GLOBAL BRASS & COPPER HOLDINGS, INC.
Form 10-K
February 28, 2019
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

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x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 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 No. 001-35938

GLOBAL BRASS AND COPPER HOLDINGS, INC.
(Exact name of registrant as specified in its charter)

Delaware	06-1826563
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)
475 N. Martingale Road Suite 1200 Schaumburg, IL	60173
(Address of principal executive offices)	(Zip Code)

(847) 240-4700
(Registrant's telephone number, including area code)

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

Title of each class	Name of each exchange on which registered
Common stock, $0.01 par value	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ¨ No ý
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 ý
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ý No ¨
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ý No ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in 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 or a smaller reporting company. See the definitions of “large accelerated filer,” “accelerated filer” and “smaller reporting company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer	¨	Accelerated filer	x
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 ý

The aggregate market value of the registrant’s common stock held by non-affiliates of the registrant on June 30, 2018, the last business day of the registrant’s most recently completed second fiscal quarter, was approximately $674.2 million.

On February 18, 2019, there were 21,880,908 shares of common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant’s definitive Proxy Statement, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018, are incorporated by reference in Part III of this Form 10-K.

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PART I

Item 1. Business.

Our Company

Global Brass and Copper Holdings, Inc. (“Holdings,” the “Company,” “we,” “us,” or “our”) was incorporated in Delaware on October 10, 2007. We commenced commercial operations on November 19, 2007 following the acquisition of the metals business from Olin Corporation. The majority of our operations are managed through three reportable operating segments: Olin Brass, Chase Brass and A.J. Oster.

We are a leading value-added converter, fabricator, processor and distributor of specialized non-ferrous products, including a wide range of sheet, strip, foil, rod, tube and fabricated metal component products. While we primarily process copper and copper alloys, we also reroll and form certain other metals such as stainless steel, carbon steel and aluminum. Using processed scrap, virgin metals and other refined metals, we engage in metal melting and casting, rolling, drawing, extruding, welding and stamping to fabricate finished and semi-finished alloy products. Key attributes of copper and copper alloys are conductivity, corrosion resistance, strength, malleability, cosmetic appearance and bactericidal properties.

Unlike traditional metals companies, particularly those that engage in mining, smelting and refining activities, we are purely a metal converter, fabricator, processor and distributor, and we do not attempt to generate profits from fluctuations in publicly traded commodity metal prices. Our financial performance is primarily driven by metal conversion economics, not by the underlying movements in the commodity price of copper and the other metals we use. Through our “balanced book” approach (as further described under “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Key Business Principles Affecting Our Results of Operations —Balanced Book”), we strive to match the timing, quantity and price of our metal sales with the timing, quantity and price of our replacement metal purchases. We do this, for the most part, by basing both sales and purchase transaction on the price of publicly traded commodity prices and having both transactions occur on the same date. This practice, along with our toll processing operations and last-in, first-out (“LIFO”) inventory accounting methodology, substantially reduces the financial impact of metal price movements on our earnings and operating margins.

Our products are used in a variety of applications across diversified markets, including the building and housing, munitions, automotive, transportation, coinage, electronics / electrical components, industrial machinery and equipment, signage, and general consumer markets. We access these markets through direct mill sales, our captive distribution network and third-party distributors. Through May 16, 2019, we hold the exclusive production and distribution rights in North America for a lead-free brass rod product, which we sell under the Green Dot® and Eco Brass® brand names. We anticipate the expiration of this exclusive license may have a negative effect on our financial performance. We believe we are the only domestic copper and brass sheet manufacturer with captive distribution and service center operations, a competitive advantage that allows us to service and access customers with a wide variety of volume and service needs.

We service nearly 4,200 customers in 28 countries across four continents. We employ approximately 1,900 people and operate 16 manufacturing facilities and distribution centers across the United States (“U.S.”), Puerto Rico and Mexico. We own 80% of a value-added service center in Guangzhou, China (“Olin Luotong Metals” or “OLM”); the other 20% is owned by Chinalco Luoyang Copper Co. Ltd. (“Chinalco”). Through Olin Luotong Metals, together with our sales offices in China and Singapore, we supply our products in China and throughout Southeast Asia.

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The following charts show the percentage of our shipments by segment, as well as the primary markets for our products and the percentage of shipments. Pounds shipped by market represent management's estimate of the markets in which our customers participate. Additionally, pounds shipped by market reflect our allocation of Chase Brass shipments to distributors, job shops and forging shops. See Item 1, "Business—Chase Brass."

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Segments Overview

We have three reportable operating segments: Olin Brass, Chase Brass and A.J. Oster.

Activities	Leading manufacturer, fabricator and converter	Leading manufacturer and supplier	Leading processor and distributor
Products	Specialized copper and brass sheet, strip, foil, tube, and fabricated products	Brass rod, including environmentally friendly alloys	Primarily copper, brass, and aluminum sheet, strip and coated products
Key Markets	Building and Housing	Building and Housing	Building and Housing
	Automotive	Transportation	Automotive
	Electronics / Electrical Components	Electronics / Electrical Components	Electronics / Electrical Components
	Munitions	Industrial Machinery and Equipment	
	Coinage		

All of our segments sell to the building and housing market. While demand within this market is affected by new residential housing, existing home sales and commercial construction, all of which are seasonal and dependent on overall economic conditions, the correlation between housing statistics and our sales is not entirely direct. Our key products are typically installed near the completion of construction, meaning there is an inherent lag time compared to housing starts, and sales of our building and housing products can be affected by factors such as housing mix (unit size, unit price point and the mix of multi-family versus single-family construction). Sales of our products can also be impacted by changes in the composition of materials and fixtures used in construction as well as competition from imported brass rod and importation of finished product made from brass rod.

The red metals industry is different from other metals industries in several ways, two of which are price and variety. Copper trades on public commodity exchanges at prices which are generally more expensive than steel or aluminum. In 2018 for example, average COMEX copper was $2.93 per pound compared to $0.96 per pound for aluminum or $0.44 per pound for steel. Thus, the investment our customers have to make in inventory to hold the same number of pounds in copper or a copper alloy is significantly greater. We believe our short lead times and on-time delivery performance within our businesses is better than most of our competitors, providing a competitive advantage by allowing our customers to hold less inventory. Also, our copper and copper alloy finished products are less standardized than finished products in the aluminum or steel industries. Thus, our ability to manufacture custom alloys in a wide variety of gauges and finishes, especially within our Olin Brass business, is a competitive advantage to meeting customers' overall needs.

Further information about our business segments and the geographic areas of our operations can be found in "Note 5, Segment Information."

Olin Brass

In addition to manufacturing, fabricating and converting specialized copper and brass sheet, strip, foil, tube and fabricated products, Olin Brass also rerolls and forms other alloys such as stainless steel, carbon steel and aluminum. Sheet and strip is generally manufactured from copper and copper-alloy scrap.

Olin Brass manufactures its wide variety of products through four sites in North America. It is not uncommon for Olin Brass to produce 50 different alloys, approximately 30% of which could be high performance alloys ("HPAs").

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Olin Brass's integrated brass mill in East Alton, Illinois is its main operating facility, which melts metal and produces strip products that are either sold directly to external customers, sold to its affiliate, A.J. Oster, or shipped to Olin Brass's downstream operations for further value-added processing. Olin Brass's downstream operations include:

- a stamping operation located in East Alton;
- a rolling mill in Waterbury, Connecticut with rolling, annealing, leveling, plating and slitting capabilities for various products ("Somers Thin Strip"), including stainless steel thin strip;
- a manufacturing facility in Bryan, Ohio specializing in products sold in the automotive and electronics / electrical components markets; and
- a manufacturing facility in Cuba, Missouri that produces high frequency welded copper-alloy tube for heat transfer, utility, decorative, automotive and plumbing applications.

Olin Brass's products are sold to original equipment manufacturers ("OEMs"), other external customers, distributors / rerollers or to its affiliate, A.J. Oster. In 2018, approximately 18% of Olin Brass's products were shipped to distribution customers, which includes its affiliate A.J. Oster. In 2018, approximately 15% of Olin Brass's shipments were to A.J. Oster.

The following chart shows the primary markets for Olin Brass's products and the percentage of shipments.

(1) Shipments to A.J. Oster are reflected in the supply chain market and are eliminated in consolidation.

Munitions Market

Olin Brass manufactures products utilized in both the military and commercial munitions markets, such as strip and cups, that are used to produce shot shells, bullet jackets, centerfire, rimfire and small caliber military munitions. Customers in this market include major munitions producers in the U.S., including those producing small caliber ammunition for the U.S. military. Demand within this market is affected by the U.S. government's security policies and troop size, as well as consumer demand for firearms and munitions. While munitions demand is predominantly domestic, occasional opportunities arise to supply U.S. alliance partners with these products.

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Coinage Market

Olin Brass supplies strip for use in the production of coins (no pennies) primarily for the United States Mint, for which we are a key supplier contracted into 2022. We have been a highly regarded supplier to the United States Mint for over 40 years, as our long-term contracts have historically been renewed at termination.

The demand within this market is affected by the level of activities in retail transactions, the use of vending machines, trends affecting forms of payment, and management of inventory levels within the U.S. Mint and Federal Reserve.

Automotive Market

Olin Brass manufactures both strip and fabricated products used as electronic and electrical connectors for use in automobiles. These products are made with HPAs, suitable for applications requiring high reliability, high temperature and low insertion force. For example, these electrical connectors, along with lead frames manufactured by us, are used in junction boxes, wiring harnesses, ignition and battery systems, lighting and media systems within vehicles.

Customers in this market include primary automotive connector suppliers in the U.S. Historically the business in this market remained largely regional in the U.S. Demand within this market is affected by the level of consumer spending on automobiles, which is significantly dependent on overall economic conditions and the amount of electrical components contained within automobiles. In addition, demand is affected by the increasing inclusion of electrical systems (televisions, cameras, sensors, etc.) within vehicles and trends towards electric powered vehicles.

Building and Housing Market

Olin Brass manufactures a variety of strip, welded tube and stamped parts used in commercial and residential buildings, such as faucets, locksets, decorative door hardware and hinges, which require workability, corrosion resistance and attractive appearance. Olin Brass also manufactures strip for products requiring high electrical conductivity, such as plug outlets, switches, lamp shells, other wiring devices, industrial controls, circuit breakers and switchgears. These products are generally manufactured with copper and copper-alloy sheet and strip, both HPAs and standard alloys, as well as copper-alloy welded tube.

Customers in this market are OEMs producing building and housing products. Olin Brass also supplies building and housing products in China through Olin Luotong Metals.

Electronics / Electrical Components Market

Olin Brass manufactures strip used in integrated circuit sockets for circuit boards, electrical connectors for laptop computers and similar devices, consumer electronics and appliances, and foils for flexible circuit applications. The strip manufactured in this market is concentrated in HPAs and is sold directly to end-use customers and distributors.

Customers in this market are primarily electronics manufacturers that operate globally. A portion of these customers is serviced through A.J. Oster, and the remainder is supplied directly by Olin Brass, with its Somers Thin Strip facility providing the foil products on a global scale.

Demand within this market is affected by consumer spending on electronics, which may fluctuate significantly as a result of economic conditions.

International

The Olin Brass segment exported 17.8 million pounds into markets that primarily serve the building and housing, automotive and electronics / electrical components markets.

Asia

Included within our Olin Brass business, our Asian operations provide service, distribution and sales activities to meet the growing demand for copper alloys in that region. These activities are conducted through two of our subsidiaries, Olin Luotong Metals (“OLM”) in China and GBC Metals Asia Pacific PTE (“GMAP”) in Singapore. These operations source materials from Olin Brass, as well as other copper and brass mills, such as Chinalco and DOWA Metaltech Co. LTD (“Dowa Metaltech”). In 2018, these Asian operations generated $40.7 million of net sales, or 6% of the Olin Brass segment’s net sales. On a pounds basis, our Asian operations sold 8.9 million pounds (4% of the Olin Brass segment’s sales) of product into Asia through OLM and GMAP, primarily into key electronics markets.

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Others

The remainder of Olin Brass's international sales are primarily to Mexico, Canada and European countries and were 8.9 million pounds (4% of the Olin Brass segment's sales) in 2018.

Chase Brass

Chase Brass primarily manufactures solid brass rod, in round, hexagonal and other shapes, ranging from 1/4 inch to 4 1/2 inches in diameter. Brass rod is generally manufactured from copper or copper-alloy scrap and all of Chase Brass's rod is manufactured at its Montpelier, Ohio facility. Chase Brass customers machine, bore out, or otherwise process the rod for various applications used in a variety of markets. Brass rod is primarily used for forged and machined products, such as valves and fittings. Key attributes of brass rod include its machinability, corrosion resistance and moderate strength.

Demand for Chase's brass rod has been impacted by increasing imports of forged and machined product that competes directly with the products our customers manufacture out of brass rod purchased from us. It is also impacted by our customers relocating production facilities to overseas, lower cost production locations. In response, Chase Brass is beginning to semi-fabricate parts from its brass rod to make its customers more cost competitive. In some instances, Chase Brass may manufacture and sell fully fabricated parts to customers. To date, sales of semi-finished and fully fabricated parts have not been significant.

Chase Brass provides its customers with high quality rod product under short lead times with high on-time delivery performance. In addition, Chase Brass partners with customers to buy the scrap customers generate from manufacturing rod purchased from Chase Brass. These customer scrap buy-backs often occur at prices greater than what customers could get from the general scrap market and helps compete against imported rod. Chase Brass has been able to capitalize on opportunities arising from regulation limiting lead content in potable water plumbing fixtures. Our green product portfolio, including Eco Brass® product which we manufacture under an exclusive license through May 16, 2019, grew significantly from 2010 to 2016 as customers switched from leaded to non or low-leaded products in certain applications. We anticipate the expiration of this exclusive license may have a negative effect on our financial performance.

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The following chart shows the primary markets for Chase Brass's products and our estimates of the percentage of shipments for each. We believe that substantially all of the electronics / electrical components shipments below are associated with the building and housing and transportation markets.

Building and Housing Market
Chase Brass manufactures brass rod for use in faucets, valves and fittings used in residential and commercial construction.
Chase Brass produces a number of low-lead and lead-free products, or "green portfolio" products, which comply with certain state and federal laws that became effective in January 2014. This legislation defines the allowed level of lead content in products used in plumbing and drinking water applications. Chase Brass's Green Dot® rod, Eco Brass® rod and Eco Brass® ingot products are part of the green portfolio, and Chase Brass is the exclusive licensee of the intellectual property rights for their production, sale and distribution in North America through May 16, 2019. Chase Brass also manufactures other non-patented green portfolio products. Green portfolio products accounted for approximately 20% of pounds shipped by Chase Brass in 2018. We anticipate the expiration of this exclusive license may have a negative effect on our financial performance.
Industrial Machinery and Equipment Market
Chase Brass manufactures brass rod which is further machined into industrial valves and fittings. Demand within this market is affected by capital spending levels, U.S. gross domestic product ("GDP") growth and industrial production growth in the U.S.
Customers in this market include various major diversified manufacturers and a variety of screw machine companies supporting OEMs.
Transportation Market
Chase Brass manufactures brass rod for applications in heavy trucks and automobiles. Specific applications include heavy truck braking systems, tire valves, temperature sensors and various truck and automotive fittings. Demand within this market is affected by levels of transportation activity, levels of maintenance capital spending by transportation companies and the level of commercial truck fleet replacement activity, all of which are affected significantly by overall economic conditions. Customers in this market include major OEMs in the transport industry and customers who support domestic automotive production.

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Electronics / Electrical Components Market

Chase Brass manufactures brass rod used for telecommunication applications, including products such as coaxial connectors and traps and filters for cable television, as well as larger connectors supporting the cell tower industry. Demand within this market is affected by consumer spending, new home construction, and technologies affecting communication devices and methods, such as wi-fi. Customers within this market include major manufacturers of specialty products for use in home and commercial construction, both of which are very dependent on overall economic conditions. We believe a significant portion of shipments in this market segment are directly associated with the building and housing market and transportation markets.

International

Chase Brass primarily supplies products within North America, and generated $41.2 million in net sales (7% of the Chase Brass segment’s net sales) to Canada and Mexico in 2018. Sales to Canada and Mexico were 23.5 million pounds (11% of the Chase Brass segment’s sales) in 2018.

A.J. Oster

A.J. Oster has historically been a processor and distributor of primarily copper and copper-alloy sheet, strip, and foil. However, with the acquisition of the Alumet business on November 1, 2017, A.J. Oster significantly expanded its product portfolio into aluminum sheet and coated aluminum products. The acquisition also deepened its presence in the signage (aluminum) and roofing (copper and copper-alloy) markets within the building and housing industry. A.J. Oster historically operated six strategically located service centers in the U.S., Puerto Rico, and Mexico and, with the Alumet acquisition, added five more service centers, including those in the South and Southeast where A.J. Oster had no presence.

Key A.J. Oster competitive advantages are: short lead-times with high reliability, high level of service, small-quantity deliveries, high quality metal, and a broad alloy breadth offering, including HPAs from Olin Brass. These capabilities, combined with A.J. Oster’s operations of precision slitting, hot tinning, traverse winding, cutting, coating, and special packaging, provide value to a broad customer base.

In 2018, Olin Brass provided A.J. Oster with 51% of its copper-based products. Aurubis AG (“Aurubis”) is A.J. Oster’s second largest supplier after Olin Brass, supplying approximately 25% of A.J. Oster’s copper-based products in 2018. Many of the coils purchased from Olin Brass and Aurubis are full-width and require slitting.

The following chart shows the primary markets for A.J. Oster’s products and the percentage of shipments for each.

Building and Housing Market

A.J. Oster distributes copper-alloy strip and aluminum foil used by our customers to manufacture products for commercial and residential applications. The primary applications are electrical, hardware, signage, and roofing.

Electrical products are primarily for wiring devices. Other electrical applications include switchgears, switches, controls and circuit breakers. Several of our customers for these products are in Puerto Rico or Mexico. A.J. Oster’s capabilities are well-suited for these geographic locations and the stringent service requirements of the electrical market because A.J. Oster is able to provide customers with high-quality metals, in less-than-truckload quantities, and can deliver products shortly after receiving orders.

Hardware products include products such as faucets, window trim, locksets, hinges and kick plates.

A.J. Oster provides aluminum coated products into the signage industry for a wide variety of government and commercial purposes.

With the Alumet acquisition, A.J. Oster now provides copper and copper-alloy sheet and strip product into the architectural roofing industry for both commercial and residential buildings.

Automotive Market

A.J. Oster distributes copper-alloy strip and aluminum foil used in automobiles. Primary customer products are electrical connectors, automotive trim and heat exchangers.

A.J. Oster’s subsidiary in Queretaro, Mexico is strategically and geographically well-positioned to take advantage of the growing number of second-tier automobile component suppliers in Mexico.

Demand within this market is affected by the overall trends affecting auto sales, such as consumer spending and overall economic conditions, the increasing electrification of vehicles with systems such as cameras, communication devices, and computer technologies, and the trend towards electric powered vehicles.

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Electronics / Electrical Components Market
A.J. Oster distributes copper-alloy strip used for electrical connectors in computers, consumer electronics and automobiles.
The demand within this market is affected by consumer spending and trends in electronics, which may fluctuate significantly as a result of economic conditions.
International
A.J. Oster operates a service center in central Mexico. The facility is located in Queretaro in the center of Mexico's industrial triangle marked by Mexico City, Monterey and Guadalajara and is easily accessible by highway connections to the U.S.
Automotive sub-suppliers that consume copper-alloy strip are now locating facilities in central Mexico in order to support primary automotive manufacturing.
Net sales from A.J. Oster Mexico were $44.1 million during 2018 (9% of A.J. Oster segment's net sales). Pounds shipped from A.J. Oster Mexico were 10.7 million and comprised 8% of the A.J. Oster segment's sales.
Raw Materials and Supply
We manufacture our products from scrap metal (both internally generated and externally sourced) or virgin raw materials. During 2018, 90% of our metal came from scrap metal, and the remainder came from virgin raw materials. We purchase virgin raw materials, including copper cathode, at a premium on the London Metal Exchange ("LME") or Commodities Exchange ("COMEX") or directly from key dealers that support producers around the world. Although virgin raw materials are more expensive compared to scrap, we use them to ensure quality production of certain alloys, especially HPAs.
Customers
Our customer base is broadly diversified across North America geographies and our end markets, as previously discussed. In 2018, we sold approximately 12,000 different stock keeping units ("SKUs") to nearly 4,200 customers. Also in 2018, net sales from our foreign entities were $84.8 million, or 5% of our net sales. We have long-term relationships with our customers, many of which are secured through short-term contracts. Our relationships with many of our significant customers have lasted more than 30 years.
All three of our operating segments had customers to whom sales activity constituted more than 10% of net sales during 2018. The largest customer within each of Olin Brass, Chase Brass and A.J. Oster comprised 24%, 20%, and 13% of net sales, respectively. Olin Brass' second largest customer comprised 17% of net sales. On a consolidated basis, we did not generate more than 10% of our net sales from any one customer in 2018.
Competition
We compete with other companies on price, service, quality, breadth, and availability of product. We believe we have been able to compete effectively because of our high levels of service, breadth of product offering, knowledgeable and trained sales force, modern equipment, proximity to customers, and economies of scale.
The North American market for brass and copper strip and sheet and brass rod consists of a few large participants and a few smaller competitors for Olin Brass and Chase Brass. A.J. Oster's competition consists of a number of smaller competitors. Our international competitors are based principally in Europe (for Olin Brass and A.J. Oster) and Asia (for Chase Brass).

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Our largest competitors in each of the markets in which we operate are the following:

- Aurubis and PMX Industries, Inc.: manufacturers of copper and copper-alloys in the form of strip, sheet and plate (Olin Brass competitor);
- ThyssenKrupp Materials NA, Copper and Brass Sales Division: processor and distributor of copper, brass, stainless and aluminum products; Wieland Metals, Inc.: re-roll mill and service center for copper and copper-alloy strip (A.J. Oster competitor); and
- Mueller Industries, Inc.: manufacturer of brass rod (Chase Brass competitor).

In addition, as previously mentioned, our Chase Brass business is affected by our customers' ability to compete with finished parts that are imported into the United States.

We use data published by independent industry associations and management estimates to determine our market share. Using this information, in 2018, we estimate our market share as follows:

- Olin Brass accounted for 31% of North American shipments (including shipments to A.J. Oster) of copper and brass alloys in the form of sheet, strip and plate;
- A.J. Oster accounted for 42% of North American shipments of copper and brass, sheet and strip products from distribution centers and rerolling facilities; and
- Chase Brass accounted for 51% of North American shipments of brass rod, not including imports.

Corporate

Our Corporate expenditures include compensation for corporate executives and officers, corporate office and administrative salaries, and professional fees for accounting, unrealized gains and losses on hedging activities, tax, and legal services. Corporate also includes interest expense, state and federal income taxes, overhead costs that management has not allocated to the operating segments, share-based compensation expense, gains and losses associated with certain acquisitions and dispositions and the elimination of intercompany sales and balances.

Government Regulation and Environmental Matters

Bactericidal Products

Through its membership in and the stewardship program of the Copper Development Association Inc. ("CDA"), Olin Brass has completed the required Federal Environmental Protection Agency ("EPA") and applicable state registration processes that allow it to market its CuVerro® products with certain approved bactericidal claims. Laboratory testing has shown that bactericidal copper touch surfaces made with CuVerro® kill more than 99.9% of bacteria within two hours. We believe that Olin Brass's copper-based CuVerro® materials are in compliance, in all material respects, with EPA standards for products recognized by the EPA as having bactericidal properties.

Even though the marketing of copper products as bactericidal started in 2008, the manufacturers of such products are still in the process of determining what specific bactericidal claims may be made in compliance with the EPA's and Federal Insecticide, Fungicide and Rodenticide Act's ("FIFRA") requirements. Therefore, there remains some uncertainty when determining whether a particular marketing approach is consistent with the EPA registration requirements. The stewardship program required under the EPA registration is an industry-wide activity, and the actions of other CDA members could jeopardize the marketing of all bactericidal copper products registered through the CDA (including CuVerro®).

Environmental

Our operations are subject to a number of federal, state and local laws and regulations relating to the protection of the environment and to workplace health and safety. In particular, our operations are subject to extensive federal, state and local laws and regulations governing the creation, transportation, use, release and disposal of wastes, air and water emissions, the storage and handling of hazardous substances, environmental protection, remediation, workplace exposure and other matters. Hazardous materials used in and activities undertaken by our operations include general commercial lubricants, cleaning solvents, cutting oils, air emissions from paints and coatings, storage of hazardous materials, and utilization of septic systems.

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We believe that we are in substantial compliance with all applicable environmental, workplace health, and safety laws and do not currently anticipate that we will be required to expend any substantial amounts in the foreseeable future in order to meet such requirements. We have a number of properties located in or near heavy industrial or light industrial use areas; accordingly, these properties may have been contaminated by pollutants which may have migrated from neighboring facilities or have been released by prior occupants for which we may become liable under various laws and regulations. Some of our properties have been affected by releases of cutting oils and similar materials and we are investigating and remediating such known contamination pursuant to applicable environmental laws. The costs of these clean-ups have not been material in the past.

In January 2018, one of our Olin Brass operations experienced a leak of mineral oil at its Waterbury, Connecticut facility. Our personnel, the Waterbury fire department, the U.S. EPA, the Connecticut DEEP, and remediation contractors responded immediately. We incurred approximately $0.7 million of expenses in 2018 associated with this leak and also reached a final settlement with the U.S. EPA, which resulted in a $6,000 fine. We remain in discussions with the Connecticut DEEP regarding ongoing remediation activity. We do not believe this incident will materially affect our long-term financial stability or cash flows.

Pursuant to the agreement, dated November 19, 2007, by which we purchased our current operating locations from Olin Corporation, Olin Corporation agreed to retain responsibility for a wide range of liabilities under environmental laws arising out of existing contamination on our properties, and agreed to indemnify us without limitation with respect to these liabilities. Specifically, Olin Corporation retained responsibility for:

- compliance with all obligations to perform investigations and remedial action required under the Connecticut Real Property Transfer Act at properties in Connecticut;
- pending corrective action / compliance obligations under the Federal Resource Conservation and Recovery Act for certain areas of concern at our East Alton, Illinois facility; and
- all obligations under environmental laws arising out of 24 additional specifically identified areas of concern on various of our properties.

Olin Corporation also retained complete responsibility for all liabilities arising out of then pending governmental inquiries relating to environmental matters; for “any liability or obligation in connection with a facility of the Business to the extent related to pre-Closing human exposure to Hazardous Materials, including asbestos-containing materials”; and for “any liability or obligation in connection with the off-site transportation or disposal of Hazardous Materials arising out of any pre-Closing operations of the Business.”

Since 2007, Olin Corporation has continued to perform environmental remedial actions on our properties, including the East Alton, Illinois and Waterbury, Connecticut properties, and continues to work closely with us to address matters covered by the indemnity. Because of the Olin Corporation indemnity, we have not been required to engage in any significant environmental cleanup activity on our properties and do not currently have any material reserves established to address environmental remedial requirements.

Employees

The following table shows the composition of our workforce by operating segment and Corporate as of December 31, 2018.

	Employees	% of Total	
Olin Brass	1,093	58	%
A.J. Oster	433	23	%
Chase Brass	335	18	%
Corporate	21	1	%
Total	1,882	100	%

As of December 31, 2018, 1,021, or approximately 54%, of our employees at various sites were members of unions. We have generally maintained good relationships with all unions and employees, which has been an important aspect of our ability to be competitive in our industry. Generally, our various agreements with unions in the United States have contractual terms which range from 3 to 5 years.

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Historically, we have succeeded in negotiating new collective bargaining agreements without a strike and we have not experienced any work stoppages at any of our facilities. Our union agreement governing a substantial portion of our employees at Olin Brass was renewed in 2017 and expires in 2022. We believe we will continue to be able to renew the outstanding collective bargaining agreements upon acceptable terms.

Research and Development

Our staff of scientists in metallurgy and electrochemistry continues to research and develop new products and expand our value-added services to meet our customers' needs. Our research and development expenditures were not material in any of the last three years.

