ 0.23
Diluted	\$ 3.92	\$ 0.99	\$ 0.23
WEIGHTED AVERAGE COMMON SHARES OUTSTANDING:			
Basic	47.2	47.0	48.1
Diluted	47.6	47.1	48.2

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
For the Years ended June 30, 2018 , 2017 and 2016

(\$ in millions)	2018	2017	2016
Net income	\$ 188.5	\$ 47.0	\$ 11.3
Other comprehensive income (loss), net of tax			
Pension and postretirement benefits gain (loss), net of tax of \$(26.3), \$(27.3) and \$52.8, respectively	78.6	45.3	(87.5)
Net gain on derivative instruments, net of tax of \$(13.7), \$(11.8) and \$(4.0), respectively	26.1	19.5	6.7
Foreign currency translation	(1.4)	2.0	(0.9)
Other comprehensive income (loss), net of tax	103.3	66.8	(81.7)
Comprehensive income (loss), net of tax	\$ 291.8	\$ 113.8	\$ (70.4)

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Years Ended June 30, 2018 , 2017 and 2016

(\$ in millions)	2018	2017	2016
OPERATING ACTIVITIES			
Net income	\$ 188.5	\$ 47.0	\$ 11.3
Adjustments to reconcile net income to net cash provided from operating activities:			
Depreciation and amortization	116.6	117.8	119.3
Goodwill impairment charge	—	—	12.5
Non-cash excess inventory write-down	—	—	22.5
Non-cash restructuring and asset impairment charges	—	—	7.6
Deferred income taxes	(61.1)	41.6	0.8
Net pension expense	14.2	48.4	53.8
Payments from qualified pension plan associated with restructuring charges	—	—	9.4
Share-based compensation expense	17.6	13.0	8.7
Net loss on disposal of property and equipment and assets held for sale	2.5	2.5	0.6
Loss on divestiture of business	—	3.2	—
Changes in working capital and other:			
Accounts receivable	(86.8)	(34.6)	48.2
Inventories	0.4	(74.6)	1.6
Other current assets	(9.6)	2.8	(2.1)
Accounts payable	10.7	42.5	(7.6)
Accrued liabilities	28.7	26.6	(13.5)
Pension plan contributions	(6.7)	(100.0)	—
Other postretirement plan contributions	(3.4)	(3.2)	(13.0)
Other, net	(2.4)	(2.7)	(2.7)
Net cash provided from operating activities	209.2	130.3	257.4
INVESTING ACTIVITIES			
Purchases of property, equipment and software	(135.0)	(98.5)	(95.2)
Proceeds from disposals of property and equipment and assets held for sale	1.9	2.5	1.4
Acquisition of business	(13.3)	(35.3)	—
Proceeds from sales and maturities of marketable securities	0.7	0.9	0.9
Proceeds from divestiture of business	—	12.0	—
Proceeds from note receivable from the sale of equity method investment	6.3	6.3	—
Proceeds received from sale of equity method investment	—	—	6.3
Other	—	—	4.0
Net cash used for investing activities	(139.4)	(112.1)	(82.6)
FINANCING ACTIVITIES			
Credit agreement borrowings	—	122.1	77.0
Credit agreement repayments	—	(122.1)	(77.0)
Dividends paid	(34.4)	(34.1)	(34.8)
Payments of debt issue costs	—	(1.4)	—
Purchases of treasury stock	—	—	(123.9)
Payments on seller financed debt related to purchase of software	—	—	(4.9)
Payments on long-term debt	(55.0)	—	—
Tax benefits on share-based compensation	—	0.5	—
Proceeds from stock options exercised	12.9	2.2	0.5
Withholding tax payments on share-based compensation awards	(2.4)	(1.0)	(0.5)
Net cash used for financing activities	(78.9)	(33.8)	(163.6)
Effect of exchange rate changes on cash and cash equivalents	(1.0)	(0.1)	0.8
(DECREASE) INCREASE IN CASH AND CASH EQUIVALENTS	(10.1)	(15.7)	12.0
Cash and cash equivalents at beginning of year	66.3	82.0	70.0
Cash and cash equivalents at end of year	\$ 56.2	\$ 66.3	\$ 82.0

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED BALANCE SHEETS
June 30, 2018 and 2017

(\$ in millions, except share data)	2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 56.2	\$ 66.3
Accounts receivable, net of allowance for doubtful accounts of \$2.6 million and \$2.6 million at June 30, 2018 and 2017, respectively	378.5	290.4
Inventories	689.2	690.4
Other current assets	54.9	46.5
Total current assets	1,178.8	1,093.6
Property, plant and equipment, net	1,313.4	1,316.8
Goodwill	268.7	263.4
Other intangibles, net	63.3	64.9
Deferred income taxes	4.3	7.6
Other assets	178.5	131.8
Total assets	\$ 3,007.0	\$ 2,878.1
LIABILITIES		
Current liabilities:		
Current portion of long-term debt	\$ —	\$ 55.0
Accounts payable	214.7	201.1
Accrued liabilities	148.6	139.9
Total current liabilities	363.3	396.0
Long-term debt, net of current portion	545.7	550.0
Accrued pension liabilities	288.8	378.3
Accrued postretirement benefits	108.2	122.6
Deferred income taxes	161.6	184.8
Other liabilities	53.5	47.8
Total liabilities	1,521.1	1,679.5
Contingencies and commitments (see Note 11)		
STOCKHOLDERS' EQUITY		
Common stock — authorized 100,000,000 shares; issued 55,712,229 shares at June 30, 2018 and 55,349,658 shares at June 30, 2017; outstanding 47,191,744 shares at June 30, 2018 and 46,753,180 shares at June 30, 2017	278.6	276.7
Capital in excess of par value	310.0	284.8
Reinvested earnings	1,475.9	1,321.8
Common stock in treasury (8,520,485 shares and 8,596,478 shares at June 30, 2018 and 2017, respectively), at cost	(338.8)	(341.6)
Accumulated other comprehensive loss	(239.8)	(343.1)
Total equity	1,485.9	1,198.6
Total liabilities and equity	\$ 3,007.0	\$ 2,878.1

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY
For the Years Ended June 30, 2018 , 2017 and 2016

(\$ in millions, except per share data)	Common Stock		Reinvested Earnings	Common Stock in Treasury	Accumulated Other Comprehensive (Loss) Income	Total Equity
	Par Value of \$5	Capital in Excess of Par Value				
Balances at June 30, 2015	\$ 276.2	\$ 266.6	\$ 1,332.4	\$ (221.1)	\$ (328.2)	\$ 1,325.9
Net income			11.3			11.3
Pension and postretirement benefits loss, net of tax					(87.5)	(87.5)
Net gain on derivative instruments, net of tax					6.7	6.7
Foreign currency translation					(0.9)	(0.9)
Cash Dividends:						
Common @ \$0.72 per share			(34.8)			(34.8)
Purchases of treasury stock				(123.9)		(123.9)
Share-based compensation plans		7.7		1.1		8.8
Stock options exercised	0.1	0.4				0.5
Tax shortfall on share-based compensation		(1.2)				(1.2)
Balances at June 30, 2016	276.3	273.5	1,308.9	(343.9)	(409.9)	1,104.9
Net income			47.0			47.0
Pension and postretirement benefits gain, net of tax					45.3	45.3
Net gain on derivative instruments, net of tax					19.5	19.5
Foreign currency translation					2.0	2.0
Cash Dividends:						
Common @ \$0.72 per share			(34.1)			(34.1)
Share-based compensation plans		10.4		2.3		12.7
Stock options exercised	0.4	1.8				2.2
Tax shortfall on share-based compensation		(0.9)				(0.9)
Balances at June 30, 2017	276.7	284.8	1,321.8	(341.6)	(343.1)	1,198.6
Net income			188.5			188.5
Pension and postretirement benefits gain, net of tax					78.6	78.6
Net gain on derivative instruments, net of tax					26.1	26.1
Foreign currency translation					(1.4)	(1.4)
Cash Dividends:						
Common @ \$0.72 per share			(34.4)			(34.4)
Share-based compensation plans		14.2		2.8		17.0
Stock options exercised	1.9	11.0				12.9
Balances at June 30, 2018	\$ 278.6	\$ 310.0	\$ 1,475.9	\$ (338.8)	\$ (239.8)	\$ 1,485.9

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY (CONTINUED)
For the Years Ended June 30, 2018, 2017 and 2016

	Common Shares		
	Issued	Treasury	Net Outstanding
Balances at June 30, 2015	55,234,942	(4,916,698)	50,318,244
Purchases of treasury stock	—	(3,762,200)	(3,762,200)
Stock options exercised	19,627	—	19,627
Share-based compensation plans	—	24,454	24,454
Balances at June 30, 2016	55,254,569	(8,654,444)	46,600,125
Stock options exercised	95,089	—	95,089
Share-based compensation plans	—	57,966	57,966
Balances at June 30, 2017	55,349,658	(8,596,478)	46,753,180
Stock options exercised	362,571	—	362,571
Share-based compensation plans	—	75,993	75,993
Balances at June 30, 2018	55,712,229	(8,520,485)	47,191,744

See accompanying notes to consolidated financial statements.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Summary of Significant Accounting Policies

Basis of Consolidation

The consolidated financial statements include the accounts of the Company and all majority-owned subsidiaries. All significant intercompany accounts and transactions are eliminated. Investments in companies in which the Company exercises significant influence, but which it does not control (generally a 20 to 50 percent ownership interest), are accounted for by the equity method of accounting and the Company's share of their income or loss is included in other income(expense), net in the consolidated statements of income. During fiscal year 2016, the Company sold its only equity method investment in exchange for \$6.3 million in cash and \$12.6 million in a note receivable. During fiscal years 2018 and 2017 the Company received \$6.3 million and \$6.3 million, respectively, related to the note receivable. As of June 30, 2018, the note receivable was fully paid.

Revenue Recognition

Revenue, net of related discounts, rebates, returns and allowances of \$26.5 million, \$23.8 million and \$29.8 million for the years ended June 30, 2018, 2017 and 2016, respectively, is recognized when persuasive evidence of arrangement exists, title and risk of loss has transferred to the customer, collectability is reasonably assured and pricing is fixed and determinable. These criteria are generally met upon shipment or delivery of the product based on the applicable shipping terms. Shipping terms may vary for products shipped outside the United States depending on the mode of transportation, the country where the material is shipped and any agreements made with the customers.

Freight and Handling Fees and Costs

Freight and handling costs billed separately to customers are included as part of net sales, and freight and handling costs expensed are included as part of cost of sales on the consolidated statements of income.

Research and Development

Research and development expenditures, which amounted to \$19.3 million, \$16.9 million and \$16.3 million in fiscal years 2018, 2017 and 2016, respectively, are expensed as incurred and are generally reported in cost of sales in the consolidated statements of income. The research and development expenditures consist principally of salaries and benefits, building costs, utilities and administrative expenses. Substantially all development costs are related to developing new products or designing significant improvements to existing products or processes.

Cash Equivalents

Cash equivalents consist of highly liquid instruments with original maturities of three months or less. Cash equivalents are stated at cost, which approximates market.

Accounts Receivable

Trade receivables are carried at original invoice amount less an estimate made for doubtful receivables based on a review of outstanding amounts. Trade credit is extended based upon periodic evaluation of each customer's ability to perform its obligations. The Company determines accounts receivable allowances based on an aging of accounts and a review of specific accounts identified as collection risks. The Company does not require collateral to secure accounts receivable.

Inventories

Inventories are valued at the lower of cost or market. Cost for inventories is principally determined by the LIFO method. The Company also uses the FIFO and average cost methods. As of June 30, 2018 and 2017, \$138.6 million and \$107.3 million of inventory, respectively, was accounted for using a method other than the LIFO method.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Property, Plant and Equipment and Depreciation

Fixed assets are stated at historical cost less accumulated depreciation. Depreciation for financial reporting purposes is computed by the straight-line method over the estimated useful lives of the assets. Upon disposal, assets and related depreciation are removed from the accounts and the differences between the net amounts and proceeds from disposal are generally included in cost of goods sold in the consolidated statements of income.

Computer Software and Amortization

Computer software is included in other assets on the consolidated balance sheets, and is amortized for financial reporting purposes on a straight-line basis over the respective estimated useful lives ranging from 3 to 7 years. Amortization expense charged to operations related to capitalized software amounted to \$5.1 million, \$5.2 million and \$5.5 million for the years ended June 30, 2018, 2017 and 2016, respectively. The carrying value of computer software net of accumulated amortization at June 30, 2018 and 2017 was \$101.8 million and \$71.0 million, respectively.

Goodwill

Goodwill, net of accumulated impairment losses, representing the excess of the cost over the net tangible and identifiable intangible assets of acquired businesses, is stated at cost. Goodwill is not amortized but instead is annually tested for impairment as of June 30, or more frequently if events or circumstances indicate that the carrying amount of goodwill may be impaired. Such events or circumstances include a decline in general economic conditions, adverse changes in the industry and markets, poor financial performance effecting earnings and cash flows and a trend of negative or declining cash flows over multiple periods. Potential impairment is identified by comparing the fair value of a reporting unit to its carrying value, including goodwill. The fair value is estimated using discounted cash flows and the use of market multiples valuation techniques. These valuation techniques require the use of estimates and assumptions related to projected operating results, capital expenditures and working capital levels as well as the cost of capital. If the carrying value of the reporting unit exceeds its fair value, any impairment loss is measured by comparing the carrying value of the reporting unit's goodwill to its implied fair value.

Intangible assets

The costs of intangible assets, consisting principally of trademarks, trade names, non-compete arrangements, technology and customer relationships are amortized on a straight-line basis over the estimated useful lives ranging from 5 to 30 years.

Impairment of Long-Lived Assets

Long-lived assets, including property, plant and equipment and intangible assets, subject to amortization are reviewed for impairment and written down to fair value whenever events or changes in circumstances indicate that the carrying value may not be recoverable through future undiscounted cash flows. The amount of the impairment loss is the excess of the carrying amount of the impaired assets over the fair value of the assets based upon discounted future cash flows.

Environmental Expenditures

Environmental expenditures that pertain to current operations or to future revenues are expensed or capitalized consistent with the Company's capitalization policy for property, plant and equipment. Expenditures that result from the remediation of an existing condition caused by past operations and that do not contribute to current or future revenues are expensed. Liabilities are recognized for remedial activities when the remediation is probable and the cost can be reasonably estimated. Most estimated liabilities are not discounted to present value due to the uncertainty as to the timing and duration of expected costs. For one former operating facility site, due to the routine nature of the expected costs, the liability for future costs is discounted to present value over 20 years assuming a discount rate of approximately 3 percent as of June 30, 2018 and 2017. The liabilities, net of present value discount, for this former operating site were \$11.0 million and \$11.0 million, as of June 30, 2018 and 2017, respectively.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Derivative Financial Instruments

All derivative financial instruments are recorded on the balance sheet at their fair value and changes in fair value are recorded each period in current earnings or other comprehensive income. The Company enters into derivative financial instruments to hedge certain anticipated transactions, firm commitments or assets and liabilities denominated in foreign currencies. In addition, the Company utilizes interest rate swaps to convert fixed rate debt to floating rate.

At least quarterly, the Company determines hedge effectiveness utilizing regression analysis for measuring the probable high correlation of the expected future cash flows of the hedged item and the derivative hedging instrument. The ineffective portion of hedges is immediately recorded in the consolidated statements of income. If the hedging relationship ceases to be highly effective or it becomes probable that an expected transaction will no longer occur, future gains or losses on the derivative instrument are recorded in the consolidated statements of income.

Foreign Currency Translation

Assets and liabilities of most international operations are translated into U.S. dollars at exchange rates in effect at year-end, and their income statements are translated at the average monthly exchange rates prevailing during the year. The resulting translation gains and losses are recorded each period as a component of accumulated other comprehensive income (loss) until the international entity is sold or liquidated. Gains and losses from transactions denominated in foreign currencies are reported in other income (expense), net in the consolidated statements of income.

Income Taxes

Deferred income taxes are recognized by applying enacted statutory tax rates, applicable to future years, to temporary differences between the tax basis and financial statement carrying values of the Company's assets and liabilities. Valuation allowances are recorded to reduce deferred tax assets to amounts that are more likely than not to be realized.

Significant judgments, estimates and assumptions are required in determining tax return reporting positions and in calculating provisions for income tax, which are based on interpretations of tax regulations and accounting pronouncements. Liabilities are established for uncertain tax positions when it is more likely than not that such positions, if challenged, would not be sustained upon review by taxing authorities. These liabilities are re-evaluated as tax regulations and facts and circumstances change, such as the closing of a tax audit or the expiration of the statute of limitations for a specific exposure.

Earnings per Share

The Company calculates basic and diluted earnings per share using the two class method. Under the two class method, earnings are allocated to common stock and participating securities (restricted stock units that receive non-forfeitable dividends) according to their participation rights in dividends and undistributed earnings. The earnings available to each class of stock are divided by the weighted average number of shares for the period in each class. Diluted earnings per share assume the issuance of common stock for all potentially dilutive share equivalents outstanding.

Concentration of Credit Risk

Financial instruments that are potentially subject to concentrations of credit risk consist primarily of cash and cash equivalents, investments in marketable securities and trade receivables. Investment and cash management policies have been implemented that limit deposit concentrations and limit investments to investment grade securities. The risk with respect to trade receivables is mitigated by monitoring payment terms and periodic credit evaluations we perform on our customers, the short duration of our payment terms and by the diversification of our customer base. During fiscal years 2018, 2017 and 2016, one customer, Arconic, Inc., accounted for approximately 12 percent, 11 percent and 13 percent, respectively, of total net sales. No single customer accounted for 10 percent or more of accounts receivable outstanding at June 30, 2018 and 2017.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications

Certain amounts in the consolidated financial statement for prior years have been reclassified to conform to the fiscal year 2018 presentation.

2. Acquisitions and Divestiture

On February 21, 2018, the Company acquired all of the outstanding membership interests of MB CalRAM LLC (“CalRAM”), for a cash purchase price of \$13.3 million. The acquisition provides the Company with immediate entry into the rapidly expanding part production segment of the additive manufacturing value chain. The purchase price allocation was completed in the fourth quarter of fiscal year 2018 and resulted in the purchase price being allocated to \$0.2 million of working capital, \$2.6 million of property and equipment, \$5.2 million of identifiable intangible assets and \$5.3 million of goodwill.

On February 28, 2017, the Company acquired substantially all the assets of Puris LLC (“Puris”), for a cash purchase price of \$35.3 million. The acquisition provides the Company with immediate entry into the rapidly growing titanium powder market, an expanded presence in additive manufacturing and strengthens the Company’s capabilities as a solutions provider for customers across its end-use markets. The purchase price allocation was completed in the fourth quarter of fiscal year 2017 and resulted in the purchase price being allocated to \$1.7 million of working capital, \$6.5 million of property and equipment, \$8.5 million of identifiable intangible assets and \$18.6 million of goodwill.

On June 29, 2017, the Company divested the Specialty Steel Supply (“SSS”) business. The divestiture was completed in two separate transactions for total cash proceeds of \$12.0 million. In connection with the divestiture, the Company recorded a pretax loss of \$3.2 million. The operations of the SSS business were historically included in our Performance Engineered Products (“PEP”) segment. The Company does not have any significant continuing involvement in the operations of SSS after the divestiture.

3. Restructuring Charges and Asset Impairment Charges

There were no restructuring or asset impairment charges during fiscal years 2018 and 2017. Restructuring and asset impairment charges for the year ended June 30, 2016 were \$18.0 million.

During the year ended June 30, 2016, the Company recorded \$10.4 million of pre-tax charges, consisting of \$9.4 million associated with an early retirement incentive funded by the Company’s qualified pension plan, \$0.7 million of other severance costs paid by the Company in fiscal year 2016 and \$0.3 million of other severance related costs paid by the Company in fiscal year 2017. At this time, the Company does not expect any additional charges related to these restructuring actions in the future.

As a result of the prolonged weakness in oil and gas drilling and exploration activities and the impact this weakness had on certain reporting units in the PEP segment, the Company recognized non-cash impairment pre-tax charges of \$7.6 million on certain long-lived assets, including \$6.5 million related to property, plant and equipment and \$1.1 million associated with certain definite lived intangible assets during the year ended June 30, 2016.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

4. Earnings per Common Share

The calculations of basic and diluted earnings per common share for the years ended June 30, 2018, 2017 and 2016 were as follows:

(in millions, except per share data)	Years Ended June 30,		
	2018	2017	2016
Net income	\$ 188.5	\$ 47.0	\$ 11.3
Less: earnings and dividends allocated to participating securities	(1.7)	(0.3)	(0.1)
Earnings available for common shareholders used in calculation of basic earnings per share	\$ 186.8	\$ 46.7	\$ 11.2
Weighted average number of common shares outstanding, basic	47.2	47.0	48.1
Basic earnings per common share	\$ 3.96	\$ 0.99	\$ 0.23
Net income	\$ 188.5	\$ 47.0	\$ 11.3
Less: earnings and dividends allocated to participating securities	(1.7)	(0.3)	(0.1)
Earnings available for common shareholders used in calculation of diluted earnings per share	\$ 186.8	\$ 46.7	\$ 11.2
Weighted average number of common shares outstanding, basic	47.2	47.0	48.1
Effect of shares issuable under share-based compensation plans	0.4	0.1	0.1
Weighted average number of common shares outstanding, diluted	47.6	47.1	48.2
Diluted earnings per common share	\$ 3.92	\$ 0.99	\$ 0.23

The following awards issued under share-based compensation plans were excluded from the calculations of diluted earnings per share above because their effects were anti-dilutive:

(in millions)	Years Ended June 30,		
	2018	2017	2016
Stock options	0.7	1.9	1.5

5. Inventories

Inventories consisted of the following components at June 30, 2018 and 2017 :

(\$ in millions)	June 30,	
	2018	2017
Raw materials and supplies	\$ 157.5	\$ 152.8
Work in process	372.5	365.6
Finished and purchased products	159.2	172.0
Total inventory	\$ 689.2	\$ 690.4

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

If the FIFO method of inventory had been used instead of the LIFO method, inventories would have been \$210.3 million and \$106.1 million higher as of June 30, 2018 and 2017, respectively. Current cost of LIFO-valued inventories was \$760.8 million at June 30, 2018 and \$689.2 million at June 30, 2017. The reductions in LIFO-valued inventories decreased cost of sales by \$0.6 million during fiscal year 2018 and \$0.0 million during fiscal year 2017 and \$0.0 million during fiscal year 2016.

During fiscal year 2016, the Company recorded a \$22.5 million charge for excess inventory adjustments in certain reporting units in the PEP segment due to the prolonged weakness in oil and gas businesses.

6. Property, Plant and Equipment

Property, plant and equipment consisted of the following components at June 30, 2018 and 2017:

(\$ in millions)	June 30,	
	2018	2017
Land	\$ 34.8	\$ 34.1
Buildings and building equipment	500.0	495.7
Machinery and equipment	2,129.0	2,082.4
Construction in progress	83.6	56.3
Total at cost	2,747.4	2,668.5
Less: accumulated depreciation and amortization	1,434.0	1,351.7
Total property, plant, and equipment	\$ 1,313.4	\$ 1,316.8

The estimated useful lives of depreciable assets are as follows:

Asset Category	Useful Life (in Years)
Buildings and building equipment	10 – 45
Machinery and equipment	3 – 30

As a result of the prolonged weakness in oil and gas drilling and exploration activities and the impact this weakness had on certain reporting units in the PEP segment, the Company recorded an impairment charge related to property, plant and equipment of \$6.5 million during fiscal year 2016.

Depreciation for the years ended June 30, 2018, 2017 and 2016 was \$104.7 million, \$105.8 million and \$106.5 million, respectively.

7. Goodwill and Other Intangible Assets, Net

Goodwill

The Company conducts goodwill impairment testing at least annually as of June 30, or more often if events, changes or circumstances indicate that the carrying amount may not be recoverable.

The Company has determined there was no goodwill impairment for the years ended June 30, 2018 and 2017. As a result of prolonged weakness in oil and gas drilling and exploration activity, the Company determined that the goodwill associated with 2 reporting units was impaired and recorded an impairment charge of \$12.5 million during the year ended June 30, 2016 which represented the entire balance of the goodwill recorded for these reporting units.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The changes in the carrying amount of goodwill by reportable segment for fiscal years 2018 and 2017 were as follows:

(\$ in millions)	June 30, 2016	Acquisition	June 30, 2017	Acquisition	June 30, 2018
Goodwill	\$ 292.0	\$ 18.6	\$ 310.6	\$ 5.3	\$ 315.9
Accumulated impairment losses	(47.2)	—	(47.2)	—	(47.2)
Total goodwill	<u>\$ 244.8</u>	<u>\$ 18.6</u>	<u>\$ 263.4</u>	<u>\$ 5.3</u>	<u>\$ 268.7</u>
Specialty Alloys Operations	\$ 195.5	\$ —	\$ 195.5	\$ —	\$ 195.5
Performance Engineered Products	49.3	18.6	67.9	5.3	73.2
Total goodwill	<u>\$ 244.8</u>	<u>\$ 18.6</u>	<u>\$ 263.4</u>	<u>\$ 5.3</u>	<u>\$ 268.7</u>

Other Intangible Assets, Net

(\$ in millions)	Useful Life (in Years)	June 30, 2018			June 30, 2017		
		Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Trademarks and trade names	15 - 30	\$ 33.5	\$ (23.2)	\$ 10.3	\$ 33.5	\$ (21.9)	\$ 11.6
Customer relationships	10 - 15	76.9	(30.8)	46.1	73.3	(25.8)	47.5
Non-compete agreements	5	0.2	(0.1)	0.1	0.2	—	0.2
Technology	15	7.3	(0.5)	6.8	5.7	(0.1)	5.6
Total		<u>\$ 117.9</u>	<u>\$ (54.6)</u>	<u>\$ 63.3</u>	<u>\$ 112.7</u>	<u>\$ (47.8)</u>	<u>\$ 64.9</u>

As a result of the prolonged weakness in oil and gas drilling and exploration activities and the impact this weakness had on certain reporting units in the PEP segment, the Company recorded an impairment charge of \$1.1 million related to definite lived intangible assets during fiscal year 2016.

The Company recorded \$6.8 million of amortization expense related to intangible assets during fiscal year 2018, \$6.8 million during fiscal year 2017 and \$7.3 million during fiscal year 2016. The estimated annual amortization expense related to intangible assets for each of the succeeding five fiscal years is \$6.9 million in fiscal years 2019, 2020, 2021, 2022 and 2023.

8. Accrued Liabilities

Accrued liabilities consisted of the following as of June 30, 2018 and 2017:

(\$ in millions)	June 30,	
	2018	2017
Accrued compensation and benefits	\$ 83.3	\$ 59.1
Accrued postretirement benefits	15.4	15.5
Accrued interest expense	10.4	11.2
Deferred revenue	10.4	9.8
Accrued pension liabilities	3.3	3.3
Accrued income taxes	1.4	5.1
Derivative financial instruments	—	13.1
Other	24.4	22.8
Total accrued liabilities	<u>\$ 148.6</u>	<u>\$ 139.9</u>

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

9. Debt

On March 31, 2017, the Company entered into a \$400.0 million syndicated credit facility (“Credit Agreement”) that extends to March 2022. Interest on the borrowings under the Credit Agreement accrue at variable rates, based upon LIBOR or a defined “Base Rate,” both determined based upon the rating of the Company’s senior unsecured long-term debt (the “Debt Rating”). The applicable margin to be added to LIBOR ranges from 1.00% to 1.75% (1.50% as of June 30, 2018), and for Base Rate-determined loans, from 0.00% to 0.75% (0.50% as of June 30, 2018). The Company also pays a quarterly commitment fee ranging from 0.125% to 0.400% (0.275% as of June 30, 2018), determined based upon the Debt Rating, of the unused portion of the \$400.0 million commitment under the Credit Agreement. In addition, the Company must pay certain letter of credit fees, ranging from 1.00% to 1.75% (1.50% as of June 30, 2018), with respect to letters of credit issued under the Credit Agreement. The Company has the right to voluntarily prepay and re-borrow loans and to terminate or reduce the commitments under the facility. As of June 30, 2018 , the Company had \$6.0 million of issued letters of credit under the Credit Agreement, with the balance of \$394.0 million available to the Company.

The Company is subject to certain financial and restrictive covenants under the Credit Agreement, which, among other things, require the maintenance of a minimum interest coverage ratio of 3.50 to 1.00 . The interest coverage ratio is defined in the Credit Agreement as, for any period, the ratio of consolidated earnings before interest, taxes, depreciation and amortization and non-cash net pension expense (“EBITDA”) to consolidated interest expense for such period. The Credit Agreement also requires the Company to maintain a debt to capital ratio of less than 55 percent. The debt to capital ratio is defined in the Credit Agreement as the ratio of consolidated indebtedness, as defined therein, to consolidated capitalization, as defined therein. As of June 30, 2018 , the Company was in compliance with all of the covenants of the Credit Agreement.

Long-term debt outstanding as of June 30, 2018 and 2017 consisted of the following:

(\$ in millions)	June 30,	
	2018	2017
Medium-term notes, Series B at 6.97% to 7.10% due from April 2018 to May 2018 (face value of \$0.0 and \$55.0 million at June 30, 2018 and 2017, respectively)	\$ —	\$ 55.0
Senior unsecured notes, 5.20% due July 2021 (face value of \$250.0 million at June 30, 2018 and 2017)	246.6	251.2
Senior unsecured notes, 4.45% due March 2023 (face value of \$300.0 million at June 30, 2018 and 2017)	299.1	298.8
Total	545.7	605.0
Less: amounts due within one year	—	(55.0)
Long-term debt, net of current portion	\$ 545.7	\$ 550.0

Aggregate maturities of long-term debt for the five years subsequent to June 30, 2018 , are \$0.0 million in fiscal years 2019 , 2020 , 2021, \$250.0 million in 2022, and \$300.0 million in 2023.

For the years ended June 30, 2018 , 2017 and 2016 , interest costs totaled \$31.1 million , \$31.1 million and \$29.9 million , respectively, of which \$2.8 million , \$1.3 million and \$1.9 million , respectively, were capitalized as part of the cost of property, plant, equipment and software.

10. Pension and Other Postretirement Benefits

The Company provides several noncontributory defined benefit pension plans to certain employees. The plans provide defined benefits based on years of service and final average salary.

In September 2016, the Company announced changes to retirement plans it offers to certain employees. The Company froze benefits accrued to eligible participants of its largest qualified defined benefit pension plan and certain non-qualified benefit plans effective December 31, 2016. The Company recognized the plan freeze during fiscal year 2017 as a curtailment, since it eliminated the accrual of defined benefits for future services for a significant number of participants. The impact of the curtailment included a one-time accelerated recognition of outstanding unamortized prior service costs of \$0.5 million . The curtailment event triggered a re-measurement for the affected benefit plans as of August 31, 2016 using a weighted average discount rate of 3.57 percent . The re-measurement resulted in a reduction of accrued pension liabilities of \$18.7 million .

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Company made a minimum required contribution of \$6.7 million and a voluntary contribution of \$ 100.0 million during fiscal years 2018 and 2017, respectively, to its qualified defined benefit pension plans.

The Company also provides other postretirement benefit plans to certain of its employees. The postretirement benefit plans consist of health care and life insurance plans. Plan assets are maintained in a Voluntary Employee Benefit Association (“VEBA”) Trust. During fiscal years 2018 and 2017, the Company funded benefit payments using assets in the VEBA Trust. In fiscal year 2016, benefit payments for these plans were funded by the Company assets.

The following provides a reconciliation of benefit obligations, plan assets and funded status of the plans:

(\$ in millions)	Pension Plans		Other Postretirement Plans	
	2018	2017	2018	2017
Change in projected benefit obligation:				
Projected benefit obligation at beginning of year	\$ 1,369.1	\$ 1,404.4	\$ 255.1	\$ 246.0
Service cost	9.5	20.5	2.6	3.6
Interest cost	52.1	50.3	9.5	9.2
Benefits paid	(89.8)	(92.0)	(13.0)	(12.7)
Actuarial (gains) loss	(76.6)	39.3	(12.7)	(1.7)
Special termination benefits	0.2	0.6	—	—
Curtailment gain	—	(72.6)	—	—
Plan amendments	—	18.6	—	10.7
Projected benefit obligation at end of year	1,264.5	1,369.1	241.5	255.1
Change in plan assets:				
Fair value of plan assets at beginning of year	987.6	885.1	117.0	115.6
Actual return	64.7	91.1	10.6	10.9
Benefits paid	(89.8)	(92.0)	(13.0)	(12.7)
Contributions	10.0	103.4	3.3	3.2
Fair value of plan assets at end of year	972.5	987.6	117.9	117.0
Funded status of the plans	\$ (292.0)	\$ (381.5)	\$ (123.6)	\$ (138.1)
Amounts recognized in the consolidated balance sheets:				
Other assets - noncurrent	\$ 0.1	\$ 0.1	\$ —	\$ —
Accrued liabilities - current	(3.3)	(3.3)	(15.4)	(15.5)
Accrued pension liabilities - noncurrent	(288.8)	(378.3)	—	—
Accrued postretirement benefits - noncurrent	—	—	(108.2)	(122.6)
	\$ (292.0)	\$ (381.5)	\$ (123.6)	\$ (138.1)

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(\$ in millions)	Pension Plans		Other Postretirement Plans	
	2018	2017	2018	2017
Amounts recognized in accumulated other comprehensive loss:				
Net actuarial loss	\$ 362.1	\$ 451.3	\$ 32.9	\$ 52.2
Prior service cost (credit)	16.2	18.3	(23.1)	(28.2)
Total	\$ 378.3	\$ 469.6	\$ 9.8	\$ 24.0
Other changes in plan assets and benefit obligations recognized in other comprehensive loss consist of:				
Net actuarial gain	\$ (75.0)	\$ (59.1)	\$ (16.3)	\$ (5.7)
Amortization of net loss	(13.5)	(37.8)	(2.9)	(3.2)
Prior service cost	—	18.6	—	10.7
Amortization of prior service (cost) benefit	(2.1)	(1.8)	5.2	6.5
Total, before tax effect	\$ (90.6)	\$ (80.1)	\$ (14.0)	\$ 8.3
Additional information:				
Accumulated benefit obligation for all pension plans	\$ 1,257.8	\$ 1,362.8	N/A	N/A

The following is additional information related to plans with projected benefit obligations in excess of plan assets as of June 30, 2018 and 2017 :

(\$ in millions)	Pension Plans		Other Postretirement Plans	
	2018	2017	2018	2017
Projected benefit obligation	\$ 1,264.4	\$ 1,369.0	\$ 241.5	\$ 255.1
Fair value of plan assets	\$ 972.4	\$ 987.4	\$ 117.9	\$ 117.0

The following additional information is for plans with accumulated benefit obligations in excess of plan assets as of June 30, 2018 and 2017 :

(\$ in millions)	Pension Plans		Other Postretirement Plans	
	2018	2017	2018	2017
Accumulated benefit obligation	\$ 1,257.7	\$ 1,362.7	\$ 241.5	\$ 255.1
Fair value of plan assets	\$ 972.4	\$ 987.4	\$ 117.9	\$ 117.0

The components of the net periodic benefit cost related to the Company's pension and other postretirement benefits for the years ended June 30, 2018 , 2017 and 2016 are as follows:

(\$ in millions)	Pension Plans			Other Postretirement Plans		
	2018	2017	2016	2018	2017	2016
Service cost	\$ 9.5	\$ 20.5	\$ 31.2	\$ 2.6	\$ 3.6	\$ 3.3
Interest cost	52.1	50.3	58.0	9.5	9.2	10.4
Expected return on plan assets	(65.9)	(65.1)	(66.1)	(6.9)	(6.9)	(7.0)
Amortization of net loss	13.5	37.8	27.4	2.9	3.2	2.7
Amortization of prior service cost (benefit)	2.1	1.8	0.4	(5.2)	(6.5)	(6.5)
Curtailment loss	—	0.5	—	—	—	—
Net periodic benefit costs	\$ 11.3	\$ 45.8	\$ 50.9	\$ 2.9	\$ 2.6	\$ 2.9

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The service cost component of the Company's net pension expense, which represents the estimated cost of future pension liabilities earned associated with active employees, is included in the operating income of the business segments. The residual net pension expense, which is comprised of the expected return on plan assets, interest costs on the projected benefit obligations of the plans, and amortization of actuarial gains and losses and prior service costs, is included under the heading "Pension earnings, interest & deferrals" in the segment data presented in Note 19 .

During the year ended June 30, 2016, the Company offered an early retirement incentive to certain employees. As a result of the incentive, \$9.4 million was paid from the Company's qualified pension plan consisting of various personnel-related costs to cover severance payments.