Risk Management and Insurance

The primary risks in our operations are personal injury, property damage, transportation, criminal acts, risks associated with international operations, directors' and officers' liability, cybersecurity, product recall, and general commercial liabilities. We are insured against general commercial liabilities (including business interruption), cybersecurity, product recall, workers' compensation liabilities, automobile accidents (including injury to employees and physical damage of goods and property and employer liabilities), directors' and officers' liability, crime, foreign risks, environmental liability, ocean cargo liability and flood through insurance policies provided by various insurance companies up to amounts we consider sufficient to protect against losses due to claims associated with these risks.

Safety

Consistent with other strategic initiatives, we strive to achieve a 'Best in Class' performance status for employee safety. A number of our locations participate in the Occupational Safety and Health Administration ("OSHA") sponsored Voluntary Protection Program, or VPP. The Safety Excellence / VPP initiative shifts the safety paradigm to an aggressive proactive approach that stresses strong employee participation and collaboration, management accountability, employee training and hazard elimination as core foundational elements. In 2018, our A.J. Oster facilities in Alliance, Ohio and Carol Stream, Illinois were recognized as VPP Star sites. In 2016, our A.J. Oster facility in Yorba Linda, California was recognized as a VPP Star site. This recognition reflects the facility's achievement in the development, implementation and continuous improvement of their safety and health management system resulting in injury and illness rates that are below the national averages for the industry.

Patents, Trademarks and Other Intellectual Property Rights

Chase Brass has exclusive intellectual property licenses, the longest of which extends to 2027, to produce and sell Eco Brass® rod and ingot in North America, granted by Mitsubishi Shindoh Company, Ltd., the Japanese company that owns the relevant intellectual property rights. The most popular versions of Eco Brass® are protected through May 2019. We have sublicensed our rights to three sublicensees, none of which is currently a competitor of any of our subsidiaries or segments. These sublicensing arrangements are valid until the expiration of the relevant patents in North America.

We license certain intellectual property from companies in Germany, Japan and China.

We own a number of other U.S. and foreign patents, trademarks and licenses relating to certain of our products and processes. We actively protect our proprietary rights by the use of trademark, copyright, and patent registrations. Additionally, we license the marks OLIN BRASS and OLIN METALS for metal products from Olin Corporation. These licenses continue unless we breach the license agreement. We also license stylized versions of these marks from Olin Corporation and the license to the stylized version includes an annual termination option by either party.

We license the intellectual property rights related to certain proprietary alloy systems to other major brass mills around the world, including Dowa Metaltech.

Government Contract

The United States Mint is and has been a significant customer of Olin Brass since 1969. We have a contractual arrangement to supply nickel and brass coinage strip to multiple United States Mint facilities. We renewed this contract in 2017 and expect to renew it again when it expires in 2022. However, the United States Mint can terminate our contract in whole or in part when it is in the best interest of the United States Mint to do so and any damages payable to us by the United States Mint for such termination would not include lost profits.

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Seasonality

There is a slight decrease in our net sales in the fourth quarter as a result of the decrease in demand due to customer shutdowns for the holidays and our customers' year-end maintenance activities and working capital management. We also typically experience slight working capital increases in the first fiscal quarter as our customers build inventory to serve the seasonal building and housing market.

Available Information

Our website address is http://www.gbcholdings.com. We make available on our website, free of charge, the periodic reports that we file with or furnish to the Securities and Exchange Commission ("SEC"), as well as all amendments to these reports, as soon as reasonably practicable after such reports are filed with or furnished to the SEC. We also make available on our website or in printed form upon request, free of charge, our Corporate Governance Guidelines, Code of Business Conduct and Ethics, charters for the standing committees of our Board of Directors and other information related to the Company. We are not including the information contained on our website as a part of, or incorporating it by reference into, this report.

The public may read and copy any materials that we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington D.C. 20549. The public may obtain information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC maintains an internet site (http://www.sec.gov) that contains reports, proxy and information statements and other information related to issuers that file electronically with the SEC.

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Item 1A. Risk Factors.

We are exposed to various risks as we operate our businesses. To provide a framework to understand our operating environment, we are providing a brief explanation of the more significant risks associated with our businesses. Although we have tried to identify and discuss key risk factors, others could emerge in the future.

Risks Related to Our Business

We are exposed to the cyclicality of the U.S. and certain foreign economies as well as fluctuations in certain industries. Our future growth also depends, to a significant extent, on improvements in the general economic conditions and the conditions of our markets.

Many of our products are further processed by our customers into products that are used in industries that are, to varying degrees, cyclical and have historically experienced periodic downturns due to factors such as economic conditions, technological advancements and substitution, energy prices, the availability of credit, consumer sentiment, demand and other factors beyond our control. These economic and industry downturns have resulted in diminished product demand and excess capacity for our products. Any future economic disruptions may negatively impact our markets or the consumers served by those markets, which would adversely affect our operating results.

A significant amount of our volume is tied to the building and housing sector. If the housing, remodeling and residential and commercial construction markets stagnate or deteriorate, demand from such markets for our products, especially our brass rod products, is likely to be adversely affected. Any recovery in such markets may not necessarily directly correlate with increased sales or profitability. In addition, competition from imported products that compete with our customers' finished products and other sources may affect demand for our product and our results of operations.

Similarly, the automotive market has in the past experienced significant downturns in connection with, or in anticipation of, declines in general economic conditions, the availability and cost of credit, the cost of fuel, and technological developments in the auto industry.

The coinage and general consumer markets are also affected by economic cycles, legislation, and trends in electronic commerce. Demand for coinage-related products generally increases with the number of cash transactions that occur, and the number of cash transactions generally increases during periods of economic growth. Demand for consumer goods is also very sensitive to economic conditions and drives demand in our electronics / electrical components market.

The munitions market is generally not correlated to any general economic indicators and thus has a high degree of volatility.

We also buy a significant portion of our raw materials from scrap dealers at prices which are often quoted as a discount to prevailing publicly traded market prices for such commodities. These discounts, or scrap spreads, can fluctuate based on many different conditions, including domestic and international forces beyond our control. Since we include these scrap spreads in the non-metal conversion fee or Adjusted Sales component of our revenue, our financial results are therefore also subject to fluctuation due to these same conditions.

Failure to maintain our balanced book approach would cause increased volatility in our profitability and our operating results and may result in significant losses.

We use our balanced book approach to substantially eliminate the impact on our operating margins of metal price fluctuations affecting the cost of the metal raw materials used in manufacturing our products. Such fluctuations can significantly affect our operating margins. Under our balanced book approach, we seek to match the timing, quantity and price of the metal component of net sales with the timing, quantity and price of replacement metal purchases on all of our non-toll sales. Since we are on a LIFO basis of inventory accounting, this allows our income statement to have current metal prices reflected in both net sales and cost of sales. We use a combination of matching price date of shipment terms, firm price terms and derivatives transactions to achieve our balanced book. See "Management's Discussion and Analysis of Financial Condition and Results of Operations—Key Business Principles Affecting Our Results of Operations—Balanced Book."

We may not be able to maintain our balanced book approach if: (a) our customers become unwilling to bear metal price risk through the matching of price date of shipment terms, (b) we cannot find counterparties for the derivatives transactions entered into in connection with firm price terms, or (c) the cost of those derivatives transactions increase such that entering into such transactions is no longer cost-effective to us. If we fail to maintain our balanced book approach, we may be forced to accept higher replacement prices, which could generate losses and would increase volatility in our results of operations.

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However, our balanced book approach does not reduce the impact of the volatility in metal prices on our working capital requirements. Metal prices impact our investment in working capital because our collection terms with our customers are longer than our payment terms to our suppliers. As a result, when metal prices are rising, even if the number of pounds of metal we process does not change, working capital may be negatively affected as we are required to draw more on our cash or available financing sources to pay for raw materials. As a result, our liquidity may be negatively affected by increasing metal prices. See “Management’s Discussion and Analysis of Operating Results and Financial Condition—Key Business Principles Affecting Our Results of Operations—Metal Cost.”

Limited access to raw materials, infrastructure or energy could negatively affect our business, financial condition or results of operations or cash flows.

Among other things, our success depends on our ability to secure a sufficient and constant supply of raw materials and energy and access to infrastructure adequate to fulfill our business needs.

We depend on scrap for our operations and acquire our scrap inventory from numerous sources typically on a discount from publicly traded indices and pricing. These suppliers generally are not bound by long-term contracts and have no obligation to sell scrap metals to us. If an adequate supply of scrap metal is not available to us or if the discounts from publicly traded indices and prices change significantly, we may be forced to use a larger amount of more expensive virgin raw materials which may materially adversely affect our ability to meet customer needs in a timely manner, our results of operations, and our financial condition.

We may experience disruptions in the supply of energy as a result of delivery curtailments due to extremely cold weather. We may also experience disruptions or increases in cost with respect to our access to water, electrical power, transport and wastewater treatment services and other infrastructure (including those subject to our transition services agreement with the parent of our predecessor). An inability to find an adequate and timely supply of raw materials or adequate and cost-effective access to infrastructure could have a material adverse effect on our profit margin, and in turn on our business, financial condition, results of operations or cash flows.

In 2018, the cost of energy and utilities represented approximately 6% of our non-metal cost of sales and prices can be volatile. As a result, our energy and utility costs may fluctuate dramatically, and we may not be able to mitigate the effect of higher energy and utility costs on our business, financial condition, results of operations, and cash flows. Although we attempt to mitigate short-term volatility in energy and utility costs through the use of derivatives contracts, we may not be able to eliminate the long-term effects of such cost volatility. Furthermore, in an effort to offset the effect of increasing costs, we may have also limited our potential benefit from declining costs.

Covenants under our debt agreements impose operating and financial restrictions. Failure to comply with these covenants could have a material adverse effect on our business, financial condition, results of operations or cash flows.

The agreement governing our asset-based revolving loan facility (“ABL Facility”) and the agreement covering our term loan facility that matures on May 29, 2025 (“Term Loan B Facility”) contain various covenants that limit or prohibit our ability, among other things, to:

- incur or guarantee additional indebtedness;
- pay dividends on our capital stock or redeem, repurchase, retire or make distributions in respect of our capital stock or subordinated indebtedness or make certain other restricted payments;
- make certain loans, acquisitions, capital expenditures or investments;
- sell certain assets, including stock of our subsidiaries;
- enter into certain sale and leaseback transactions;
- create or incur certain liens;
- consolidate, merge, sell, transfer or otherwise dispose of all or substantially all of our assets;
- enter into certain transactions with our affiliates; and
- engage in certain business activities.

The agreement governing the ABL Facility also contains a financial covenant that requires us to maintain a fixed charge coverage ratio whenever excess availability, as defined in such agreement, falls below a certain level. For more information regarding these covenants, please see “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—Outstanding Indebtedness.”

The agreement governing the Term Loan B Facility also contains a financial covenant that requires us to maintain a total debt leverage ratio that is tested quarterly.

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A violation of covenants may result in default or an event of default under our debt agreements.

Upon the occurrence of an event of default under the agreement governing the ABL Facility or the Term Loan B Facility, our outstanding indebtedness may become immediately due and payable and we may lose access to further credit under our ABL Facility. If we are unable to repay our indebtedness, the lenders under such facilities may proceed against the collateral granted to them to secure such indebtedness. Substantially all of our assets are pledged as collateral under the ABL Facility and the Term Loan B Facility. If the lenders under either facility, as applicable, accelerate the repayment of borrowings, such acceleration would have a material adverse effect on our business, financial condition, results of operations or cash flows. Furthermore, cross-default provisions in the ABL Facility and the Term Loan B Facility provide that any default under the other facility or other significant debt agreements could trigger a cross-default under the ABL Facility or the Term Loan B Facility, as applicable. If we are unable to repay the amounts outstanding under these agreements or obtain replacement financing on acceptable terms, which ability will depend in part upon the impact of economic conditions on the liquidity of credit markets, our creditors may exercise their rights and remedies against us and the assets that serve as collateral for the debt, including initiating a bankruptcy proceeding.

For a more detailed description on the limitations on our ability to incur additional indebtedness and our compliance with financial covenants, please see "Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—Outstanding Indebtedness."

Our sales volumes, financial results, and financial condition could be reduced if we were to lose order volumes from any of our largest customers.

Our five largest customers were responsible for approximately 30% of our net sales in 2018. A loss of order volumes from any major customer could negatively affect our business, financial condition or results of operations by lowering sales volumes, increasing costs and lowering profitability. Order volumes from customers could decrease for a variety of reasons including loss of market share, customer production outages, technological obsolescence of our products, or other competitive factors. Our balance sheet reflected an allowance for doubtful accounts totaling $1.3 million at December 31, 2018. If adverse economic and market conditions impair the ability of our customers to pay us in the future, our allowance for doubtful accounts and write-offs of accounts receivable from the Company's customers may increase in the future, which could materially and adversely affect our financial condition and results of operations.

In addition, we will not be entitled to lost profits should the United States Mint voluntarily terminate our contract prior to the contractual end date in 2022.

Our business could be disrupted if our customers shift either their manufacturing or sourcing offshore.

Much of our business depends on maintaining close geographical proximity to our customers because the costs of transporting metals across large distances can be prohibitive. If customers, especially those in the automotive, electrical, and building and housing industries, relocate the production of products or source their products from foreign locations, we may lose business to foreign competitors or suffer deterioration in our business.

Competition could adversely affect our business, financial condition and results of operations.

We are engaged in a highly competitive industry. Each of our segments competes with a limited number of companies. The Olin Brass segment competes with domestic and foreign manufacturers of copper and brass alloys in the form of strip, sheet and foil. The Chase Brass segment competes with domestic as well as foreign manufacturers of brass rod and beginning in 2013, encountered increased competition from foreign rod suppliers. The A.J. Oster segment primarily competes with distributors, mills and processors of copper and brass products. Furthermore, we believe that domestic sales to customers that are not made by major companies, including us, are fragmented among many smaller companies. In the future, these smaller companies may choose to combine, creating a more significant domestic competitor against our business. We may be required to explore additional initiatives in each of our segments in order to maintain our sales volume at a competitive level. Increased competition in any of the fields in which our segments operate could adversely affect our business, financial condition and results of operations.

Changes in trade tariffs could adversely affect our business, financial condition, and results of operations.

On March 8, 2018, President Trump signed a proclamation pursuant to Section 232 imposing a 25% tariff on imported steel and a 10% tariff on imported aluminum. The U.S. government has also announced various agreements for exemptions from the Section 232 steel and aluminum tariffs for certain countries, including Argentina, Australia, Brazil and South Korea. Some of these countries, such as South Korea, have agreed to a quota system that limits their annual imports of steel and aluminum into the U.S. Although steel and aluminum products from the European Union, Canada and Mexico were initially exempted from the tariff, on June 1, 2018, those exemptions expired and the Section 232 tariff was applied to steel and aluminum imports from these countries. In retaliation against the Section 232 tariffs, the European Union, Mexico and Canada subsequently imposed their own tariffs against certain steel products and other goods imported from the U.S. The Mexican retaliatory tariffs went into effect on June 5, 2018, the European Union's tariffs began to apply on June 22, 2018, and Canadian tariffs became effective on July 1, 2018. These tariffs could result in significantly higher domestic prices as well as decreased supply with U.S. producers. Our inability to pass through these price increases and the reduced supply from U.S. producers could adversely affect the performance of our business or shipments to customers.

Our understanding is that the U.S. government has been and will continue to negotiate with the European Union, Mexico and Canada for a resolution to the trade issues between the U.S. and these countries. We do not know how long these tariffs will remain in effect, if these trade issues will be resolved or whether the terms of any such resolutions will be beneficial to our business. In addition to the ongoing country-by-country negotiations in which the U.S. government is engaged, the Commerce Department has also implemented a system for petitioning the U.S. government to exempt specific products (for instance, a certain grade of steel) from the tariff and a process for challenging these exemption requests.

Additionally, in November 2018, the U.S. reached an agreement with Canada and Mexico on the United States-Mexico-Canada Trade Agreement ("USMCA"), which is being proposed to replace the existing North American Free Trade Agreement ("NAFTA") among those countries. Among other things, the USMCA, as proposed, includes revised country of origin rules and labor provisions for the protection of workers. These changes and other changes to trade policy could have an adverse effect on our costs to procure products, the prices at which we can sell our products, and, in turn, the demand for our products, which could result in an adverse effect on our business, financial condition, results of operations, or cash flows.

Adverse developments in our relationship with our employees could have a material adverse effect on our business, financial condition, results of operations and cash flows.

As of December 31, 2018, we had 1,882 employees, 1,021, or approximately 54%, of whom at various sites were members of unions. Our primary union contracts expire in 2020 and 2022. Our union agreements are a meaningful determinant of our labor costs and are very important to our ability to maintain flexibility to fulfill our customers' needs. As we attempt to renew our collective bargaining agreements, labor negotiations may not conclude successfully and, in that case, may result in a significant increase in the cost of labor or may result in work stoppages or labor disturbances, disrupting our operations. Any such cost increases, stoppages or disturbances could have a material adverse effect on our business, financial condition, results of operations and cash flows by limiting plant production, sales volumes and profitability.

Our participation in multi-employer union pension plans may have a material adverse effect on our financial performance.

We are required to make contributions to the IAM National Pension Plan ("IAM Plan"), a multi-employer pension plan that covers certain of our union employees. Our obligations may be impacted by the funded status of the plan, the plan's investment performance, changes in the participant demographics, financial stability of contributing employers and changes in actuarial assumptions. In addition, if a participating employer becomes insolvent and ceases to contribute to a multiemployer plan, the unfunded obligation of the plan will be borne by the remaining participating employers. Under current law, an employer that withdraws or partially withdraws from a multi-employer pension plan may incur withdrawal liability to the plan. If, in the future, we choose to withdraw from the multi-employer pension plan in which we participate, we will likely need to record withdrawal liabilities, which could negatively impact our financial performance in the applicable periods.

Our operations are subject to natural disasters, acts of war, terrorism, widespread illness, and cyber attacks or other information security breaches, any one of which could result in a business stoppage and negatively affect our business, financial condition or results of operations.

We have facilities located throughout North America, including in Illinois, Ohio, Connecticut, Rhode Island, Missouri, California, Puerto Rico and Mexico, as well as in China. We take precautions to safeguard our facilities, computer systems, and transportation for our personnel including obtaining insurance and maintaining health and safety protocols. However, a natural disaster, such as a tornado, fire, flood, hurricane, earthquake, or similar event, inclement weather conditions, acts of war, terrorism, or widespread illness could cause a substantial interruption in our operations, damage or destroy our facilities or inventory, and cause us to incur additional expenses. The insurance we maintain against natural disasters may not be adequate to cover our losses in any particular case, which would require us to expend significant resources to replace any destroyed assets, thereby harming our financial condition and prospects significantly.

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For example, Olin Brass's manufacturing facilities and A.J. Oster's California facility are located near geologic fault zones, and therefore are subject to greater risk of earthquakes which could result in increased costs and a disruption in our operations, which could harm our operating results and financial condition significantly. Our facility in East Alton, Illinois is located in a flood zone, and all of our facilities in the Midwestern United States are subject to the risk of tornadoes and damaging winds. A.J. Oster's facility in Puerto Rico is subject to hurricanes. Should earthquakes or other catastrophes, such as fires, tornadoes, hurricanes, floods, power outages, communication failures or similar events disable our facilities, we do not have readily available alternative facilities from which we could continue our operations, and any resulting stoppage could have a negative effect on our operating results. Acts of terrorism, widespread illness and war could also have a negative effect at our international and domestic facilities.

We are increasingly dependent on digital technology to process and record financial and operating data and communicate with our employees and business partners. Our technologies, systems, networks, and those of our business partners may become the target of cyber attacks or information security breaches that could result in the unauthorized release, misuse, loss or destruction of proprietary and other information, or other disruption of our business operations, subject us to additional legal costs and damage our reputation in the marketplace. Although to date we have not experienced any losses relating to cyber attacks, there can be no assurance that we will not suffer such losses in the future. As cyber threats continue to evolve, we may be required to expend additional resources to continue to modify or enhance our protective measures or to investigate and fix any information security vulnerabilities.

Any prolonged disruptions, failures, or inability to operate our business, manufacturing facilities, or equipment, including those arising from information technology related incidents, could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Our ability to satisfy our customers' orders in an efficient manner and to effectively manage inventory levels is dependent on the proper operation of our business, facilities, equipment, and information technology environment and tools. On-time delivery and accurate order fulfillment are essential to maintaining customer satisfaction and generating repeat business. Any prolonged equipment failures, supplier caused production delays, quality control incidents, network outages, information technology system failures or implementations, temporary facility closures, or other disruptions in operations such as a major fire or major equipment breakdown at our manufacturing facilities could materially disrupt our operations and thereby adversely affect our business, financial condition, and results of operations. In addition, we may not have adequate insurance to cover all losses.

We do not have redundancy in our operations on certain critical pieces of equipment, including the Olin Brass hot and cold mills and Chase Brass extruders. If this equipment were damaged, we would have to make alternative arrangements to replicate these processes, which could be costly and result in manufacturing delays, which could materially adversely affect our business, financial condition and results of operations.

The increased use of substitute materials and miniaturization may adversely affect our business.

In many applications, copper and other commodities may be replaced by other materials such as aluminum, stainless steel, plastic and other materials and the use of copper and other commodities may be reduced by the miniaturization of components. Increased prices of copper could encourage our customers to use substitute materials and / or miniaturization to limit the amount of copper in their products and applications in an attempt to control their overall product costs. For example, historically, there has been discussion over reducing or eliminating copper content in coins in reaction to the rising prices of copper. Such increased use of substitute materials and / or miniaturization could have a material adverse effect on prices and demand for our products.

If we fail to develop or enhance our products to satisfy evolving customer demands, our business, operating results, financial condition and prospects may be harmed significantly.

The market for copper and copper-alloy products is characterized by changing technologies, periodic new product introductions, evolving customer and industry standards and demands, and factors affecting the products our customers make from the metal we sell them. To achieve market acceptance for our products, we must effectively and timely anticipate and adapt to customer requirements, new technologies and production methods, and offer products and services that meet customer demands.

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A portion of our net sales is derived from our international operations, which exposes us to certain risks inherent in doing business abroad.

In the aggregate, our international operations accounted for 5% of our net sales in 2018. In addition, we have various licensing agreements around the world and our products are distributed globally. We plan to continue to explore opportunities to expand our international operations. Our international operations generally are subject to risks, including:

- changes in U.S. and international governmental regulations, trade restrictions and laws, including tax laws and regulations;
- currency exchange rate fluctuations;
- tariffs and other trade barriers;
- the potential for nationalization of enterprises or government policies favoring local production;
- interest rate fluctuations;
- high rates of inflation;
- currency restrictions and limitations on repatriation of profits;
- differing protections for intellectual property and enforcement thereof;
- divergent environmental laws and regulations;
- political, economic and social instability;
- unfamiliarity with foreign laws and regulations and ability to enforce obligations of foreign counterparties;
- difficulties in staffing and managing international operations and labor unrest;
- language and cultural barriers;
- natural disasters and widespread illness;
- geopolitical conditions, such as terrorist attacks, war, or other military action; and
- a divergence between the price of copper on the copper exchange in China and the LME, and the COMEX.

The occurrence of any of these events could cause our costs to rise, limit growth opportunities or have a negative effect on our operations and our ability to plan for future periods, and subject us to risks not generally prevalent in North America.

New governmental regulations or legislation, or changes in existing regulations or legislation, may subject us to significant costs, taxes and restrictions on our operations.

Our operations are subject to a wide variety of U.S. federal, state, local and non-U.S. laws and regulations, including those relating to taxation, international trade and competition and firearms.

For example, the Olin Brass segment provides strip and cups to both the military and commercial munitions markets. In 2018, the shipments by Olin Brass to the munitions market accounted for 40% of its total shipments. The private use of firearms is subject to extensive regulation. Any restriction on the use of firearms and ammunition could affect the demand for munitions, and in turn could negatively affect our business, financial condition or results of operations. Moreover, any changes in the government budget or policy over military spending may adversely affect our contracts with customers in the munitions market.

Changes in U.S. or foreign tax laws, including possibly with retroactive effect, and audits by tax authorities could result in unanticipated increases in our tax expense and affect profitability and cash flows. From time to time, legislative initiatives are proposed in the U.S., such as the repeal of the election to use LIFO or to lower the U.S. corporate tax rate. The repeal of LIFO accounting for tax purposes could result in a substantial cash tax liability, which could adversely impact our liquidity and financial condition. Furthermore, such a repeal could result in an increase in the volatility of our earnings, a greater disparity between our earnings and net sales in our financial statements, and an increase in the costs associated with our derivative transactions to mitigate metal price fluctuations.

Our operations expose our employees to risk of injury or death. We may be subject to claims that are not covered by, or exceed, our insurance. Additional safety measures or rules imposed by regulatory agencies may reduce productivity, require additional capital expenditure or reduce profitability.

Because of the type manufacturing activities conducted at our facilities, there exists a risk of injury or death to our employees or other visitors, notwithstanding the safety precautions we take. Despite policies and standards that are designed to minimize such risks, we may nevertheless be unable to avoid material liabilities, civil or regulatory, for any employee death or injury that may occur in the future. These types of incidents may not be covered by or may exceed our insurance coverage and may have a material adverse effect on our results of operations and financial condition.

Our ability to retain our senior management team is critical to the success of our business, and failure to do so could materially adversely affect our business, financial condition, results of operations and cash flows.

We are dependent on our senior management team to remain competitive in our industry. We have employment contracts or severance agreements with members of our senior management team. Failure to renew the employment contracts or other agreements of a significant portion of our senior management team could have a material adverse effect on our business, financial condition, results of operations and cash flows. Members of our senior management team are subject to employment conditions or arrangements that permit the employees to terminate their employment without notice. We do not maintain any life insurance policies for our benefit covering our key employees.

If our senior management team were not able to dedicate adequate time to our business, due to personal or other factors, if we lose or suffer an extended interruption in the services of a significant portion of our senior management team, or if a significant portion of our senior management team were to terminate employment within a short period it could have a material adverse effect on our business, financial condition, results of operations and cash flows. In addition, the market for qualified individuals may be highly competitive and we may not be able to attract and retain qualified personnel to replace or succeed members of our senior management team, should the need arise.

Environmental costs could decrease our net cash flow and adversely affect our profitability.

Our operations are subject to extensive regulations governing, amongst other things, the creation, use, transportation and disposal of wastes and hazardous substances, air and water emissions, remediation, workplace exposure and other environmental matters. The costs of complying with such laws and regulations, including participation in assessments and clean-ups of sites, as well as internal voluntary programs, can be significant and will continue to be so for the foreseeable future. Additionally, evolving regulatory standards and expectations could result in increased litigation and / or increased costs of compliance with environmental laws, all of which could have a material and adverse effect on our business, financial condition, results of operations and cash flows.

Environmental matters for which we may be liable may arise in the future at our present sites, at previously owned sites, sites previously operated by us, sites owned by our predecessors or sites that we may acquire in the future. Our operations or liquidity in a particular period could be affected by certain health, safety or environmental matters, including remediation costs and damages related to several sites. Because a number of our properties are located in or near industrial or light industrial use areas, we may be liable for any contamination by pollutants which may have migrated to our facility from neighboring facilities or have been released by prior occupants. Some of our properties have been affected by releases of cutting oils and similar materials, and we are investigating and remediating such known contamination pursuant to applicable environmental laws. The costs of these clean-ups have not been material in the past. We are not currently subject to any material claims or notices with respect to clean-up or remediation under CERCLA or similar laws for contamination at our leased or owned properties or at any off-site location. However, we cannot rule out the possibility that we could be notified of such claims in the future. It is also possible that we could be identified by the Environmental Protection Agency, a state agency or one or more third parties as a potentially responsible party under CERCLA or under analogous state laws.

In January 2018, one of our Olin Brass operations experienced a leak of mineral oil at its Waterbury, Connecticut facility. Our personnel, the Waterbury fire department, the US EPA, the Connecticut DEEP, and remediation contractors responded immediately. We incurred approximately $0.7 million of expenses in 2018 associated with this incident. Although we reached a final settlement with the U.S. EPA which resulted in a $6,000 fine, we remain in discussions with the Connecticut DEEP regarding ongoing remediation activity. We do not believe this incident will materially affect our long-term financial stability or cash flows, but events similar to this could occur again in the future.