Weighted-average assumptions used to determine benefit obligations at fiscal year end	Pension Plans		Other Postretirement Plans	
	2018	2017	2018	2017
Discount rate	4.32%	3.92%	4.32%	3.89%
Rate of compensation increase	3.44%	3.50%	N/A	N/A

Weighted-average assumptions used to determine net periodic benefit cost for the fiscal year	Pension Plans			Other Postretirement Plans		
	2018	2017	2016	2018	2017	2016
Discount rate	3.92%	3.91%	4.50%	3.89%	3.86%	4.50%
Expected long-term rate of return on plan assets	6.87%	6.88%	6.92%	6.25%	6.25%	6.25%
Long-term rate of compensation increase	3.44%	3.50%	3.49%	N/A	N/A	N/A

The following table shows the expected health care rate increase and the future rate and time at which it is expected to remain constant:

	June 30,	
	2018	2017
Assumed health care cost trend rate	6.50%	7.00%
Rate to which the cost trend rate is assumed to decline and remain (the ultimate trend rate)	5.00%	5.00%
Year that the rate reaches the ultimate trend rate	2022	2022

Assumed health care cost trend rates have an effect on the amounts reported for other postretirement benefits. A one percentage point increase in the assumed health care cost trend rate would increase service and interest cost by \$0.1 million and increase the postretirement benefit obligation by \$2.6 million . A one percentage point decrease in the assumed health care cost trend rate would decrease service and interest cost by \$0.1 million and decrease the postretirement benefit obligation by \$2.3 million .

Amounts in other comprehensive loss (gain) that are expected to be recognized as components of net periodic benefit cost in the year ended June 30, 2019 are:

(\$ in millions)	Pension Plans	Other Postretirement Plans	Total
Amortization of prior service cost (benefit)	\$ 2.1	\$ (5.2)	\$ (3.1)
Amortization of net actuarial loss	10.4	1.7	12.1
Amortization of accumulated other comprehensive loss (gain)	\$ 12.5	\$ (3.5)	\$ 9.0

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Company's U.S. pension plans' weighted-average asset allocations at June 30, 2018 and 2017, by asset category are as follows:

	2018	2017
Equity securities	55.7%	55.0%
Fixed income securities	44.3	45.0
Total	100.0%	100.0%

The Company's policy for developing a pension plan investment strategy includes the periodic development of an asset and liability study by an independent investment consultant. Management considers this study in establishing an asset allocation that is presented to and approved by the Company's Retirement Plan Committee.

Based on the current funding level, the allocation policy for the Company's largest pension plan assets is to have approximately 60 percent in return seeking assets and 40 percent in liability matching assets. Return seeking assets include domestic and international equities and diversified loan funds. Liability matching assets include long duration bond funds. As the funding level of the plans improves in increments of 5 percent, assets will be shifted from return seeking to liability matching in increments of 4 percent as a de-risking strategy. The assets related to the Company's other postretirement benefit plans were invested in approximately 87 percent U.S. equities and 13 percent fixed income securities as of June 30, 2018. Management establishes the expected long-term rate of return assumption by reviewing historical trends and analyzing the current and projected market conditions in relation to the plan's asset allocation and risk management objectives. In determining the expected long-term rate of return, the Company considered historical returns for individual asset classes and the impact of active portfolio management.

The fair values of the Company's pension plan assets as of June 30, 2018 and 2017, by asset category and by the levels of inputs used to determine fair value were as follows:

(\$ in millions)	June 30, 2018			
	Fair Value Measurements Using Input Type		Net Asset Value	Total
	Level 1	Level 2		
Short-term investments	\$ 2.5	\$ 14.6	\$ —	\$ 17.1
Domestic and international equities	156.4	—	—	156.4
Commingled funds	—	—	365.3	365.3
Limited partnerships	—	—	43.3	43.3
Government agency bonds	3.5	151.6	—	155.1
Corporate bonds	—	226.3	—	226.3
Mutual funds	—	—	1.8	1.8
Mortgage/asset backed securities and other	—	7.2	—	7.2
	\$ 162.4	\$ 399.7	\$ 410.4	\$ 972.5

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

June 30, 2017				
(\$ in millions)	Fair Value Measurements Using Input Type		Net Asset Value	Total
	Level 1	Level 2		
Short-term investments	\$ 9.4	\$ 14.6	\$ —	\$ 24.0
Domestic and international equities	148.3	—	—	148.3
Commingled funds	—	—	376.6	376.6
Limited partnerships	—	—	42.3	42.3
Government agency bonds	3.4	151.0	—	154.4
Corporate bonds	—	236.2	—	236.2
Mutual funds	—	—	1.8	1.8
Mortgage/asset backed securities and other	—	4.0	—	4.0
	<u>\$ 161.1</u>	<u>\$ 405.8</u>	<u>\$ 420.7</u>	<u>\$ 987.6</u>

The fair values of the Company's other postretirement benefit plans as of June 30, 2018 and 2017, by asset category and by the level of inputs used to determine fair value, were as follows:

June 30, 2018				
(\$ in millions)	Fair Value Measurements Using Input Type		Net Asset Value	Total
	Level 1	Level 2		
Commingled fund	\$ —	\$ —	\$ 80.3	\$ 80.3
Short-term investments	—	23.0	—	23.0
Government agency bonds	—	8.7	—	8.7
Corporate bonds and other	—	5.4	—	5.4
Mortgage backed securities	—	0.5	—	0.5
	<u>\$ —</u>	<u>\$ 37.6</u>	<u>\$ 80.3</u>	<u>\$ 117.9</u>

June 30, 2017				
(\$ in millions)	Fair Value Measurements Using Input Type		Net Asset Value	Total
	Level 1	Level 2		
Commingled fund	\$ —	\$ —	\$ 73.0	\$ 73.0
Short-term investments	—	22.4	—	22.4
Government agency bonds	—	12.2	—	12.2
Corporate bonds and other	—	8.2	—	8.2
Mortgage backed securities	—	1.2	—	1.2
	<u>\$ —</u>	<u>\$ 44.0</u>	<u>\$ 73.0</u>	<u>\$ 117.0</u>

A financial instrument's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement. Investments in domestic and international equities are generally valued at the closing price reported on the active market on which they are traded. Commingled funds, limited partnerships and mutual funds are valued based on the net asset value ("NAV") established for the fund at each valuation date. The NAV is based on the value of the underlying assets owned by the fund, minus its liabilities, and then divided by the number of units/shares outstanding. Corporate and government agency bonds and other fixed income securities are valued using closing bid prices on an active market when possible, otherwise using evaluated bid prices.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Cash Flows — Employer Contributions

The Company made contributions to the qualified U.S. pension plans of \$6.7 million , \$100.0 million and \$0.0 million during fiscal years 2018 , 2017 and 2016 , respectively. The Company currently expects to make \$5.5 million in required cash pension contributions to the qualified defined benefit pension plans during fiscal year 2019 . During the years ended June 30, 2018 , 2017 and 2016 , the Company made contributions of \$3.3 million , \$3.5 million and \$3.2 million to other non-qualified pension plans, respectively.

Estimated Future Benefit Payments

The following benefit payments, which reflect expected future service, as appropriate, are expected to be paid. Pension benefits are currently paid from plan assets and other benefits are currently paid from corporate assets.

(\$ in millions)	Pension Benefits	Other Benefits
2019	\$ 83.8	\$ 15.4
2020	\$ 84.6	\$ 15.4
2021	\$ 85.3	\$ 15.4
2022	\$ 85.9	\$ 15.4
2023	\$ 86.3	\$ 15.3
2024-2028	\$ 423.7	\$ 74.6

Other Benefit Plans

Carpenter also maintains defined contribution retirement and savings plans for substantially all domestic employees. Company contributions to the plans were \$22.6 million in fiscal year 2018 , \$16.7 million in fiscal year 2017 and \$11.8 million in fiscal year 2016 .

11 . Contingencies and Commitments

Environmental

The Company is subject to various federal, state, local and international environmental laws and regulations relating to pollution, protection of public health and the environment, natural resource damages and occupational safety and health. Although compliance with these laws and regulations may affect the costs of the Company's operations, compliance costs to date have not been material. The Company has environmental remediation liabilities at some of its owned operating facilities and has been designated as a potentially responsible party ("PRP") with respect to certain third party Superfund waste-disposal sites and other third party-owned sites. Additionally, the Company has been notified that it may be a PRP with respect to other Superfund sites as to which no proceedings have been instituted against the Company. Neither the exact amount of remediation costs nor the final method of their allocation among all designated PRPs at these Superfund sites have been determined. Accordingly, at this time, we cannot reasonably estimate expected costs for such matters. The liability for future environmental remediation costs that can be reasonably estimated is evaluated by management on a quarterly basis. The Company accrues amounts for environmental remediation costs that represent management's best estimate of the probable and reasonably estimable future costs related to environmental remediation. For fiscal year 2018 , the Company had no change to the liability for a company-owned former operating site. During fiscal year 2017 , the Company decreased the liability for a company-owned former operating site by \$0.1 million . During fiscal year 2016 , the Company increased the liability for a company-owned former operating site by \$0.3 million . The liabilities recorded for environmental remediation costs at Superfund sites, other third party-owned sites and Carpenter-owned current or former operating facilities remaining at June 30, 2018 and 2017 were \$16.1 million and \$16.1 million , respectively.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Other

The Company is defending various routine claims and legal actions that are incidental to its business and common to its operations, including those pertaining to product claims, commercial disputes, patent infringement, employment actions, employee benefits, compliance with domestic and foreign laws, personal injury claims and tax issues. Like many other manufacturing companies in recent years, the Company, from time to time, has been named as a defendant in lawsuits alleging personal injury as a result of exposure to chemicals and substances in the workplace. The Company provides for costs relating to these matters when a loss is probable and the amount of the loss is reasonably estimable. The effect of the outcome of these matters on the Company's future results of operations and liquidity cannot be predicted because any such effect depends on future results of operations and the amount and timing (both as to recording future charges to operations and cash expenditures) of the resolution of such matters. While it is not feasible to determine the outcome of these matters, management believes that the total liability from these matters will not have a material effect on the Company's financial position, results of operations or cash flows over the long-term. However, there can be no assurance that an increase in the scope of pending matters or that any future lawsuits, claims, proceedings or investigations will not be material to the Company's financial position, results of operations or cash flows in a particular future quarter or year.

The Company has entered into purchase agreements primarily for various key raw materials at market related prices, all made in the normal course of business. The commitments include both fixed and variable price provisions. Raw material prices as of June 30, 2018 were used for commitments with variable pricing. The purchase commitments covered by these agreements aggregate to \$172.2 million as of June 30, 2018. Of this amount \$170.7 million relates to fiscal year 2019 and \$1.5 million to fiscal year 2020.

12. Share Repurchase Program

In October 2014, the Company's Board of Directors authorized a share repurchase program. The program authorized the purchase of up to \$500.0 million of the Company's outstanding common stock and expired in October 2016. The shares were repurchased from time to time at the Company's discretion based on capital needs of the business, general market conditions and market price of the stock. During the years ended June 30, 2018 and 2017, the Company did not purchase shares of its common stock on the open market.

13. Operating Leases

The Company leases certain facilities and equipment under operating leases. Total rent expense was \$13.4 million, \$13.2 million and \$11.3 million for the fiscal years ended June 30, 2018, 2017 and 2016, respectively.

Future minimum payments for non-cancellable operating leases in effect at June 30, 2018 are: \$9.1 million in fiscal year 2019, \$7.0 million in fiscal year 2020, \$3.9 million in fiscal year 2021, \$2.9 million in fiscal year 2022, \$2.7 million in fiscal year 2023 and \$2.9 million thereafter.

14. Fair Value Measurements

The fair value hierarchy has three levels based on the inputs used to determine fair value. Level 1 refers to quoted prices in active markets for identical assets or liabilities. Level 2 refers to observable inputs other than quoted prices included in Level 1, such as quoted prices for similar assets and liabilities in active markets; quoted prices for identical or similar assets and liabilities in markets that are not active; or other inputs that are observable or can be corroborated by observable market data. Level 3 refers to unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets and liabilities. This includes certain pricing models, discounted cash flow methodologies and similar techniques that use significant unobservable inputs.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The following tables present the Company's assets and liabilities that are measured at fair value on a recurring basis and are categorized using the fair value hierarchy:

June 30, 2018		Fair Value Measurements Using Input Type	
(\$ in millions)		Level 2	Total
Assets:			
Marketable securities			
Municipal auction rate securities	\$	2.9	\$ 2.9
Derivative financial instruments		35.2	35.2
Total assets	\$	38.1	\$ 38.1
Liabilities:			
Derivative financial instruments	\$	3.4	\$ 3.4

June 30, 2017		Fair Value Measurements Using Input Type	
(\$ in millions)		Level 2	Total
Assets:			
Marketable securities			
Municipal auction rate securities	\$	3.4	\$ 3.4
Derivative financial instruments		14.5	14.5
Total assets	\$	17.9	\$ 17.9
Liabilities:			
Derivative financial instruments	\$	19.1	\$ 19.1

The Company's derivative financial instruments consist of commodity forward contracts, foreign currency forward contracts, interest rate swaps and forward interest rate swaps. These instruments are measured at fair value using the market method valuation technique. The inputs to this technique utilize information related to foreign exchange rates, commodity prices and interest rates published by third party leading financial news and data providers. This is observable data; however, the valuation of these instruments is not based on actual transactions for the same instruments and, as such, they are classified as Level 2. The Company's use of derivatives and hedging policies are more fully discussed in Note 16 .

The Company has currently chosen not to elect the fair value option for any items that are not already required to be measured at fair value in accordance with accounting principles generally accepted in the United States of America.

The carrying amounts of other financial instruments not listed in the table below approximate fair value due to the short-term nature of these items. The carrying amounts and estimated fair values of the Company's financial instruments not recorded at fair value in the financial statements were as follows:

(\$ in millions)	June 30, 2018		June 30, 2017	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Long-term debt, including current portion	\$ 545.7	\$ 558.3	\$ 605.0	\$ 622.5
Company-owned life insurance	\$ 16.4	\$ 16.4	\$ 15.9	\$ 15.9

The fair values of long-term debt as of June 30, 2018 and June 30, 2017 were determined by using current interest rates for debt with terms and maturities similar to the Company's existing debt arrangements and accordingly would be classified as Level 2 inputs in the fair value hierarchy.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The carrying amount of company-owned life insurance reflects cash surrender values based upon the market values of underlying securities, using Level 2 inputs, net of any outstanding policy loans. The carrying value associated with the cash surrender value of these policies is recorded in other assets in the accompanying consolidated balance sheets.

For purposes of performing Step 1 of goodwill impairment testing, the Company uses certain nonrecurring fair value measurements using significant unobservable inputs (Level 3). Fair value of each reporting unit for purposes of the goodwill impairment test is based on a weighting of an income approach and a market approach. Under the income approach, fair value is determined based on a discounted cash flow analysis that uses estimates of cash flows discounted to present value using rates commensurate with the risks associated with those cash flows. Under the market approach, a market-based value is derived by relating multiples for earnings and cash flow measures for a group of comparable public companies to the same measure for each reporting unit to estimate fair value. The assumptions used by the Company to determine fair value of the reporting units are similar to those that would be used by market participants performing valuations.

15. Share-Based Compensation

The Company has two share-based compensation plans: Amended and Restated Stock-Based Incentive Compensation Plan for Officers and Key Employees (the “Omnibus Plan”) and the Stock-Based Compensation Plan for Non-Employee Directors (“Director’s Plan”). The Company recognizes compensation cost based on the fair value of the awards on the date of grant. The compensation cost is recognized over the requisite service period of the award, which is generally the shorter of the vesting period that the holder is required to provide service, or the period from the grant date to the date on which the employee is eligible to retire. Upon retirement, as defined in the Company’s share-based compensation plans, outstanding awards are subject to certain accelerated vesting terms.

Awards granted under the share-based compensation plans are paid from shares held in treasury and newly issued shares. The total compensation cost that has been charged against income related to these share-based compensation plans was \$17.6 million, \$13.0 million and \$8.7 million for the years ended June 30, 2018, 2017 and 2016, respectively.

Omnibus Plan

The Omnibus Plan provides that the Board of Directors or a designated committee may grant stock options, restricted stock and restricted stock units, and determine the terms and conditions of each grant. The Omnibus Plan provides the Chief Executive Officer with limited authority to grant awards. As of June 30, 2018, 2,567,536 shares were available for awards which may be granted under this plan.

Director’s Plan

The Director’s Plan provides for the granting of stock options and stock units to non-employee directors. As of June 30, 2018, 572,104 shares were available for awards which may be granted under this plan.

Stock Options (all plans)

Stock options granted under the plans above are granted with an exercise price equal to at least the fair market value of the Company’s common stock on the date of grant. The options are typically exercisable after one to three years of service and expire no longer than ten years from the grant date.

The fair value of stock options awarded in fiscal years 2018, 2017 and 2016 was estimated on the date of each grant using a Black-Scholes option pricing model with the following weighted-average assumptions:

	Years Ended June 30,		
	2018	2017	2016
Expected volatility	35%	37%	33%
Dividend yield	1.8%	1.8%	2.0%
Risk-free interest rate	1.8%	1.1%	1.5%
Expected term (in years)	5.0	5.0	5.0

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The assumptions are based on multiple factors, including historical exercise patterns of employees in relatively homogeneous groups with respect to exercise and post-vesting employment termination behaviors, expected future exercising patterns for these same homogeneous groups and the implied volatility of our stock price based on historical performance for the same expected term of the options granted. The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of each grant.

	Number of Awards	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value (\$ in millions)
Outstanding at June 30, 2015	1,507,878	\$ 44.61		
Granted	277,769	\$ 36.31		
Exercised	(19,627)	\$ 25.12		
Forfeited	(64,518)	\$ 47.98		
Outstanding at June 30, 2016	1,701,502	\$ 43.35		
Granted	907,141	\$ 38.98		
Exercised	(95,289)	\$ 23.21		
Forfeited	(80,926)	\$ 44.35		
Expired	(40,000)	\$ 55.12		
Outstanding at June 30, 2017	2,392,428	\$ 42.27		
Granted	252,545	\$ 41.27		
Exercised	(362,571)	\$ 35.70		
Forfeited	(25,915)	\$ 45.27		
Expired	(33,226)	\$ 63.12		
Outstanding at June 30, 2018	2,223,261	\$ 42.88	6.9 years	\$ 22.3
Exercisable at June 30, 2018	1,135,224	\$ 46.26	5.6 years	\$ 8.0

Outstanding and Exercisable Options

Exercise Price Range	Number Outstanding at June 30, 2018	Weighted Average Remaining Contractual Term (in Years)	Weighted Average Exercise Price	Number Exercisable at June 30, 2018	Weighted Average Exercise Price
\$14.17 - \$20.00	25,407	1.1	\$ 17.30	25,407	\$ 17.30
\$20.01 - \$30.00	8,267	0.3	\$ 22.39	8,267	\$ 22.39
\$30.01 - \$40.00	1,043,789	7.7	\$ 38.42	202,240	\$ 36.88
\$40.01 - \$50.00	548,986	7.4	\$ 41.91	302,498	\$ 42.41
\$50.01 - \$63.54	596,812	5.5	\$ 52.95	596,812	\$ 52.95
	2,223,261		\$ 42.88	1,135,224	\$ 46.26

The weighted average grant date fair value of options awarded during fiscal years 2018, 2017 and 2016 was \$11.65, \$10.81 and \$9.27, respectively. Share-based compensation charged against income related to stock options for the years ended June 30, 2018, 2017 and 2016 was \$5.0 million, \$4.7 million and \$3.1 million, respectively. As of June 30, 2018, \$4.1 million of compensation cost related to nonvested stock options will be recognized over a weighted average remaining life of 1.2 years.