On November 19, 2007, we acquired the assets and operations relating to the worldwide metals business of Olin Corporation. Olin Corporation agreed to retain liability arising out of then existing conditions on certain of our properties for any remedial actions required by environmental laws, and agreed to indemnify us for all or part of a number of other environmental liabilities. Since 2007, Olin Corporation has been performing remedial actions at the facilities in East Alton, Illinois and Waterbury, Connecticut, and has been participating in remedial actions at our other properties as well. If Olin Corporation were to stop its environmental remedial activities at our properties, we could be required to assume responsibility for these activities, the cost of which could be material. For additional information concerning the indemnity granted to us by Olin Corporation for environmental liabilities, see "Business—Government Regulation and Environmental Matters."

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We may be subject to litigation that could strain our resources and distract management.
From time to time, we are involved in a variety of claims, lawsuits and other disputes arising in the ordinary course of business. It is not feasible to predict the outcome of all pending suits and claims, and the ultimate resolution and the cost of and time spent in defending ourselves in these matters as well as future lawsuits could have a material adverse effect on our reputation, business, financial condition, results of operations, cash flows or reputation.
Failure to protect, or uncertainty regarding the validity, enforceability or scope of, our intellectual property rights or the expiration of our intellectual property rights could impair our competitive position.
We rely on a combination of patents, trademarks, trade secrets and other intellectual property rights, in addition to contractual rights, to protect the intellectual property we use in making our business successful. It is possible that our intellectual property rights could be challenged, invalidated, violated or made obsolete by our competitors or third parties, or our pending patent applications may not be granted, thereby hurting our success.
In addition, Chase Brass has entered into agreements with Mitsubishi Shindoh pursuant to which Chase Brass has access to and the right to use certain of its technologies including lead-free Eco Brass® rod and the sublicensing of lead-free Eco Brass® ingot. To the extent that Mitsubishi Shindoh fails to adequately protect the technologies upon which we rely, our competitors may be able to use such technologies or develop similar technologies independently. Conversely, to the extent that we do not fulfill our contractual or other obligations to adequately protect the technologies to which we have been granted access by Mitsubishi Shindoh, we could be liable for any resulting harm to its business or could lose further access to this technology, which could harm our business, operating results or financial condition.
If the technologies upon which we rely infringe upon the patents or proprietary rights of third parties, we may be unable to continue using such technologies or we may face lawsuits related to our past use of these technologies. Furthermore, our competitors, who have made significant investments in competing technologies or products, may seek to apply for and obtain patents that will prevent, limit or interfere with our ability to make or sell our products or provide our services.
If we are unsuccessful in defending against any challenge to our rights to market and sell our products covered by intellectual property rights, our business, financial condition, and financial results may be adversely affected.
Even if we are successful, the expense, time, delay and burden on management of litigation could prevent us from maintaining or increasing our business. Further, negative publicity could decrease demand for our products and services and cause our revenues to decline, thus harming our operating results significantly.
Finally, for our products that are covered on patent protection, once a patent has expired, the product is generally open to competition. For example, patent protection for the most popular versions of Eco Brass® expires in May 2019. The expiration of such patent could enable other companies to compete more effectively with us by allowing our competitors to make and sell products substantially similar to those we offer. This could negatively impact our ability to produce and sell the associated products, thereby adversely affecting our operations.
If we are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology, products and services could be harmed significantly.
We rely on trade secrets, know-how and other proprietary information in operating our business. We seek to protect this information through a variety of means. In the event of unauthorized use or disclosure of our trade secrets or proprietary information, our business, financial condition, and financial results could be negatively affected.
The risk that other parties may breach confidentiality agreements or that our trade secrets become known or independently discovered by competitors, could harm us by enabling our competitors, who may have greater experience and financial resources, to copy or use our trade secrets and other proprietary information in the advancement of their products, methods or technologies. The disclosure of our trade secrets would impair our competitive position, thereby weakening demand for our products or services and harming our ability to maintain or increase our customer base.

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Disruption or failures of our information technology systems could have a material adverse effect on our business.
Our business depends on the operation of our information technology systems, some of which have not been updated for many years. As a result, our information technology systems are more susceptible to security breaches, operational data loss, general disruptions in functionality, and may not be compatible with new technology. We depend on our information technology systems for the effectiveness of our operations and to interface with our customers, as well as to maintain financial records and accuracy. Disruption or failures of our information technology systems or security breaches could impair our ability to effectively and timely provide our services and products and maintain our financial records, which could damage our reputation and have a material adverse effect on our business.
Olin Brass began the process of implementing a fully integrated enterprise resource planning ("ERP") system to replace their current management information systems and plan to implement the system in a phased approach over the course of the next several years, and implemented the first phase in early fiscal 2017. These implementations may present challenges. Such challenges include, among other things, training of personnel, communication of new rules and procedures, changes in corporate culture, migration of data and the potential instability of the new system. Furthermore, large-scale system implementations are complex and time-consuming projects that are capital intensive and can span several months or even years. Certain of our business and financial processes also may require transformation in order to effectively leverage the benefits of the new systems. The implementation of the new systems may not result in the anticipated improvements, and the cost of implementation may outweigh the benefits. There can be no assurance that the new systems will be successfully implemented, and failure to do so could adversely affect our business, financial condition, results of operations and the effectiveness of our internal controls over financial reporting.
We face a number of risks related to future acquisitions and joint ventures.
We may continue to seek opportunities for further acquisitions to supplement our operations and for expansion of our international presence, potentially, through joint ventures.
Acquisitions and joint ventures involve a number of risks which could have an adverse effect on our business, financial condition, results of operations and cash flows, including the following:

- we may experience adverse short-term effects on our operating results;
- we may be unable to successfully and rapidly integrate the new businesses, personnel and products with our existing business, including financial reporting, management and information technology systems;
- we may experience higher than anticipated costs of integration and unforeseen operating difficulties and expenditures, including potential disruption of our ongoing business and distraction of management;
- an acquisition may be in a market or geographical area in which we have little experience and could increase the scope, geographic diversity and complexity of our operations;
- the acquisition or joint venture formation process may require significant attention by our senior management and the engagement of outside advisors (and the payment of related fees), and proposed acquisitions and joint ventures may not be successfully completed;
- we may lose key employees or customers of the acquired company; and
- we may encounter unknown contingent liabilities that could be material.

In addition, we may require additional debt or equity financing for future acquisitions, and such financing may not be available on favorable terms, if available at all. We may not be able to successfully integrate or profitably operate any new business we acquire, and we cannot assure you that any such acquisition will meet our expectations. The process of integrating acquired operations into our existing operations may result in unforeseen operating difficulties and may require significant resources that would otherwise be available for the ongoing development or expansion of existing operations.
Our common stock is subject to price and volume fluctuations.
The market price of our common stock may be volatile and affected by not only our performance but also the risk factors discussed herein. In addition, the market price of our common shares may fluctuate and is subject to volatility due to factors beyond our control.

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CAUTIONARY STATEMENT CONCERNING FORWARD-LOOKING STATEMENTS

This report contains “forward-looking statements” that involve risks and uncertainties. All statements we make relating to our estimated and projected earnings, margins, costs, expenditures, cash flows, growth rates and financial results or to our expectations regarding future industry trends are forward-looking statements. In addition, we, through our senior management, from time to time make or may make forward-looking public statements concerning our expected future operations and performance and other developments. These forward-looking statements are subject to known and unknown risks, uncertainties and other factors that may change at any time, and, therefore, our actual results may differ materially from those that we expected. All forward-looking statements contained in this report are based upon information available to us on the date of this report.

Important factors that could cause actual results to differ materially from our expectations include general economic conditions, market demand, pricing and competitive factors, the ability to implement business and acquisition strategies, the ability to address unexpected operational issues, and the ability to continue to implement our balanced book approach, among others, which are discussed in the “Risk Factors” section in Item 1A in this annual report on Form 10-K

We undertake no obligation to publicly update or revise any forward-looking statement as a result of new information, future events or otherwise, except as otherwise required by law.

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Item 1B. Unresolved Staff Comments.
None.
Item 2. Properties.
The following table summarizes our major facilities as of December 31, 2018:

Entity	Operation	Location	Owned or Leased	Products
Corporate	Corporate Headquarters	Schaumburg, Illinois	Leased	N/A
Olin Brass segment	Mill Products	East Alton, Illinois	Owned (1)	Copper-based strip Clad copper & copper-alloy strip
	Fabricated Products	East Alton, Illinois	Owned (1)	Stamped & drawn copper-based parts
	Fineweld Tube	Cuba, Missouri	Owned	Welded copper-alloy tube
	Bryan Metals	Bryan, Ohio	Owned	Copper-based strip
	Somers Thin Strip	Waterbury, Connecticut	Owned	Copper-based strip and foil Stainless steel light gauge strip
	Olin Luotong Metals	Guangzhou, China	Owned building; 50-year lease on land	Copper-based strip
	Olin Brass Headquarters	Louisville, Kentucky	Leased	N/A
Chase Brass segment	Manufacturing	Montpelier, Ohio	Owned	Copper-based rod
	Warehouse	Los Angeles, California	Leased	Copper-based rod
A.J. Oster segment	Processing and Distribution	Warwick, Rhode Island	Leased	Copper-alloy sheet, strip, bar, rod and wire Aluminum sheet and strip Stainless steel sheet, strip and specialty rod
	Processing and Distribution	Alliance, Ohio	Owned	
	Processing and Distribution	Carol Stream, Illinois	Owned	
	Processing and Distribution	Yorba Linda, California	Leased	
	Processing and Distribution	Fullerton, California	Leased	
	Processing and Distribution	Caguas, Puerto Rico	Owned	
	Processing and Distribution	Queretaro, Mexico	Owned	
	Processing and Distribution	Parsippany, New Jersey	Leased	
	Processing and Distribution	Irving, Texas	Leased	
	Distribution	Houston, Texas	Leased	
	Distribution	Atlanta, Georgia	Leased	
	A.J. Oster Headquarters	Warwick, Rhode Island	Leased	N/A

(1) Certain utility infrastructure at the East Alton, Illinois facility is leased by Olin Brass from Olin Corporation. Pursuant to a 2007 transition services agreement, Olin Corporation supplies Olin Brass with natural gas, water, steam and waste water disposal, among other things, at Olin Brass's East Alton, Illinois facility. According to the transition services agreement, Olin Corporation has agreed to provide utility services until Olin Corporation ceases operations at its East Alton, Illinois facility, at which time Olin Brass has the option to acquire the utilities infrastructure at fair market value. The transition services agreement renewed automatically in November 2018 and automatically renews for one-year terms thereafter subject to termination by either party upon one year's notice.
Item 3. Legal Proceedings.
We are currently and from time to time involved in a variety of claims, lawsuits and other disputes arising in the ordinary course of business, none of which management currently believes are, or will be, material to our business.

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Item 4. Mine Safety Disclosures.

Not applicable.

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PART II

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

Holders of Record

Our common stock is traded on the New York Stock Exchange (ticker symbol BRSS). As of February 18, 2019, we had approximately 117 holders of record of our common stock.

Securities Authorized for Issuance Under Equity Compensation Plans

Certain information regarding securities authorized for issuance under our equity compensation plans is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.

Dividends

The payment of dividends in the future will be at the discretion of our Board of Directors and will depend on a number of factors, including our financial and operating results, financial position, anticipated cash requirements and restrictions contained in the agreements governing our asset-based revolving loan facility, which matures on July 19, 2021 ("ABL Facility") and our term loan facility, which matures on May 29, 2025 ("Term Loan B Facility"). Currently, we have significant availability under our credit agreements to pay dividends consistent with past practice and future expectations. We can give no assurance that dividends will be paid in the future. See Note 10, "Financing," of our consolidated financial statements, which are included elsewhere in this report, for further discussion of these restrictive covenants.

Issuer Purchases of Equity Securities

	Stock Compensation Plans		Share Repurchase Program		
Period	Total Number of Shares Purchased (1)	Average Price per Share	Total Number of Shares Purchased (2)	Average Price per Share	Maximum Dollar Value of Shares That May Yet be Purchased Under the Program (millions) (2)
October 1, 2018 through October 31, 2018	—	$ —	—	—	$ 35.0
November 1, 2018 through November 30, 2018	—	$ —	400,000	31.48	$ 22.4
December 1, 2018 through December 31, 2018	1,026	$ 25.15	—	—	$ 22.4
Total	1,026	$ 25.15	400,000	31.48	N/A

(1) Includes shares which were surrendered to the Company by participants under share-based compensation plans to satisfy tax withholding obligations relating to the vesting of equity awards.

(2) On July 31, 2018, the Company's Board of Directors authorized a share repurchase program (the "2018 Share Repurchase Program"), authorizing the Company to repurchase up to $35.0 million of its common stock on the open market through September 30, 2020. As of December 31, 2018, we had approximately $22.4 million of remaining authorization.

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Performance Graph

This performance graph shall not be deemed “soliciting material” or to be “filed” with the SEC for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (Exchange Act), or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of Global Brass and Copper Holdings, Inc. under the Securities Act of 1933, as amended, or the Exchange Act.

The following graph shows a comparison from May 23, 2013 (the date our common stock commenced trading on the New York Stock Exchange) through December 31, 2018 of the cumulative total return for our common stock, the Russell 2000 Index (“Total Market Index”) and the S&P SmallCap 600 Index—Materials (“Materials Index”). The graph assumes that $100 was invested at the market close on May 23, 2013 in the common stock of Global Brass and Copper Holdings, Inc., the Total Market Index and the Materials Index and data assumes reinvestments of dividends. The stock price performance of the following graph is not necessarily indicative of future stock price performance.

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Item 6. Selected Financial Data.

The following table includes selected historical consolidated financial data of our business as of the dates and for the periods indicated. The table should be read in conjunction with the information about the limitations on comparability of our financial results, including as a result of acquisitions. See Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," Item 1A, "Risk Factors," and our consolidated financial statements and related notes included in Item 8 to this report.

(in millions, except per share data)	Year Ended December 31,				
	2018	2017	2016	2015	2014
Pounds shipped (1)	564.6	507.3	520.8	511.9	520.4
Statements of Operations Data:					
Net sales	$1,765.4	$1,578.6	$1,338.3	$1,506.2	$1,711.4
Cost of sales	(1,578.7)	(1,394.4)	(1,156.6)	(1,335.9)	(1,546.8)
Gross profit	186.7	184.2	181.7	170.3	164.6
Selling, general and administrative expenses	(92.7)	(83.8)	(82.8)	(83.2)	(76.9)
Operating income	94.0	100.4	98.9	87.1	87.7
Interest expense, net	(16.8)	(17.6)	(26.2)	(39.1)	(39.6)
Loss on extinguishment of debt	(0.5)	(0.2)	(23.4)	(3.1)	—
Gain on sale of investment in joint venture	—	—	—	6.3	—
Other income (expense), net	(0.8)	3.0	0.2	0.2	(0.5)
Income before provision for income taxes and equity income	75.9	85.6	49.5	51.4	47.6
Provision for income taxes	(17.3)	(33.9)	(16.7)	(15.9)	(16.6)
Income before equity income	58.6	51.7	32.8	35.5	31.0
Equity income, net of tax	—	—	—	0.3	1.1
Net income	58.6	51.7	32.8	35.8	32.1
Net income attributable to noncontrolling interest	(0.4)	(0.6)	(0.6)	(0.2)	(0.4)
Net income attributable to Global Brass and Copper Holdings, Inc.	$58.2	$51.1	$32.2	$35.6	$31.7
Per Share Data:					
Cash dividends declared per common share (2)	$0.3000	$0.1950	$0.1500	$0.1500	$0.1500
Basic net income attributable to Global Brass and Copper Holdings, Inc. per common share	$2.66	$2.35	$1.50	$1.67	$1.50
Diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share	$2.61	$2.31	$1.49	$1.66	$1.49
Number of common shares used in basic per share calculations	21.9	21.7	21.4	21.3	21.2
Number of common shares used in diluted per share calculations	22.3	22.1	21.6	21.4	21.3
Balance Sheet Data:					
Cash	$125.5	$59.0	$88.2	$83.5	$44.6
Total assets	691.0	652.2	578.6	557.2	566.3
Total debt (3)	310.3	314.0	316.0	343.1	371.4
Total liabilities	503.2	504.9	483.4	496.5	540.3
Total equity	187.8	147.3	95.2	60.7	26.0

(1) Amounts exclude quantity of unprocessed metal sold.

(2) In 2018, 2017, 2016, 2015 and 2014, we declared dividends of $6.7 million, $4.5 million, $3.3 million, $3.2 million and $3.2 million, respectively, to the Company's stockholders.

(3) Consists of long-term debt, capital lease obligations and current maturities of long-term debt (presented net of discount and net of deferred financing fees incurred in connection with the issuance of debt).

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

Readers should refer to the information presented under the caption "Risk Factors" for risk factors that may affect our future performance. The following discussion and analysis of financial condition and results of operations should be read in conjunction with "Selected Financial Data" and our consolidated financial statements and related notes included elsewhere in this report. In addition to historical data, this discussion contains forward-looking statements about our business, operations and financial performance based on current expectations that involve risks, uncertainties and assumptions. Our actual results may differ materially from those discussed in the forward-looking statements as a result of various factors, including but not limited to those discussed in the sections entitled "Risk Factors" and "Cautionary Statements Concerning Forward-Looking Statements" included elsewhere in this report.

Overview

Our Company

Global Brass and Copper Holdings, Inc. ("Holdings," "GBC," the "Company," "we," "us," or "our") was incorporated in Delav on October 10, 2007. We commenced commercial operations on November 19, 2007 following the acquisition of the metals business from Olin Corporation.

We are a leading, value-added converter, fabricator, processor, and distributor of specialized non-ferrous products, including a wide range of sheet, strip, foil, rod, tube, and fabricated metal component products. While we primarily process copper and copper alloys, we also reroll and form certain other metals such as stainless steel, carbon steel, and aluminum. Using processed scrap, virgin metals, and other refined metals, we engage in metal melting and casting, rolling, drawing, extruding, welding and stamping to fabricate finished and semi-finished alloy products. Key attributes of copper and copper alloys are conductivity, corrosion resistance, strength, malleability, cosmetic appearance, and bactericidal properties.

Unlike traditional metals companies, particularly those that engage in mining, smelting, and refining activities, we are purely a metal converter, fabricator, processor, and distributor, and we do not attempt to generate profits from fluctuations in metal prices. Our financial performance is primarily driven by metal conversion economics, not by the underlying movements in the commodity price of copper and the other metals we use. Through our "balanced book" approach, we strive to match the timing, quantity, and price of our metal sales with the timing, quantity, and price of our replacement metal purchases. This practice, along with our toll processing operations and last-in, first-out ("LIFO") inventory accounting methodology, substantially eliminates the financial impact of fluctuating metal commodity prices on our earnings and operating margins.

Our products are used in a variety of applications across diversified markets, including the building and housing, munitions, automotive, transportation, coinage, electronics / electrical components, industrial machinery and equipment, signage, and general consumer markets. We access these markets through direct mill sales, our captive distribution network, and third-party distributors. We hold the exclusive production and distribution rights in North America for a lead-free brass rod product, which we sell under the Green Dot® and Eco Brass® brand names. We believe we are the only domestic copper and brass sheet manufacturer with captive distribution and service center operations, a competitive advantage which allows us to service and access customers with a wide variety of volume and service needs.

We service nearly 4,200 customers in 28 countries across four continents. We employ approximately 1,900 people and operate 16 manufacturing facilities and distribution centers across the United States ("U.S."), Puerto Rico and Mexico. We own 80% of a value-added service center in Guangzhou, China ("Olin Luotong Metals" or "OLM"); the other 20% is owned by Chinalco Luoyang Copper Co. Ltd. ("Chinalco"). Through Olin Luotong Metals, together with our sales offices in China and Singapore, we supply our products in China and throughout Southeast Asia.

Our Operating Segments

We operate through three reportable operating segments: Olin Brass, Chase Brass and A.J. Oster.

Our Olin Brass segment is the leading manufacturer, fabricator and converter of specialized copper and brass sheet, strip, foil, tube and fabricated components in North America. While primarily processing copper and copper alloys, the segment also rerolls and forms other metals such as stainless steel, carbon steel and aluminum. Olin Brass's customers further process the rod into finished products that are sold into five primary markets: munitions, coinage, automotive, building and housing and electronics / electrical components. In 2018, Olin Brass shipped approximately

15% of its products to A.J. Oster.

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Chase Brass is a leading manufacturer of brass rod in North America. Chase Brass primarily manufactures brass rod, including round and other shapes, ranging from 1/4 inch to 4 1/2 inches in diameter. The key attributes of brass rod include its machinability, corrosion resistance and moderate strength, making it especially suitable for forging and machining products such as valves and fittings. Brass rod is generally manufactured from copper or copper-alloy scrap. Chase Brass's customers further process the rod into finished products that are sold into four primary markets: building and housing, transportation, electronics / electrical components and industrial machinery and equipment.

A.J. Oster is a processor and distributor of copper and copper-alloy sheet, strip, and foil, aluminum sheet, and coated aluminum products. A.J. Oster operates eleven strategically located service centers in the U.S., Puerto Rico, and Mexico. Each A.J. Oster service center reliably provides products at quick lead-times in small quantities. These capabilities, combined with A.J. Oster's operations of precision slitting, hot tinning, traverse winding, cutting, and special packaging, provide value to a broad customer base. A.J. Oster's products are used in three primary markets: building and housing, automotive, and electronics / electrical components. In 2018, 51% of A.J. Oster's brass and copper material requirements were supplied by our Olin Brass segment.

All three segments generate revenue from product sales and earn a premium margin over the cost of metal as a result of our metal conversion, value-added processing, and service capabilities.

Finally, we also have a Corporate entity which includes compensation for corporate executives, corporate office and administrative salaries, and professional fees for accounting, tax, and legal services. Corporate and other also includes interest expense and income, state and federal income taxes, certain overhead costs, share-based compensation expense, gains and losses associated with certain acquisitions and dispositions, unrealized gains and losses on hedging activities, and the elimination of intercompany sales and balances.

Formation and Acquisition of the Worldwide Metals Business of Olin Corporation

On October 10, 2007, affiliates of KPS Capital Partners, L.P. ("KPS") formed GBC as an acquisition vehicle to acquire the worldwide metals business of Olin Corporation, which was completed on November 19, 2007. The transaction was accounted for under the purchase method of accounting.

At the time of the transaction, the fair market value of the net assets acquired exceeded the purchase price in the acquisition. This resulted in a bargain purchase, and we reduced the value of all identified intangible assets and other noncurrent assets, including the acquired property, plant and equipment, to zero in the opening balance sheet as of the acquisition date. Accordingly, our fixed assets reflect only post-acquisition capital investments, and our cost of sales and selling, general and administrative expense, depending on the nature and use of the underlying asset, includes depreciation only on capital investments made after the acquisition date.

Recent Transactions

Purchases and Redemption of Senior Secured Notes

Prior to obtaining the Term Loan B Credit Agreement and the ABL Credit Agreement in 2016 (as defined below), our debt facilities consisted of our 9.50% senior secured notes ("Senior Secured Notes") and a former asset-based loan facility ("Former ABL Facility").

During the year ended December 31, 2016, we purchased in the open market an aggregate of $40.0 million principal amount of our then existing Senior Secured Notes, for an aggregate purchase price of $42.5 million, plus accrued interest.

On July 18, 2016, we obtained a new Term Loan B Facility and used a portion of the proceeds to redeem the remaining $305.3 million principal amount outstanding of our Senior Secured Notes. As part of this refinancing and in accordance with the indenture governing the then existing Senior Secured Notes ("Indenture"), we called and terminated the notes at a redemption price of 104.75% plus accrued interest.

We recognized a loss on the extinguishment of debt in the year ended December 31, 2016 of $23.4 million, which includes a premium of $17.0 million and the write-off of $6.4 million of unamortized debt issuance costs for both the Senior Secured Notes and the Former ABL Facility.

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2016 Refinancing

On July 18, 2016, we entered into a long-term credit agreement that matures July 18, 2023 (the "Term Loan B Credit Agreement" and the loans thereunder, the "Term Loan B Facility") and provides for borrowings of $320.0 million. We may request an increase in the aggregate term loans, at our option and under certain circumstances, of up to an additional $75.0 million or an unlimited amount so long as after giving effect to any incremental facility or incremental equivalent debt, the net senior secured leverage ratio does not exceed 2.50 to 1.00 (but the lenders, in either case, are not obligated to grant such an increase). On December 30, 2016, we began making quarterly payments of $0.8 million ($3.2 million annually) with the balance expected to be due on July 18, 2023.

On July 18, 2016, we also entered into a credit agreement with a syndicate of lenders that matures on July 19, 2021 (the "ABL Credit Agreement" and the facility thereunder, the "ABL Facility"). The ABL Facility is an asset-based revolving loan facility that provides for borrowings of up to the lesser of $200.0 million or the borrowing base, in each case less outstanding loans and letters of credit.

Amounts outstanding, if any, under the ABL Facility bear interest at a rate per annum equal to, at our option, either (1) 0.25% to 0.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus an Alternate Base Rate (as defined in the ABL Credit Agreement) or (2) 1.25% to 1.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus the Adjusted LIBO Rate (as defined in the ABL Credit Agreement). Unused amounts under the ABL Facility incur an unused line fee of 0.375% or 0.25% per annum (depending on the percentage of aggregate revolving exposure), payable in arrears on a quarterly basis.

2017 and 2018 Refinancings

On each of July 18, 2017 and May 29, 2018, we amended the credit agreement governing our Term Loan B Facility (the "Amended Term Loan B Credit Agreement"), and on July 18, 2017, we amended our credit agreement governing our asset-based revolving facility that matures on July 19, 2021 (the "Amended ABL Credit Agreement"). The most recent refinancing of the Term Loan B Facility reduced our interest rate spread by an additional 75 basis points, reduced the LIBO Rate floor from 1% to 0%, and extended the maturity date through May 29, 2025. Amounts outstanding under the Term Loan B Facility now bear interest at a rate per annum equal to, at our option, either (1) 1.50% plus an Alternate Base Rate (as defined in the Amended Term Loan B Credit Agreement) or (2) 2.50% plus the Adjusted LIBO Rate (as defined in the Amended Term Loan B Credit Agreement).

Interest Rate Swap Agreement

In order to minimize the variability in cash flows caused by fluctuations in market interest rates, we entered into an interest rate swap agreement on May 25, 2018, which expires on May 31, 2023. This swap agreement fixes the LIBO Rate on $150.0 million of our floating rate LIBO Rate debt at 2.75%. At December 31, 2018, amounts outstanding under the Term Loan B Facility combined with our interest rate swap derivative accrued interest at a weighted average rate of 5.15%.

Acquisition

On November 1, 2017, A.J. Oster acquired certain assets and assumed certain liabilities of Unimet Metal Supply, Inc. and Alliance Service Centers, Inc. (together "Alumet"). Headquartered in Parsippany, New Jersey, Alumet is a non-ferrous metals service center that provides coated aluminum, aluminum, copper and brass sheet, and strip products to the building and housing and transportation markets through its cut to length, slitting, and coating capabilities. The acquisition of Alumet expands A.J. Oster's geographic presence into the South and Southeast through Alumet's facilities in Atlanta and Texas while also providing additional outlets for Alumet's products through A.J. Oster's facilities in Chicago and Mexico. The Alumet acquisition was part of our strategic efforts to profitably grow through acquisitions and expands our geographic presence in targeted regions, strengthens our position in the aluminum market, and enhances our position as a market leader in the non-ferrous metals distribution business.

We accounted for the Alumet acquisition as a business combination using the acquisition method in accordance with ASC 805, Business Combinations. The results of operations of Alumet since November 1, 2017 have been included in the Consolidated Statement of Operations. We acquired the net assets of Alumet for approximately $41.7 million.

Share Repurchase Program

On July 31, 2018, our Board of Directors authorized a share repurchase program (the "2018 Share Repurchase Program"), whereby we may repurchase up to $35.0 million of our common stock on the open market through

September 30, 2020. We repurchased 400,000 shares of our common stock under the 2018 Share Repurchase Program during 2018 and have a remaining authorization of $22.4 million.

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Key Business Principles Affecting Our Results of Operations

LIFO Accounting

The metals component of inventory that is valued on last-in, first-out (“LIFO”) basis comprises approximately 67% and 65% of total inventory at December 31, 2018 and 2017, respectively. The impact of LIFO accounting on our financial results may be significant with respect to period-to-period comparisons depending on the fluctuations in our inventory levels. During 2018, 2017 and 2016, certain domestic metal inventory quantities were reduced, resulting in a liquidation of LIFO inventory layers. The effect of this reduction increased cost of sales by $0.1 million, $1.0 million and $1.9 million in 2018, 2017 and 2016, respectively.

Metal Cost

We are a leading, value-added converter, fabricator, processor and distributor of specialized non-ferrous products in North America. We generate our profits from the conversion, manufacturing and fabrication of metal into end products, and not by taking advantage of fluctuations in the price of copper and other metals. Our business model uses various methods to substantially reduce the financial impact of fluctuations in metal prices so that our operating margins are largely unaffected by trends in metal prices. Nevertheless, fluctuations in metal prices will impact the total amount of our net sales, the cost of shrinkage loss, the impact of LIFO liquidations (as previously discussed) and our investments in working capital.

Shrinkage loss is the loss of metal that occurs naturally through the process of melting and casting metals. While the shrinkage loss rate is very low relative to the total volume of metal cast, the cost of the shrinkage loss and its impact on financial performance increases as metal prices increase.

Over the last three years, approximately 23% of our sales volumes were made on a toll basis where our customers supply us with the metal and we charge them a processing or conversion fee to melt the metal and convert it into a finished product. For metal processed on a non-toll basis, we procure and own the metal until we melt, convert, and sell it to the customer, whereby we charge them not only a conversion fee but also a metal replacement fee. For these non-toll sales, we use our balanced book approach, discussed below, to substantially reduce the impact of metal price movements on earnings and operating margins.

Metal prices also impact our investment in working capital because our collection terms with our customers are longer than our payment terms to our suppliers. Therefore, our investments in working capital are directly correlated to fluctuations in metal prices, even if the number of pounds sold does not change.

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Balanced Book

The majority of our sales volume is from non-toll customers. To substantially reduce the financial impact of metal price volatility on earnings and operating margins on these non-toll sales, we use a balanced book approach to hedge the impact of metal price fluctuations. The balanced book approach minimizes the financial impact of metal price movements in the period between date of order and date of shipment by matching a) the timing, quantity and price of the metal cost recovery component of net sales made on a non-toll basis with b) the timing, quantity and price of the replacement metal purchases. For any non-toll sale, we seek to achieve our balanced book through one of the following three mechanisms:

- "Price date of shipment" terms - meaning that the metal sale price to the customer and the purchase price for replacement metal from a supplier are set on the date of shipment. At the time we receive an order from a customer on price date of shipment terms, we place an order with a vendor on price date of shipment terms to correlate the price of the replacement metal with what we will sell to the customer. Thus, the customer bears the risk of metal price changes from the date of order to the date of shipment;
- Firm pricing - meaning that the metal sale price to the customer is fixed on the order date and a matching replacement purchase from a supplier is made at a fixed price. At the time we receive an order from a customer, we give the customer a fixed metal price, and, shortly thereafter, we place an order with a vendor at a fixed price to lock in the price of the metal to replace what we will sell to the customer. Thus, the supplier bears the risk of metal price changes from the date of order to the date of shipment;
- Financial derivatives - meaning we use financial derivatives when one of the other two mechanisms is unavailable. In this situation, we give the customer a fixed metal price at the time we receive the order, and, shortly thereafter, we (i) place a purchase order for scrap metal with a vendor on price date of shipment terms and (ii) enter into a financial derivative transaction in the form of a forward purchase contract to lock in the price of the metal to replace what we will sell to the customer. Typically, we will net settle this derivative and use the gain or loss on the derivative transaction to offset any loss or gain from the metal purchase transaction we entered into with our scrap vendor. Thus, the derivative counterparty bears the risk of metal price changes from the date of order to the date of shipment.

In 2018, approximately 50% of our non-toll sales volumes (39% of our total unit shipments) were conducted with price date of shipment terms. All other non-toll unit sales volumes were conducted with firm pricing or financial derivatives.

Metal Derivatives

As discussed above, we use derivative contracts in support of our balanced book approach. These derivative contracts are not designated as hedges for accounting purposes and are recorded at fair value in accordance with the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 820, Fair Value Measurements and Disclosures ("ASC 820"). Thus, we include the unrealized and realized gains and losses on these derivatives within cost of sales in our consolidated statements of operations.

Industry Dynamics and Demand for Our Products

Demand for our product is driven predominantly by six markets: 1) building and housing, 2) munitions, 3) automotive, 4) electronics / electrical components, 5) coinage and 6) industrial machinery and equipment.

Building and Housing

According to our estimates, we expect U.S. housing starts and U.S. existing home sales to increase 1.8% and 2.4% annually, respectively, from 2018 through 2021.

Demand within this market is affected by new residential housing, existing home sales and commercial construction, all of which are significantly dependent on overall economic conditions. Particularly as it relates to Chase Brass, demand within this segment is affected by (i) increasing importation of parts that compete with those our customers manufacture from our brass rod and (ii) the offshoring of production by our customers to overseas, lower cost manufacturing environments.

In addition, the correlation between housing statistics and our sales is not entirely direct as products containing our metal are typically installed near the completion of construction. Thus, there is an inherent lag time compared to housing starts. Sales of our products to customers in the building and housing market can be also affected by factors such as housing mix (single family versus multi-family homes), unit size and unit price point as these affect the quality of components used in and the quantity of plumbing fixtures and products. Sales of our products can also be impacted by changes and trends in the composition of materials and fixtures used in construction.

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Munitions
In 2014, our customers began destocking their munitions inventories and thus, Olin Brass's munitions volumes decreased in 2015 as these efforts continued. In 2016, we saw improved volumes in this market, but again experienced a decline in munitions volumes in 2017 due to decreased demand after the 2016 U.S. Presidential election and a production outage at one of our main customer's facilities. Volumes improved in 2018 compared to the prior year primarily due to the impact of the production outage in the prior year, but are still below 2016 levels. We expect volumes to return to a more normalized run rate in the longer run.
Automotive
The automotive market is dependent on the level of consumer spending on automobiles, which is significantly dependent on overall economic conditions, replacement needs, and the amount of electrical components contained within automobiles. According to our estimates, North American light vehicle production is expected to grow by 0.1% annually from 2018 through 2021.
We also believe demand for our sales to this segment has been affected by the ever increasing electronification of vehicles due to increased electrical connectors needed for computer technologies, such as navigation systems, electronic media, and wireless technologies, embedded within these vehicles. In addition, we believe demand will increase as internal combustible engines are replaced with power sourced or supplemented by battery and similar technologies.
Particularly within Olin Brass and A.J. Oster, we are implementing pricing strategies that focus on pricing our products to automotive customers: to earn a return commensurate with cost complexity required to produce them, to earn an appropriate return on the assets used to produce them, and to earn an appropriate return in relation to other competitive offerings. We believe these pricing strategies will better position us in the long-term.
Electronics / Electrical Components
Customers use our products to manufacture electronics / electrical components in a wide range of applications, from medical devices to computers to aviation components, and demand is largely correlated to general economic activity and technological developments.
Coinage
As it has done from time to time for over 40 years, Olin Brass renewed its long-term contract with the U.S. Mint in 2017 to extend the supply agreement into 2022. Demand for coinage is directly tied to consumer transactions and coinage demand has fluctuated in the last three years.
Industrial Machinery and Equipment ("IM&E")
Sales in this market primarily lie within Chase Brass. IM&E volumes decreased in both 2015 and 2016 as compared to each previous year due to softness in the oil and gas, metals and mining, and agricultural industries, as well as competition from imported parts. IM&E volumes in 2018 and 2017 were consistent with 2016 volumes.
Industry Dynamics Affecting Growth Opportunities
Regarding demand for copper and copper-alloy sheet, strip and plate ("SSP"), there are a number of growth opportunities that could increase the demand for SSP products, including our CuVerro® bactericidal products. Olin Brass completed the federal and state registration processes necessary to market its CuVerro® materials as having bactericidal properties. It has also registered more than 30 component manufacturers to market products made with CuVerro®.
Legislation to replace the one-dollar paper notes with dollar coins keeps receiving attention in Congress, most recently by the reintroduction of the Unified Savings and Accountability Act ("USA Act") in July 2015. Among other matters, the USA Act brings added focus and support to replace the one dollar note with the dollar coin. We anticipate a significant increase in the size of the coinage market if the U.S. transitions to the dollar coin and eliminates the one-dollar paper note.
Regarding demand for brass rod, some of our green products are marketed under the Eco Brass® tradename under an exclusive license in North America which expires May 16, 2019. We anticipate the expiration of this exclusive license may have a negative effect on our financial performance.

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Finally, the North American market may be affected by certain factors related to the supply of brass and copper, including imported rod and finished parts made from foreign sourced rod. Therefore, competition from offshore suppliers could become more significant in the future if certain factors change. Historically these factors have included foreign trade agreements, competition, antidumping orders, foreign exchange rate fluctuations, domestic capacity and pricing levels, as well as costs in the import supply chain.

Management’s View of Performance

In addition to the results reported in accordance with accounting principles generally accepted in the United States of America, (“US GAAP”), we also report “adjusted sales,” “adjusted gross profit,” “adjusted selling, general and administrative expenses,” “adjusted EBITDA” and “adjusted diluted earnings per common share” which are non-GAAP financial measures as defined below.

Adjusted sales, adjusted gross profit, adjusted selling, general and administrative expenses, adjusted EBITDA and adjusted diluted earnings per common share may not be comparable to similarly titled measures presented by other companies and are not intended as alternatives to any other measure of performance in conformity with US GAAP. You should therefore not place undue reliance on adjusted sales, adjusted gross profit, adjusted selling, general and administrative expenses, adjusted EBITDA, adjusted diluted earnings per common share, or any ratios calculated using them. The most comparable US GAAP-based measure for each respective non-GAAP financial measure can be found in our consolidated financial statements and the related notes thereto included elsewhere in this report.

The following discussions present an analysis of certain US GAAP and non-GAAP measures for 2018, 2017, and 2016. These discussions should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Net sales by customer arrangement

The following table breaks down our revenue by the type of arrangement with the customer:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Non-toll revenue	$1,709.8	$1,503.3	$1,332.2
Unprocessed metal sales	126.6	138.6	70.3
Toll processing revenue	16.7	15.9	12.3
Intersegment net sales elimination	(87.7)	(79.2)	(76.5)
Net sales	$1,765.4	$1,578.6	$1,338.3

Net sales and adjusted sales

Net sales is the most directly comparable US GAAP measure to adjusted sales, a non-GAAP revenue measure. We deduct the cost of our metal within cost of sales from net sales to arrive at adjusted sales. Metal cost reflects the cost of replacing metal sold to the customer, whereas adjusted sales is our internal measure of the value-added revenue generated from our operations. We use adjusted sales on a consolidated basis to monitor the revenues that are generated excluding the effects of fluctuations in commodity metal costs. We believe that adjusted sales supplements our US GAAP results because it provides a more complete understanding of the results of our business, and we believe it is useful to our investors and other parties for these same reasons.

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Net sales is reconciled to adjusted sales as follows:

	Year Ended December 31,			Change: 2018 vs. 2017		Change: 2017 vs. 2016	
(in millions, except per pound values)	2018	2017	2016	Amount	Percent	Amount	Percent
Pounds shipped (a)	564.6	507.3	520.8	57.3	11.3 %	(13.5)	(2.6)%
Net sales	$1,765.4	$1,578.6	$1,338.3	$186.8	11.8 %	$240.3	18.0 %
Metal component of net sales	(1,148.8)	(1,042.8)	(796.0)	(106.0)	10.2 %	(246.8)	31.0 %
Adjusted sales	$616.6	$535.8	$542.3	$80.8	15.1 %	$(6.5)	(1.2)%
Net sales per pound	$3.13	$3.11	$2.57	$0.02	0.6 %	$0.54	21.0 %
less: Metal component of net sales per pound	2.04	2.05	1.53	(0.01)	(0.5)%	0.52	34.0 %
Adjusted sales per pound	$1.09	$1.06	$1.04	$0.03	2.8 %	$0.02	1.9 %
Average copper price per pound (b)	$2.93	$2.80	$2.20	$0.13	4.6 %	$0.60	27.3 %

(a)Amounts exclude the quantity of unprocessed metal sold.

(b)Copper prices reported by the Commodity Exchange (“COMEX”).

2018 compared to 2017

Net sales increased by $186.8 million, or 11.8%, primarily due to our Alumet acquisition ($120.8 million), a $41.3 million increase in the cost of replacement metal stemming from increased metal prices, increased volumes ($14.5 million), and benefits from changes in sales mix and pricing ($10.2 million). Adjusted sales increased by $80.8 million, or 15.1%, primarily due to our acquisition of Alumet ($56.1 million), other organic volume increases, and favorable metal mix and metal sourcing.

2017 compared to 2016

Net sales increased by $240.3 million, or 18.0%, primarily as the result of a $246.8 million increase in the metal cost recovery component stemming from increased metal prices and greater sales of unprocessed metals (combined $263.3 million) and the Alumet acquisition, partially offset by decreased volumes ($52.6 million). Adjusted sales decreased by $6.5 million due to lower demand, largely in the munitions market, partially offset by an increase from Alumet.

Gross profit and adjusted gross profit

Gross profit is the most directly comparable US GAAP measure to adjusted gross profit. Adjusted gross profit is defined as gross profit less items excluded from the calculation of adjusted EBITDA, as detailed in the following table. We believe that adjusted gross profit supplements our US GAAP results to provide a more complete understanding of the results of our business as it provides period-to-period comparisons of our core operations that are more consistent and more easily understood.

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Gross profit is reconciled to adjusted gross profit as follows:

(in millions)	Year Ended December 31, 2018	2017	2016	Amount change: 2018 vs. 2017	2017 vs. 2016
Total gross profit	$186.7	$184.2	$181.7	$2.5	$2.5
Unrealized (gain) loss on derivative contracts	2.8	0.8	(3.1)	2.0	3.9
LIFO liquidation loss (gain)	0.1	1.0	1.9	(0.9)	(0.9)
Lower of cost or market adjustment to inventory	2.9	(3.6)	(1.7)	6.5	(1.9)
Share-based compensation expense	0.3	—	—	0.3	—
Restructuring and other business transformation charges	—	0.2	—	(0.2)	0.2
Inventory step-up costs from acquisition accounting	0.2	0.3	—	(0.1)	0.3
Depreciation expense	17.1	15.0	12.9	2.1	2.1
Adjusted gross profit	$210.1	$197.9	$191.7	$12.2	$6.2

2018 compared to 2017

Gross profit increased by $2.5 million (1.4%) due to an increase in adjusted gross profit, partially offset by an unfavorable lower of cost or market adjustment to inventory ($6.5 million), increased depreciation expense ($2.1 million), and an unfavorable unrealized (gain) loss on derivative contracts ($2.0 million). Adjusted gross profit increased by $12.2 million (6.2%) primarily due to the combination of the following:

- the addition of Alumet ($14.5 million);
- $7.8 million improvement from our metal pricing, sourcing, and blending initiatives;
- the fact that 2017 includes $1.5 million more of costs associated with transitioning to a health savings account ("HSA"), increased cost of sales due to the reduction of inventories at Olin Brass and additional costs from the implementation of A.J. Oster's fully integrated Enterprise Resource Planning ("ERP") system;
- the absence of a $3.5 million benefit recognized in the prior year resulting from the recovery of insurance proceeds related to our 2016 production outage;
- increased conversion costs of $1.8 million stemming from operational inefficiencies that negatively impacted yields and productivity;
- increased shrinkage costs as a result of higher metal prices; and
- $0.4 million of expenses related to an environmental incident at an Olin Brass facility.

2017 compared to 2016

Gross profit increased by $2.5 million, or 1.4%, and benefited from a $1.9 million reduction in lower of cost or market charges, a $0.9 million favorable LIFO liquidation loss, and an increase in adjusted gross profit, partially offset by increased depreciation expense and unfavorable fluctuations in unrealized gains/losses on derivative contracts.

Adjusted gross profit increased by $6.2 million (3.2%) due to the net result of four main factors; decreased volumes, the 2016 production outages at Olin Brass, increased shrinkage costs, and a few specific decisions discussed below.

Volumes have decreased most significantly in our munitions market due to both depletion of inventory levels throughout the channel following the 2016 Presidential election and a production outage at one of our larger customers. Our building and housing volumes, excluding Alumet, suffered as our customers lost pieces of their business. Volumes decreased in our stamping and automotive markets due to underlying demand. In addition, volumes at A.J. Oster earlier in the year were hampered by the implementation of a new Enterprise Resource Planning ("ERP") system, which later led to customer service issues at one of our facilities.

In the second quarter of 2016, Olin Brass suffered a production outage for which we recorded, in 2017, $7.4 million of proceeds ($3.5 million recorded as a reduction to cost of sales) from insurance policies we collected relating to this outage. In 2016, we also incurred increased production expenses to toll process inventory to meet customer needs during the outage. These costs were not incurred again in 2017.

As metal prices, especially copper, have increased, the cost of shrinkage, which is a normal part of production, has increased, unfavorably impacting the comparison of gross profit to the prior year amounts.

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In 2017, we also made certain specific decisions which increased costs and negatively impacted our gross profit by $1.8 million as compared to 2016. These relate to transitioning to a health savings account (“HSA”) medical program for our employees, reducing inventory levels at Olin Brass to generate increased cash flow without commensurate reductions in production overhead costs, and launching a fully integrated ERP system at A.J. Oster which led to increased consulting, freight, and other expenses.

Selling, general and administrative expenses and adjusted selling, general and administrative expenses

Selling, general and administrative expenses are the most directly comparable US GAAP measure to adjusted selling, general and administrative expenses. Adjusted selling, general and administrative expenses is defined as selling, general and administrative expenses less items excluded from the calculation of adjusted EBITDA. We believe that adjusted selling, general and administrative expenses supplement our US GAAP results and provides a more complete understanding of the results of our business as it provides period-to-period comparisons of our core operations that are more consistent and more easily understood.

Selling, general and administrative expenses is reconciled to adjusted selling, general and administrative expenses as follows:

(in millions)	Year Ended December 31, 2018	2017	2016	Amount change: 2018 vs. 2017	2017 vs. 2016
Total selling, general and administrative expenses	$92.7	$83.8	$82.8	$8.9	$1.0
Specified legal / professional expenses	(0.4)	(1.3)	(1.2)	0.9	(0.1)
Share-based compensation expense	(6.4)	(8.2)	(6.9)	1.8	(1.3)
Restructuring and other business transformation charges	—	(0.2)	—	0.2	(0.2)
Depreciation and amortization expense	(4.4)	(3.6)	(2.0)	(0.8)	(1.6)
Adjusted selling, general and administrative expenses	$81.5	$70.5	$72.7	$11.0	$(2.2)

2018 compared to 2017

Selling, general and administrative expenses increased by $8.9 million (10.6%) primarily due to an increase in adjusted selling, general and administrative expenses, partially offset by reduced expenses for share-based compensation awards and specified legal / professional services. Adjusted selling, general and administrative expenses increased $11.0 million due to the Alumet acquisition ($8.7 million), an increase in employee and employee related costs, and $0.3 million of costs incurred related to an environmental incident at an Olin Brass facility, partially offset by the fact that the prior year includes $0.9 million more of expenses associated with transitioning to the HSA medical plan and consulting fees associated with the implementation of A.J. Oster’s ERP system.

2017 compared to 2016

Selling, general and administrative expenses increased by $1.0 million (1.2%) and were unfavorably impacted by an increase in depreciation and share-based compensation expense and favorably impacted by the change in adjusted selling, general and administrative expenses which decreased by $2.2 million (3.0%). Adjusted selling, general and administrative expenses declined primarily due to lower outside services ($3.6 million) and lower employee and employee related costs ($2.0 million) largely relating to incentive compensation, partially offset by the combined costs of approximately $1.1 million associated with transitioning to the HSA medical plan and consulting fees associated with the implementation of A.J. Oster’s ERP system. We have made significant progress in reducing professional fees for accounting, tax, legal and consulting services incurred in our early years as a public company and thus, in 2017, these costs are no longer an adjustment for purposes of calculating adjusted selling, general and administrative expenses. Specified legal / professional expenses in 2017 and after represent accounting, tax, legal, and consulting services related to merger and acquisition activity.

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Net income and adjusted EBITDA

Net income attributable to Global Brass and Copper Holdings, Inc. is the most directly comparable US GAAP measure to adjusted EBITDA. Adjusted EBITDA is defined as net income attributable to Global Brass and Copper Holdings, Inc., plus interest, taxes, depreciation and amortization ("EBITDA") adjusted to exclude the following:

- unrealized gains and losses on derivative contracts in support of our balanced book approach;
- unrealized gains and losses associated with derivative contracts related to energy and utility costs;
- impact associated with lower of cost or market adjustments to inventory;
- gains and losses due to the depletion of a LIFO layer of metal inventory;
- share-based compensation expense;
- refinancing costs;
- restructuring and other business transformation charges;
- inventory step-up costs related to acquisition accounting;
- specified legal and professional expenses; and
- certain other items.

We believe adjusted EBITDA represents a meaningful presentation of the financial performance of our core operations, because it provides period-to-period comparisons that are more consistent and more easily understood. We also believe it is an important supplemental measure that is frequently used by securities analysts, investors and other interested parties in the evaluation of companies in our industry.

Adjusted EBITDA is the key metric used by our Chief Operating Decision Maker to evaluate the segment performance in a way that we believe reflects our core operating performance, and in turn, incentivizes members of management and certain employees. For example, we use adjusted EBITDA per pound in order to measure the effectiveness of the balanced book approach in reducing the financial impact of metal price volatility on earnings and operating margins, and to measure the effectiveness of our business transformation initiatives in improving earnings and operating margins.

Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for analysis of our results as reported under US GAAP. We compensate for these limitations by using adjusted EBITDA along with other comparative tools, together with US GAAP measurements, to assist in the evaluation of operating performance. Such US GAAP measurements include operating income and net income.

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Net income attributable to Global Brass and Copper Holdings, Inc. is reconciled to adjusted EBITDA as follows:

(in millions)	Year Ended December 31, 2018	2017	2016	Amount change: 2018 vs. 2017	2017 vs. 2016
Net income attributable to Global Brass and Copper Holdings, Inc.	$58.2	$51.1	$32.2	$7.1	$18.9
Interest expense, net	16.8	17.6	26.2	(0.8)	(8.6)
Provision for income taxes	17.3	33.9	16.7	(16.6)	17.2
Depreciation expense	21.1	18.5	14.8	2.6	3.7
Amortization expense	0.4	0.1	0.1	0.3	—
Unrealized (gain) loss on derivative contracts	2.8	0.8	(3.1)	2.0	3.9
LIFO liquidation loss (gain)	0.1	1.0	1.9	(0.9)	(0.9)
Refinancing costs	1.6	0.9	23.4	0.7	(22.5)
Specified legal / professional expenses (a)	0.4	1.3	1.2	(0.9)	0.1
Lower of cost or market adjustment to inventory	2.9	(3.6)	(1.7)	6.5	(1.9)
Share-based compensation expense	6.7	8.2	6.9	(1.5)	1.3
Restructuring and other business transformation charges (b)	—	0.4	—	(0.4)	0.4
Inventory step-up costs from acquisition accounting	0.2	0.3	—	(0.1)	0.3
Adjusted EBITDA	$128.5	$130.5	$118.6	$(2.0)	$11.9

(a) Represents selected professional fees for accounting, tax, legal, and consulting services for merger and acquisition activity or incurred as a public company that exceed our expected long-term requirements.

(b) Restructuring and other business transformation charges in 2017 represent severance charges at Olin Brass.

2018 compared to 2017

Net income attributable to Global Brass and Copper Holdings, Inc. increased by $7.1 million, or 13.9%, mainly due to the combination of the following:

- a decrease in tax expense of $16.6 million;
- $7.8 million improvement from our metal pricing, sourcing, and blending initiatives;
- the Alumet acquisition ($4.7 million);
- $2.4 million more of expenses recorded in the prior year for unusual costs associated with our transition to an HSA medical plan, increased cost of sales due to inventory reductions at Olin Brass, and costs incurred at A.J. Oster related to its ERP implementation;
- favorable share based compensation expense of $1.5 million;
- favorable specified legal / professional expenses of $0.9 million;
- a favorable change in our LIFO liquidation loss (gain) of $0.9 million;
- the absence of a $7.4 million benefit recorded in the prior year related to the recovery of insurance proceeds associated with our 2016 production outage;
- an unfavorable change in our lower of cost or market adjustment to inventory of $6.5 million;
- an unfavorable increase in employee and employee related costs;
- an increase in depreciation expense of $2.6 million;
- an unfavorable unrealized (gain) loss on derivative contracts of $2.0 million;
- increased conversion costs of $1.8 million stemming from operational inefficiencies that negatively impacted yields and productivity;
- increased shrinkage costs as a result of higher metal prices; and
- costs incurred of $0.7 million associated with an environmental incident at an Olin Brass facility.

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Adjusted EBITDA decreased by $2.0 million, or 1.5%, primarily due to the combination of the following:

- $7.4 million of income related to insurance proceeds recorded in 2017 related to our 2016 production outage;
- increased employee and employee related costs;
- increased conversion costs of $1.8 million stemming from operational inefficiencies that negatively impacted yields and productivity;
- increased shrinkage costs as a result of higher metal prices;
- $0.7 million of costs associated with an environmental incident at an Olin Brass facility;
- $7.8 million improvement from our metal pricing, sourcing, and blending initiatives;
- the Alumet acquisition ($5.9 million); and
- $2.4 million more of unusual costs in the prior year, as mentioned above.

2017 compared to 2016

Net income attributable to Global Brass and Copper Holdings, Inc. increased by $18.9 million, or 58.7%, mainly due to the decrease in refinancing costs and interest expense, as well as the $7.4 million of income resulting from the recovery of insurance proceeds, and the fact that the prior year includes the impact of the Olin Brass production outage. These favorable fluctuations were partially offset by unfavorable fluctuations in the provision for income taxes, unrealized gains / losses on derivative contracts and depreciation expense.

Adjusted EBITDA increased $11.9 million, or 10.0%, primarily due to $7.4 million of income resulting from an insurance recovery and the absence of costs related to the Olin Brass 2016 production outage, partially offset by the costs in 2017 related to transitioning to an HSA medical plan and the A.J. Oster ERP implementation. The negative effect of reduced volumes was partially offset by favorable customer pricing and reduced employee and related compensation costs, mostly related to incentive compensation.

Diluted earnings per common share and adjusted diluted earnings per common share

Diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share is the most directly comparable US GAAP measure to adjusted diluted earnings per common share. Diluted income per common share increased by $0.30 in 2018 and increased by $0.82 in 2017 as compared to the previous year for each, for the same reasons driving the fluctuations in net income. Our weighted average diluted common shares outstanding increased 0.9% in 2018 and 2.3% in 2017 due to the issuance and vesting of share based compensation awards partially offset by the repurchase of 400,000 shares of our common stock in 2018 under the 2018 Share Repurchase Program. The increase in weighted average diluted common shares outstanding decreased diluted net income per common share by $0.02 in 2018 and $0.06 in 2017.

Adjusted diluted earnings per common share is defined as diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share adjusted to remove the per share impact of the add backs to EBITDA in calculating adjusted EBITDA. Adjusted diluted earnings per common share increased by $0.66 in 2018 and $0.10 in 2017 as compared to the previous year for each for the same reasons driving the fluctuations in adjusted EBITDA. Additionally, the increase in adjusted diluted earnings per share in 2018 included favorable fluctuations in the provision for income taxes and interest expense, net, while the 2017 increase included a favorable fluctuation in interest expense, net, offset by an unfavorable fluctuation in the provision for income taxes. The increase in weighted average diluted common shares outstanding decreased our adjusted diluted earnings per common share by $0.02 in 2018 and $0.05 in 2017.

We believe adjusted diluted earnings per common share represents a meaningful presentation of the financial performance of our consolidated results because it provides period-to-period comparisons that are more consistent, and more easily understood, and thus is more useful to and is frequently used by securities analysts, investors and other interested parties in the evaluation of companies in our industry.

Adjusted diluted earnings per share is a key metric used to evaluate our performance, and in turn, incentivize members of management and certain employees.