Of the options outstanding at June 30, 2018, 2,031,795 relate to the Omnibus Plan and 191,466 relate to the Directors' Plan.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Restricted Stock Unit Awards (Omnibus Plan)

Restricted stock unit awards are granted to employees with performance and/or service conditions. Earned restricted stock unit awards receive non-forfeitable cash dividends during the restriction period. The fair value of the restricted stock unit awards is determined based on the close price of the Company's stock on the grant date.

Performance-based restricted stock unit awards are earned dependent upon how certain performance goals are achieved during a specified performance period according to the terms determined at the date of the grant. These shares typically vest zero to two years from the date of the attainment of the specified performance goals. Compensation cost is determined and charged to expense beginning in the performance period through the vesting period.

Time-based restricted stock unit awards typically vest three years from the date of grant. Compensation cost related to time-based stock unit awards is recognized over the vesting period of the award.

Amounts charged to compensation expense for restricted stock unit awards were \$8.8 million , \$5.0 million and \$2.4 million for the years ended June 30, 2018 , 2017 and 2016 , respectively. As of June 30, 2018 , \$11.0 million of compensation cost related to restricted stock unit awards remains to be recognized over a weighted average remaining life of 1.3 years.

	Number of Awards	Weighted Average Grant Date Fair Value
Restricted Balance at June 30, 2015	127,409	\$ 45.09
Time-based granted	130,742	\$ 35.96
Performance-based granted	49,529	\$ 31.11
Vested	(36,057)	\$ 48.85
Forfeited	(83,154)	\$ 42.14
Restricted Balance at June 30, 2016	188,469	\$ 35.69
Time-based granted	231,195	\$ 38.82
Performance-based granted	55,478	\$ 36.18
Vested	(44,873)	\$ 34.24
Forfeited	(37,792)	\$ 38.80
Restricted Balance at June 30, 2017	392,477	\$ 37.47
Time-based granted	138,718	\$ 41.49
Performance-based granted	124,432	\$ 50.99
Vested	(62,215)	\$ 35.35
Forfeited	(21,384)	\$ 39.48
Restricted Balance at June 30, 2018	572,028	\$ 41.54

Total Stockholder Return Awards

The Company granted Total Stockholder Return ("TSR") awards in fiscal years 2018 , 2017 and 2016 . The TSR awards are granted at a target number of shares. The TSR awards are earned based on the Company's total stockholder return compared to the total stockholder returns of the Russell RSCC Materials & Processing Growth Index at the end of a three -year period. The actual number of shares awarded may range from a minimum of 0 percent of the target shares to a maximum of 200 percent of the target shares. Participants do not have any rights to dividends (or equivalents) during the performance period. The fair value of the TSR awards was estimated using Monte Carlo valuation models. Compensation cost related to TSR awards recognized in fiscal years 2018 , 2017 and 2016 was \$2.8 million , \$2.0 million and \$2.0 million , respectively.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Director Stock Units

According to the provisions of the Director's Plan, on the date of each annual stockholders' meeting or on such other regularly scheduled date as the Board of Directors may determine from time to time in light of the Company's prevailing practices for the grant of equity awards to employees, each Director shall be granted, in place of cash compensation, a number of stock units determined by dividing 50 percent of the Director's annual retainer by the fair market value of the Company's common stock on that date. These stock units vest as to one-quarter of the units for every three months of service following the grant date and are fully vested on the first anniversary of the grant date. At the Director's election, the remaining 50 percent of the annual retainer and 100 percent of committee chair fees may be paid in stock units in lieu of cash. These units are immediately vested.

In addition to the grant of retainer stock units described above, each Director may be granted annually an additional award of stock units as the Board may determine by resolution. These stock units vest as to one-quarter of the units for every three months of service following the grant date and are fully vested on the first anniversary of the grant date.

Additional units are credited to each Director on a quarterly basis to reflect dividend equivalents on the Company's common stock.

In the case of separation from service due to death or disability, all stock units shall immediately vest.

Following a Director's separation from service, or such other elected distribution date or event, the number of stock units credited to the Director's account will be converted to an equivalent number of the Company's common stock.

	Number of Units	Weighted Average Grant Date Fair Value
Outstanding at June 30, 2015	287,436	\$ 35.48
Granted	40,323	\$ 32.54
Dividend equivalents	7,184	\$ —
Outstanding at June 30, 2016	334,943	\$ 38.64
Granted	27,285	\$ 39.69
Distributed	(30,022)	\$ 34.19
Dividend equivalents	6,347	\$ —
Outstanding at June 30, 2017	338,553	\$ 42.47
Granted	21,813	\$ 49.14
Distributed	(35,489)	\$ 35.22
Dividend equivalents	4,869	\$ —
Outstanding at June 30, 2018	329,746	\$ 33.05

Compensation cost is determined using the grant date fair value and charged to expense over the vesting period of one year and amounted to \$1.0 million, \$1.2 million and \$1.2 million for the years ended June 30, 2018, 2017 and 2016, respectively. As of June 30, 2018, \$0.3 million of compensation cost related to director stock units remains to be recognized over a weighted average remaining life of 0.3 years.

16. Derivatives and Hedging Activities

The Company uses commodity forwards, interest rate swaps, forward interest rate swaps and foreign currency forwards to manage risks generally associated with commodity price, interest rate and foreign currency rate fluctuations. The following explains the various types of derivatives and includes a recap about the impact the derivative instruments had on the Company's financial position, results of operations and cash flows.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Cash Flow Hedging — Commodity forward contracts: The Company enters into commodity forward contracts to fix the price of a portion of anticipated future purchases of certain critical raw materials and energy to manage the risk of cash flow variability associated with volatile commodity prices. The commodity forward contracts have been designated as cash flow hedges. The qualifying hedge contracts are marked-to-market at each reporting date and any unrealized gains or losses are included in accumulated other comprehensive income (“AOCI”) to the extent effective, and reclassified to cost of sales in the period during which the hedged transaction affects earnings or it becomes probable that the forecasted transaction will not occur. As of June 30, 2018, the Company had forward contracts to purchase 23.2 million pounds of certain raw materials with settlement dates through December 2023.

Cash Flow Hedging — Forward interest rate swaps: Historically, the Company has entered into forward interest rate swap contracts to manage the risk of cash flow variability associated with fixed interest debt expected to be issued. The forward interest rate swaps were designated as cash flow hedges. The qualifying hedge contracts were marked-to-market at each reporting date and any unrealized gains or losses were included in AOCI to the extent effective, and reclassified to interest expense in the period during which the hedged transaction affects earnings or it becomes probable that the forecasted transaction will not occur. For the years ended June 30, 2018, 2017 and 2016 net gains of \$0.3 million, \$0.3 million, \$0.3 million, respectively, were recorded as a reduction to interest expense. These amounts represent the impact of previously terminated swaps which are being amortized over the remaining term of the underlying debt.

Cash Flow Hedging — Foreign currency forward contracts: The Company uses foreign currency forward contracts to hedge a portion of anticipated future sales denominated in foreign currencies, principally the Euro and Pound Sterling, in order to offset the effect of changes in exchange rates. The qualifying hedge contracts are marked-to-market at each reporting date and any unrealized gains or losses are included in AOCI to the extent effective, and reclassified to net sales in the period during which the transaction affects earnings or it becomes probable that the forecasted transaction will not occur.

The Company also uses foreign currency forward contracts to protect certain short-term asset positions denominated in foreign currencies against the effect of changes in exchange rates. These positions do not qualify for hedge accounting and accordingly are marked-to-market at each reporting date through charges to other income and expense. As of June 30, 2018, the fair value of the outstanding foreign currency forwards not designated as hedging instruments and the charges to income for changes in fair value for these contracts were not material.

Fair Value Hedging — Interest rate swaps: The Company uses interest rate swaps to achieve a level of floating rate debt relative to fixed rate debt. The Company has designated fixed to floating interest rate swaps as fair value hedges. Accordingly, the changes in the fair value of these instruments are immediately recorded in earnings. The mark-to-market values of both the fair value hedging instruments and the underlying debt obligations are recorded as equal and offsetting gains and losses in interest expense in the consolidated statements of income. As of June 30, 2018 and 2017, the total notional amount of floating interest rate contracts was \$150.0 million and \$150.0 million, respectively. For the years ended June 30, 2018, 2017 and 2016, net gains of \$0.4 million, \$1.8 million and \$2.6 million, respectively, were recorded as a reduction to interest expense.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The fair value and location of outstanding derivative contracts recorded in the accompanying consolidated balance sheets were as follows as of June 30, 2018 and 2017 :

June 30, 2018 (\$ in millions)	Interest Rate Swaps	Foreign Currency Contracts	Commodity Contracts	Total Derivatives
Asset Derivatives:				
<i>Derivatives designated as hedging instruments:</i>				
Other current assets	\$ 0.1	\$ 0.4	\$ 15.3	\$ 15.8
Other assets	—	—	19.4	19.4
Total asset derivatives	\$ 0.1	\$ 0.4	\$ 34.7	\$ 35.2
Liability Derivatives:				
<i>Derivatives designated as hedging instruments:</i>				
Accrued liabilities	\$ —	\$ 0.1	\$ —	\$ 0.1
Other liabilities	2.9	—	0.4	3.3
Total liability derivatives	\$ 2.9	\$ 0.1	\$ 0.4	\$ 3.4

June 30, 2017 (\$ in millions)	Interest Rate Swaps	Foreign Currency Contracts	Commodity Contracts	Total Derivatives
Asset Derivatives:				
<i>Derivatives designated as hedging instruments:</i>				
Other current assets	\$ 0.6	\$ 0.2	\$ 6.4	\$ 7.2
Other assets	1.6	—	5.7	7.3
Total asset derivatives	\$ 2.2	\$ 0.2	\$ 12.1	\$ 14.5
Liability Derivatives:				
<i>Derivatives designated as hedging instruments:</i>				
Accrued liabilities	\$ —	\$ 1.0	\$ 12.1	\$ 13.1
Other liabilities	—	—	6.0	6.0
Total liability derivatives	\$ —	\$ 1.0	\$ 18.1	\$ 19.1

Substantially all of the Company's derivative contracts are subject to master netting arrangements, or similar agreements with each counterparty, which provide for the option to settle contracts on a net basis when they settle on the same day and in the same currency. In addition, these arrangements provide for a net settlement of all contracts with a given counterparty in the event that the arrangement is terminated due to the occurrence of default or a termination event. The Company presents the outstanding derivative contracts on a net basis by counterparty in the consolidated balance sheets. If the Company had chosen to present the derivative contracts on a gross basis, the total asset derivatives would have been \$41.7 million and total liability derivatives would have been \$9.9 million as of June 30, 2018.

According to the provisions of the Company's derivative arrangements, in the event that the fair value of outstanding derivative positions with certain counterparties exceeds certain thresholds, the Company may be required to issue cash collateral to the counterparties. As of June 30, 2018 the Company had no cash collateral held by counterparties.

The Company is exposed to credit loss in the event of nonperformance by counterparties on its derivative instruments as well as credit or performance risk with respect to its customer commitments to perform. Although nonperformance is possible, the Company does not anticipate nonperformance by any of the parties. In addition, various master netting arrangements are in place with counterparties to facilitate settlements of gains and losses on these contracts.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Cash Flow Hedges

For derivative instruments that are designated and qualify as cash flow hedges, the effective portion of the gain or loss on the derivative is reported as a component of AOCI and reclassified into earnings in the same period or periods during which the hedged transactions affect earnings or it becomes probable the forecasted transactions will not occur. The following is a summary of the gains (losses) related to cash flow hedges recognized during the years ended June 30, 2018, 2017 and 2016:

(\$ in millions)	Amount of Gain (Loss) Recognized in AOCI on Derivatives (Effective Portion) Years Ended June 30,		
	2018	2017	2016
Derivatives in Cash Flow Hedging Relationship:			
Commodity contracts	\$ 41.4	\$ 9.4	\$ (34.0)
Foreign exchange contracts	(0.4)	(0.1)	0.7
Total	\$ 41.0	\$ 9.3	\$ (33.3)

(\$ in millions)	Location of Gain (Loss) Reclassified from AOCI into Income (Effective Portion)	Amount of Gain (Loss) Reclassified from AOCI into Income (Effective Portion) Years Ended June 30,		
		2018	2017	2016
Derivatives in Cash Flow Hedging Relationship:				
Commodity contracts	Cost of sales	\$ 3.8	\$ (22.8)	\$ (44.6)
Foreign exchange contracts	Net sales	(1.0)	0.5	0.2
Forward interest rate swaps	Interest expense	0.4	0.4	0.4
Total		\$ 3.2	\$ (21.9)	\$ (44.0)

(\$ in millions)	Location of (Loss) Gain Reclassified from AOCI into Income (Ineffective Portion)	Amount of (Loss) Gain Reclassified from AOCI into Income (Ineffective Portion) Years Ended June 30,		
		2018	2017	2016
Derivatives in Cash Flow Hedging Relationship:				
Commodity contracts	Cost of sales	\$ (2.0)	\$ 2.0	\$ 1.5

The Company estimates that \$15.4 million of net derivative gains included in AOCI as of June 30, 2018 will be reclassified into earnings within the next twelve months. No significant cash flow hedges were discontinued during the year ended June 30, 2018.

The changes in AOCI associated with derivative hedging activities during the years ended June 30, 2018, 2017 and 2016 were as follows:

(\$ in millions)	2018	2017	2016
Balance, beginning	\$ (2.3)	\$ (21.8)	\$ (28.5)
Current period changes in fair value, net of tax	26.9	5.8	(20.8)
Reclassification to earnings, net of tax	(0.8)	13.7	27.5
Balance, ending	\$ 23.8	\$ (2.3)	\$ (21.8)

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

17. Income Taxes

In December 2017, an Act to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018 (the “Act”) was enacted. The Act includes provisions that reduce the federal statutory income tax rate from 35 percent to 21 percent, create a territorial tax system with a one-time mandatory tax on previously deferred foreign earnings (i.e. transition tax), and change certain business deductions including allowing for immediate expensing of certain qualified capital expenditures and limitation on deductions of interest expense. Given the Company’s fiscal year ends on June 30, the lower U.S. statutory federal income tax rate is a blended U.S. federal statutory rate of 28.1 percent for our fiscal year ending June 30, 2018.

Income before income taxes for the Company’s domestic and foreign operations was as follows:

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Domestic	\$ 140.3	\$ 56.0	\$ 17.3
Foreign	19.9	14.2	4.2
Income before income taxes	\$ 160.2	\$ 70.2	\$ 21.5

The (benefit) provision for income taxes from continuing operations consisted of the following:

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Current:			
Federal	\$ 22.6	\$ (24.5)	\$ 4.7
State	3.5	(1.1)	0.4
Foreign	6.7	7.2	4.3
Total current	32.8	(18.4)	9.4
Deferred:			
Federal	(66.0)	38.7	0.1
State	4.8	3.5	0.5
Foreign	0.1	(0.6)	0.2
Total deferred	(61.1)	41.6	0.8
Total income tax (benefit) expense	\$ (28.3)	\$ 23.2	\$ 10.2

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The following is a reconciliation of income taxes computed at the U.S. Federal income tax rate to the Company's effective income tax rates:

(% of pre-tax income)	Years Ended June 30,		
	2018	2017	2016
Statutory federal income tax rate	28.1 %	35.0 %	35.0 %
State income taxes, net of federal tax benefit	2.6	2.0	2.2
Foreign tax rate differential	(0.1)	(1.5)	5.5
Domestic manufacturing deduction	(1.5)	(3.0)	(7.0)
Research and development tax credit	(1.4)	(3.9)	(8.4)
Law changes	0.1	0.9	(3.8)
Increases in valuation allowances	0.8	1.1	2.1
Adjustments of prior years' income taxes	0.2	3.3	1.3
Unremitted earnings of foreign subsidiaries	(0.2)	(1.2)	12.7
Non-deductible goodwill impairment	—	—	5.1
Re-measurement of U.S. deferred taxes	(49.3)	—	—
Transition tax on foreign earnings	3.1	—	—
Other, net	(0.1)	0.3	2.7
Effective income tax rate	(17.7)%	33.0 %	47.4 %

Deferred taxes are recorded for temporary differences between the carrying amounts of assets and liabilities and their tax bases. In connection with the Act, during fiscal year 2018 the Company recorded a provisional net benefit of \$78.9 million for the re-measurement of deferred tax assets and liabilities at the lower U.S. federal tax rate. Although the Company believes the net benefit recorded is a reasonable estimate of the deferred tax impact of the Act, the re-measurement of deferred tax assets and liabilities at the lower federal corporate income tax rate is provisional until such time that the underlying temporary differences are known rather than estimated. The significant components of deferred tax assets and liabilities that are recorded in the consolidated balance sheets are summarized in the table below.

(\$ in millions)	June 30,	
	2018	2017
Deferred tax assets:		
Pensions	\$ 66.8	\$ 139.8
Postretirement provisions	33.7	54.4
Net operating loss carryforwards	26.5	23.1
Derivatives and hedging activities	—	2.4
Other	29.4	44.8
Gross deferred tax assets	156.4	264.5
Valuation allowances	(23.9)	(18.5)
Total deferred tax assets	132.5	246.0
Deferred tax liabilities:		
Depreciation	(235.2)	(347.5)
Intangible assets	(11.9)	(19.4)
Inventories	(30.5)	(50.1)
Derivatives and hedging activities	(8.7)	—
Other	(3.5)	(6.2)
Total deferred tax liabilities	(289.8)	(423.2)
Deferred tax liabilities, net	\$ (157.3)	\$ (177.2)

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

A valuation allowance is required when it is more likely than not that all or a portion of a deferred tax asset will not be realized. As of June 30, 2018, the Company had state net operating loss carryforwards of \$339.9 million expiring between 2019 and 2038. A significant portion of the state net operating loss carryforwards are subject to an annual limitation that under current law is likely to limit future tax benefits to approximately \$3 million. Valuation allowances increased by \$5.4 million during fiscal year 2018 primarily due to the re-measurement of deferred tax assets and corresponding valuation allowances due to the Act as well as the impact of a state tax law change that will limit the Company's ability to utilize the state net operating loss carryforwards in future years.

Prior to the Act, undistributed earnings of foreign subsidiaries, totaling \$93.8 million were considered permanently reinvested. Upon enactment of the provisions of the Act, the Company recorded a \$5.0 million accrual for the anticipated one-time mandatory tax on previously deferred foreign earnings (i.e. transition tax). The Company is still in the process of evaluating our assertion for indefinite reinvestment. The amounts recorded for the transition tax are provisional due to various components of the computation not yet finalized as of June 30, 2018, including the following significant items: (i.) the actual aggregate foreign cash position and the earnings and profits of the foreign entities as of June 30, 2018, (ii.) the interpretation and identification of cash positions as of June 30, 2018, and (iii.) computations of accumulated earnings and profits balances as of November 2, 2017 and December 31, 2017. Under the Act, the transition tax will be paid over an eight year period beginning in fiscal year 2019.

The Act also established new tax provisions that become effective in future periods, including but not limited to eliminating the corporate alternative minimum tax, creating the base erosion anti-abuse tax ("BEAT"), establishing new limitations on deductible interest expense and certain executive compensation, creating a new provision designed to tax global intangible low-tax income ("GILTI") and generally eliminating U.S. Federal income taxes on dividends from foreign subsidiaries.

Regarding the new GILTI tax rules, which apply to fiscal years beginning after December 31, 2017, an accounting policy election must be made to either treat taxes due on future GILTI inclusions in U.S. taxable income as a current period expense when incurred or reflect such portion of the future GILTI inclusions in U.S. taxable income that relate to existing basis differences in the Company's current measurement of deferred taxes. The Company's analysis of the new GILTI rules and its impacts is currently incomplete. Accordingly, the Company has not yet made a policy election regarding the treatment of the GILTI tax.

The Company does not have unrecognized tax benefits as of June 30, 2018, 2017 and 2016. The Company recognizes interest and penalties accrued on any unrecognized tax benefits as of a component of income tax expense.

All years prior to fiscal year 2013 have been settled with the Internal Revenue Service and with most significant state, local and foreign tax jurisdictions.

18. Other Income (Expense), Net

Other income (expense), net consists of the following:

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Unrealized gains (losses) on company owned life insurance contracts and investments held in rabbi trusts	\$ 1.5	\$ 1.7	\$ (0.5)
Interest income	0.3	0.3	0.2
Equity in earnings of unconsolidated subsidiaries	—	—	0.6
Foreign exchange	(0.6)	(0.4)	(2.4)
Other	0.2	1.2	—
Total other income (expense), net	\$ 1.4	\$ 2.8	\$ (2.1)

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

19. Segment Information, Geographic and Product Data

The Company has two reportable segments, Specialty Alloys Operations (“SAO”) and Performance Engineered Products (“PEP”).

The SAO segment is comprised of the Company’s major premium alloy and stainless steel manufacturing operations. This includes operations performed at mills primarily in Reading and Latrobe, Pennsylvania and surrounding areas as well as South Carolina and Alabama. The combined assets of the SAO operations are being managed in an integrated manner to optimize efficiency and profitability across the total system.

The PEP segment is comprised of the Company’s differentiated operations. This segment includes the Dynamet titanium business, the Carpenter Powder Products business, the Amega West business, the CalRAM business, and the Latrobe and Mexico distribution businesses. The businesses in the PEP segment are managed with an entrepreneurial structure to promote flexibility and agility to quickly respond to market dynamics.

The Company’s executive management evaluates the performance of these operating segments based on sales, operating income and cash flow generation. Segment operating profit excludes general corporate costs, which include executive and director compensation, and other corporate facilities and administrative expenses not allocated to the segments. Also excluded are items that management considers not representative of ongoing operations, such as loss on divestiture of business, restructuring and asset impairment charges, and other specifically-identified income or expense items.

The service cost component of the Company’s net pension expense, which represents the estimated cost of future pension liabilities earned associated with active employees, is included in the operating income of the business segments. The residual net pension expense, which is comprised of the expected return on plan assets, interest costs on the projected benefit obligations of the plans and amortization of actuarial gains and losses and prior service costs, is included under the heading “Pension earnings, interest and deferrals.”

On a consolidated basis, one customer, Arconic, Inc., accounted for approximately 12 percent, 11 percent and 13 percent of net sales for the years ended June 30, 2018, 2017 and 2016, respectively. No single customer accounted for 10 percent or more of the accounts receivable outstanding at June 30, 2018 and 2017.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Segment Data (\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Net Sales:			
Specialty Alloys Operations	\$ 1,803.8	\$ 1,461.6	\$ 1,481.0
Performance Engineered Products	429.7	366.6	358.7
Intersegment	(75.8)	(30.6)	(26.3)
Consolidated net sales	<u>\$ 2,157.7</u>	<u>\$ 1,797.6</u>	<u>\$ 1,813.4</u>

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Operating Income:			
Specialty Alloys Operations	\$ 232.4	\$ 172.3	\$ 176.9
Performance Engineered Products	26.1	8.5	(5.5)
Corporate costs (including loss on divestiture of business, restructuring and impairment charges)	(66.4)	(61.3)	(103.0)
Pension earnings, interest and deferrals	(2.1)	(23.8)	(19.3)
Intersegment	(2.9)	1.5	2.5
Consolidated operating income	<u>\$ 187.1</u>	<u>\$ 97.2</u>	<u>\$ 51.6</u>

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Depreciation and Amortization:			
Specialty Alloys Operations	\$ 93.3	\$ 94.0	\$ 94.4
Performance Engineered Products	20.2	20.6	21.9
Corporate	3.9	4.0	3.8
Intersegment	(0.8)	(0.8)	(0.8)
Consolidated depreciation and amortization	<u>\$ 116.6</u>	<u>\$ 117.8</u>	<u>\$ 119.3</u>

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Capital Expenditures:			
Specialty Alloys Operations	\$ 63.6	\$ 52.2	\$ 67.0
Performance Engineered Products	31.6	17.0	19.8
Corporate	41.6	29.7	8.6
Intersegment	(1.8)	(0.4)	(0.2)
Consolidated capital expenditures	<u>\$ 135.0</u>	<u>\$ 98.5</u>	<u>\$ 95.2</u>

(\$ in millions)	June 30,	
	2018	2017
Total Assets:		
Specialty Alloys Operations	\$ 2,312.1	\$ 2,292.1
Performance Engineered Products	513.6	434.3
Corporate	193.2	167.2
Intersegment	(11.9)	(15.5)
Consolidated total assets	<u>\$ 3,007.0</u>	<u>\$ 2,878.1</u>

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Geographic Data (\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Net Sales: (a)			
United States	\$ 1,429.4	\$ 1,198.3	\$ 1,243.5
Europe	383.0	349.6	321.4
Asia Pacific	174.8	127.2	129.5
Canada	65.7	47.7	44.9
Mexico	61.7	48.5	46.7
Other	43.1	26.3	27.4
Consolidated net sales	<u>\$ 2,157.7</u>	<u>\$ 1,797.6</u>	<u>\$ 1,813.4</u>

(a) Net sales were attributed to countries based on the location of the customer.

(\$ in millions)	June 30,	
	2018	2017
Long-lived assets:		
United States	\$ 1,286.4	\$ 1,290.7
Asia Pacific	15.4	15.3
Canada	6.3	5.6
Europe	3.9	4.0
Mexico	1.4	1.2
Consolidated long-lived assets	<u>\$ 1,313.4</u>	<u>\$ 1,316.8</u>

20. Recent Accounting Pronouncements

Recently Issued Accounting Pronouncements - Adopted in current period

In March 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2016-09, Compensation - Stock Compensation (Topic 718) - Improvements to Employee Share-Based Payment Accounting, which outlines new provisions intended to simplify various aspects related to accounting for share-based payments and their presentation in the financial statements. The update revised requirements in the following areas: income tax consequences, forfeitures and classification on the statement of cash flows. The Company adopted this standard in the quarter ended September 30, 2017. The standard did not have a material impact on the consolidated financial statements of the Company. The inclusion of excess tax benefits and deficiencies as a component of income tax expense will increase volatility of the provision for income taxes as the amount of excess tax benefits or deficiencies from share-based compensation awards are dependent on the stock price at the date the awards are exercised or vested. The Company does not expect the impact to be material to the Company’s consolidated results of operations; however, such determination is subject to change based on facts and circumstances at the time when awards vest or settle. The Company accounts for forfeitures of share-based awards when they occur. The Company applied the amendments related to the presentation of excess tax benefits on the consolidated statements of cash flows using a prospective transition method, and as a result, excess tax benefits related to share-based awards are reported as cash flows from operating activities. The Company applied the amendments related to the presentation of statutory tax withholding on the consolidated statements of cash flows using a retrospective transition method as required, and as a result, statutory tax withholding related to share-based awards which had been previously classified as cash flows used for operating activities has been reclassified as cash flows used for financing activities.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows (Topic 230) - Classification of Certain Cash Receipts and Cash Payments, which outlines new provisions intended to reduce the existing diversity in practice related to accounting for the cash flow and its presentation in the financial statements. ASU 2016-15 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2017, with early adoption permitted. The Company adopted the provisions of ASU 2016-15 in the quarter ended September 30, 2017. The adoption of ASU 2016-15 did not materially impact the Company’s consolidated statement of cash flows.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

In November 2016, the FASB issued ASU 2016-18, Statement of Cash Flows (Topic 230) - Restricted Cash, which outlines that a statement of cash flows explains the change during the period in total cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. ASU 2016-18 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2017, with early adoption permitted. The Company adopted the provisions of ASU 2016-18 in the quarter ended September 30, 2017. The adoption of ASU 2016-18 did not materially impact the Company's consolidated statement of cash flows.

In January 2017, the FASB issued ASU 2017-04, Intangibles - Goodwill and Other (Topic 350) - Simplifying the Test for Goodwill Impairment, which outlines updates to simplify the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. ASU 2017-04 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2019, with early adoption permitted. The Company adopted ASU 2017-04 in the quarter ended September 30, 2017. The adoption of ASU 2017-04 did not have an impact on the Company's financial statements.

In March 2018, the FASB issued ASU 2018-05, Income Taxes (Topic 740) - Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118. The amendment provides guidance on accounting for the impact of the Act and allows entities to complete the accounting under ASC 740 within a one-year measurement period from the Act enactment date. This standard is effective upon issuance. The Company will continue to assess the impact that various provisions will have on its business. Any subsequent adjustment to these amounts will be recorded to current tax expense in the quarter of fiscal year 2019 when the analysis is complete.

Recently Issued Accounting Pronouncements - Pending Adoption

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606). Topic 606, as further amended by subsequent Accounting Standard Updates, affects all aspects of an entity's revenue recognition, including determining the measurement of revenue and the timing of when it is recognized for the transfer of goods or services to customers. Currently, the Company is in the process of finalizing the assessment phase of its evaluation. The assessment phase included conducting and evaluating the results of internal surveys of its businesses, holding revenue recognition workshops with commercial and business unit finance leadership and reviewing revenue arrangements across all businesses to initially identify a set of applicable qualitative revenue recognition changes related to the standards update. The Company also is evaluating the expanded disclosure requirements included in the guidance. Additionally, as part of the overall evaluation for implementing the guidance, the Company is identifying and preparing to implement changes to its accounting policies, practices, and internal controls over financial reporting. The Company plans to adopt the guidance in Topic 606 effective July 1, 2018 under the modified retrospective method.

In February 2016, the FASB issued ASU 2016-02 Leases (Topic 842). ASU 2016-02 improves transparency and comparability among companies by recognizing lease assets and lease liabilities on the balance sheet and by disclosing key information about leasing arrangements. ASU 2016-02 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2018, with early adoption permitted. The Company is evaluating the impact of the adoption of ASU 2016-02 on the consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16, Income Taxes (Topic 740) - Intra-Entity Transfers of Assets Other Than Inventory, which outlines updates to improve the accounting for the income tax consequences of intra-entity transfers of assets other than inventory. ASU 2016-16 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2017, with early adoption permitted. The Company is evaluating the impact of the adoption of ASU 2016-16 on the consolidated financial statements. The Company's effective date for the adoption of ASU 2016-16 is July 1, 2018.

In March 2017, the FASB issued ASU 2017-07, Compensation - Retirement Benefits (Topic 715) - Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which outlines updates to improve the presentation of net periodic pension cost and net periodic postretirement benefit cost. ASU 2017-07 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2017, with early adoption permitted. The Company is evaluating the impact of the adoption of ASU 2017-07 on the consolidated financial statements. The Company's effective date for the adoption of ASU 2017-07 is July 1, 2018.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

In August 2017, the FASB issued ASU 2017-12, Derivatives and Hedging (Topic 815) - Targeted Improvements to Accounting for Hedging Activities, which expands and refines hedge accounting for both financial and non-financial risk components, aligns the recognition and presentation of the effects of hedging instruments and hedge items in the financial statements, and includes certain targeted improvements to ease the application of current guidance related to the assessment of hedge effectiveness. ASU 2017-12 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2018, with early adoption permitted. The Company is evaluating the impact of the adoption of ASU 2017-12 on the consolidated financial statements.

In February 2018, the FASB issued ASU 2018-02, Income Statement - Reporting Comprehensive Income (Topic 220) - Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income, which allows a reclassification from accumulated other comprehensive income to retained earnings for standard tax effects resulting from the Act. ASU 2018-02 is effective for public business entities for annual periods, including interim periods within those annual periods, beginning after December 15, 2018, with early adoption permitted. The Company is evaluating the impact of the adoption of ASU 2018-02 on the consolidated financial statements.

21. Reclassifications from Accumulated Other Comprehensive (Loss) Income

The changes in AOCI by component, net of tax, for the years ended June 30, 2018 and 2017 were as follows:

(\$ in millions) (a)	Cash flow hedging items	Pension and other postretirement benefit plan items	Unrealized losses on available-for-sale securities	Foreign currency items	Total
Balance at June 30, 2017	\$ (2.3)	\$ (299.0)	\$ (0.3)	\$ (41.5)	\$ (343.1)
Other comprehensive income (loss) before reclassifications	26.9	69.7	—	(1.4)	95.2
Amounts reclassified from AOCI (b)	(0.8)	8.9	—	—	8.1
Net current-period other comprehensive income (loss)	26.1	78.6	—	(1.4)	103.3
Balance at June 30, 2018	\$ 23.8	\$ (220.4)	\$ (0.3)	\$ (42.9)	\$ (239.8)

(\$ in millions) (a)	Cash flow hedging items	Pension and other postretirement benefit plan items	Unrealized losses on available-for-sale securities	Foreign currency items	Total
Balance at June 30, 2016	\$ (21.8)	\$ (344.3)	\$ (0.3)	\$ (43.5)	\$ (409.9)
Other comprehensive income before reclassifications	5.7	22.4	—	2.0	30.1
Amounts reclassified from AOCI (b)	13.8	22.9	—	—	36.7
Net current-period other comprehensive income	19.5	45.3	—	2.0	66.8
Balance at June 30, 2017	\$ (2.3)	\$ (299.0)	\$ (0.3)	\$ (41.5)	\$ (343.1)

(a) All amounts are net of tax. Amounts in parentheses indicate debits.

(b) See separate table below for further details.

CARPENTER TECHNOLOGY CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The following is a summary of amounts reclassified from AOCI for the years ended June 30, 2018 and 2017 :

(\$ in millions) (a)	Location of gain (loss)	Amount Reclassified from AOCI	
		Years Ended June 30,	
		2018	2017
Details about AOCI Components			
Cash flow hedging items			
Commodity contracts	Cost of sales	\$ 1.8	\$ (22.8)
Foreign exchange contracts	Net sales	(1.0)	0.5
Forward interest rate swaps	Interest expense	0.4	0.4
	Total before tax	1.2	(21.9)
	Tax (expense) benefit	(0.4)	8.1
	Net of tax	\$ 0.8	\$ (13.8)
Amortization of pension and other postretirement benefit plan items			
Net actuarial loss	(b)	\$ (16.4)	\$ (41.0)
Prior service cost	(b)	3.1	4.7
	Total before tax	(13.3)	(36.3)
	Tax benefit	4.4	13.4
	Net of tax	\$ (8.9)	\$ (22.9)

(a) Amounts in parentheses indicate debits to income/loss.

(b) These AOCI components are included in the computation of net periodic benefit cost (see Note 10 for additional details).

22. Supplemental Data

The following are additional required disclosures and other material items:

(\$ in millions)	Years Ended June 30,		
	2018	2017	2016
Cost Data:			
Repairs and maintenance costs	\$ 108.0	\$ 99.1	\$ 101.8
Cash Flow Data:			
Noncash investing and financing activities:			
Sale of equity method investment	\$ —	\$ —	\$ 12.6
Noncash purchases of property, equipment and software	\$ 16.5	\$ 13.7	\$ 15.1
Cash paid (received) during the year for:			
Interest payments, net	\$ 29.5	\$ 27.7	\$ 27.5
Income tax payments (refunds), net	\$ 33.7	\$ (33.3)	\$ 27.9

SUPPLEMENTARY DATA

Quarterly Financial Data (Unaudited)

Quarterly sales and earnings results are normally influenced by seasonal factors. Historically, the first two fiscal quarters (three months ending September 30 and December 31) are typically the lowest principally because of annual plant vacation and maintenance shutdowns by the Company and by many of its customers. However, the timing of major changes in the general economy or the markets for certain products can alter this pattern.

(\$ in millions)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Results of Operations				
Fiscal Year 2018				
Net sales	\$ 479.8	\$ 487.8	\$ 572.2	\$ 618.0
Gross profit	\$ 85.6	\$ 85.7	\$ 96.0	\$ 114.9
Operating income	\$ 41.7	\$ 40.8	\$ 45.2	\$ 59.4
Net income	\$ 23.4	\$ 92.1	\$ 30.2	\$ 42.8
Fiscal Year 2017				
Net sales	\$ 389.0	\$ 427.4	\$ 473.6	\$ 507.7
Gross profit	\$ 46.0	\$ 62.5	\$ 83.1	\$ 92.7
Operating income	\$ 1.4	\$ 15.4	\$ 35.8	\$ 44.6
Net income (loss)	\$ (6.2)	\$ 7.0	\$ 20.7	\$ 25.5

During the quarter ended December 31, 2017, the Company recorded an income tax benefit. See Note 17, Income Taxes to Notes to Consolidated Financial Statements included in Item 8, “Financial Statements and Supplementary Data”. During the quarter ended June 30, 2017, the Company recorded a loss on divestiture of business. See Note 2, Acquisitions and Divestiture to Notes to Consolidated Financial Statements included in Item 8, “Financial Statements and Supplementary Data”.