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Diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share is reconciled to adjusted diluted earnings per common share as follows:

	Year Ended December 31,			Amount change:	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share	$2.61	$2.31	$1.49	$0.30	$0.82
Unrealized (gain) loss on derivative contracts	0.13	0.03	(0.15)	0.10	0.18
Refinancing costs	0.07	0.04	1.08	0.03	(1.04)
Specified legal / professional expenses	0.02	0.06	0.06	(0.04)	—
Lower of cost or market adjustment to inventory	0.13	(0.16)	(0.08)	0.29	(0.08)
LIFO liquidation loss (gain)	—	0.04	0.09	(0.04)	(0.05)
Share-based compensation expense	0.30	0.37	0.32	(0.07)	0.05
Restructuring and other business transformation charges	—	0.02	—	(0.02)	0.02
Inventory step-up costs from acquisition accounting	0.01	0.01	—	—	0.01
Tax impact on above adjustments (a)	(0.15)	(0.26)	(0.45)	0.11	0.19
Adjusted diluted earnings per common share	$3.12	$2.46	$2.36	$0.66	$0.10

(a) Calculated based on our effective tax rate plus specific tax items related to share-based compensation expense, including tax benefits related to the vesting of share awards and option exercises.

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Results of Operations

Consolidated Results of Operations for the Year Ended December 31, 2018, Compared to the Year Ended December 31, 2017.

	Year ended December 31,				Change: 2018 vs. 2017	
(in millions)	2018	% of Net Sales	2017	% of Net Sales	Amount	Percent
Net sales	$1,765.4	100.0 %	$1,578.6	100.0 %	$186.8	11.8 %
Cost of sales	(1,578.7)	89.4 %	(1,394.4)	88.3 %	(184.3)	13.2 %
Gross profit	186.7	10.6 %	184.2	11.7 %	2.5	1.4 %
Selling, general and administrative expenses	(92.7)	5.3 %	(83.8)	5.3 %	(8.9)	10.6 %
Operating income	94.0	5.3 %	100.4	6.4 %	(6.4)	(6.4)%
Interest expense, net	(16.8)	1.0 %	(17.6)	1.1 %	0.8	(4.5)%
Loss on extinguishment of debt	(0.5)	— %	(0.2)	— %	(0.3)	150.0 %
Other income (expense), net	(0.8)	— %	3.0	0.2 %	(3.8)	(126.7)%
Income before provision for income taxes	75.9	4.3 %	85.6	5.5 %	(9.7)	(11.3)%
Provision for income taxes	(17.3)	1.0 %	(33.9)	2.2 %	16.6	(49.0)%
Net income	58.6	3.3 %	51.7	3.3 %	6.9	13.3 %
Net income attributable to noncontrolling interest	(0.4)	— %	(0.6)	— %	0.2	(33.3)%
Net income attributable to Global Brass and Copper Holdings, Inc.	$58.2	3.3 %	$51.1	3.3 %	$7.1	13.9 %
Adjusted EBITDA (a)	$128.5	7.3 %	$130.5	8.3 %	$(2.0)	(1.5)%

(a)See “Management’s View of Performance—Net income and adjusted EBITDA.”

The following discussions present an analysis of our results of operations for 2018 as compared to 2017. See “Management’s View of Performance” for discussions of net sales, adjusted sales, gross profit, adjusted gross profit, selling, general and administrative expenses, adjusted selling, general and administrative expenses, net income attributable to Global Brass and Copper Holdings, Inc., adjusted EBITDA, diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share and adjusted diluted earnings per common share. These discussions should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Interest expense, net

Interest expense, net decreased by $0.8 million primarily due to increased interest income in 2018. Our average interest rate on our debt principal remained constant at 5.0%.

The following table summarizes the components of interest expense, net:

	Year Ended December 31,		Amount change:
(in millions)	2018	2017	2018 vs. 2017
Interest on principal	$16.1	$16.1	$ —
Amortization of debt discount and issuance costs	1.2	1.3	(0.1)
Capitalized interest	(0.1)	(0.1)	—
Other borrowing costs (a)	0.8	0.8	—
Interest income	(1.2)	(0.5)	(0.7)
Total interest expense, net	$16.8	$17.6	$ (0.8)

(a)Includes fees related to letters of credit and unused line of credit fees.

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Other income (expense), net

Other income (expense), net was unfavorable by $3.8 million, due primarily to the $7.4 million recovery of insurance proceeds related to the temporary Olin Brass production outage in 2016, of which $3.9 million was recorded as other income in 2017. For additional information regarding these insurance recoveries, see Note 15, “Commitments and Contingencies.”

Provision for income taxes

The provision for income taxes decreased by $16.6 million, or 49.0%, due to a decrease in the statutory tax rate and changes in tax accounting methods reflected in our 2017 federal income tax return. The effective income tax rate, which is the provision for income taxes as a percentage of income before provision for income taxes, was 22.8% and 39.6% for 2018 and 2017, respectively. The decrease to the effective tax rate is driven by the lowering of the 2018 U.S. federal corporate income tax rate under the Tax Cuts and Jobs Act (the “2017 Tax Act”) as well as changes in methods of tax accounting that the IRS approved in 2018 and that we reflected in our 2017 federal income tax return. The effective tax rate for 2018 differs from the statutory rate of 21% primarily due to decreased deductions for state income taxes and the above mentioned tax accounting method changes.

For 2017, the effective tax rate differed from the statutory rate of 35% primarily due to the enactment of the 2017 Tax Act. The 2017 Tax Act made broad and complex changes to the U.S. tax code, which resulted in an increase in the provision for income taxes in 2017 of $7.3 million, an 860 basis point increase in our effective tax rate. This was partially offset by the adoption of ASU 2016-09 on January 1, 2017. As a result of adopting the new standard, we recorded a $2.7 million tax benefit related to the vesting of share awards and option exercises during 2017, reducing the effective tax rate by 321 basis points. For 2018, the benefit generated by ASU 2016-09 was offset by the new IRS code Section 162(m) rules passed under tax reform.

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Segment Results of Operations

Segment Results of Operations for the Year Ended December 31, 2018, Compared to the Year Ended December 31, 2017.

	Year Ended December 31,		Change: 2018 vs. 2017	
(in millions)	2018	2017	Amount	Percent
Pounds shipped (a)				
Olin Brass	255.9	245.5	10.4	4.2 %
Chase Brass	212.4	218.5	(6.1)	(2.8)%
A.J. Oster	134.7	81.0	53.7	66.3 %
Corporate and other (b)	(38.4)	(37.7)	(0.7)	(1.9)%
Total	564.6	507.3	57.3	11.3 %
Net sales				
Olin Brass	$767.3	$743.1	$24.2	3.3 %
Chase Brass	612.1	591.1	21.0	3.6 %
A.J. Oster	473.7	323.6	150.1	46.4 %
Corporate and other (b)	(87.7)	(79.2)	(8.5)	(10.7)%
Total	$1,765.4	$1,578.6	$186.8	11.8 %
Adjusted EBITDA				
Olin Brass	$57.2	$51.2	$6.0	11.7 %
Chase Brass	66.3	73.2	(6.9)	(9.4)%
A.J. Oster	23.1	14.8	8.3	56.1 %
Total adjusted EBITDA of operating segments	146.6	139.2	7.4	5.3 %
Corporate and other (c)	(18.1)	(8.7)	(9.4)	108.0 %
Total consolidated adjusted EBITDA	$128.5	$130.5	$(2.0)	(1.5)%

(a)Amounts exclude the sales of unprocessed metal.
(b)Amounts represent intercompany eliminations.
(c)Includes a $7.4 million recovery of insurance proceeds in 2017 relating to a production outage in 2016.

See Note 5, “Segment Information,” of our consolidated financial statements, which are included elsewhere in this report, for a reconciliation of adjusted EBITDA of segments to income before provision for income taxes and equity income.

The following discussions present an analysis of our results by segment for 2018 as compared to 2017. This discussion should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Olin Brass

Net sales increased by $24.2 million primarily due to increased commodity prices ($13.0 million) and volumes ($27.1 million), partially offset by decreased sales of unprocessed metal ($15.9 million). Adjusted sales increased by ($15.9 million) due to increased volumes ($12.4 million) and favorable scrap spreads, better metal margins, and improved raw material sourcing. Volumes increased in the munitions and coinage markets.

Adjusted EBITDA increased by $6.0 million due to increased volumes ($4.6 million) and favorable scrap prices, better metal margins, and improved raw material sourcing. These were partially offset by unfavorable production costs, increased employee and employee related expenses, and $0.7 million of costs incurred related to an environmental incident at an Olin Brass facility

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Chase Brass

Net sales increased by $21.0 million due to increased commodity prices ($36.4 million) and unprocessed metals sales ($0.8 million), partially offset by decreased volumes ($16.2 million). Volumes decreased in the building and housing and industrial machinery and equipment markets due to underlying demand from our customers who are seeing increased competition from parts imported into the U.S. and who are outsourcing production overseas.

Adjusted EBITDA decreased by $6.9 million predominantly due to decreased volumes ($2.6 million) and unfavorable production costs as a result of operational inefficiencies, partially offset by better metal margins and improved raw material sourcing.

A.J. Oster

We experienced fluctuations in our performance due to both base operations and the acquisition of Alumet as shown in the following table, which reflects increases or decreases for each category for 2018 over prior year amounts:

(in millions)	Base	Acquisition	Total
Pounds shipped	3.8	49.9	53.7
Net sales	$29.3	$ 120.8	$150.1
Adjusted EBITDA	$2.5	$ 5.8	$8.3

Regarding base operations, net sales increased by $29.3 million due to increased commodity prices ($13.5 million) and increased volumes ($15.8 million). Volumes increased in the automotive and electronics / electrical components markets as compared to 2017 when we had experienced difficulties stemming from our implementation of a new ERP system.

Adjusted EBITDA from base operations increased by $2.5 million due to favorable product mix and selling prices, increased volumes, and more costs incurred in the prior year associated with transitioning to the HSA medical plan and consulting fees associated with the implementation of a new ERP system, partially offset by unfavorable employee and employee related costs.

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Results of Operations

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

	Year ended December 31,				Change: 2017 vs. 2016	
(in millions)	2017	% of Net Sales	2016	% of Net Sales	Amount	Percent
Net sales	$1,578.6	100.0 %	$1,338.3	100.0 %	$240.3	18.0 %
Cost of sales	(1,394.4)	88.3 %	(1,156.6)	86.4 %	(237.8)	20.6 %
Gross profit	184.2	11.7 %	181.7	13.6 %	2.5	1.4 %
Selling, general and administrative expenses	(83.8)	5.3 %	(82.8)	6.2 %	(1.0)	1.2 %
Operating income	100.4	6.4 %	98.9	7.4 %	1.5	1.5 %
Interest expense, net	(17.6)	1.1 %	(26.2)	2.0 %	8.6	(32.8)%
Loss on extinguishment of debt	(0.2)	— %	(23.4)	1.7 %	23.2	(99.1)%
Other income (expense), net	3.0	0.2 %	0.2	— %	2.8	N/M
Income before provision for income taxes	85.6	5.5 %	49.5	3.7 %	36.1	72.9 %
Provision for income taxes	(33.9)	2.2 %	(16.7)	1.2 %	(17.2)	103.0 %
Net income	51.7	3.3 %	32.8	2.5 %	18.9	57.6 %
Net income attributable to noncontrolling interest	(0.6)	— %	(0.6)	— %	—	— %
Net income attributable to Global Brass and Copper Holdings, Inc.	$51.1	3.3 %	$32.2	2.5 %	$18.9	58.7 %
Adjusted EBITDA (a)	$130.5	8.3 %	$118.6	8.9 %	$11.9	10.0 %

(a) See “Management’s View of Performance—Net income and adjusted EBITDA.”

N/M - not meaningful

The following discussions present an analysis of our results of operations for 2017 as compared to 2016. See “Management’s View of Performance” for discussions of net sales, adjusted sales, gross profit, adjusted gross profit, selling, general and administrative expenses, adjusted selling, general and administrative expenses, net income attributable to Global Brass and Copper Holdings, Inc., adjusted EBITDA, diluted net income attributable to Global Brass and Copper Holdings, Inc. per common share and adjusted diluted earnings per common share. These discussions should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Interest expense, net

Interest expense, net decreased by $8.6 million primarily due to lower average interest rates resulting from our July 2016 and July 2017 refinancings. Our average rate on our debt principal decreased from 7.5% to 5.0%. In addition, in 2017, we began investing our cash balances in marketable securities to generate interest income.

The following table summarizes the components of interest expense, net:

	Year Ended December 31,		Amount change: 2017 vs. 2016
(in millions)	2017	2016	
Interest on principal	$16.1	$24.4	$ (8.3)
Amortization of debt issuance costs	1.3	2.0	(0.7)
Capitalized interest	(0.1)	(1.1)	1.0
Other borrowing costs (a)	0.8	0.9	(0.1)
	(0.5)	—	(0.5)
Total interest expense, net	$17.6	$26.2	$ (8.6)

(a)Includes fees related to letters of credit and unused line of credit fees.

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Loss on extinguishment of debt

In 2017, we amended our ABL facility and Term Loan B debt agreement, which resulted in an expense of $0.2 million related to the write-off of unamortized debt issuance costs. In 2016, we bought back and redeemed all of our Senior Secured Notes for an aggregate purchase price of $362.3 million, plus accrued interest. As a result of these purchases, we recognized a loss on the extinguishment of debt of $23.4 million, which includes a premium of $17.0 million and the write-off of $6.4 million of unamortized debt issuance costs related to both the Senior Secured Notes and the former asset-based loan facility.

Other income (expense), net

Other income (expense), net increased favorably by $2.8 million, due primarily to the $7.4 million recovery of insurance proceeds related to the temporary Olin Brass production outage in 2016, of which $3.9 million was recorded as other income in 2017. For additional information regarding these insurance recoveries, see Note 15, “Commitments and Contingencies.”

Provision for income taxes

The provision for income taxes increased by $17.2 million, or 103.0%, due primarily to an increase in income before provision for income taxes, the components of which are discussed elsewhere in this report. The effective tax rate increased from 33.7% to 39.6% for the following reasons:

- On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the “2017 Tax Act”). The 2017 Tax Act makes broad and complex changes to the U.S. tax code, which resulted in an increase in the provision for income taxes in 2017 of $7.3 million, an 860 basis point increase in our effective tax rate;
- We adopted a new accounting standard covering stock compensation in 2017 as mandated by the Securities Exchange Commission. As a result of adopting the new standard, we recorded a $2.7 million tax benefit related to the vesting of share awards and option exercises during 2017, reducing the effective tax rate by 321 basis points;
- The prior year effective tax rate benefited from the release of our valuation allowance recorded against our foreign tax credits, resulting in a one-time reduction in income tax expense of approximately $1.0 million or 198 basis points.

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Segment Results of Operations

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

(in millions)	Year Ended December 31, 2017	Year Ended December 31, 2016	Change: 2017 vs. 2016 Amount	Change: 2017 vs. 2016 Percent
Pounds shipped (a)				
Olin Brass	245.5	260.5	(15.0)	(5.8)%
Chase Brass	218.5	222.7	(4.2)	(1.9)%
A.J. Oster	81.0	75.6	5.4	7.1 %
Corporate and other (b)	(37.7)	(38.0)	0.3	0.8 %
Total	507.3	520.8	(13.5)	(2.6)%
Net Sales				
Olin Brass	$743.1	$629.4	$113.7	18.1 %
Chase Brass	591.1	502.7	88.4	17.6 %
A.J. Oster	323.6	282.7	40.9	14.5 %
Corporate and other (b)	(79.2)	(76.5)	(2.7)	(3.5)%
Total	$1,578.6	$1,338.3	$240.3	18.0 %
Adjusted EBITDA				
Olin Brass	$51.2	$49.9	$1.3	2.6 %
Chase Brass	73.2	68.0	5.2	7.6 %
A.J. Oster	14.8	18.4	(3.6)	(19.6)%
Total adjusted EBITDA of operating segments	139.2	136.3	2.9	2.1 %
Corporate and other (c)	(8.7)	(17.7)	9.0	(50.8)%
Total consolidated adjusted EBITDA	$130.5	$118.6	$11.9	10.0 %

(a) Amounts exclude quantity of unprocessed metal sold.
(b) Amounts represent intercompany eliminations.
(c) Includes a $7.4 million recovery of insurance proceeds in 2017 relating to a production outage in 2016.

See Note 5, “Segment Information,” of our consolidated financial statements, which are included elsewhere in this report, for a reconciliation of adjusted EBITDA of segments to income before provision for income taxes and equity income.

The following discussions present an analysis of our results by segment for 2017 as compared to 2016. This discussion should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Olin Brass

Net sales increased by $113.7 million primarily as a result of an increase in the metal cost recovery component ($131.0 million) stemming from increased metal prices along with increased sales of unprocessed metal ($145.7 million), partially offset by decreased volumes ($32.5 million). Adjusted sales decreased by $17.3 million due to decreased volumes ($17.8 million). Volumes decreased in the munitions market due to decreased demand and a production outage at a significant munitions customer’s facilities.

Adjusted EBITDA increased by $1.3 million, primarily due to the combination of the following:

- decreased volumes;
- improved productivity, especially taking into account the impact of the 2016 production outage at Olin Brass;
- reduced selling, general and administrative expenses stemming from less consulting expenses in 2017 than were incurred in 2016 given the software upgrades undertaken at that time;
- increased benefit costs associated with transitioning to a HSA medical plan; and
- increased cost of goods sold due to a reduction in inventories.

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Chase Brass

Net sales increased by $88.4 million as increased prices ($98.0 million) were partially offset by decreased volumes ($9.6 million). Volumes decreased in the building and housing, distributor and transportation markets due to underlying demand from our customers.

Adjusted EBITDA increased by $5.2 million as increased pricing on metal conversion activities were partially offset by decreased volumes and increased costs of conversion activities.

A.J. Oster

We experienced fluctuations in our performance due to both base operations and the acquisition of Alumet as shown in the following table, which reflects increases or decreases for each category for 2017 over prior year amounts:

(in millions)	Base	Acquisition	Total
Pounds shipped	(2.9)	8.3	5.4
Net sales	$21.9	$ 19.0	$40.9
Adjusted EBITDA	$(4.7)	$ 1.1	$(3.6)

On November 1, 2017, we completed the Alumet acquisition and the activity in the above table shows the impact of this acquisition on our performance. Note that the volume impact occurred mostly in the building and housing market due to their sales of signage and roofing products.

Regarding our base activity, volumes decreased predominately in the automotive, stamping, distribution and building and housing markets, partially offset by increased volumes in the electronics / electrical components market due to underlying demand. In addition, volumes earlier in the year were hampered by the implementation of a new ERP system, which later led to a customer service issue at one of our facilities. Remediation of the customer service issue at the facility is underway and yielding improvement.

Regarding base operations, net sales increased by $21.9 million due to the combination of increased metal prices ($33.3 million) and lower volumes ($10.9 million). Adjusted EBITDA decreased by $4.7 million due to the impact of decreased volumes, unfavorable conversion costs, and costs incurred early in 2017 as a result of transitioning to an HSA medical plan for our employees and implementing a new ERP system.

Changes in Financial Condition

The following discussions present an analysis of fluctuations in certain asset, liability and equity components of our consolidated balance sheet as of December 31, 2018 as compared to the amounts as of December 31, 2017. These discussions should be read in conjunction with the accompanying consolidated financial statements and the notes thereto.

Cash and cash equivalents increased by $66.5 million. The financial impacts of this change to the periods covered by this report are provided in the consolidated statements of cash flows in our consolidated financial statements included elsewhere in this report.

Accounts receivable decreased by $32.2 million mostly due to decreased metal prices and the timing of toll sales.

Treasury stock increased by $16.0 million due to the repurchase of $12.6 million of our common stock on the open market under our share repurchase program and the purchase of $3.4 million of common stock from employees to satisfy tax withholding obligations under our stock compensation plans.

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Liquidity and Capital Resources

Sources and Uses of Cash

Our primary uses of cash are to fund working capital, operating expenses, service our debt, make capital expenditures, facilitate stock compensation awards, pay dividends, repurchase our own stock, and execute strategic acquisitions. Historically, our primary sources of short-term liquidity and long-term liquidity have been cash flow from operations and borrowings under our ABL Facility.

At December 31, 2018, $9.1 million of our $125.5 million of cash and cash equivalents was held by our foreign subsidiaries. We believe cash held by our foreign subsidiaries provides these operations with the necessary liquidity to meet future obligations and allows them to reinvest in their operations. We do not expect restrictions on repatriation of cash held outside of the United States for domestic purposes to have a material effect on our overall liquidity, financial condition, or the results of operations for the foreseeable future.

On each of July 18, 2017 and May 29, 2018, we amended the credit agreement governing our Term Loan B Facility that matures on May 29, 2025 (the “Amended Term Loan B Credit Agreement”), and on July 18, 2017, we amended our credit agreement governing our asset-based revolving facility that matures on July 19, 2021 (the “Amended ABL Credit Agreement,” together, the “Credit Agreements”), as further discussed in Note 10, “Financing.” The Credit Agreements contain various customary covenants that limit or prohibit our ability, among other things, to (i) incur or guarantee additional indebtedness; (ii) pay certain dividends on our capital stock or redeem, repurchase, retire or make distributions in respect of our capital stock or subordinated indebtedness or make certain other restricted payments; (iii) make certain loans, acquisitions, capital expenditures or investments; (iv) sell certain assets, including stock of our subsidiaries; (v) enter into certain sale and leaseback transactions; (vi) create or incur certain liens; (vii) consolidate, merge, sell, transfer or otherwise dispose of all or substantially all of our assets; (viii) enter into certain transactions with our affiliates; and (ix) engage in certain business activities.

We do not believe that the limitations imposed by the terms of our debt agreements have any significant impact on our liquidity, financial condition or results of operations. We believe that these resources will be sufficient to meet our working capital, debt service, dividend obligations and capital investment obligations for the foreseeable future, including costs that we may incur in connection with our growth strategy.

On July 31, 2018, our Board of Directors authorized a share repurchase program (the “2018 Share Repurchase Program”), authorizing us to repurchase up to $35.0 million of our common stock on the open market through September 30, 2020. We repurchased 400,000 shares of our common stock under the 2018 Share Repurchase Program during 2018. In addition to the 2018 Share Repurchase Program, we frequently buy shares of our common stock from employees as an accommodation to them to satisfy their tax withholding obligations under our stock compensation plans.

Capital improvements and replacement costs account for the majority of our capital expenditures, which we expect to be relatively in line with our historical spend over the foreseeable future.

Cash Flows

The following table presents the summary components of net cash provided by (used in) operating, investing and financing activities for the periods indicated. The following discussion presents an analysis of cash flows for each of the years ended December 31, 2018, December 31, 2017 and December 31, 2016 and should be read in conjunction with our consolidated statements of cash flows in our consolidated financial statements included elsewhere in this report.

Cash Flow Analysis	Year Ended December 31,			Change	
(in millions)	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net cash provided by operating activities	$122.1	$49.2	$96.0	$72.9	$ (46.8)
Net cash used in investing activities	$(27.8)	$(64.6)	$(34.3)	$36.8	$ (30.3)
Net cash used in financing activities	$(26.8)	$(13.8)	$(56.5)	$(13.0)	$ 42.7

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Cash flows from operating activities

In 2018, net cash provided by operating activities increased by $72.9 million versus the prior year as changes in working capital resulted in decreased cash outflows in 2018 as compared to 2017. Accounts receivable, inventory, and accounts payable accounted for $57.4 million of the $72.9 million improvement in cash flows and benefited by approximately $16.5 million due to metal prices. Accounts receivable were also favorably impacted by the timing of toll sales and customer payments. Cash from operations also benefited from increased net income.

In 2017, net cash provided by operating activities decreased by $46.8 million versus the prior year as increased investments in working capital resulted in increased cash outflows in 2017. Net accounts receivable, accounts receivable less accounts payable, resulted in an estimated $34.4 million increase in cash outflows due to increased metal prices and the timing of vendor payments. Inventory resulted in an estimated $22.7 million increase in cash outflows due to increased inventory quantities as a result of timing of inventory purchases, partially offset by improved inventory turns. Increased net income and other adjustments thereto partially offset these unfavorable fluctuations.

Cash flows from investing activities

Net cash used in investing activities in 2018 decreased due to cash outflows in 2017 related to the Alumet acquisition completed on November 1, 2017. We made $0.4 million, $2.3 million and $9.6 million of capital expenditures in each of 2018, 2017, and 2016, respectively, on technology investments related to our new consolidation software system and upgraded ERP systems.

Cash flows from financing activities

Net cash used in financing activities increased by $13.0 million primarily due to a $10.9 million increase in cash outflows for share repurchases. Our Board of Directors authorized our 2018 Share Repurchase Program on July 31, 2018 and we repurchased 400,000 under this program in 2018. Additionally, cash outflows increased by $2.3 million due to an increase in our quarterly cash dividend from $0.06 per share to $0.09 per share on August 2, 2018.

Outstanding Indebtedness

Through July 18, 2016, our debt facilities consisted of Senior Secured Notes and a former ABL Facility. During the year ended December 31, 2016, we purchased in the open market an aggregate of $40.0 million principal amount of our then existing Senior Secured Notes, for an aggregate purchase price of $42.5 million, plus accrued interest.

On July 18, 2016, we obtained a new Term Loan B Facility and used a portion of the proceeds to redeem the remaining $305.3 million principal amount outstanding of our Senior Secured Notes. As part of this refinancing and in accordance with the indenture governing the then existing Senior Secured Notes (“Indenture”), we called and terminated the notes at a redemption price of 104.75% plus accrued interest.

We recognized a loss on the extinguishment of debt in the year ended December 31, 2016 of $23.4 million, which includes a premium of $17.0 million and the write-off of $6.4 million of unamortized debt issuance costs for both the Senior Secured Notes and the former ABL Facility.

Term Loan B Facility

On July 18, 2016, we entered into a long-term credit agreement that matures July 18, 2023 (the “Term Loan B Credit Agreement” and the loans thereunder, the “Term Loan B Facility”) and provides for borrowings of $320.0 million. We may request an increase in the aggregate term loans, at our option and under certain circumstances, of up to an additional $75.0 million or an unlimited amount so long as after giving effect to any incremental facility or incremental equivalent debt, the net senior secured leverage ratio does not exceed 2.50 to 1.00 (but the lenders, in either case, are not obligated to grant such an increase). On December 30, 2016, we began making quarterly payments of $0.8 million with the balance expected to be due at maturity.

On each of July 18, 2017 and May 29, 2018, we amended the credit agreement governing our Term Loan B Facility (the “Amended Term Loan B Credit Agreement”). The most recent refinancing reduced our interest rate spread by an additional 75 basis points, reduced the LIBO Rate floor from 1% to 0%, and extended the maturity date through May 29, 2025. Amounts outstanding under this facility now bear interest at a rate per annum equal to, at our option, either (1) 1.50% plus an Alternate Base Rate (as defined in the Amended Term Loan B Credit Agreement) or (2) 2.50% plus the Adjusted LIBO Rate (as defined in the Amended Term Loan B Credit Agreement).

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In order to minimize the variability in cash flows caused by fluctuations in market interest rates, we entered into an interest rate swap agreement on May 25, 2018, which expires on May 31, 2023. This swap agreement fixes the LIBOR rate on $150.0 million of our floating rate LIBOR debt at 2.75%. At December 31, 2018, amounts outstanding under the Term Loan B Facility combined with our interest rate swap derivative accrued interest at a weighted average rate of 5.15%.

The Term Loan B Credit Agreement requires mandatory prepayments based on various events and circumstances as are customary in such agreements. Since December 31, 2017, we are subject to a 50% excess cash flow sweep, subject to step-downs to 25% and 0% depending on the total net leverage ratio from time to time. We may, however, voluntarily prepay outstanding loans under the Term Loan B Facility at any time

ABL Facility

We have an asset-based revolving loan facility that provides for borrowings of up to the lesser of $200.0 million or the borrowing base, in each case less outstanding loans and letters of credit. Maturing on July 19, 2021, we entered into this credit agreement with a syndicate of lenders on July 18, 2016 (the “ABL Credit Agreement” and the facility thereunder, the “ABL Facility”) when we refinanced out of the already existing asset-based lending facility.

As of December 31, 2018, available borrowings under the ABL Facility were $195.4 million after giving effect to $4.6 million of letters of credit outstanding, which are used to provide collateral for our insurance programs. We may request an increase in the maximum commitments, at our option and under certain circumstances, of up to $200.0 million (but the lenders are not obligated to grant such an increase).