(per share amount)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Earnings (Loss) per common share				
Fiscal Year 2018				
Basic earnings	\$ 0.49	\$ 1.93	\$ 0.63	\$ 0.90
Diluted earnings	\$ 0.49	\$ 1.92	\$ 0.63	\$ 0.88
Fiscal Year 2017				
Basic earnings	\$ (0.13)	\$ 0.15	\$ 0.44	\$ 0.54
Diluted earnings	\$ (0.13)	\$ 0.15	\$ 0.44	\$ 0.54

(shares in millions)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Weighted average common shares outstanding				
Fiscal Year 2018				
Basic	47.1	47.2	47.2	47.4
Diluted	47.3	47.6	47.7	48.0
Fiscal Year 2017				
Basic	46.9	47.0	47.0	47.1
Diluted	46.9	47.1	47.1	47.1

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

(a) Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

The Company's management, with the participation of the Company's Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of the Company's disclosure controls and procedures as defined in Rules 13a—15(e) and 15d—15(e) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") as of June 30, 2018. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that the Company's disclosure controls and procedures as of June 30, 2018 were effective in providing a reasonable level of assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods required under the Securities and Exchange Commission's rules and forms, including a reasonable level of assurance that information required to be disclosed by us in such reports is accumulated and communicated to the Company's management, including the Company's Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

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

Management's Report on the Company's internal control over financial reporting is included in Item 8 of this Annual Report on Form 10-K under the caption "Management's Report on Internal Control Over Financial Reporting" and is incorporated herein by reference. The Company's independent registered public accounting firm has issued a report on management's assessment of the Company's internal control over financial reporting and is set forth in Item 8 of this Annual Report on Form 10-K under the caption "Report of Independent Registered Public Accounting Firm" and is incorporated herein by reference.

(c) Changes in Internal Control over Financial Reporting

There have been no changes in the Company's internal control over financial reporting that occurred during the quarter ended June 30, 2018 that have materially affected, or are likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required as to the officers is set forth in Part I hereof.

The information required as to directors and the committees of the Board of Directors is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the captions "Election of Directors" and "Corporate Governance".

The information concerning compliance with Section 16(a) of the Securities and Exchange Act of 1934, as amended, is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "Corporate Governance".

The information concerning Carpenter's Code of Ethics and certain additional information relating to the Company's Corporate Governance is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "Corporate Governance".

The information concerning the Audit Committee and its financial experts is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "Audit/Finance Committee Report".

The information concerning material changes to the procedures by which shareholders may recommend nominees to the Board of Directors is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "General Information".

On October 17, 2017, we filed with the New York Stock Exchange ("NYSE") the Annual CEO Certification regarding our compliance with the NYSE's Corporate Governance listing standards as required by Section 303 A-12(a) of the NYSE Listed Company Manual. In addition, we have filed as exhibits to our annual report on Form 10-K for the fiscal year ended June 30, 2018, the applicable certifications of our Chief Executive Officer and our Chief Financial Officer required under Section 302 of the Sarbanes-Oxley Act of 2002, regarding the quality of Carpenter's public disclosures.

Item 11. Executive Compensation

Certain information required by this item is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the captions "Compensation Discussion and Analysis" and "Executive Compensation".

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

The information required by this item is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "Security Ownership of Certain Persons".

Equity Compensation Plan Information

The following table shows the securities authorized for issuance under equity compensation plans as of June 30, 2018 :

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)	
Equity compensation plans approved by security holders	2,223,261	\$ 42.88	3,139,640	(1)
Equity compensation plans not approved by security holders	—	—	—	
Total	2,223,261	\$ 42.88	3,139,640	(1)

- (1) Includes 2,567,536 shares available for issuance under the Amended and Restated Stock-Based Incentive Compensation Plan for Officers and Key Employees (which provides for the issuance of stock options, restricted stock and restricted stock units) and 572,104 shares available under the Stock-Based Compensation Plan for Non-Employee Directors (which provides for issuance of stock options, stock units and performance units).

There were no reportable purchases during the quarter ended June 30, 2018, provided however that 16,463 shares, at an average purchase price of \$53.40, were surrendered by employees to the Company for the payment of the minimum tax liability withholding obligations upon the vesting of shares of restricted stock and the exercise of options. We do not consider this a share repurchase program.

Item 13. Certain Relationships, Related Transactions and Director Independence

The information required by this item is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the captions "Corporate Governance" and "Executive Compensation".

Item 14. Principal Accounting Fees and Services

The information required by this item is incorporated herein by reference to the Company's fiscal year 2018 definitive Proxy Statement under the caption "Approval of Appointment of Independent Registered Public Accounting Firm".

PART IV**Item 15. Exhibits and Financial Statement Schedules****(a) Financial Statement Schedule:**

- (1) The following consolidated financial statement schedule should be read in conjunction with the consolidated financial statements (see Item 8. "Financial Statements and Supplementary Data"):

Schedule II — Valuation and Qualifying Accounts

All other schedules are omitted because they are not applicable or the required information is contained in the consolidated financial statements or notes thereto.

(b) Exhibits

Exhibits required to be filed by Item 601 of Regulation S-K are listed below. Documents not designated as being incorporated herein by reference are filed herewith. The exhibit numbers correspond to the paragraph numbers designated in Item 601 of Regulation S-K.

Exhibit No.	Description
3(A)	Restated Certificate of Incorporation, dated October 26, 1998 (Exhibit 3(A) to our Annual Report on Form 10-K filed on September 9, 2005 and incorporated herein by reference).
3(B)	By-Laws, amended as of August 11, 2015 (Exhibit 3.1 to our Current Report on Form 8-K filed on August 17, 2015 and incorporated herein by reference).
4(A)	Indenture, dated January 12, 1994, between Carpenter Technology Corporation and U.S. Bank Trust National Association (formerly known as First Trust of New York, National Association, as successor Trustee to Morgan Guaranty Trust Company of New York) (Exhibit 4(A) to our Quarterly Report on Form 10-Q filed on February 10, 1994 and incorporated herein by reference).
4(B)	Forms of Fixed Rate and Floating Rate Medium-Term Note, Series B (Exhibit 4(F) to our Annual Report on Form 10-K filed on September 3, 2004 and incorporated herein by reference).
4(C)	First Supplemental Indenture, dated May 22, 2003, between Carpenter Technology Corporation and U.S. Bank Trust National Association (formerly known as First Trust of New York, National Association as successor Trustee to Morgan Guaranty Trust Company of New York) (Exhibit 4(I) to our Annual Report on Form 10-K filed on September 12, 2003 and incorporated herein by reference).
4(D)	Second Supplemental Indenture, dated as of June 30, 2011, between Carpenter Technology Corporation and U.S. Bank National Association (Exhibit 4.1 to our Current Report on Form 8-K filed on June 30, 2011 and incorporated herein by reference).

4(E)	Form of 5.20% Senior Notes Due 2021 (Exhibit 4.2 to our Current Report on Form 8-K filed on June 30, 2011 and incorporated herein by reference).
4(F)	Registration Rights Agreement, dated February 29, 2012, by and among Carpenter, Watermill-Toolrock Partners, L.P., Watermill-Toolrock Partners II, L.P., Watermill-Toolrock Enterprises, LLC and HHEP-Latrobe, L.P. (Exhibit 10.2 to our Current Report on Form 8-K filed on March 1, 2012 and incorporated herein by reference).
4(G)	Third Supplemental Indenture, dated as of February 26, 2013, between Carpenter Technology Corporation and U.S. Bank National Association (Exhibit 4.1 to our Current Report on Form 8-K filed on February 26, 2013 and incorporated herein by reference).
4(H)	Form of 4.450% Senior Notes Due 2023 (Exhibit 4.2 to our Current Report on Form 8-K filed on February 26, 2013 and incorporated herein by reference).
4(I)	Form of Note related to the Credit Agreement, dated as of March 31, 2017, among Carpenter Technology Corporation, as borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto, JPMorgan Chase Bank, N.A., as Syndication Agent, PNC Bank, National Association, US Bank, National Association and Wells Fargo Bank, National Association, each, as Documentation Agent and Merrill Lynch, Pierce, Fenner & Smith Incorporated and JPMorgan Chase Bank, N.A., as Joint Lead Arrangers and Joint Bookrunners (Exhibit 4(I) to our Annual Report on Form 10-K filed on August 11, 2017 and incorporated herein by reference).
† 10(A)	Supplemental Retirement Plan for Executives of Carpenter Technology Corporation (Exhibit 10(A) to our Annual Report on Form 10-K filed on August 20, 2010 and incorporated herein by reference).
† 10(B)	First Amendment to the Supplemental Retirement Plan for Executives of Carpenter Technology Corporation (Exhibit 10(A) to our Quarterly Report on Form 10-Q filed on October 27, 2016 and incorporated herein by reference.)
† 10(C)	Amended and Restated Deferred Compensation Plan for Non-Management Directors of Carpenter Technology Corporation (Exhibit 10(B) to our Annual Report on Form 10-K filed on August 24, 2011 and incorporated herein by reference).
† 10(D)	Amended and Restated Deferred Compensation Plan for Officers and Key Employees of Carpenter Technology Corporation (Exhibit 10(D) to our Annual Report on Form 10-K filed on August 11, 2017 and incorporated herein by reference).
† 10(E)	Amended and Restated Executive Bonus Compensation Plan (Exhibit B to our Definitive Proxy Statement filed on September 19, 2016 and incorporated herein by reference).
† 10(F)	Stock-Based Compensation Plan For Non-Employee Directors, as amended (Exhibit 10(E) to our Annual Report on Form 10-K filed on August 24, 2011 and incorporated herein by reference).
10(G)	Trust Agreement for Non-Qualified Employee Benefits Trust between Carpenter Technology Corporation and JP Morgan Chase Bank, N.A., effective as of August 15, 2014 (Exhibit 10(G) to our Annual Report on Form 10-K filed on August 25, 2015 and incorporated herein by reference).
† 10(H)	Amended and Restated Stock-Based Incentive Compensation Plan for Officers and Key Employees (Exhibit A to our Definitive Proxy Statement filed on September 19, 2016 and incorporated herein by reference).

† 10(I)	First Amendment to the Amended and Restated Stock-Based Incentive Compensation Plan for Officers and Key Employees (Exhibit A to our Definitive Additional Materials filed on September 27, 2016 and incorporated herein by reference).
† 10(J)	Second Amendment to the Amended and Restated Stock-Based Incentive Compensation Plan for Officers and Key Employees (filed herewith).
† 10(K)	Form of Restricted Stock Unit Award Agreement (pursuant to Carpenter’s Stock-Based Incentive Compensation Plan for Officers and Key Employees) (filed herewith).
† 10(L)	Form of Performance Stock Unit Award Agreement (pursuant to Carpenter’s Stock-Based Incentive Compensation Plan for Officers and Key Employees) (filed herewith).
† 10(M)	Form of Stock Option Award Agreement (pursuant to Carpenter’s Stock-Based Incentive Compensation Plan for Officers and Key Employees) (filed herewith).
† 10(N)	Form of Three-Year Performance Stock Unit Award Agreement (pursuant to Carpenter’s Stock-Based Incentive Compensation Plan for Officers and Key Employees) (filed herewith).
† 10(O)	Amended and Restated Carpenter Technology Corporation Change of Control Severance Plan (Exhibit 10.A to our Quarterly Report on Form 10-Q filed on February 1, 2018 and incorporated herein by reference).
† 10(P)	Benefits Restoration Plan of Carpenter Technology Corporation (Exhibit 10.1 to our Quarterly Report on Form 10-Q filed on May 2, 2016 and incorporated herein by reference).
† 10(Q)	First Amendment to the Benefits Restoration Plan of Carpenter Technology Corporation (Exhibit 10(A) to our Quarterly Report on Form 10-Q filed on October 27, 2016 and incorporated herein by reference.)
† 10(R)	Form of Indemnification Agreement for Directors and Officers (Exhibit 10.1 to our Quarterly Report on Form 10-Q filed on May 7, 2015 and incorporated herein by reference).
† 10(S)	Amended and Restated Severance Pay Plan for Executives of Carpenter Technology Corporation (Exhibit 10(S) to our Annual Report on Form 10-K filed on August 11, 2017 and incorporated herein by reference).
10(T)	Credit Agreement, dated as of March 31, 2017, among Carpenter Technology Corporation, as borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto, JPMorgan Chase Bank, N.A., as Syndication Agent, PNC Bank, National Association, US Bank, National Association and Wells Fargo Bank, National Association, each, as Documentation Agent and Merrill Lynch, Pierce, Fenner & Smith Incorporated and JPMorgan Chase Bank, N.A., as Joint Lead Arrangers and Joint Bookrunners (Exhibit 10.1 to our Current Report on Form 8-K filed on April 4, 2017 and incorporated herein by reference).
† 10(U)	Offer Letter, dated June 15, 2015, by and between Carpenter Technology Corporation and Joseph E. Haniford (Exhibit 10.1 to our Current Report on Form 8-K filed on June 22, 2015 and incorporated herein by reference).
† 10(V)	Offer Letter, dated June 1, 2015, by and between Carpenter Technology Corporation and Tony R. Thene (Exhibit 10.1 to our Current Report on Form 8-K filed on June 3, 2015 and incorporated herein by reference).

† 10(W)	Offer Letter, dated October 13, 2015, by and between Carpenter Technology Corporation and Damon Audia (Exhibit 10.1 to our Current Report on Form 8-K filed on October 16, 2015 and incorporated herein by reference).
12	Computations of Ratios of Earnings to Fixed Charges (Unaudited) (filed herewith).
21	Subsidiaries of the Registrant (filed herewith).
23	Consent of PricewaterhouseCoopers LLP (filed herewith).
24	Powers of Attorney in favor of James D. Dee or Damon J. Audia (filed herewith).
31(A)	Certification of Chief Executive Officer required by the Securities and Exchange Commission Rule 13a-14(a)/15d-14(a) (filed herewith).
31(B)	Certification of Chief Financial Officer required by the Securities and Exchange Commission Rule 13a-14(a)/15d-14(a) (filed herewith).
32	Certification pursuant to 18 U.S.C Section 1350 (filed herewith).
101	The following financial information from this Annual Report on Form 10-K for the fiscal year ended June 30, 2018, formatted in XBRL (Extensible Business Reporting Language) and furnished electronically herewith: (i) the Consolidated Balance Sheets; (ii) the Consolidated Statements of Income; (iii) the Consolidated Statements of Comprehensive Income (Loss); (iv) the Consolidated Statements of Cash Flows; (v) the Consolidated Statements of Changes in Equity; and (vi) the Notes to the Consolidated Financial Statements (filed herewith).

† Denotes employment- or compensation- related agreement, document or plan.

Item 16. Form 10-K Summary

Not applicable.

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.

CARPENTER TECHNOLOGY CORPORATION

By /s/ Damon J. Audia
Damon J. Audia
Senior Vice President and Chief Financial Officer

Date: August 14, 2018

[Table of Contents](#)

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

<u>/s/ Tony R. Thene</u> Tony R. Thene	President and Chief Executive Officer and Director (Principal Executive Officer)	August 14, 2018
<u>/s/ Damon J. Audia</u> Damon J. Audia	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	August 14, 2018
<u>/s/ Timothy Lain</u> Timothy Lain	Vice President - Controller, Chief Accounting Officer (Principal Accounting Officer)	August 14, 2018
<u>*</u> Gregory A. Pratt	Chairman and Director	August 14, 2018
<u>*</u> Dr. Philip M. Anderson	Director	August 14, 2018
<u>*</u> I. Martin Inglis	Director	August 14, 2018
<u>*</u> Steven E. Karol	Director	August 14, 2018
<u>*</u> Kathleen Ligoeki	Director	August 14, 2018
<u>*</u> Robert R. McMaster	Director	August 14, 2018
<u>*</u> Kathryn C. Turner	Director	August 14, 2018
<u>*</u> Jeffrey Wadsworth	Director	August 14, 2018
<u>*</u> Stephen M. Ward, Jr.	Director	August 14, 2018

Original Powers of Attorney authorizing James D. Dee or Damon J. Audia to sign this Report on behalf of: Gregory A. Pratt, Dr. Philip M. Anderson, I. Martin Inglis, Steven E. Karol, Kathleen Ligoeki, Robert R. McMaster, Kathryn C. Turner, Jeffrey Wadsworth, and Stephen M. Ward, Jr., being filed with the Securities and Exchange Commission.

*By /s/ James D. Dee
James D. Dee
Attorney-in-fact

CARPENTER TECHNOLOGY CORPORATION AND SUBSIDIARIES
SCHEDULE II. VALUATION AND QUALIFYING ACCOUNTS
(\$ in millions)

Column A	Column B	Column C Additions		Column D	Column E
Description	Balance at Beginning of Period	Charged to Costs & Expenses	Charged to Other Accounts	Deductions	Balance at End of Period
Year Ended June 30, 2018					
Allowance for doubtful accounts receivable	\$ 2.6	\$ 0.1	\$ (0.1)	\$ —	\$ 2.6
Deferred tax valuation allowance	\$ 18.5	\$ 4.9	\$ 0.5	\$ —	\$ 23.9
Year Ended June 30, 2017					
Allowance for doubtful accounts receivable	\$ 4.1	\$ (1.0)	\$ —	\$ (0.5)	\$ 2.6
Deferred tax valuation allowance	\$ 17.7	\$ 0.8	\$ —	\$ —	\$ 18.5
Year Ended June 30, 2016					
Allowance for doubtful accounts receivable	\$ 3.8	\$ 1.2	\$ —	\$ (0.9)	\$ 4.1
Deferred tax valuation allowance	\$ 17.5	\$ 0.2	\$ —	\$ —	\$ 17.7

**SECOND AMENDMENT TO THE
CARPENTER TECHNOLOGY CORPORATION
STOCK-BASED INCENTIVE COMPENSATION PLAN
FOR OFFICERS AND KEY EMPLOYEES**

THIS SECOND AMENDMENT is made as of the 18th day of July, 2018, by Carpenter Technology Corporation, a corporation organized under the laws of the State of Delaware (the “Company”).

INTRODUCTION

The Company maintains the Carpenter Technology Corporation Stock-Based Incentive Compensation Plan for Officer and Key Employees (the “Plan”), which was last amended and restated as of August 9, 2016, and was amended one time since that date. The Company reserved the right to amend the Plan pursuant to Section 10.1 thereof. The Company wishes to amend to the Plan to modify the change in control vesting provision to require that immediately vesting will only occur following a change in control in the event of certain terminations of a Participant’s employment.

AMENDMENT

NOW THEREFORE, the Plan is amended, effective as of July 18, 2018, by deleting the existing Section 8 and substituting therefor the following new Section 8:

“ **Section 8 . Change in Control.**

8.1 With respect to Awards granted prior to July 18, 2018, notwithstanding any provision in this Plan and any Award Agreement to the contrary, upon the occurrence of a Change in Control, (a) each Option then outstanding shall become immediately exercisable to the full extent of any shares of Common Stock subject thereto, (b) any remaining restrictions on shares of Restricted Stock shall immediately lapse, and (c) the Performance Goals or other performance criteria and/or time period or periods applicable to any Restricted Stock or Restricted Stock Units shall be deemed satisfied and payment shall be made pursuant to Sections 6.1(c) and 6.3(d), respectively.

8.2 With respect to Awards granted on or after July 18, 2018, notwithstanding any provision in this Plan and any Award Agreement to the contrary, if, within two (2) years immediately following a Change in Control, a Participant’s employment is terminated by the Company other than for Cause or terminated by the Participant for Good Reason (as defined in this Section 8), (a) each Option then outstanding shall become immediately exercisable to the full extent of any shares of Common Stock subject thereto, (b) any remaining restrictions on shares of Restricted Stock shall immediately lapse, and (c) the Performance Goals or other performance criteria and/or time period or periods applicable

to any Restricted Stock or Restricted Stock Units shall be deemed satisfied and settlement and/or payment shall be made pursuant to Sections 6.1(c) and 6.3(d), respectively.

For purposes of this Section 8, 'Good Reason' shall mean a Participant's termination of employment within the ninety(90) day period following the initial existence of one (1) or more of the following conditions arising without the Participant's consent: (i) a material diminution in the Participant's base salary; (ii) a material permanent diminution in the Participant's authority, duties or responsibilities; (iii) a material change in the geographic location at which the Participant must perform services which is at least fifty (50) miles from his or her current principal place of work; (iv) if a Participant holds the title of Chief Executive Officer, a change in such title to a non-Chief Executive Officer title; (v) if a Participant holds the title of Chief Financial Officer, a change in such title to a non-Chief Executive Officer or non-Chief Financial Officer title; or (vi) any other action or inaction that constitutes a material breach by the Company or a Subsidiary of any employment agreement between the Participant and the Company or Subsidiary; and within thirty (30) days following the initial existence of a condition described in subsections (i) through (vi) above, the Participant must provide notice to the Company or Subsidiary of the existence of the condition, and the Company or Subsidiary must fail to remedy the condition within thirty (30) days of receipt of such notice."

Except as specifically amended hereby, the Plan shall remain in full force and effect prior to this Second Amendment.

IN WITNESS WHEREOF, the Company has caused this Second Amendment to be executed on the day and year first written above.

CARPENTER TECHNOLOGY CORPORATION

By: _____

Print Name: _____

Title: _____

CARPENTER TECHNOLOGY CORPORATION

STOCK-BASED INCENTIVE COMPENSATION PLAN

FOR OFFICERS AND KEY EMPLOYEES

RESTRICTED STOCK UNIT AWARD AGREEMENT

AGREEMENT, effective as of [**DATE**] (the “Award Date”), by and between CARPENTER TECHNOLOGY CORPORATION (the “Company”) and [**PARTICIPANT**] (the “Participant”). Capitalized terms that are not defined in this Agreement have the same meaning as defined in the CARPENTER TECHNOLOGY CORPORATION STOCK-BASED INCENTIVE COMPENSATION PLAN FOR OFFICERS AND KEY EMPLOYEES (the “Plan”), a copy of which is attached. The terms, conditions and provisions of the Plan are applicable to this Award Agreement and are incorporated by reference.

1. Grant of Award. Participant has been granted an Award of Restricted Stock Units under the Plan comprised of an aggregate of the number of Restricted Stock Units set forth below (collectively, the “Units”).

2. Duration of Restriction Period. The Restriction Period with respect to the Units will lapse as follows:

[**VEST SCHEDULE - RSU**] .

3. Conditions of Forfeiture. Subject to the provisions of Section 4 hereof, the Units are subject to forfeiture by Participant at any time during the applicable Restriction Period immediately upon termination of Participant’s employment with the Company or a Subsidiary. Upon any such forfeiture, all rights of Participant with respect to the forfeited Units shall terminate and Participant shall have no further interest of any kind therein.

4. Lapse of Restrictions on Death, Disability or Retirement. Notwithstanding any provision hereof to the contrary, in the event of termination of Participant's employment prior to vesting by reason of (i) death, or (ii) Disability, the Units will not be forfeited and the Participant shall become vested with respect to the Units on the same date as such death or Disability. In the event of a Participant's Retirement during a Restriction Period, the Participant shall be vested in not less than a pro rata portion of the Units subject to such Restriction Period based on the number of days during the applicable Restriction Period during which the Participant was employed. Upon a Participant's Retirement, all unvested Units shall be forfeited; provided however, that the Committee reserves the right to vest unvested Units.

5. Time and Form of Payment. Payment of vested Units shall be made as soon as practicable (but not later than 30 days) following the close of a Restriction Period or, if earlier, within 30 days following the earlier of the Participant's death, Disability or Retirement that constitutes a "Separation from Service" within the meaning of Code Section 409A. Payment shall be in the form of a number of shares of Common Stock equal to the number of Units subject hereto. Notwithstanding anything herein to the contrary, if the Participant's Award is subject to the application of Code Section 409A and if the Participant is a "Specified Employee" within the meaning of Code Section 409A and the Treasury regulations and other guidance thereunder, the Participant may not receive payment with respect to any Units that are payable as a result of the Participant's Separation from Service, earlier than six (6) months following the Participant's Separation from Service, except that in the event of the Participant's earlier death, such Units shall be paid within 30 days after the Company receives notice of the Participant's death.

6. Voting Rights. The Participant will not have the right to vote with respect to the Units prior to payment of Common Stock in satisfaction of the Units.

7. Dividend Equivalencies. Upon the payment of dividends on Common Stock prior to payment of Common Stock in satisfaction of the Units, the Company will, within 30 days following the date the dividend was paid to the holders of the Company's Common Stock, pay to the Participant a dividend equivalent provided that the Participant was employed by the Company or a Subsidiary on the date the dividend was paid to holders of the Company's Common Stock.

8. Change in Control. Notwithstanding anything in this Agreement to the contrary, if, within the two-year period immediately following the occurrence of a Change in Control, the Participant's employment is terminated by the Company for any reason other than for Cause or terminated by the Participant for Good Reason, any remaining conditions on forfeiture with respect to the Units shall immediately lapse.

9. Tax Withholding. Participant authorizes the Company to deduct, to the extent required by statute or regulation, from payments of any kind due to Participant or anyone claiming through Participant, the aggregate amount of any federal, state, local or other taxes required to be withheld in respect of any present or future Award under the Plan.

10. Non-Competition and Non-Solicitation. Participant agrees to comply fully with any written agreement between the Company and the Participant which provides for post-termination of employment restrictions against solicitation or competition (the "Restrictive Covenant Agreement"); provided, however, that if no such Restrictive Covenant Agreement exists, the Participant shall not for a period of **[six (6)] [twelve (12)] [eighteen (18)]** months after Participant's voluntary termination of employment with Company or involuntary termination of employment by Company, either himself or together with other persons, directly or indirectly: (i) own, manage, operate, finance, join, control or participate in the ownership, management, operation, financing, or control of or be connected as an officer, director, employee, partner, principal, agent, representative, consultant or otherwise with, or have any financial interest in, or aid or assist anyone else in the conduct of, or use or permit Participant's name to be used in connection with, any business engaged in the research, development, manufacture, sale, marketing or distribution of stainless steel, titanium, specialty alloys, metal powders or metal fabricated parts or components similar to or competitive with those manufactured by the Company (a "Competing Business") as of the date the Participant's employment with Company ends; provided, however, that nothing herein shall prevent the Participant from investing in the securities of any company listed on a national securities exchange, provided that Participant's involvement with any such company is solely that of a stockholder of 5% or less of any class of the outstanding securities thereof; (ii) solicit or divert to any Competing Business any individual or entity that is a customer or prospective customer of the Company or its subsidiaries or affiliates, or was such a customer or prospective customer at any

time during the eighteen (18) months prior to the date of Participant's employment termination with the Company; (iii) induce, offer, assist, encourage or suggest (A) that another business or enterprise offer employment to or enter into a business affiliation with any Company employee, agent or representative, or any individual who acted as an employee, agent or representative of the Company in the previous six (6) months; or (B) that any Company employee, agent or representative (or individual who acted as an employee, agent or representative of the Company in the previous six (6) months) terminate his or her employment or business affiliation with the Company; or (iv) hire or participate in the hiring of any Company employee or any person who was an employee of the Company in the previous six (6) months, by any business, enterprise or employer. For this purpose, "prospective customer" shall mean a person or business entity that the Company has identified as a user or potential user of the Company's products and toward which the Company plans to direct sales or marketing activities.

In the event that the Company determines in good faith that the Participant violated the terms of any Restrictive Covenant Agreement, or, if there is no Restrictive Covenant Agreement, the provisions of the preceding paragraph: (i) this Award shall be forfeited and (ii) the Participant shall be obligated to return to the Company any shares previously issued under this Award or a cash payment equal to the value of the shares at the time such shares were sold or transferred, if any or all of the Award has been issued to the Participant or such recoupment is required by law.

11. Severability. The covenants in this Agreement are severable, and if any covenant or portion thereof is held to be invalid or unenforceable for any reason, such covenant or portion thereof shall be modified to the extent necessary to cure such invalidity or unenforceability and all other covenants and provisions shall remain valid and enforceable.

12. Notices to Participant. Any notices or deliveries to Participant hereunder or under the Plan shall be directed to Participant at the address reflected for Participant on the Company's payroll records or at such other address as Participant may designate in writing to the Company.

13. Binding Effect. Subject to the terms of the Plan, this Agreement shall be binding upon and inure to the benefit of the Company and its assigns, and Participant, his heirs and personal representatives.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Award Date first above written.

CARPENTER TECHNOLOGY CORPORATION

By: __

Tony R. Thene

President and Chief Executive Officer

PARTICIPANT

[NAME]

Number of Award Units: [# OF UNITS AWARDED]

CARPENTER TECHNOLOGY CORPORATION
STOCK-BASED INCENTIVE COMPENSATION PLAN
FOR OFFICERS AND KEY EMPLOYEES

PERFORMANCE
STOCK UNIT AWARD AGREEMENT

AGREEMENT, effective as of [DATE] (the “Award Date”), by and between CARPENTER TECHNOLOGY CORPORATION (the “Company”) and [NAME] (the “Participant”). Capitalized terms that are not defined in this Agreement have the same meaning as defined in the CARPENTER TECHNOLOGY CORPORATION STOCK-BASED INCENTIVE COMPENSATION PLAN FOR OFFICERS AND KEY EMPLOYEES (the “Plan”), a copy of which is attached. The terms, conditions and provisions of the Plan are applicable to this Award Agreement and are incorporated by reference.

1. Grant of Award. Participant has been granted an Award of “Performance Stock Units” under the Plan comprised of an aggregate of the number of Performance Stock Units set forth below (collectively, the “Units”).

2. Performance Goal. Performance Stock Units awarded hereunder shall become “Earned Units” based on the attainment of the Performance Goals during the Performance Period, both as set forth on Schedule A, provided that the Participant remains continuously employed by the Company or a Subsidiary throughout the Performance Period, except as otherwise provided in Section 5 hereof. Any Performance Stock Units which do not become Earned Units shall be forfeited.

3. Duration of Restriction Period. Earned Units are subject to forfeiture if the Participant does not remain continuously employed by the Company or a Subsidiary throughout the Restriction Period, except as provided in Section 5 hereof. The Restriction Period with respect to the Earned Units will commence on the first day of the Performance Period and shall lapse on .

4. Conditions of Forfeiture. Subject to the provisions of Section 5 hereof, the Units are subject to forfeiture by Participant at any time during the applicable Restriction Period immediately upon termination of Participant’s employment with the Company or a Subsidiary. Upon any such forfeiture, all rights of Participant with respect to the forfeited Units shall terminate and Participant shall have no further interest of any kind therein.

5. Lapse of Restrictions on Death, Disability or Retirement.

(a). During the Performance Period. Notwithstanding any provision hereof to the contrary, in the event of termination of Participant’s employment prior to the end of the Performance Period by reason of (i) death, (ii) Disability or (iii) unless otherwise determined by the Committee, Retirement, the Units shall not be forfeited and the Participant shall be vested in not less than a pro rata portion of the Units that become Earned Units at the expiration of the Performance Period, based on the number of days during the applicable Restriction Period during which the Participant was employed. Upon a Participant’s Retirement, all unvested Earned Units shall be forfeited; provided however, that the Committee reserves the right to vest unvested Earned Units.

(b). Following the Performance Period. Notwithstanding any provision hereof to the

contrary, in the event of termination of Participant's employment after the expiration of the Performance Period but prior to the end of the Restriction Period by reason of (i) death, or (ii) Disability the Earned Units will not be forfeited and the Participant shall become vested with respect to the Earned Units on the same date as such death or Disability. Unless otherwise determined by the Committee, in the event of a Participant's Retirement after the expiration of the Performance Period but prior to the end of the Restriction Period, the Participant shall be vested in not less than a pro rata portion of the Earned Units subject to such Restriction Period based on the number of days during the applicable Restriction Period during which the Participant was employed. Upon a Participant's Retirement, all unvested Earned Units shall be forfeited; provided however, that the Committee reserves the right to vest unvested Earned Units.

6. Time and Form of Payment. Payment of vested Earned Units shall be made as soon as practicable (but not later than 30 days) following the close of a Restriction Period or, if earlier, within 30 days following the earlier of the Participant's death, Disability or Retirement that constitutes a "Separation from Service" within the meaning of Code Section 409A; provided that if such death, Disability or Retirement occurs during the Performance Period, payment of the vested Earned Units shall be made within ninety (90) days following the end of the Performance Period. Payment shall be in the form of a number of shares of Common Stock equal to the number of Earned Units subject hereto.

Notwithstanding anything herein to the contrary, if the Participant's Award is subject to the application of Code Section 409A and if the Participant is a "Specified Employee" within the meaning of Code Section 409A and the Treasury Regulations and other guidance thereunder, the Participant may not receive payment with respect to any Earned Units that are payable as a result of the Participant's Separation from Service, earlier than six (6) months following the Participant's Separation from Service, except that in the event of the Participant's earlier death, such Earned Units shall be paid within 30 days after the Company receives notice of the Participant's death.

7. Voting Rights. The Participant will not have the right to vote with respect to the Units prior to payment of Common Stock in satisfaction of the Earned Units.

8. Dividend Equivalencies. Upon the payment of dividends on Common Stock prior to payment of Common Stock in satisfaction of the Earned Units, the Company will, within 30 days following the date the dividend was paid to the holders of the Company's Common Stock, pay to the Participant a dividend equivalent provided that the Participant was employed by the Company on the date the dividend was paid to holders of the Company's Common Stock.

9. Change in Control. Notwithstanding any provision in this Award to the contrary, if, within the two-year period immediately following the occurrence of a Change in Control, the Participant's employment is terminated by the Company for any reason other than for Cause or terminated by the Participant for Good Reason, any remaining conditions on forfeiture with respect to the Units shall immediately lapse and the Performance Goals will be deemed satisfied at the target level of performance.

10. Tax Withholding. Participant authorizes the Company to deduct, to the extent required by statute or regulation, from payments of any kind due to Participant or anyone claiming through Participant, the aggregate amount of any federal, state, local or other taxes required to be withheld in respect of any present or future Award under the Plan.

11. Non-Competition and Non-Solicitation. Participant agrees to comply fully with any written agreement between the Company and the Participant which provides for post-termination of employment restrictions against solicitation or competition (the “Restrictive Covenant Agreement”); provided, however, that if no such Restrictive Covenant Agreement exists, the Participant shall not for a period of ~~[six (6)]~~ **[twelve (12)]** ~~[eighteen (18)]~~ months after Participant’s voluntary termination of employment with Company or involuntary termination of employment by Company, either himself or together with other persons, directly or indirectly: (i) own, manage, operate, finance, join, control or participate in the ownership, management, operation, financing, or control of or be connected as an officer, director, employee, partner, principal, agent, representative, consultant or otherwise with, or have any financial interest in, or aid or assist anyone else in the conduct of, or use or permit Participant’s name to be used in connection with, any business engaged in the research, development, manufacture, sale, marketing or distribution of stainless steel, titanium, specialty alloys, metal powders or metal fabricated parts or components similar to or competitive with those manufactured by the Company (a “Competing Business”) as of the date the Participant’s employment with Company ends; provided, however, that nothing herein shall prevent the Participant from investing in the securities of any company listed on a national securities exchange, provided that Participant’s involvement with any such company is solely that of a stockholder of 5% or less of any class of the outstanding securities thereof; (ii) solicit or divert to any Competing Business any individual or entity that is a customer or prospective customer of the Company or its subsidiaries or affiliates, or was such a customer or prospective customer at any time during the eighteen (18) months prior to the date of Participant’s employment termination with the Company; (iii) induce, offer, assist, encourage or suggest (A) that another business or enterprise offer employment to or enter into a business affiliation with any Company employee, agent or representative, or any individual who acted as an employee, agent or representative of the Company in the previous six (6) months; or (B) that any Company employee, agent or representative (or individual who acted as an employee, agent or representative of the Company in the previous six (6) months) terminate his or her employment or business affiliation with the Company; or (iv) hire or participate in the hiring of any Company employee or any person who was an employee of the Company in the previous six (6) months, by any business, enterprise or employer. For this purpose, “prospective customer” shall mean a person or business entity that the Company has identified as a user or potential user of the Company’s products and toward which the Company plans to direct sales or marketing activities.