Amounts outstanding, if any, under the ABL Facility bear interest at a rate per annum equal to, at our option, either (1) 0.25% to 0.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus an Alternate Base Rate (as defined in the ABL Credit Agreement) or (2) 1.25% to 1.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus the Adjusted LIBO Rate (as defined in the ABL Credit Agreement). Unused amounts under the ABL Facility incur an unused line fee of 0.375% or 0.25% per annum (depending on the percentage of aggregate revolving exposure), payable in arrears on a quarterly basis.

The ABL Credit Agreement requires us to prepay or cash collateralize the applicable portion of any outstanding revolving loans under circumstances as are customary in agreements of this type. However, we may voluntarily repay and reborrow outstanding loans under the ABL Facility at any time without a premium or penalty, other than customary “breakage” costs with respect to loans made utilizing the Adjusted LIBO Rate (as defined in the ABL Credit Agreement).

The ABL Credit Agreement also contains a financial covenant requiring us to maintain a fixed charge coverage ratio that is tested whenever excess availability, as defined in the ABL Credit Agreement, falls below the greater of $20.0 million or 10% of our potential borrowings. The “fixed charge coverage ratio” requires us to maintain a ratio of “Consolidated Adjusted EBITDA” to the amount of our “fixed charges” (for all terms, as defined in the ABL Credit Agreement) for the twelve consecutive months prior to the date on which the ratio is tested equal to or greater than 1.0 to 1.0.

The Credit Agreements

The ABL Credit Agreement and the Term Loan B Credit Agreement (together, the “Credit Agreements”) contain various other covenants consistent with debt agreements of this kind, such as restrictions on the amounts of dividends we can pay.

A violation of covenants under either of the Credit Agreements may result in default in that agreement or a cross-default in the other agreement, as applicable. Upon the occurrence of an event of default under one or both of the Credit Agreements, the requisite lenders could elect to declare all amounts of such indebtedness outstanding immediately due and payable and terminate any commitments to extend further credit.

If we are unable to repay those amounts, the lenders under the applicable Credit Agreement may proceed against the collateral granted to them to secure such indebtedness. Substantially all of our assets are pledged as collateral under the Credit Agreements. The ABL Facility is secured by a senior-priority interest in our cash, accounts receivable and inventory (which secure the Term Loan B Facility on a junior-priority basis) and the Term Loan B is secured by a senior-priority security interest in the remaining pledged assets (most significant of which is our fixed assets), which secure the ABL Facility on a junior-priority basis. If the lenders accelerate the repayment of borrowings, such acceleration could have a material adverse effect on our business, financial condition, results of operations or cash flows. Furthermore, cross-default provisions in the Credit Agreements provide that any default under the Credit Agreements or other significant debt agreements could trigger a cross-default under the Credit Agreements, as applicable.

As of December 31, 2018, we were in compliance with all of the covenants relating to the Credit Agreements.

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Contractual Obligations

The following table illustrates our contractual commitments as of December 31, 2018:

Contractual commitments (in millions)	2019	2020	2021	2022	2023	Beyond	Total
Term Loan B—Principal (a)	$3.2	$3.2	$3.2	$3.2	$3.2	$296.8	$312.8
Term Loan B—Interest (b)	16.1	15.9	15.7	15.6	15.2	21.0	99.5
Capital Lease Obligation (c)	1.5	0.5	0.3	0.3	0.1	0.1	2.8
Purchase Obligations	181.5	—	—	—	—	—	181.5
IAM National Pension Fund	3.8	3.9	4.0	3.5	—	—	15.2
Leases	3.2	2.1	1.5	0.6	0.3	0.2	7.9
Total	$209.3	$25.6	$24.7	$23.2	$18.8	$318.1	$619.7

(a) Represents quarterly payments required in connection with the Term Loan B Facility. As discussed in "Liquidity and Capital Resources—Outstanding Indebtedness," we are also subject to excess cash flow sweep payments depending on the total net leverage ratio from time to time; however, it is not practicable to estimate these payments.

(b) Assumes that interest will be paid on the Term Loan B Facility at the December 31, 2018 weighted average interest rate through the maturity of the interest rate swap agreement on May 31, 2023 and the December 31, 2018 prevailing Term Loan B interest rate from the maturity of the interest rate swap agreement through maturity of the Term Loan B Facility on May 29, 2025. Future interest rates may change and actual interest payments could differ from those disclosed in the table above.

(c) Represents principal and interest portion of capital lease obligation.

We are obligated to make future payments under various contracts such as debt agreements, lease agreements and collective bargaining agreements. Operating lease obligations are payment obligations under leases classified as operating leases. Most leases are for a period of three years but some last up to five years and are primarily for vehicles and equipment used in our manufacturing and distribution operations. Our purchase obligations are agreements to purchase goods or services that are enforceable and legally binding on us (i.e. non-cancelable) that specify all significant terms, including fixed or minimum quantities, fixed or variable prices and the approximate timing of the transaction. Purchase obligations include the pricing of anticipated metal purchases using contractual metal prices, or where pricing is dependent on prevailing COMEX or London Metal Exchange ("LME") prices at the time of delivery, market metal prices as of December 31, 2018, as well as energy and utility prices. As a result of the variability in the pricing of many of our metal purchasing obligations, actual amounts may vary from the amounts shown above.

We participate in a multi-employer pension plan under the collective bargaining agreement that covers the East Alton, Illinois operations of our Olin Brass segment and the Alliance, Ohio operations of our A.J. Oster segment. These collective bargaining agreements obligate us to contribute to the union's pension plan at a rate per eligible hour per covered employee as specified in the agreement. The contributions to the multi-employer plan are a function of employment levels and eligible work hours. As a result, actual amounts may vary from the amounts shown above.

The ABL Facility bears interest at variable rates, and the outstanding amounts under the ABL Facility will vary from time to time, so estimating future interest and principal payments under the ABL Facility is not practicable. The ABL Facility matures on July 19, 2021.

At December 31, 2018, we had a noncurrent liability for workers' compensation of $9.4 million, but as we are unable to reasonably estimate the ultimate timing of settlement, it is not practical to present annual payment information.

At December 31, 2018, we had a liability for uncertain tax positions, including interest and penalties, of $26.4 million, but as we are unable to reasonably estimate the ultimate amount or timing of settlement or other resolution, it is not practical to present annual payment information.

Off-Balance Sheet Arrangements

We have not created, and are not party to, any special-purpose or off-balance sheet entities for the purpose of raising capital, incurring debt or operating our business. We do not have any off-balance sheet arrangements or relationships with entities that are not consolidated into our financial statements that have or are reasonably likely to have a material current or future effect on our financial condition, changes in financial condition, sales, expenses, results of operations, liquidity, capital expenditures or capital resources.

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Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements in accordance with US GAAP requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, equity, revenues and expenses, and various disclosures. Estimates are based on historical experience and on various other assumptions that are believed to be reasonable under the circumstances. The result of this process forms the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. We review our estimates and judgments on a regular, ongoing basis. Actual results may differ from these estimates due to changes in circumstances and conditions.

The following accounting policies and estimates are considered critical in light of the potentially material impact that the estimates, judgments and uncertainties affecting the application of these policies might have on our reported financial information.

Our accounting policies are more fully described in Note 2, "Summary of Significant Accounting Policies," to our consolidated financial statements included elsewhere in this report. On January 1, 2018, we changed how we recognize unprocessed metal sales to toll customers as a result of the adoption of Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers. The financial impacts of this change to the periods covered by this report are provided in Note 2, "Summary of Significant Accounting Policies," to our consolidated financial statements included elsewhere in this report.

Revenue Recognition

Revenue is measured based on the consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. Revenue is recognized when performance obligations to our customers are satisfied. We recognize revenue upon transfer of control to our customers, which is generally the date the product is shipped. Estimates for rebates, returns and payment discounts are recognized in the period in which the corresponding revenue is recorded based on historical experience.

Inventories

Inventories include costs attributable to direct labor and manufacturing overhead but are primarily comprised of material costs. The metals component of inventories that is valued on a LIFO basis comprised approximately 67% and 65% of total inventory at December 31, 2018 and 2017, respectively.

Other manufactured inventories, including the direct labor and manufacturing overhead components and certain non-U.S. inventories, are valued on a first-in, first-out ("FIFO") basis. Elements of cost in finished goods inventory in addition to the cost of material include depreciation, amortization, utilities, consumable production supplies, maintenance, production wages and transportation costs.

Inventories are stated at the lower of cost or market. The market price of metals used in production and related scrap is subject to volatility. During periods when open-market prices decline below net book value, we may need to record a provision to reduce the carrying value of our inventory. We analyze the carrying value of inventory for impairment if circumstances indicate impairment may have occurred. If an impairment occurs, the amount of impairment loss is determined by measuring the excess of the carrying value of inventory over the net realizable value of inventory.

We record an estimate for slow moving and obsolete inventory based upon product knowledge, physical inventory observation, estimated future demand, market conditions and an aging analysis of the inventory on hand. Our policy is to evaluate all inventories including raw material, work-in-process and finished goods. Inventory in excess of our estimated usage requirements is written down to its estimated net realizable value.

Purchase Accounting

Determining the fair value of certain assets, liabilities and subsidiaries assumed in a business combination is judgmental in nature and often involves the use of significant estimates and assumptions. Some of the more significant estimates and assumptions used in valuing our acquisition of the worldwide metals business of Olin Corporation in 2007 and our acquisition of the tradename, customer relationships, non-compete agreements and leasehold interests of Alumet in November 2017 included projected future cash flows and discount rates reflecting the risk inherent in future cash flows.

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We recognize goodwill related to acquisitions when the purchase price exceeds the fair value of net assets. For the acquisition of the worldwide metals business of Olin Corporation, the estimated fair value of the net assets exceeded the purchase price, thus creating negative goodwill under then current GAAP guidance. As such, noncurrent assets were assigned no value in the acquisition from Olin Corporation.

Uncertain Tax Positions

We evaluate the recognition and measurement of uncertain tax positions based on applicable tax law, regulations, case law, administrative rulings and pronouncements and the facts and circumstances surrounding the tax position. Changes in our estimates related to the recognition and measurement of the amount recorded for uncertain tax positions could result in significant changes in our provision for (benefit from) income taxes, which could be material to our consolidated statements of operations.

Derivative Contracts

We measure the fair value of our derivative contract positions under the provisions of ASC 820, which defines fair value, establishes a framework for measuring fair value and enhances disclosures about fair value measures required under other accounting pronouncements but does not change existing guidance as to whether or not an instrument is carried at fair value. This guidance also specifies a fair value hierarchy based upon the observability of inputs used in valuation techniques.

In accordance with this guidance, fair value measurements are classified under the following hierarchy:

- Level 1—Quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active and model-derived valuations in which all significant inputs or significant value-drivers are observable in active markets.
- Level 3—Model-derived valuations in which one or more significant inputs or significant value-drivers are unobservable.

In accordance with ASC 820, we determine the fair value of derivative contracts using Level 2 inputs. As of December 31, 2018, we did not hold assets or liabilities requiring a Level 3 measurement, and there were no transfers between the hierarchy levels during 2018 or 2017. We include the fair value of our interest rate swap agreement and commodity derivative contracts as assets or liabilities in our consolidated balance sheet.

We use hedge accounting for our interest rate swap agreement that we entered into in May 2018. We do not use hedge accounting for our commodity derivative contracts. For our interest rate swap agreement, the change in fair value is recorded to accumulated other comprehensive income (loss) in the accompanying consolidated balance sheets. For our commodity derivative contracts, all gains and losses are recorded as cost of sales in the consolidated statements of operations as these contracts are marked to market each period.

Recently Issued and Recently Adopted Accounting Pronouncements

For information on recently issued and recently adopted accounting pronouncements, see Note 2, “Summary of Significant Accounting Policies,” to the consolidated financial statements, which are included elsewhere in this report.

Inflation and Seasonality

We experience effects of inflation on input costs, such as wages, medical benefits, natural gas, electricity, plating and other key inputs. We may not be able to offset fully the impact of inflation on these input costs or energy costs through price increases, productivity improvements or cost reduction programs.

There is a slight decrease in our net sales in each fourth quarter as a result of a decrease in demand due to customer shutdowns for the holidays and year-end maintenance of plants and inventory by customers. We also typically experience slight working capital increases in the first quarter as operations start up again and as we prepare for increased sales to our building and housing customers, who typically have increased seasonal needs in the first half of the year. We do not foresee these seasonality trends to change materially.

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Item 7A. Quantitative and Qualitative Disclosures About Market Risk.
Market risk represents the risk of changes in the value of market risk sensitive instruments caused by fluctuations in interest rates, commodity prices and foreign exchange rates. Changes in these factors could cause fluctuations in the results of our operations and cash flows. In the ordinary course of business, we are primarily exposed to changes in commodity prices, interest rates and foreign currency exchange rates. To manage the volatility related to these exposures we use various financial instruments, including some derivatives, to help us manage our metal price, energy price, and interest rate risk. We also use offsetting forward sale and purchase agreements to help mitigate commodity price risks on operating margins. These agreements generally do not contain minimum purchase requirements.
We do not use derivative instruments for trading or speculative purposes. We use hedge accounting for our interest rate swap agreement that we entered into in May 2018, but we do not apply hedge accounting to our commodity derivative contracts. We manage credit risk associated with derivative contracts by executing derivative instruments with counterparties that we believe are credit-worthy.
The following tables set forth the impact of a 10% price change on our commodity hedging positions as of December 31, 2018 and December 31, 2017, respectively.
(in millions)

December 31, 2018	Notional value	Fair value	Unrealized (losses) gains	Impact of 10% price change on fair value
Metals	$ 27.9	$ 27.0	$ (0.9)	$ 2.7
Energy and utilities	3.0	2.8	(0.2)	0.3
Totals	$ 30.9	$ 29.8	$ (1.1)	$ 3.0

December 31, 2017	Notional value	Fair value	Unrealized (losses) gains	Impact of 10% price change on fair value
Metals	$ 12.8	$ 14.9	$ 2.1	$ 1.5
Energy and utilities	3.8	3.4	(0.4)	0.3
Totals	$ 16.6	$ 18.3	$ 1.7	$ 1.8

Commodity Prices
In the ordinary course of business, we are exposed to earnings and cash flow volatility resulting from fluctuations in metal, energy and utility costs. We use our balanced book approach, supported, where required, by derivative contracts, to substantially reduce the impact of metal price fluctuations on operating margins. Despite this, we must bear the cost of any shrinkage during production, which may increase the volatility of our results of operations. We also use derivative contracts to reduce uncertainty and volatility in energy and utility costs.
Interest Rates
We are exposed to volatility in interest rates and expense under the terms of our credit agreements. Interest rates under the ABL Facility and the Term Loan B Facility are comprised of a base rate and margin. The ABL Facility and the Term Loan B Facility provide the option of a LIBOR or alternate base rate (as defined in the agreements governing the credit facilities) and the Term Loan B Facility rate is subject to a total net leverage ratio pricing grid set forth in the agreement governing the Term Loan B Facility. In order to minimize the variability in cash flows caused by fluctuations in market interest rates, we entered into an interest rate swap agreement on May 25, 2018, which expires on May 31, 2023. This swap agreement fixes the LIBOR rate on $150.0 million of our floating rate LIBOR debt at 2.75%. We had no amounts outstanding under the ABL Facility during 2018; however, an increase of 1% in the interest rates on the variable portion of our Term Loan B Facility that was not covered by the interest rate swap agreement would have increased our 2018 debt service requirements by approximately $2.0 million.

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Foreign Exchange

We have international operations that accounted for approximately 5% of our net sales in 2018. The functional currency of our operating subsidiaries is the related local currency, and the currency effects of translating the financial statements are included in accumulated other comprehensive income and do not impact earnings unless there is a liquidation or sale of those foreign subsidiaries. During 2018, the fluctuation of the U.S. dollar against other currencies resulted in an unrealized currency translation loss that decreased our equity by $1.8 million. Gains or losses from currency translation primarily relate to our operations in China (Olin Luotong Metals) and Mexico (A.J. Oster Mexico).

We also have exposure to foreign exchange risk on transactions that can potentially be denominated in foreign currencies other than the U.S. dollar. As our results of operations historically have not been materially affected by foreign currency transaction gains and losses, we do not attempt to hedge foreign currency exposure in a manner that would eliminate the effect of changes in foreign currency exchange rates on net income and cash flow. We do not speculate in foreign currency nor do we hedge the foreign currency translation of our international business to the U.S. dollar for purposes of consolidating our financial results, or other foreign currency net asset positions. During 2018, foreign currency transaction gains and losses resulted in a reduction of income before provision for income taxes of approximately $0.1 million.

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Item 8. Financial Statements and Supplementary Data.
Report of Independent Registered Public Accounting Firm
To the Board of Directors and Stockholders of Global Brass and Copper Holdings, Inc.
Opinions on the Financial Statements and Internal Control over Financial Reporting
We have audited the accompanying consolidated balance sheets of Global Brass and Copper Holdings, Inc. and its subsidiaries as of December 31, 2018 and December 31, 2017 and the related consolidated statements of operations, comprehensive income, changes in equity, and cash flows for each of the three years in the period ended December 31, 2018, including the related notes for each of the three years in the period ended December 31, 2018 (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 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 December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 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 December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.
Change in Accounting Principle
As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2018.
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 Annual 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.

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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
Chicago, IL
February 28, 2019

We have served as the Company's auditor since 2008.

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Global Brass and Copper Holdings, Inc.
Consolidated Balance Sheets

(in millions, except share and par value data)	As of December 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$125.5	$ 59.0
Accounts receivable (net of allowance of $1.3 and $1.0 at December 31, 2018 and December 31, 2017, respectively)	165.6	197.8
Inventories	218.2	208.1
Prepaid expenses and other current assets	8.5	11.7
Income tax receivable	2.8	3.6
Total current assets	520.6	480.2
Property, plant and equipment, net	147.8	142.9
Goodwill	4.4	4.5
Intangible assets, net	1.6	2.0
Deferred income taxes	11.3	16.1
Other noncurrent assets	5.3	6.5
Total assets	$691.0	$ 652.2
Liabilities and equity		
Current liabilities:		
Current portion of debt	$4.6	$ 5.0
Accounts payable	114.1	117.1
Accrued liabilities	40.2	36.0
Accrued interest	0.1	0.2
Income tax payable	—	0.5
Total current liabilities	159.0	158.8
Noncurrent portion of debt	305.7	309.0
Other noncurrent liabilities	38.5	37.1
Total liabilities	503.2	504.9
Commitments and contingencies (Note 15)		
Global Brass and Copper Holdings, Inc. stockholders' equity:		
Common stock - $0.01 par value; 80,000,000 shares authorized; 22,541,310 and 22,133,764 shares issued at December 31, 2018 and December 31, 2017, respectively	0.2	0.2
Additional paid-in capital	62.5	54.5
Retained earnings	148.8	97.3
Treasury stock - 743,057 and 226,576 shares at December 31, 2018 and December 31, 2017, respectively	(22.6)	(6.6)
Accumulated other comprehensive loss	(6.1)	(2.9)
Total Global Brass and Copper Holdings, Inc. stockholders' equity	182.8	142.5
Noncontrolling interest	5.0	4.8
Total equity	187.8	147.3
Total liabilities and equity	$691.0	$ 652.2

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

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Global Brass and Copper Holdings, Inc.
Consolidated Statements of Operations

	Year Ended December 31,		
(in millions, except per share data)	2018	2017	2016
Net sales	$1,765.4	$1,578.6	$1,338.3
Cost of sales	(1,578.7)	(1,394.4)	(1,156.6)
Gross profit	186.7	184.2	181.7
Selling, general and administrative expenses	(92.7)	(83.8)	(82.8)
Operating income	94.0	100.4	98.9
Interest expense, net	(16.8)	(17.6)	(26.2)
Loss on extinguishment of debt	(0.5)	(0.2)	(23.4)
Other income (expense), net	(0.8)	3.0	0.2
Income before provision for income taxes	75.9	85.6	49.5
Provision for income taxes	(17.3)	(33.9)	(16.7)
Net income	58.6	51.7	32.8
Net income attributable to noncontrolling interest	(0.4)	(0.6)	(0.6)
Net income attributable to Global Brass and Copper Holdings, Inc.	$58.2	$51.1	$32.2
Net income attributable to Global Brass and Copper Holdings, Inc. per common share:			
Basic	$2.66	$2.35	$1.50
Diluted	$2.61	$2.31	$1.49
Weighted average common shares outstanding:			
Basic	21.9	21.7	21.4
Diluted	22.3	22.1	21.6

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

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Global Brass and Copper Holdings, Inc.
Consolidated Statements of Comprehensive Income

	Year Ended December 31,		
(in millions)	2018	2017	2016
Net income	$ 58.6	$ 51.7	$ 32.8
Other comprehensive income (loss):			
Derivatives:			
Net derivative gain (loss) on hedge transactions	(2.0)	—	—
Income taxes on derivative transactions	0.5	—	—
Foreign currency translation:			
Foreign currency translation adjustment	(1.8)	1.4	(2.8)
Income tax (expense) benefit on foreign currency translation adjustment	(0.1)	—	0.7
Comprehensive income	55.2	53.1	30.7
Comprehensive income attributable to noncontrolling interest	(0.2)	(0.8)	(0.3)
Comprehensive income attributable to Global Brass and Copper Holdings, Inc.	$ 55.0	$ 52.3	$ 30.4

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

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Global Brass and Copper Holdings, Inc.
Consolidated Statements of Changes in Equity

(in millions, except share data)	Shares outstanding	Common stock	Additional paid-in capital	Retained earnings	Treasury stock	Accumulated other comprehensive loss	Total Global Brass and Copper Holdings, Inc. stockholders' equity	Noncontrolling interest	Total equity
Balance at December 31, 2015	21,507,154	$ 0.2	$ 36.9	$ 22.3	$ (0.7)	$ (2.3)	$ 56.4	$ 4.3	$ 60.7
Share-based compensation	117,267	—	6.9	—	—	—	6.9	—	6.9
Exercise of stock options	41,066		0.5	—	—	—	0.5	—	0.5
Share repurchases	(32,420)	—	—	—	(0.8)	—	(0.8)	—	(0.8)
Excess tax benefit on share-based compensation	—	—	0.7	—	—	—	0.7	—	0.7
Dividends declared ($0.15 per common share)	—	—	—	(3.3)	—	—	(3.3)	—	(3.3)
Distribution to noncontrolling interest	—	—	—	—	—	—	—	(0.2)	(0.2)
Net income	—	—	—	32.2	—	—	32.2	0.6	32.8
Other comprehensive income (loss), net of tax	—	—	—	—	—	(1.8)	(1.8)	(0.3)	(2.1)
Balance at December 31, 2016	21,633,067	$ 0.2	$ 45.0	$ 51.2	$ (1.5)	$ (4.1)	$ 90.8	$ 4.4	$ 95.2
Share-based compensation	383,167	—	8.2	—	—	—	8.2	—	8.2
Exercise of stock options	38,381	—	0.8	—	—	—	0.8	—	0.8
Share repurchases	(147,427)	—	—	—	(5.1)	—	(5.1)	—	(5.1)
Adoption of ASU 2016-09	—	—	0.5	(0.5)	—	—	—	—	—
Dividends declared ($0.195 per common share)	—	—	—	(4.5)	—	—	(4.5)	—	(4.5)
Distribution to noncontrolling interest	—	—	—	—	—	—	—	(0.4)	(0.4)
Net income			—	51.1		—	51.1	0.6	51.7
Other comprehensive income (loss), net of tax	—	—	—	—	—	1.2	1.2	0.2	1.4
Balance at December 31, 2017	21,907,188	$ 0.2	$ 54.5	$ 97.3	$ (6.6)	$ (2.9)	$ 142.5	$ 4.8	$ 147.3
Share-based compensation	326,446	—	6.7	—	—	—	6.7	—	6.7
Exercise of stock options	81,100	—	1.3	—	—	—	1.3	—	1.3
Share repurchases	(516,481)	—	—	—	(16.0)	—	(16.0)	—	(16.0)
Dividends declared ($0.30 per common share)	—	—	—	(6.7)	—	—	(6.7)	—	(6.7)
Net income	—	—	—	58.2	—	—	58.2	0.4	58.6
Other comprehensive income (loss)	—	—	—	—	—	(3.2)	(3.2)	(0.2)	(3.4)
	21,798,253	$ 0.2	$ 62.5	$ 148.8	$ (22.6)	$ (6.1)	$ 182.8	$ 5.0	$ 187.8

Balance at December 31,
2018
The accompanying notes are an integral part of these consolidated financial statements.

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Global Brass and Copper Holdings, Inc.
Consolidated Statements of Cash Flows

	Year Ended December 31,		
(in millions)	2018	2017	2016
Cash flows from operating activities			
Net income	$58.6	$51.7	$32.8
Adjustments to reconcile net income to net cash provided by (used in) operating activities:			
Lower of cost or market adjustment to inventory	2.9	(3.6)	(1.7)
Unrealized (gain) loss on derivatives	2.8	0.8	(3.1)
Depreciation	21.1	18.5	14.8
Amortization of intangible assets	0.4	0.1	0.1
Amortization of debt discount and issuance costs	1.2	1.3	2.0
Loss on extinguishment of debt	0.5	0.2	23.4
Uncertain tax positions	—	2.1	—
Share-based compensation expense	6.7	8.2	6.9
Provision for bad debts, net of reductions	0.8	0.1	(0.3)
Deferred income taxes	5.3	18.0	4.7
Loss on disposal of property, plant and equipment	0.3	—	0.1
Change in assets and liabilities, net of effects of business acquisition:			
Accounts receivable	31.6	(49.8)	(15.0)
Inventories	(13.3)	(9.7)	13.0
Prepaid expenses and other current assets	1.0	2.6	2.5
Accounts payable	(1.5)	18.9	18.5
Accrued liabilities	3.5	(10.1)	0.9
Accrued interest	(0.1)	—	(2.8)
Income taxes, net	0.1	0.9	(1.2)
Other, net	0.2	(1.0)	0.4
Net cash provided by (used in) operating activities	122.1	49.2	96.0
Cash flows from investing activities			
Capital expenditures	(26.2)	(24.7)	(34.4)
Business acquisition	(1.7)	(40.0)	—
Proceeds from sale of property, plant and equipment	0.1	0.1	0.1
Net cash used in investing activities	(27.8)	(64.6)	(34.3)
Cash flows from financing activities			
Borrowings on ABL Facility	0.9	0.8	1.2
Payments on ABL Facility	(0.9)	(0.8)	(1.2)
Retirement of Senior Secured Notes	—	—	(345.3)
Premium payment on extinguishment of debt	—	—	(17.0)
Payments of debt issuance costs	(0.4)	(0.2)	(5.4)
Proceeds from term loan, net of discount	25.4	8.7	316.8
Payments on term loan	(28.6)	(11.9)	(0.8)
Principal payments under capital lease obligation	(1.8)	(1.3)	(1.1)
Dividends paid	(6.7)	(4.4)	(3.2)
Distribution to noncontrolling interest owner	—	(0.4)	(0.2)
Proceeds from exercise of stock options	1.3	0.8	0.5
Share repurchases	(16.0)	(5.1)	(0.8)
Net cash used in financing activities	(26.8)	(13.8)	(56.5)

Effect of foreign currency exchange rates	(1.0)	—	(0.5)
Net increase (decrease) in cash	66.5	(29.2)	4.7
Cash and cash equivalents at beginning of period	59.0	88.2	83.5
Cash and cash equivalents at end of period	$125.5	$59.0	$88.2
Noncash investing and financing activities			
Purchases of property, plant and equipment not yet paid	$4.4	$5.0	$4.1
Acquisition of equipment under capital lease obligation	$0.4	$—	$—
Supplemental disclosure of cash flow information			
Cash paid during the period for:			
Interest, net of amount capitalized	$16.9	$16.8	$27.0
Income taxes, net of refunds	$12.4	$12.6	$13.3

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

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

1. Organization and Formation of the Company

Global Brass and Copper Holdings, Inc. ("Holdings," "GBC," the "Company," "we," "us," or "our") was incorporated in Delaw on October 10, 2007. Holdings commenced commercial operations on November 19, 2007 with the acquisition of the metals business from Olin Corporation. On May 23, 2013, we completed our initial public offering on the New York Stock Exchange and our shares of common stock began trading under the ticker symbol "BRSS."