In the event that the Company determines in good faith that the Participant violated the terms of any Restrictive Covenant Agreement, or, if there is no Restrictive Covenant Agreement, the provisions of the preceding paragraph: (i) this Award shall be forfeited and (ii) the Participant shall be obligated to return to the Company any shares previously issued under this Award or a cash payment equal to the value of the shares at the time such shares were sold or transferred, if any or all of the Award has been issued to the Participant or such recoupment is required by law.

12. Clawback. This Agreement, and any payment in the form of cash or shares of Common Stock made pursuant to this Agreement, is expressly subject to any “Clawback Policy” as may be adopted by the Company or its designee from time to time or any other recoupment required by law.

13. Severability. The covenants in this Agreement are severable, and if any covenant or portion thereof is held to be invalid or unenforceable for any reason, such covenant or portion thereof shall be modified to the extent necessary to cure such invalidity or unenforceability and all other covenants and provisions shall remain valid and enforceable.

14. Notices to Participant. Any notices or deliveries to Participant hereunder or under the Plan shall be directed to Participant at the address reflected for Participant on the Company's payroll records or at such other address as Participant may designate in writing to the Company.

15. Binding Effect. Subject to the terms of the Plan, this Agreement shall be binding upon and inure to the benefit of the Company and its assigns, and Participant, his/her heirs and personal representatives.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Award Date first above written.

CARPENTER TECHNOLOGY CORPORATION

By:

Tony R. Thene
President and Chief Executive Officer

PARTICIPANT

[NAME]

Number of Award Units at Target: [Target # of Units]

UP TO A MAXIMUM AWARD OF 200% OF TARGET AS DETERMINED PURSUANT TO SCHEDULE A

SCHEDULE A**PERFORMANCE GOALS AND PERFORMANCE PERIOD****Performance Period**

Fiscal Year

Performance Goals

The number of Performance Stock Units that become Earned Units is determined based on the level of achievement during the Performance Period based on the following metric(s):

Metric	Earned Units		
	Threshold <i>(50% of Target)</i>	Target	Maximum <i>(200% of Target)</i>

**CARPENTER TECHNOLOGY CORPORATION
STOCK-BASED COMPENSATION PLAN
FOR OFFICERS AND KEY EMPLOYEES**

STOCK OPTION AWARD AGREEMENT

CARPENTER TECHNOLOGY CORPORATION (the "Company") grants this STOCK OPTION to the individual identified below (the "Participant"). Capitalized terms used herein without definition have the respective meanings ascribed to them in the CARPENTER TECHNOLOGY CORPORATION STOCK-BASED INCENTIVE COMPENSATION PLAN FOR OFFICERS AND KEY EMPLOYEES, as amended and restated August 9, 2016 (the "Plan"); the terms, conditions and provisions of which are applicable to the Award evidenced hereby and incorporated herein by reference.

1. **Grant of Option**. The Participant has been granted a non-qualified stock option (the "Option") to purchase the number of Shares set forth below (the "Option Shares") pursuant to the terms of the Plan.

2. **Price**. The purchase price per Option Share is set forth below.

3. **Term of Exercise**. One-third (1/3) of the total Option Shares shall become exercisable on each of the first three anniversaries of the Grant Date contingent upon continued employment of the Participant with the Company on each such anniversary and shall continue to be exercisable within the period ending on the tenth anniversary of the Grant Date, except as otherwise provided under the terms of the Plan. Notwithstanding the foregoing, in the event of a Participant's Retirement after the first anniversary of the Grant Date and prior to the third anniversary of the Grant Date, not less than a pro rata portion of the Option Shares shall be exercisable based on the number of days during the three-year period from the Grant Date the Participant was employed by the Company. Upon a Participant's Retirement, the Committee reserves the right to cause all Option Shares to become exercisable. Notwithstanding anything in this Award to the contrary, if, within the two-year period immediately following a Change in Control, the Participant's employment is terminated by the Company for any reason other than for Cause or terminated by the Participant for Good Reason, one hundred percent (100%) of the Option Shares shall become fully exercisable.

4. **Payment**. Notice of the Participant's intention to exercise all or a portion of the Option shall be given (in accordance with the procedures established by the Company from time to time) by the Participant or, in the case of death of the participant, his/her legal representative. The form of payment is to be specified in such notice. Full payment for Option Shares purchased shall be made to the Plan Administrator, as specified in the guidelines, following delivery to the Plan Administrator of notice of intention to exercise.

5. **Automatic Exercise**. Any Option Shares that are exercisable but unexercised as of the tenth anniversary of the Grant Date shall be automatically exercised on the tenth anniversary of the Grant Date if the purchase price of an Option Share is less than the Fair Market Value of a Share on such date and the automatic exercise will result in the issuance of at least one (1) whole Share to the Participant after payment of the purchase price and any applicable tax withholding requirements. Payment of the purchase price and any applicable tax withholding requirements shall be made by having the number of Shares to be issued upon exercise reduced by a number of Shares having a Fair Market Value on the date of exercise equal to the purchase price and any applicable tax withholding requirements.

6. **Binding Effect**. Subject to the terms of the Plan, the terms of this Option shall be binding upon, and inure to the benefit of, both the Company, its successors and assigns, and the Participant, his/her heirs and personal representatives.

7. Plan Compliance. The Participant should be aware that the terms of this Option, including methods for exercise, may be modified without the consent of the Participant to comply with applicable law, stock exchange or accounting requirements.

CARPENTER TECHNOLOGY CORPORATION

By:

Tony R. Thene

President and Chief Executive Officer

Name of Participant: [NAME]

Number of Options Shares: [# of Options]

Purchase Price per Option Share: [Purchase Price]

Grant Date: [Grant Date]

CARPENTER TECHNOLOGY CORPORATION
STOCK-BASED INCENTIVE COMPENSATION PLAN
FOR OFFICERS AND KEY EMPLOYEES

THREE-YEAR PERFORMANCE STOCK UNIT
AWARD AGREEMENT

AGREEMENT, effective as of [DATE] (the “Award Date”), by and between CARPENTER TECHNOLOGY CORPORATION (the “Company”) and [NAME] (the “Participant”). Capitalized terms that are not defined in this Agreement have the same meaning as defined in the CARPENTER TECHNOLOGY CORPORATION STOCK-BASED INCENTIVE COMPENSATION PLAN FOR OFFICERS AND KEY EMPLOYEES (the “Plan”), a copy of which is attached. The terms, conditions and provisions of the Plan are applicable to this Award Agreement and are incorporated by reference.

1. Grant of Award. Participant has been granted an Award of “Performance Stock Units” under the Plan comprised of an aggregate of the number of Performance Stock Units set forth below (collectively, the “Units”).

2. Performance Goal. Performance Stock Units awarded hereunder shall become “Earned Units” based on the attainment of the Performance Goals during the Performance Period, both as set forth on Schedule A, provided that the Participant remains continuously employed by the Company or a Subsidiary throughout the Performance Period, except as otherwise provided in Section 4 hereof. Any Performance Stock Units which do not become Earned Units shall be forfeited.

3. Conditions of Forfeiture. Subject to the provisions of Section 4 hereof, the Units are subject to forfeiture by Participant at any time during the Performance Period immediately upon termination of Participant’s employment with the Company or a Subsidiary. Upon any such forfeiture, all rights of Participant with respect to the forfeited Units shall terminate and Participant shall have no further interest of any kind therein.

4. Lapse of Restrictions on Death, Disability or Retirement. Notwithstanding any provision hereof to the contrary, in the event of termination of Participant’s employment prior to the end of the Performance Period by reason of (i) death, (ii) Disability or (iii) unless otherwise determined by the Committee, Retirement, the Units shall not be forfeited and the Participant shall be vested in not less than a pro rata portion of the Units that become Earned Units at the expiration of the Performance Period, based on the number of days during the applicable Performance Period during which the Participant was employed. Upon a Participant’s Retirement, all unvested Earned Units shall be forfeited; provided however, that the Committee reserves the right to vest unvested Earned Units.

5. Time and Form of Payment. Payment of vested Earned Units shall be made as soon as practicable (but not later than 30 days) following the close of the Performance Period; provided, however, that in the event of a Participant’s death, Disability or Retirement that constitutes a “Separation from Service” within the meaning of Code Section 409A during the Performance Period, payment of the vested Earned Units shall be made within ninety (90) days following the end of the

Performance Period. Payment shall be in the form of a number of shares of Common Stock equal to the number of Earned Units subject hereto.

Notwithstanding anything herein to the contrary, if the Participant's Award is subject to the application of Code Section 409A and if the Participant is a "Specified Employee" within the meaning of Code Section 409A and the Treasury Regulations and other guidance thereunder, the Participant may not receive payment with respect to any Earned Units that are payable as a result of the Participant's Separation from Service, earlier than six (6) months following the Participant's Separation from Service, except that in the event of the Participant's earlier death, such Earned Units shall be paid within 30 days after the Company receives notice of the Participant's death.

6. Voting Rights. The Participant will not have the right to vote with respect to the Units prior to payment of Common Stock in satisfaction of the Earned Units.

7. Change in Control. Notwithstanding any provision in this Award to the contrary, if, within the two-year period immediately following the occurrence of a Change in Control, the Participant's employment is terminated by the Company for any reason other than for Cause or terminated by the Participant for Good Reason, any remaining conditions on forfeiture with respect to the Units shall immediately lapse and the Performance Goals will be deemed satisfied at the target level of performance.

8. Tax Withholding. Participant authorizes the Company to deduct, to the extent required by statute or regulation, from payments of any kind due to Participant or anyone claiming through Participant, the aggregate amount of any federal, state, local or other taxes required to be withheld in respect of any present or future Award under the Plan.

9. Non-Competition and Non-Solicitation. Participant agrees to comply fully with any written agreement between the Company and the Participant which provides for post-termination of employment restrictions against solicitation or competition (the "Restrictive Covenant Agreement"); provided, however, that if no such Restrictive Covenant Agreement exists, the Participant shall not for a period of ~~six (6)~~ **twelve (12)** ~~eighteen (18)~~ months after Participant's voluntary termination of employment with Company or involuntary termination of employment by Company, either himself or together with other persons, directly or indirectly: (i) own, manage, operate, finance, join, control or participate in the ownership, management, operation, financing, or control of or be connected as an officer, director, employee, partner, principal, agent, representative, consultant or otherwise with, or have any financial interest in, or aid or assist anyone else in the conduct of, or use or permit Participant's name to be used in connection with, any business engaged in the research, development, manufacture, sale, marketing or distribution of stainless steel, titanium, specialty alloys, metal powders or metal fabricated parts or components similar to or competitive with those manufactured by the Company (a "Competing Business") as of the date the Participant's employment with Company ends; provided, however, that nothing herein shall prevent the Participant from investing in the securities of any company listed on a national securities exchange, provided that Participant's involvement with any such company is solely that of a stockholder of 5% or less of any class of the outstanding securities thereof; (ii) solicit or divert to any Competing Business any individual or entity that is a customer or prospective customer of the Company or its subsidiaries or affiliates, or was such a customer or prospective customer at any time during the eighteen (18) months prior to the date of Participant's employment termination with the Company; (iii) induce, offer, assist, encourage or suggest (A) that another business or enterprise offer employment to or enter into a business affiliation with any Company employee, agent or

representative, or any individual who acted as an employee, agent or representative of the Company in the previous six (6) months; or (B) that any Company employee, agent or representative (or individual who acted as an employee, agent or representative of the Company in the previous six (6) months) terminate his or her employment or business affiliation with the Company; or (iv) hire or participate in the hiring of any Company employee or any person who was an employee of the Company in the previous six (6) months, by any business, enterprise or employer. For this purpose, “prospective customer” shall mean a person or business entity that the Company has identified as a user or potential user of the Company’s products and toward which the Company plans to direct sales or marketing activities.

In the event that the Company determines in good faith that the Participant violated the terms of any Restrictive Covenant Agreement, or, if there is no Restrictive Covenant Agreement, the provisions of the preceding paragraph: (i) this Award shall be forfeited and (ii) the Participant shall be obligated to return to the Company any shares previously issued under this Award or a cash payment equal to the value of the shares at the time such shares were sold or transferred, if any or all of the Award has been issued to the Participant or such recoupment is required by law.

10. Clawback. This Agreement, and any payment in the form of cash or shares of Common Stock made pursuant to this Agreement, is expressly subject to any “Clawback Policy” as may be adopted by the Company or its designee from time to time or any other recoupment required by law.

11. Severability. The covenants in this Agreement are severable, and if any covenant or portion thereof is held to be invalid or unenforceable for any reason, such covenant or portion thereof shall be modified to the extent necessary to cure such invalidity or unenforceability and all other covenants and provisions shall remain valid and enforceable.

12. Notices to Participant. Any notices or deliveries to Participant hereunder or under the Plan shall be directed to Participant at the address reflected for Participant on the Company’s payroll records or at such other address as Participant may designate in writing to the Company.

13. Binding Effect. Subject to the terms of the Plan, this Agreement shall be binding upon and inure to the benefit of the Company and its assigns, and Participant, his/her heirs and personal representatives.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Award Date first above written.

CARPENTER TECHNOLOGY CORPORATION

By:

Tony R. Thene
President and Chief Executive Officer

PARTICIPANT

[NAME]

Number of Award Units at Target: [Target # of Units]

UP TO A MAXIMUM AWARD OF 200% OF TARGET AS DETERMINED PURSUANT TO SCHEDULE A

SCHEDULE A

PERFORMANCE GOALS AND PERFORMANCE PERIOD

Performance Period

Fiscal Year Three-Year Performance Period (DATE - DATE)

Performance Goals

The number of Performance Stock Units that become Earned Units is determined based on the level of achievement during the Performance Period based on the following metric(s):

Metric	Earned Units		
	Threshold <i>(50% of Target)</i>	Target	Maximum <i>(200% of Target)</i>

Carpenter Technology Corporation
Computation of Ratios of Earnings to Fixed Charges - unaudited
Five Years Ended June 30, 2018
(\$ in millions)

	Years Ended June 30,				
	2018	2017	2016	2015	2014
Fixed charges:					
Interest costs (a)	\$ 31.1	\$ 31.1	\$ 29.9	\$ 30.4	\$ 32.1
Interest component of non-capitalized lease rental expense (b)	4.5	4.4	3.8	4.0	4.3
Total fixed charges	<u>\$ 35.6</u>	<u>\$ 35.5</u>	<u>\$ 33.7</u>	<u>\$ 34.4</u>	<u>\$ 36.4</u>
Earnings as defined:					
Income before income taxes	\$ 160.2	\$ 70.2	\$ 21.5	\$ 89.1	\$ 196.4
Less income from less-than-fifty-percent owned entities, and loss on sale of partial interest in less-than-fifty percent owned entities	—	—	(0.6)	(0.1)	(0.6)
Fixed charges less interest capitalized	32.9	34.2	31.8	31.7	21.3
Amortization of capitalized interest	<u>1.4</u>	<u>1.3</u>	<u>1.3</u>	<u>1.4</u>	<u>1.4</u>
Earnings as defined	<u>\$ 194.5</u>	<u>\$ 105.7</u>	<u>\$ 54.0</u>	<u>\$ 122.1</u>	<u>\$ 218.5</u>
Ratio of earnings to fixed charges	<u>5.5x</u>	<u>3.0x</u>	<u>1.6x</u>	<u>3.5x</u>	<u>6.0x</u>

(a) Includes interest capitalized relating to significant construction projects, amortization of debt discount and debt issue costs.

(b) One-third of rental expense which approximates the interest component of non-capitalized leases.

SUBSIDIARY LIST

Doing Business As	State of Incorporation
Carpenter Investments, Inc.	Delaware
CRS Holdings Inc.	Delaware
Dynamet Incorporated	Delaware
Talley Industries, LLC	Delaware
LSM Holding LLC	Delaware
Latrobe Specialty Metals Company, LLC	Delaware

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 2-83780, 2-81019, 33-42536, 33-65077, 33-54045, 333-40991, 333-55667, 333-55669, 333-57774, 333-147057, 333-147059, 333-173830, 333-182155, 333-182156, 333-186361, and 333-214151) and Form S-3ASR (No. 333-182121 and 333-214152) of Carpenter Technology Corporation of our report dated August 14, 2018 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Philadelphia, Pennsylvania
August 14, 2018

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Philip M. Anderson

Philip M. Anderson
Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ I. Martin Inglis

I. Martin Inglis

Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Steven E. Karol

Steven E. Karol

Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

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IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Kathleen Ligocki

Kathleen Ligocki

Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Robert R. McMaster

Robert R. McMaster

Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Gregory A. Pratt

Gregory A. Pratt
Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Kathryn C. Turner

Kathryn C. Turner

Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Jeffrey Wadsworth
Jeffrey Wadsworth
Director

CARPENTER TECHNOLOGY CORPORATION

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that the undersigned, in his or her capacity as a Director of Carpenter Technology Corporation, hereby appoints James D. Dee and Damon J. Audia, or either of them, his or her true and lawful attorneys to execute in his name, place and stead, in his or her capacity as Director of the Company, the Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 on Form 10-K, for the year ended June 30, 2018, of said Company, and any and all amendments to said Annual Report and all instruments necessary or incidental in connection therewith and to file them with the Securities and Exchange Commission. The attorneys shall individually have full power and authority to do and perform in the name and on behalf of the undersigned, in any and all capacities, every act whatsoever requisite or desirable to be done in the exercise of any of the rights and powers herein granted, as fully and to all intents and purposes as the undersigned might or could do in person, the undersigned hereby ratifying and approving the acts of said attorneys.

IN TESTIMONY WHEREOF, the undersigned has voluntarily executed this instrument this 14th day of August 2018.

/s/ Stephen M. Ward, Jr.
Stephen M. Ward, Jr.
Director

**CERTIFICATIONS OF PERIODIC REPORTS PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Tony R. Thene, certify that:

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

Date: August 14, 2018

/s/ Tony R. Thene

Tony R. Thene

President and Chief Executive Officer

**CERTIFICATIONS OF PERIODIC REPORTS PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Damon J. Audia, certify that:

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

Date: August 14, 2018

/s/ Damon J. Audia

Damon J. Audia

Senior Vice President and Chief Financial Officer

CERTIFICATION OF PERIODIC FINANCIAL REPORTS PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Carpenter Technology Corporation (the “Issuer”) on Form 10-K for the year ended June 30, 2018 , as filed with the Securities and Exchange Commission on the date hereof (the “Periodic Report”), I, Tony R. Thene, and I, Damon J. Audia, each hereby certify, pursuant to 18 U.S.C. §1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Periodic Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and that information contained in the Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Issuer.

Date: August 14, 2018

/s/ Tony R. Thene

Tony R. Thene

President and Chief Executive Officer

/s/ Damon J. Audia

Damon J. Audia

Senior Vice President and Chief Financial Officer