We are a leading, value-added converter, fabricator, processor and distributor of specialized non-ferrous products in North America. We operate through three distinct, reportable segments: GBC Metals, LLC ("Olin Brass"), Chase Brass and Copper Company, LLC ("Chase Brass") and A.J. Oster, LLC ("A.J. Oster"). We also have a Corporate entity which includes certain administrative costs and expenses and the elimination of intercompany balances.

2. Summary of Significant Accounting Policies

Principles of Consolidation

The consolidated financial statements include the accounts of the Company, our wholly-owned subsidiaries and our majority-owned subsidiaries, in which we hold a controlling interest. All intercompany accounts and transactions are eliminated in consolidation. We use the equity method to account for investments in affiliated companies that are 20% to 50% owned where we do not hold a controlling voting interest and do not direct the matters that most significantly impact the investee's operations.

We own an 80% interest in Olin Luotong (GZ) Corporation ("Olin Luotong Metals" or "OLM"), based in China, and Olin Luotong Metals' financial information is consolidated herein, with the net results attributable to the 20% noncontrolling interest reflected in the accompanying consolidated financial statements.

Use of Estimates and Assumptions

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("US GAAP") requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements. In addition, it requires us to make estimates and assumptions that affect the reported amount of net sales and expenses during the reporting period. Actual amounts could differ from those estimates.

Cash Equivalents

We consider all highly liquid investments with a maturity of three months or less when purchased to be cash equivalents. The carrying amount of our cash equivalents at December 31, 2018 approximates fair value.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable consists of trade receivables for amounts billed to customers for products sold and other receivables. The determination of collectability of our accounts receivable requires us to make frequent judgments and estimates in order to determine the appropriate allowance needed for doubtful accounts. In circumstances where we are aware of a customer's inability to meet its financial obligations (e.g., bankruptcy filings or substantial down-grading of credit ratings), we record an allowance for bad debts equal to the amount we believe is not collectible. For all other customers, we recognize allowances for bad debts based on historical collection experience. If circumstances change (e.g., greater than expected defaults or an unexpected material change in a major customer's ability to meet its financial obligations), the estimate of the allowance could change by a material amount. Accounts are written off once deemed to be uncollectible.

Inventories

Inventories include costs attributable to direct labor and manufacturing overhead but are primarily comprised of metal costs. The metals component of inventory is valued on a last-in, first-out ("LIFO") basis, and comprised approximately 67% and 65% of total inventory at December 31, 2018 and 2017, respectively. All other inventory components, including the direct labor and manufacturing overhead components and certain non-U.S. inventories, are valued on a first-in, first-out ("FIFO") basis. In addition to the cost of material, finished goods inventory includes costs for depreciation, utilities, consumable production supplies, maintenance, production wages and transportation.

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Inventories are valued at the lower of cost or market. The market price of metals used in production and related scrap is subject to volatility. We evaluate the need to record adjustments to inventory values on a regular basis. During periods when open market prices decline below carrying value, we record a provision to reduce the carrying value of inventory. Additionally, we record an estimate for slow moving and obsolete inventory based upon product knowledge, physical inventory observation, future demand, market conditions and an aging analysis of the inventory on hand. Our policy is to include all types of inventory, including raw material, work-in-process, finished goods, and spare parts, in the evaluation of slow moving and obsolete reserves. Inventory in excess of estimated usage requirements is written down to its estimated net realizable value.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. We depreciate property, plant and equipment, which includes assets under capital leases, using the straight-line method based on the estimated useful lives of the assets as they are placed into service. Property, plant and equipment are generally depreciated over their useful lives as detailed in the notes to the accompanying consolidated financial statements. Depreciation expense is recorded in cost of sales or selling, general and administrative costs depending on the nature and use of the underlying asset.

Expenditures for repairs and maintenance are expensed as incurred. Expenditures which improve an asset or extend its estimated useful life are capitalized. Interest costs related to the construction of qualifying assets are capitalized as part of the construction costs. When assets are retired or otherwise disposed of, the related cost and accumulated depreciation are removed from the accounts and any gain or loss is included in the accompanying consolidated statements of operations.

We review property, plant and equipment for impairment when a change in events or circumstances indicates that the carrying value of the assets may not be recoverable. We determine the fair value of our asset group through various valuation techniques, including discounted cash flow models, quoted market values, and third-party independent appraisals.

Acquisitions and Goodwill

All acquisitions are accounted for using the acquisition method as prescribed by ASC 805, Business Combinations. The purchase price paid is allocated to the assets acquired and liabilities assumed based on their estimated fair values. Any excess purchase price over the fair value of the net assets acquired is recorded as goodwill.

Goodwill is not amortized but is tested for impairment annually and whenever events or changes in circumstances indicate that impairment may have occurred. We perform our annual goodwill impairment test as of October 31 and monitor for interim triggering events on an ongoing basis.

We utilized the qualitative goodwill evaluation model for our annual goodwill impairment test conducted as of October 31, 2018. Based on the results of that qualitative assessment, we believe it was more likely than not that the fair value of the reporting units exceeded their carrying values as of October 31, 2018, indicating no impairment of goodwill.

Intangible Assets

We record finite-lived intangible assets at fair value under the purchase method of accounting and amortize them over their useful lives using the straight-line method. We record amortization expense related to intangible assets in selling, general and administrative expenses. We review identifiable finite-lived intangible assets for impairment whenever events or circumstances indicate that their carrying values may not be recoverable. We do not have any indefinite-lived intangible assets as of December 31, 2018 or 2017. Accumulated amortization on intangible assets was $1.8 million and $1.4 million as of December 31, 2018 and 2017, respectively.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

We expect to incur amortization expense related to intangible assets in subsequent years as follows:

(in millions)

Year	Amortization
2019	$ 0.4
2020	0.2
2021	0.1
2022	0.1
2023	0.1
Thereafter	0.7
	$ 1.6

Deferred Financing Fees

We amortize deferred financing fees incurred in connection with the issuance of debt as non-cash interest expense over the terms of the debt agreements. We present unamortized balances of deferred financing fees incurred in connection with the issuance of our long-term debt facilities in the noncurrent portion of debt in our consolidated balance sheets and amortize them using the effective interest method over the term of the debt facility. We present the unamortized balances of deferred financing fees incurred in connection with the issuance of our asset based loan facility in other noncurrent assets in our consolidated balance sheets and amortize them on a straight-line basis over the term of the facility.

Derivative Contracts

Our operating activities expose us to a variety of market risks, including risks related to fluctuations in commodity prices, energy costs, foreign currency exchange rates, and interest rates. We monitor and manage these financial exposures as an integral part of our overall risk-management program. We do not enter into derivative contracts for speculation purposes where the objective is to generate profits. We use hedge accounting for our interest rate swap agreement that we entered into in May 2018. We did not apply hedge accounting to our commodity derivative contracts in 2018, 2017 or 2016. We include the fair value of our interest rate swap agreement and commodity derivative contracts as assets or liabilities in our consolidated balance sheet. For our interest rate swap agreement, the change in fair value is recorded to accumulated other comprehensive income (loss) in the accompanying consolidated balance sheets. For our commodity derivative contracts, we recognize all amounts paid and received and changes in fair value of the derivative contracts, including unrealized gains and losses, as adjustments to income in the accompanying consolidated statements of operations.

Treasury Stock

On July 31, 2018, our Board of Directors authorized a share repurchase program (the “2018 Share Repurchase Program”), authorizing us to repurchase up to $35.0 million of our common stock on the open market through September 30, 2020. We repurchased 400,000 shares of our common stock under the 2018 Share Repurchase Program during 2018. In addition to the 2018 Share Repurchase Program, we frequently buy shares of our common stock from employees as an accommodation to them to satisfy their tax withholding obligations under our stock compensation plans. Both the repurchased shares and shares bought from our employees are reflected at cost within treasury stock in the consolidated balance sheets.

Share-Based Compensation

We have one share-based compensation plan, which is described in Note 16, “Share-based Compensation.” Pursuant to this plan, we have granted non-qualified options, restricted stock and performance-based shares to certain employees and members of our management and our Board of Directors. See Note 16, “Share-based Compensation” for further detail.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Revenue Recognition

Revenue is measured based on the consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. Revenue is recognized when performance obligations to our customers are satisfied. We recognize revenue upon transfer of control to our customers, which is generally the date the product is shipped. See Note 3, “Revenue” for further detail.

Estimates for rebates, returns and payment discounts are recognized in the period in which the corresponding revenue is recorded based on contractual values or historical experience. Such rebates were not material for 2018, 2017, or 2016.

Shipping and Freight

Billings to customers for shipping costs are included in net sales and the cost of shipping product to those customers is reflected in cost of sales in the accompanying consolidated statements of operations. We elect to account for the shipping costs incurred after transfer of control to the customer as fulfillment costs.

Provision for Income Taxes

We use the asset and liability approach to record our provision for income taxes. We measure our current and deferred income taxes payable by applying the provisions of enacted tax laws. Deferred income taxes are provided for temporary differences between the income tax basis of assets and liabilities and their carrying amounts for financial reporting purposes. We record a valuation allowance to reduce deferred tax assets when we determine it is “more likely than not” that some portion or all of the deferred tax assets will not be realized.

Foreign Currency Translation

We translate the financial statements of our foreign subsidiaries into United States dollars in accordance with ASC 830, Foreign Currency Matters. The functional currency of our foreign subsidiaries is the local currency. We translate the consolidated statements of operations of our foreign operations at weighted-average exchange rates for the periods. We translate their assets and liabilities at period-end exchange rates and equity transactions at historical rates. Gains and losses resulting from the translation adjustment are reported as a component of other comprehensive income (loss). We record the income tax effect of currency translation adjustments related to foreign subsidiaries and joint ventures that are not considered indefinitely reinvested as a component of deferred taxes with an offset to other comprehensive income (loss).

Concentrations of Credit Risk and Certain Other Exposures

We sell and distribute our products to a wide range of companies primarily in the building and housing, munitions, automotive, transportation, coinage, electronics / electrical components and industrial machinery and equipment markets. We perform ongoing credit evaluations of our customers and generally do not require collateral. There was no customer that represented 10% or more of consolidated net sales in 2018, 2017, or 2016.

We use various strategies to minimize the impact of changes in the commodity metal prices between the date of order from a customer and the date of sale to a customer. Generally, we price a forward replacement purchase of an equivalent amount of copper and other metals under flexible pricing arrangements with our suppliers at the same time that we determine the forward selling price of finished products to our customers. We have various sources of raw materials and are not materially dependent on any one supplier.

As of December 31, 2018, approximately 54% of our employees at various sites were members of unions. Generally, our various agreements with unions in the United States have contractual terms which range from 3 to 5 years. Since our establishment in November 2007, we have not experienced any work stoppages at any of our facilities.

We are required to make contributions to the IAM National Pension Plan (“IAM Plan”), a multi-employer pension plan that covers certain of our union employees. Our obligations may be impacted by the plan’s funded status, investment performance, changes in the participant demographics, financial stability of contributing employers and changes in actuarial assumptions. In addition, if a participating employer becomes insolvent and ceases to contribute to a multiemployer plan, the unfunded obligation of the plan will be borne by the remaining participating employers.

Under current law, an employer that withdraws or partially withdraws from a multi-employer pension plan may incur withdrawal liability to the plan. Given the facts that the IAM Plan is 92% funded, many other participating employers are much larger than us, and the large number of participating employers in the plan, we do not view this to be a significant risk.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Self-Insurance Programs

We are self-insured up to a retention amount for workers' compensation claims and benefits paid under employee health care programs. Accruals for employee health care liabilities are primarily based on the estimated, undiscounted cost of claims, which includes claims incurred but not yet reported to us. We estimate liabilities for workers' compensation benefits and related expenses for claims, in part, by considering historical claims experience and undiscounted claims estimates provided by insurance carriers, third-party administrators, and actuaries. Our accruals for self-insurance liabilities are sufficient to cover outstanding claims, including those incurred but not yet reported to us as of the estimation date.

Environmental Reserves and Environmental Expenses

We recognize an environmental liability when it is probable the liability exists and the amount is reasonably estimable. We estimate the duration and extent of our remediation obligations based upon internal analyses of clean-up costs, ongoing monitoring costs and estimated legal fees, communications with regulatory agencies and changes in environmental law. If we were to determine that our estimates of the duration or extent of environmental obligations were no longer accurate, we would adjust our environmental liabilities accordingly in the period that such determination is made. We do not discount estimated future expenditures for environmental remediation to their present value. Accrued environmental liabilities are not reduced by potential insurance reimbursements. Environmental expenses that relate to ongoing operations are included as a component of cost of sales in the accompanying consolidated statement of operations.

Recently Issued and Recently Adopted Accounting Pronouncements

In August 2018, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2018-15, Intangibles - Goodwill and Other - Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service. ASU 2018-15 provides guidance on capitalizing hosting arrangement implementation costs and recognizing and presenting the expense and payments related to capitalized implementation costs for hosting arrangements in our financial statements. The provisions of ASU 2018-15 are effective for fiscal years, and interim reporting periods within those fiscal years, beginning after December 15, 2019. Early adoption is permitted and the provisions are to be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. We are in the process of evaluating the impact of adoption on our consolidated financial statements.

In August 2017, the FASB issued ASU 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities. This ASU provides new guidance about the income statement classification of and eliminates the requirement to separately measure and report hedge ineffectiveness. The entire change in fair value for qualifying hedge instruments included in the effectiveness will be recorded in other comprehensive income ("OCI") and amounts deferred in OCI will be reclassified to earnings in the same income statement line item in which the earnings effect of the hedged item is reported. We early adopted this guidance on May 25, 2018 upon entering into an interest rate swap agreement. The adoption of this standard did not impact our consolidated financial statements.

In January 2017, the FASB issued ASU 2017-01, Business Combinations (Topic 805): Clarifying the definition of a business, which clarifies the definition of a business and assists entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. Under this guidance, when substantially all of the fair value of gross assets acquired is concentrated in a single asset (or group of similar assets), the assets acquired would not represent a business. In addition, in order to be considered a business, an acquisition would have to include at a minimum an input and a substantive process that together significantly contribute to the ability to create an output. The amended guidance also narrows the definition of outputs by more closely aligning it with how outputs are described in FASB guidance for revenue recognition. This guidance became effective on January 1, 2018 for interim and annual periods. The adoption of this standard did not have a material impact on our consolidated financial statements.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

In March 2016, the FASB issued ASU No. 2016-09, Compensation-Stock Compensation (Topic 718) (“ASU 2016-09”). ASU 2016-09 simplifies various aspects of the accounting for share-based payment transactions, including income tax consequences, presentation of awards as either equity or liabilities, presentation in the statement of cash flows and accounting for forfeitures. The provisions of ASU 2016-09 are effective for fiscal years, and interim reporting periods within those fiscal years, beginning after December 15, 2016. As allowed under the new guidance, we have elected to change our accounting policy to now recognize forfeitures as they occur. As of January 1, 2017, the date we adopted this ASU, the $0.5 million cumulative effect of that change in accounting policy resulted in a decrease to retained earnings and increase to additional paid-in capital. Additionally, ASU 2016-09 eliminates the requirement to report excess tax benefits and certain tax deficiencies related to share-based payment transactions in additional paid-in capital. In accordance with the new standard and prospectively since the date we adopted this ASU, we are recording excess tax benefits and tax deficiencies as an income tax benefit or provision in the consolidated statements of operations. The guidance also requires excess tax benefits to be reported as operating activities in the statement of cash flows rather than as a financing activity. We have elected to retrospectively adjust the cash flow classification, resulting in an increase of $0.7 million in cash from operating activities for the year ended December 31, 2016 with a corresponding decrease to cash from financing activities during this period.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), with further clarification and improvements issued in ASU 2018-10, Codification Improvements to Topic 842, Leases, and ASU 2018-11, Leases (Topic 842) Targeted Improvements, which are collectively referred to as Topic 842. The new lease guidance in Topic 842 sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract (i.e. lessees and lessors). Topic 842 requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease effectively finances a purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method (finance lease) or on a straight line basis over the term of the lease (operating lease). A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less will be accounted for similar to existing guidance for operating leases. The new lease guidance supersedes the existing guidance on accounting for leases in Leases (Topic 840). The provisions of Topic 842 are effective for fiscal years, and interim reporting periods within those fiscal years, beginning after December 15, 2018 with early adoption permitted.

We will adopt the new lease guidance on January 1, 2019 using the modified retrospective approach. As a result of adopting Topic 842, we will implement new processes and accounting policies. We are currently finalizing our accounting policies and determining changes needed in current processes for lease accounting and verifying the completeness of our lease population.

We are in the process of evaluating our current lease portfolio. The impact of adoption will depend on our lease portfolio as of the adoption date and our accounting policy elections. For our operating leases, we expect to recognize approximately $7 million of operating lease right of use assets and approximately $7 million of operating lease liabilities in the consolidated balance sheet upon adoption.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

On January 1, 2018, we adopted ASC Topic 606, Revenue from Contracts with Customers, using the full retrospective method. The adoption of ASC Topic 606 impacted the timing of recognition of revenue from unprocessed metal sales to toll customers. The following tables summarize the effects of adopting ASC Topic 606 on our prior period unaudited Consolidated Financial Statements:

Consolidated Balance Sheet (Unaudited)

(in millions, except share data)	December 31, 2017 As Reported	Effects of the Adoption of ASC Topic 606	December 31, 2017 As Adjusted
Assets			
Current assets:			
Cash and cash equivalents	$ 59.0	$ —	$ 59.0
Accounts receivable (net of allowance of $1.0)	197.9	(0.1)	197.8
Inventories	208.1	—	208.1
Prepaid expenses and other current assets	33.3	(21.6)	11.7
Income tax receivable	3.6	—	3.6
Total current assets	501.9	(21.7)	480.2
Property, plant and equipment, net	142.9	—	142.9
Goodwill	4.5	—	4.5
Intangible assets, net	2.0	—	2.0
Deferred income taxes	16.1	—	16.1
Other noncurrent assets	6.5	—	6.5
Total assets	$ 673.9	$ (21.7)	$ 652.2
Liabilities and equity			
Current liabilities:			
Current portion of debt	$ 5.0	$ —	$ 5.0
Accounts payable	117.1	—	117.1
Accrued liabilities	57.9	(21.9)	36.0
Accrued interest	0.2	—	0.2
Income tax payable	0.5	—	0.5
Total current liabilities	180.7	(21.9)	158.8
Noncurrent portion of debt	309.0	—	309.0
Other noncurrent liabilities	37.1	—	37.1
Total liabilities	526.8	(21.9)	504.9
Global Brass and Copper Holdings, Inc. stockholders’ equity:			
Common stock - 22,133,764 shares issued	0.2	—	0.2
Additional paid-in capital	54.5	—	54.5
Retained earnings	97.1	0.2	97.3
Treasury stock - 226,576 shares	(6.6)	—	(6.6)
Accumulated other comprehensive loss	(2.9)	—	(2.9)
Total Global Brass and Copper Holdings, Inc. stockholders’ equity	142.3	0.2	142.5
Noncontrolling interest	4.8	—	4.8
Total equity	147.1	0.2	147.3
Total liabilities and equity	$ 673.9	$ (21.7)	$ 652.2

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Consolidated Statement of Operations (Unaudited) (in millions, except per share data)	Year Ended December 31, 2017 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2017 As Adjusted	Year Ended December 31, 2016 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2016 As Adjusted
Net sales	$1,560.8	$ 17.8	$1,578.6	$1,338.5	$ (0.2)	$1,338.3
Cost of sales	(1,376.8)	(17.6)	(1,394.4)	(1,156.9)	0.3	(1,156.6)
Gross profit	184.0	0.2	184.2	181.6	0.1	181.7
Selling, general and administrative expenses	(83.8)	—	(83.8)	(82.8)	—	(82.8)
Operating income	100.2	0.2	100.4	98.8	0.1	98.9
Interest expense	(17.6)	—	(17.6)	(26.2)	—	(26.2)
Loss on extinguishment of debt	(0.2)	—	(0.2)	(23.4)	—	(23.4)
Other income (expense), net	3.0	—	3.0	0.2	—	0.2
Income before provision for income taxes	85.4	0.2	85.6	49.4	0.1	49.5
Provision for income taxes	(33.9)	—	(33.9)	(16.6)	(0.1)	(16.7)
Net income	51.5	0.2	51.7	32.8	—	32.8
Net income attributable to noncontrolling interest	(0.6)	—	(0.6)	(0.6)	—	(0.6)
Net income attributable to Global Brass and Copper Holdings, Inc.	$50.9	$ 0.2	$51.1	$32.2	$ —	$32.2
Net income attributable to Global Brass and Copper Holdings, Inc. per common share:						
Basic	$2.35	$ —	$2.35	$1.50	$ —	$1.50
Diluted	$2.30	$ 0.01	$2.31	$1.49	$ —	$1.49
Weighted average common shares outstanding:						
Basic	21.7	—	21.7	21.4	—	21.4
Diluted	22.1	—	22.1	21.6	—	21.6

Consolidated Statement of Comprehensive Income (Unaudited) (in millions)	Year Ended December 31, 2017 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2017 As Adjusted	Year Ended December 31, 2016 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2016 As Adjusted
Net income	$ 51.5	$ 0.2	$ 51.7	$ 32.8	$ —	$ 32.8
Other comprehensive income (loss):						
Foreign currency translation adjustment	1.4	—	1.4	(2.8)	—	(2.8)
Income tax (expense) benefit on foreign currency translation adjustment	—	—	—	0.7	—	0.7
Comprehensive income	52.9	0.2	53.1	30.7	—	30.7
Comprehensive income attributable to noncontrolling interest	(0.8)	—	(0.8)	(0.3)	—	(0.3)
Comprehensive income attributable to Global Brass and Copper Holdings, Inc.	$ 52.1	$ 0.2	$ 52.3	$ 30.4	$ —	$ 30.4

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Consolidated Statement of Changes in Equity
(Unaudited)

(in millions, except share data)	Shares outstanding	Common stock	Additional paid-in capital	Retained earnings	Treasury stock	Accumulated other comprehensive loss	Total Global Brass and Copper Holdings, Inc. stockholders' equity	Noncontrolling interest	Total equity
December 31, 2015 - as reported	21,507,154	$ 0.2	$ 36.9	$ 22.3	$ (0.7)	$ (2.3)	$ 56.4	$ 4.3	$ 60.7
Cumulative effect adjustment of ASC Topic 606 on January 1, 2016	—	—	—	—	—	—	—	—	—
December 31, 2015 - as adjusted	21,507,154	0.2	36.9	22.3	(0.7)	(2.3)	56.4	4.3	60.7
Year ended December 31, 2016 - as reported	125,913	—	8.1	28.9	(0.8)	(1.8)	34.4	0.1	34.5
Effect of the adoption of ASC Topic 606	—	—	—	—	—	—	—	—	—
December 31, 2016 - as adjusted	21,633,067	0.2	45.0	51.2	(1.5)	(4.1)	90.8	4.4	95.2
Year ended December 31, 2017 - as reported	274,121	—	9.5	45.9	(5.1)	1.2	51.5	0.4	51.9
Effect of the adoption of ASC Topic 606	—	—	—	0.2	—	—	0.2	—	0.2
December 31, 2017 - as adjusted	21,907,188	$ 0.2	$ 54.5	$ 97.3	$ (6.6)	$ (2.9)	$ 142.5	$ 4.8	$ 147.3

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Global Brass and Copper Holdings, Inc.
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Consolidated Statement of Cash Flows (Unaudited) (in millions)	Year Ended December 31, 2017 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2017 As Adjusted	Year Ended December 31, 2016 As Reported	Effects of the Adoption of ASC Topic 606	Year Ended December 31, 2016 As Adjusted
Cash flows from operating activities						
Net income	$ 51.5	$ 0.2	$ 51.7	$ 32.8	$ —	$ 32.8
Adjustments to reconcile net income to net cash provided by (used in) operating activities:						
Lower of cost or market adjustment to inventory	(3.6)	—	(3.6)	(1.7)	—	(1.7)
Unrealized (gain) loss on derivatives	0.8	—	0.8	(3.1)	—	(3.1)
Depreciation	18.5	—	18.5	14.8	—	14.8
Amortization of intangible assets	0.1	—	0.1	0.1	—	0.1
Amortization of debt discount and issuance costs	1.3	—	1.3	2.0	—	2.0
Loss on extinguishment of debt	0.2	—	0.2	23.4	—	23.4
Uncertain tax positions	2.1	—	2.1	—	—	—
Share-based compensation expense	8.2	—	8.2	6.9	—	6.9
Provision for bad debts, net of reductions	0.1	—	0.1	(0.3)	—	(0.3)
Deferred income taxes	18.0	—	18.0	4.6	0.1	4.7
Loss on disposal of property, plant and equipment	—	—	—	0.1	—	0.1
Change in assets and liabilities:						
Accounts receivable	(49.8)	—	(49.8)	(15.0)	—	(15.0)
Inventories	(9.7)	—	(9.7)	13.0	—	13.0
Prepaid expenses and other current assets	(15.0)	17.6	2.6	2.8	(0.3)	2.5
Accounts payable	18.9	—	18.9	18.5	—	18.5
Accrued liabilities	7.7	(17.8)	(10.1)	0.7	0.2	0.9
Accrued interest	—	—	—	(2.8)	—	(2.8)
Income taxes, net	0.9	—	0.9	(1.2)	—	(1.2)
Other, net	(1.0)	—	(1.0)	0.4	—	0.4
Net cash provided by (used in) operating activities	49.2	—	49.2	96.0	—	96.0
Cash flows from investing activities						
Capital expenditures	(24.7)	—	(24.7)	(34.4)	—	(34.4)
Business acquisition	(40.0)	—	(40.0)	—	—	—
Proceeds from sale of property, plant and equipment	0.1	—	0.1	0.1	—	0.1
Net cash used in investing activities	(64.6)	—	(64.6)	(34.3)	—	(34.3)
Cash flows from financing activities						
Borrowings on ABL Facility	0.8	—	0.8	1.2	—	1.2
Payments on ABL Facility	(0.8)	—	(0.8)	(1.2)	—	(1.2)
Retirement of Senior Secured Notes	—	—	—	(345.3)	—	(345.3)
Premium payment on extinguishment of debt	—	—	—	(17.0)	—	(17.0)
Payments of debt issuance costs	(0.2)	—	(0.2)	(5.4)	—	(5.4)
Proceeds from term loan, net of discount	8.7	—	8.7	316.8	—	316.8
Payments on term loan	(11.9)	—	(11.9)	(0.8)	—	(0.8)
Principal payments under capital lease obligation	(1.3)	—	(1.3)	(1.1)	—	(1.1)

Dividends paid	(4.4)	—	(4.4)	(3.2)	—	(3.2)
Distribution to noncontrolling interest owner	(0.4)	—	(0.4)	(0.2)	—	(0.2)
Proceeds from exercise of stock options	0.8	—	0.8	0.5	—	0.5
Share repurchases	(5.1)	—	(5.1)	(0.8)	—	(0.8)
Net cash used in financing activities	(13.8)	—	(13.8)	(56.5)	—	(56.5)
Effect of foreign currency exchange rates	—	—	—	(0.5)	—	(0.5)
Net increase (decrease) in cash	(29.2)	—	(29.2)	4.7	—	4.7
Cash and cash equivalents at beginning of period	88.2	—	88.2	83.5	—	83.5
Cash and cash equivalents at end of period	$ 59.0	$ —	$ 59.0	$ 88.2	$ —	$ 88.2

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Global Brass and Copper Holdings, Inc.
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3. Revenue
On January 1, 2018, we adopted ASC Topic 606, Revenue from Contracts with Customers, using the full retrospective method. The adoption of ASC Topic 606 impacted the timing of recognition of revenue from unprocessed metal sales to toll customers. See Note 2, “Summary of Significant Accounting Policies,” for further discussion of the adoption including the impact on our 2017 and 2016 financial statements.
Revenue is measured based on the consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. Revenue is recognized when performance obligations to our customers are satisfied. We recognize revenue upon transfer of control to our customers, which is generally the date the product is shipped. Estimates for rebates, returns and payment discounts are recognized in the period in which the corresponding revenue is recorded based on contractual values or historical experience. Our terms of shipping are generally FOB shipping point. We elect to account for the shipping costs incurred after transfer of control to the customer as fulfillment costs.
Non-toll customers
We generate revenues primarily by procuring scrap and virgin metal, converting the metal to a finished product, and charging customers a conversion fee and metal replacement fee. Non-toll customers generally assume title and risk of loss for product upon shipment, in accordance with FOB shipping terms.
Toll Customers
We also procure scrap and virgin metal for a small number of customers and sell it to them. Title to the metal and risk of loss transfers to the customer upon sale. We then hold the metal for them on our premises together with our metal. We also sell converted finished products to these customers. We charge the customer and earn a conversion fee when we transfer control of the processed metal to the customer upon shipment, which is generally FOB shipping point. We accept their metal in place of charging a metal replacement fee.
The following table presents our revenues disaggregated by market based on the customer’s primary market or the primary market for the shipped product:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Building and housing	$585.8	$494.0	$413.3
Automotive and transportation	339.1	309.4	274.1
Munitions	185.0	190.3	142.3
Coinage	168.3	155.6	131.6
Industrial machinery and equipment	146.4	140.3	118.2
Electronics / electrical components	146.0	135.5	126.4
Other	194.8	153.5	132.4
Net sales	$1,765.4	$1,578.6	$1,338.3

Generally, we bill customers when product is shipped in concurrence with revenue recognition. In some instances, we receive advance payment from customers prior to shipment and revenue recognition, at which time we record a liability for the advance payment. The expected duration from time of advance payment to time of shipment is less than one year. As of December 31, 2018, we had no advance payments in Accrued Liabilities. As of December 31, 2017, we had $0.4 million of advance payments in Accrued Liabilities. Revenue recognized in 2018 that was included in Accrued Liabilities at the beginning of the year was $0.4 million. There was no revenue recognized in 2017 or 2016 that was included in Accrued Liabilities at the beginning of the year.

Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

4. Earnings Per Share

We compute basic earnings per share using the weighted-average number of common shares outstanding and diluted earnings per share using the weighted-average number of common shares outstanding adjusted by the number of additional shares that would have been outstanding had potentially dilutive common shares been issued. Potentially dilutive securities include nonvested share awards and stock options for which the exercise price was less than the average market price of our outstanding common stock. We include nonvested performance-based share awards in the average diluted shares outstanding for each period if established performance criteria have been met at the end of the respective periods.

The following table sets forth the computation of basic and diluted earnings per share:

	Year Ended December 31,		
(in millions, except per share data)	2018	2017	2016
Numerator			
Net income attributable to Global Brass and Copper Holdings, Inc.	$58.2	$51.1	$32.2
Denominator			
Weighted-average common shares outstanding	21.9	21.7	21.4
Effect of potentially dilutive securities:			
Stock options and nonvested share awards	0.4	0.4	0.2
Weighted-average common shares outstanding, assuming dilution	22.3	22.1	21.6
Anti-dilutive shares excluded from above	0.1	0.1	0.1
Net income attributable to Global Brass and Copper Holdings, Inc. per common share:			
Basic	$2.66	$2.35	$1.50
Diluted	$2.61	$2.31	$1.49

5. Segment Information

Our Chief Operating Decision Maker allocates resources and evaluates performance at the divisional level. As such, we have determined that we have three reportable segments: Olin Brass, Chase Brass and A.J. Oster.

Olin Brass is a leading manufacturer, fabricator, and converter of non-ferrous products, including sheet, strip, foil, tube, and fabricated products. Olin Brass also rerolls and forms other alloys such as stainless steel, carbon steel, and aluminum. Sheet and strip is generally manufactured from copper and copper-alloy scrap. Olin Brass's products are used in five primary markets: building and housing, munitions, automotive, coinage, and electronics / electrical components.

Chase Brass is a leading manufacturer of brass rod in North America. Chase Brass primarily manufactures solid rod in round and other shapes, ranging from 1/4 inch to 4.5 inches in diameter. The key attributes of brass rod include its machinability, corrosion resistance, and moderate strength, making it especially suitable for forging and machining for products such as valves and fittings. Brass rod is generally manufactured from copper or copper-alloy scrap. Chase Brass produces brass rod used in production applications which can be grouped into four primary markets: building and housing, transportation, electronics / electrical components, and industrial machinery and equipment.

A.J. Oster is a processor and distributor of copper and copper-alloy sheet, strip, and foil, aluminum sheet, and coated aluminum products. A.J. Oster operates eleven strategically located service centers in the U.S., Puerto Rico, and Mexico. Each A.J. Oster service center reliably provides products at quick lead-times in small quantities. These capabilities, combined with A.J. Oster's operations of precision slitting, hot tinning, traverse winding, cutting, and special packaging, provide value to a broad customer base. A.J. Oster's products are used in three primary markets: building and housing, automotive, and electronics / electrical components.

Corporate includes compensation for corporate executives, corporate office and administrative salaries, and professional fees for accounting, tax, and legal services. Corporate also includes interest expense and income, state and federal income taxes, certain overhead costs, share-based compensation expense, gains and losses associated with certain acquisitions and dispositions, unrealized gains and losses on hedging activities, and the elimination of intercompany sales and balances.

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The Chief Operating Decision Maker evaluates segment performance and determines resource allocations based on a number of factors, the primary performance measure being adjusted EBITDA.

Adjusted EBITDA is defined as net income attributable to Global Brass and Copper Holdings, Inc., plus interest, taxes, depreciation and amortization ("EBITDA") adjusted to exclude the following:

- unrealized gains and losses on derivative contracts in support of our balanced book approach;
- unrealized gains and losses associated with derivative contracts related to energy and utility costs;
- impact associated with lower of cost or market adjustments to inventory;
- gains and losses due to the depletion of a LIFO layer of metal inventory;
- share-based compensation expense;
- refinancing costs;
- restructuring and other business transformation charges;
- inventory step-up costs related to acquisition accounting;
- specified legal and professional expenses; and
- certain other items.

Each of these items are excluded because our management believes they are not indicative of the ongoing performance of our core operations.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Below is a reconciliation of adjusted EBITDA of operating segments to income before provision for income taxes and equity income:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Net Sales, External Customers			
Olin Brass	$679.8	$664.1	$553.9
Chase Brass	612.1	591.0	501.7
A.J. Oster	473.5	323.5	282.7
Total net sales, external customers	$1,765.4	$1,578.6	$1,338.3
Intersegment Net Sales			
Olin Brass	$87.5	$79.0	$75.5
Chase Brass	—	0.1	1.0
A.J. Oster	0.2	0.1	—
Total intersegment net sales	$87.7	$79.2	$76.5
Adjusted EBITDA			
Olin Brass	$57.2	$51.2	$49.9
Chase Brass	66.3	73.2	68.0
A.J. Oster	23.1	14.8	18.4
Total adjusted EBITDA of operating segments	146.6	139.2	136.3
Corporate (a)	(18.1)	(8.7)	(17.7)
Depreciation expense	(21.1)	(18.5)	(14.8)
Amortization of intangible assets	(0.4)	(0.1)	(0.1)
Interest expense, net	(16.8)	(17.6)	(26.2)
Net income attributable to noncontrolling interest	0.4	0.6	0.6
Unrealized gain (loss) on derivative contracts (b)	(2.8)	(0.8)	3.1
LIFO liquidation (loss) gain (c)	(0.1)	(1.0)	(1.9)
Refinancing costs (d)	(1.6)	(0.9)	(23.4)
Specified legal / professional expenses (e)	(0.4)	(1.3)	(1.2)
Lower of cost or market adjustment to inventory (f)	(2.9)	3.6	1.7
Share-based compensation expense (g)	(6.7)	(8.2)	(6.9)
Restructuring and other business transformation charges (h)	—	(0.4)	—
Inventory step-up costs from acquisition accounting	(0.2)	(0.3)	—
Income before provision for income taxes	$75.9	$85.6	$49.5

(a) 2017 includes $7.4 million of insurance proceeds recoveries relating to a production outage in 2016.
(b) Represents unrealized gains / losses on derivative contracts.
(c) Calculated based on the difference between the base year LIFO carrying value and the metal prices prevailing in the market at the time of inventory depletion.
(d) Represents the loss on extinguishment of debt and other expenses associated with our refinancing activities.
(e) Represents selected professional fees for accounting, tax, legal, and consulting services for merger and acquisition activity or incurred as a public company that exceed our expected long-term requirements.
(f) Represents the impact of lower of cost or market adjustments to domestic metal inventory. This impact is included in the Corporate entity results.
(g) Represents compensation expense resulting from stock compensation awards to certain employees and our Board of Directors.
(h) Restructuring and other business transformation charges in 2017 represent severance charges at Olin Brass.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

	Year Ended December 31,		
(in millions)	2018	2017	2016
Depreciation and amortization			
Olin Brass	$11.4	$10.8	$9.2
Chase Brass	6.2	5.7	4.9
A.J. Oster	3.8	2.0	0.5
Corporate	0.1	0.1	0.3
Total depreciation and amortization	$21.5	$18.6	$14.9
LIFO liquidation (loss)/gain			
Olin Brass	$(0.2)	$(1.0)	$(1.6)
Chase Brass	—	—	(0.3)
A.J. Oster	0.1	—	0.1
Corporate	—	—	(0.1)
Total LIFO liquidation (loss)/gain	$(0.1)	$(1.0)	$(1.9)
Interest expense, net			
Olin Brass	$0.1	$0.3	$0.3
A.J. Oster	0.1	—	—
Corporate	16.6	17.3	25.9
Total interest expense, net	$16.8	$17.6	$26.2
Capital expenditures			
Olin Brass	$12.3	$13.5	$15.1
Chase Brass	9.2	6.7	10.0
A.J. Oster	3.6	4.3	9.3
Corporate	1.1	0.2	—
Total capital expenditures	$26.2	$24.7	$34.4

	As of December 31,	
(in millions)	2018	2017
Total Assets		
Olin Brass	$ 242.0	$ 263.2
Chase Brass	134.4	142.9
A.J. Oster	178.3	171.9
Corporate	136.3	74.2
Total assets	$ 691.0	$ 652.2

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Summarized geographic information is shown in the following table. Net sales are attributed to individual countries based on the location from which the products are shipped.

	Year Ended December 31,		
(in millions)	2018	2017	2016
Net sales:			
United States	$1,680.6	$1,489.8	$1,261.4
Asia Pacific	40.7	44.0	37.1
Mexico	44.1	44.8	39.8
Total net sales	$1,765.4	$1,578.6	$1,338.3

Substantially all long-lived assets are maintained in the United States.

There was no customer that represented 10% or more of consolidated net sales in 2018, 2017, or 2016.

6. Inventories

Inventories were as follows:

	As of December 31,	
(in millions)	2018	2017
Raw materials and supplies	$31.9	$23.2
Work-in-process	72.9	73.5
Finished goods	113.4	111.4
Total inventories	$218.2	$208.1

We recorded adjustments for certain domestic, non-copper metal inventory during 2018, 2017 and 2016 resulting from the fluctuations in market value of these metals. These adjustments increased cost of sales by $2.9 million in 2018 and decreased cost of sales by $3.6 million and $1.7 million in 2017 and 2016, respectively.

During 2018, 2017 and 2016, we reduced the quantity of certain domestic metal inventory, resulting in a liquidation of LIFO inventory layers. These reductions increased cost of sales by $0.1 million, $1.0 million and $1.9 million in 2018, 2017 and 2016, respectively.

Below is a summary of inventories valued at period-end market values compared to the as reported values.

	As of December 31,	
(in millions)	2018	2017
Market value	$296.5	$329.1
As reported	218.2	208.1
Excess of market over reported value	$78.3	$121.0

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

7. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets were as follows:

	As of December 31,	
(in millions)	2018	2017
Workers' compensation plan deposits	$ 2.9	$ 3.8
Prepaid insurance	1.6	1.9
Derivative contract assets	—	2.0
Other	4.0	4.0
Total prepaid expenses and other current assets	$ 8.5	$ 11.7

8. Property, Plant and Equipment

Property, plant and equipment balances, including assets under capital lease, were as follows:

	As of December 31,		Useful Life (in years)
(in millions)	2018	2017	
Land improvements	$4.4	$3.6	12 - 20
Buildings and building improvements	32.6	29.9	20 - 50
Machinery and equipment	195.2	175.3	3 - 12
Leasehold improvements	2.1	1.7	
Construction-in-process	11.3	11.4	
Gross property, plant and equipment	245.6	221.9	
Accumulated depreciation	(97.8)	(79.0)	
Property, plant and equipment, net	$147.8	$142.9	

Leasehold improvements are amortized over the lesser of their useful lives or the remaining lease term.

We capitalized interest relating to the construction of long-term assets in the amount of $0.1 million in 2018, $0.1 million in 2017 and $1.1 million in 2016.

As of December 31, 2018, assets recorded under capital lease obligations totaled $8.1 million and related accumulated depreciation totaled $6.0 million. As of December 31, 2017, assets recorded under capital lease obligations totaled $7.6 million and related accumulated depreciation totaled $4.3 million. Interest recorded on capital lease obligations is included in interest expense in the accompanying consolidated statements of operations.

9. Accrued Liabilities

Accrued liabilities consisted of the following:

	As of December 31,	
(in millions)	2018	2017
Compensation and benefits	$ 23.4	$ 21.1
Workers' compensation	2.7	2.9
Utilities	2.7	2.4
Professional fees	1.8	1.6
Taxes	1.2	1.4
Derivative contract liabilities	0.9	0.2
Other	7.5	6.4
Total accrued liabilities	$ 40.2	$ 36.0

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Global Brass and Copper Holdings, Inc.
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10. Financing

Long-term debt consisted of the following:

(in millions)	As of December 31, 2018	2017
Term Loan B Facility	$ 312.8	$ 316.0
Deferred financing fees and discount on debt	(5.1)	(5.9)
Obligations under capital lease	2.6	3.9
Total debt	310.3	314.0
Current portion of debt	(4.6)	(5.0)
Noncurrent portion of debt	$ 305.7	$ 309.0

Through July 18, 2016, our debt facilities consisted of Senior Secured Notes and a former ABL Facility. During the year ended December 31, 2016, we purchased in the open market an aggregate of $40.0 million principal amount of our then existing Senior Secured Notes, for an aggregate purchase price of $42.5 million, plus accrued interest.

On July 18, 2016, we obtained a new Term Loan B Facility and used a portion of the proceeds to redeem the remaining $305.3 million principal amount outstanding of our Senior Secured Notes. As part of this refinancing and in accordance with the indenture governing the then existing Senior Secured Notes (“Indenture”), we called and terminated the notes at a redemption price of 104.75% plus accrued interest.

We recognized a loss on the extinguishment of debt in the year ended December 31, 2016 of $23.4 million, which includes a premium of $17.0 million and the write-off of $6.4 million of unamortized debt issuance costs for both the Senior Secured Notes and the former ABL Facility.

Term Loan B Facility

On July 18, 2016, we entered into a long-term credit agreement that matures July 18, 2023 (the “Term Loan B Credit Agreement” and the loans thereunder, the “Term Loan B Facility”) and provides for borrowings of $320.0 million. We may request an increase in the aggregate term loans, at our option and under certain circumstances, of up to an additional $75.0 million or an unlimited amount so long as after giving effect to any incremental facility or incremental equivalent debt, the net senior secured leverage ratio does not exceed 2.50 to 1.00 (but the lenders, in either case, are not obligated to grant such an increase). On December 30, 2016, we began making quarterly payments of $0.8 million with the balance expected to be due at maturity.

On each of July 18, 2017 and May 29, 2018, we amended the credit agreement governing our Term Loan B Facility (the “Amended Term Loan B Credit Agreement”). The most recent refinancing reduced our interest rate spread by an additional 75 basis points, reduced the LIBO Rate floor from 1% to 0%, and extended the maturity date through May 29, 2025. Amounts outstanding under this facility now bear interest at a rate per annum equal to, at our option, either (1) 1.50% plus an Alternate Base Rate (as defined in the Amended Term Loan B Credit Agreement) or (2) 2.50% plus the Adjusted LIBO Rate (as defined in the Amended Term Loan B Credit Agreement).

In order to minimize the variability in cash flows caused by fluctuations in market interest rates, we entered into an interest rate swap agreement on May 25, 2018, which expires on May 31, 2023. This swap agreement fixes the LIBOR rate on $150.0 million of our floating rate LIBOR debt at 2.75%. At December 31, 2018, amounts outstanding under the Term Loan B Facility combined with our interest rate swap derivative accrued interest at a weighted average rate of 5.15%.

The Term Loan B Credit Agreement requires mandatory prepayments based on various events and circumstances as are customary in such agreements. Since December 31, 2017, we are subject to a 50% excess cash flow sweep, subject to step-downs to 25% and 0% depending on the total net leverage ratio from time to time. We may, however, voluntarily prepay outstanding loans under the Term Loan B Facility at any time

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ABL Facility

We have an asset-based revolving loan facility that provides for borrowings of up to the lesser of $200.0 million or the borrowing base, in each case less outstanding loans and letters of credit. Maturing on July 19, 2021, we entered into this credit agreement with a syndicate of lenders on July 18, 2016 (the "ABL Credit Agreement" and the facility thereunder, the "ABL Facility") when we refinanced out of the already existing asset-based lending facility.

As of December 31, 2018, available borrowings under the ABL Facility were $195.4 million after giving effect to $4.6 million of letters of credit outstanding, which are used to provide collateral for our insurance programs. We may request an increase in the maximum commitments, at our option and under certain circumstances, of up to $200.0 million (but the lenders are not obligated to grant such an increase).

Amounts outstanding, if any, under the ABL Facility bear interest at a rate per annum equal to, at our option, either (1) 0.25% to 0.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus an Alternate Base Rate (as defined in the ABL Credit Agreement) or (2) 1.25% to 1.75% subject to an average quarterly availability pricing grid set forth in the ABL Credit Agreement plus the Adjusted LIBO Rate (as defined in the ABL Credit Agreement). Unused amounts under the ABL Facility incur an unused line fee of 0.375% or 0.25% per annum (depending on the percentage of aggregate revolving exposure), payable in arrears on a quarterly basis.

The ABL Credit Agreement requires us to prepay or cash collateralize the applicable portion of any outstanding revolving loans under circumstances as are customary in agreements of this type. However, we may voluntarily repay and reborrow outstanding loans under the ABL Facility at any time without a premium or penalty, other than customary "breakage" costs with respect to loans made utilizing the Adjusted LIBO Rate (as defined in the ABL Credit Agreement).

The ABL Credit Agreement also contains a financial covenant requiring us to maintain a fixed charge coverage ratio that is tested whenever excess availability, as defined in the ABL Credit Agreement, falls below the greater of $20.0 million or 10% of our potential borrowings. The "fixed charge coverage ratio" requires us to maintain a ratio of "Consolidated Adjusted EBITDA" to the amount of our "fixed charges" (for all terms, as defined in the ABL Credit Agreement) for the twelve consecutive months prior to the date on which the ratio is tested equal to or greater than 1.0 to 1.0.

The Credit Agreements

The ABL Credit Agreement and the Term Loan B Credit Agreement (together, the "Credit Agreements") contain various other covenants consistent with debt agreements of this kind, such as restrictions on the amounts of dividends we can pay.

A violation of covenants under either of the Credit Agreements may result in default in that agreement or a cross-default in the other agreement, as applicable. Upon the occurrence of an event of default under one or both of the Credit Agreements, the requisite lenders could elect to declare all amounts of such indebtedness outstanding immediately due and payable and terminate any commitments to extend further credit.

If we are unable to repay those amounts, the lenders under the applicable Credit Agreement may proceed against the collateral granted to them to secure such indebtedness. Substantially all of our assets are pledged as collateral under the Credit Agreements. The ABL Facility is secured by a senior-priority interest in our cash, accounts receivable and inventory (which secure the Term Loan B Facility on a junior-priority basis) and the Term Loan B is secured by a senior-priority security interest in the remaining pledged assets (most significant of which is our fixed assets), which secure the ABL Facility on a junior-priority basis. If the lenders accelerate the repayment of borrowings, such acceleration could have a material adverse effect on our business, financial condition, results of operations or cash flows. Furthermore, cross-default provisions in the Credit Agreements provide that any default under the Credit Agreements or other significant debt agreements could trigger a cross-default under the Credit Agreements, as applicable.

As of December 31, 2018, we were in compliance with all of the covenants relating to the Credit Agreements.

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Capital Lease Obligations

Future minimum capital lease payments at December 31, 2018 are as follows:

(in millions)		
2019	$	1.5
2020	0.5	
2021	0.3	
2022	0.3	
2023	0.1	
Thereafter	0.1	
Total	$	2.8
Amount representing interest	(0.2	)
Present value of minimum lease payments	$	2.6
Current portion of capital lease obligations	(1.4	)
Noncurrent portion of capital lease obligations	$	1.2

11. Income Taxes

Income before provision for income taxes and equity income is comprised of the following:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Domestic	$69.6	$77.4	$40.8
Foreign	6.3	8.2	8.7
Total	$75.9	$85.6	$49.5

The provision for income taxes is summarized as follows:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Current tax provision			
U.S. federal	$ 7.0	$ 11.2	$ 8.0
State and local	3.3	1.8	1.2
Foreign	1.7	2.9	2.8
Total current	12.0	15.9	12.0
Deferred tax provision			
U.S. federal	3.9	16.7	4.1
State and local	1.3	1.6	0.8
Foreign	0.1	(0.3)	(0.2)
Total deferred	5.3	18.0	4.7
Total provision	$ 17.3	$ 33.9	$ 16.7

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The effective income tax rate differs from the amount determined by applying the applicable U.S. statutory federal income tax rate to pretax results primarily as a result of the following:

	Year Ended December 31,		
	2018	2017	2016
Statutory provision rate	21.0 %	35.0 %	35.0 %
Permanent differences and other items			
State tax provision	4.3 %	2.6 %	2.4 %
Section 199 manufacturing credit	— %	(2.6)%	(2.0)%
Incremental tax effects of foreign earnings	0.7 %	(0.4)%	(0.2)%
Valuation allowance	(0.8)%	— %	(2.0)%
Stock compensation	0.4 %	(3.2)%	— %
Tax reform adjustment	— %	8.6 %	— %
Return-to-provision adjustment	(2.5)%	0.6 %	0.3 %
Other	(0.3)%	(1.0)%	0.2 %
Effective income tax rate	22.8 %	39.6 %	33.7 %

Deferred tax assets and liabilities are comprised of the following:

	As of December 31,	
(in millions)	2018	2017
Deferred tax assets		
Inventory	$ 26.2	$ 27.9
Accounts receivable	1.0	1.4
UNICAP adjustment	2.0	1.9
Derivative contracts	1.5	0.3
Other	4.3	5.0
Valuation allowance	—	(0.6)
Total deferred tax assets, net of valuation allowance	$ 35.0	$ 35.9
Deferred tax liabilities		
Fixed assets and intangibles	$ 21.0	$ 16.8
Accruals and other reserves	0.2	0.2
Investments in foreign entities	1.5	1.3
Financing fees	1.0	1.5
Total deferred tax liabilities	23.7	19.8
Net deferred tax asset	$ 11.3	$ 16.1

At December 31, 2018 and 2017, our deferred tax assets include $15.7 million and $16.5 million, respectively, related to the impact of the purchase price allocations to LIFO inventories for tax purposes on the bargain purchase gain on the original asset acquisition from Olin Corporation on November 19, 2007.

At December 31, 2018, we had a foreign tax credit carryforward of $0.8 million which can be utilized through 2027. Deferred tax assets are recorded for the estimated future benefit of foreign tax credits and other temporary differences to the extent we believe these assets will be realized. A valuation allowance is recorded when we cannot reach the conclusion that it is more likely than not that the deferred tax assets will be realized. In 2017, we established a valuation allowance against our foreign tax credits of $0.6 million. In 2018, we released the $0.6 million valuation allowance on foreign tax credits based on new regulations and future projections.

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We have established a deferred tax liability for foreign withholding and U.S. state income taxes of $1.5 million on earnings of foreign consolidated subsidiaries expected to be repatriated. We consider any excess of the amount for financial reporting over the tax basis of our investment in our foreign subsidiaries to be indefinitely reinvested. At this time, the determination of deferred tax liabilities on this amount is not practicable.

Uncertain Tax Positions

We are subject to income taxation in several jurisdictions around the world. We believe that an adequate provision has been made for any adjustments that may result from tax examinations. However, the outcome of tax audits cannot be predicted with certainty. If any issues addressed in our tax audits are resolved in a manner not consistent with our expectations, we could be required to adjust our provision for income taxes in the period such resolution occurs. Although timing of the resolution and/or closure of audits is not certain, we believe we have adequately reserved for any potential tax exposures at December 31, 2018. Our U.S. federal returns for the period ended December 31, 2015 and all subsequent periods remain open for audit. The majority of state returns for the period ended December 31, 2014 and all subsequent periods remain open for audit.

At December 31, 2018 and 2017, we had $23.9 million and $25.2 million, respectively, of unrecognized tax benefits, of which $8.2 million and $8.5 million, respectively, would impact the effective tax rate, if recognized. Estimated interest and penalties related to the underpayment of income taxes are classified as a component of the provision for income taxes in the accompanying consolidated statements of operations. There was $2.5 million and $2.1 million of accrued interest and penalties as of December 31, 2018 and 2017, respectively. Our liability for uncertain tax positions, including accrued interest and penalties, of $26.4 million and $27.3 million at December 31, 2018 and 2017, respectively, are presented in other noncurrent liabilities in the accompanying consolidated balance sheets.

A reconciliation of the summary of activity of our uncertain tax positions is summarized as follows:

(in millions)	
Balance at January 1, 2017	$25.2
Additions for tax positions related to prior years	—
Reductions for tax positions related to prior years	—
Reductions due to tax settlements	—
Reductions due to tax statute of limitations	—
Balance at December 31, 2017	$25.2
Additions for tax positions related to prior years	—
Reductions for tax positions related to prior years	(1.3)
Reductions due to tax settlements	—
Reductions due to tax statute of limitations	—
Balance at December 31, 2018	$23.9

2017 Tax Act

On December 22, 2017, the Tax Act was signed into law. The Tax Act made broad and complex changes to the U.S. tax code including, but not limited to: (1) lowering of the U.S. federal corporate income tax rate from 35.0% to 21.0% effective January 1, 2018, (2) accelerated expensing of qualified capital investments for a specific period, and (3) transition from a worldwide to a territorial tax system which will require companies to pay a one-time transition tax on certain unrepatriated earnings from foreign subsidiaries that is payable over eight years.

The Securities and Exchange Commission staff issued Staff Accounting Bulletin No. 118 (“SAB 118”), which provides guidance on accounting for the tax effects of the Tax Act. SAB 118 allows a company to record a provisional amount when it does not have the necessary information available, prepared, or analyzed in reasonable detail to complete its accounting for the change in the tax law. We utilized the approach outlined in SAB 118 to record provisional estimates for the Deemed Repatriation Transition Tax (the “Transition Tax”) in 2017.

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The Transition Tax is a tax on certain previously untaxed accumulated and current earnings and profits ("E&P") of our foreign subsidiaries. We were able to reasonably estimate the Transition Tax and recorded a provisional Transition Tax obligation of $1.0 million, net of foreign tax credits, for the year ended December 31, 2017. After further analysis, we recognized an additional measurement-period adjustment of $0.1 million during 2018, resulting in a total Transition Tax obligation of $1.1 million.
The Act reduced the corporate tax rate to 21.0%, effective January 1, 2018. We were able to reasonably estimate a decrease to our deferred tax asset of $7.0 million for the year ended December 31, 2017. On the basis of tax accounting method changes made with the filing of the 2017 tax return, we recognized an additional return-to-provision adjustment of $(2.0) million during 2018, resulting in a decrease to our deferred tax assets of $5.0 million.
We must assess whether any Uncertain Tax Positions should be recorded as a result of the Tax Act. We have completed this assessment and did not record any Uncertain Tax Positions as a result of the Tax Act.
The Act also included changes to the foreign tax credit regulations, including the addition of new tax credit buckets for general, foreign branch, and Global Intangible Low Taxed Income (GILTI) tax credits. This included an opportunity to allocate past credit carry-forwards specifically to the foreign branch bucket. Based on the new regulations and future projections, we were able to release the valuation allowance of $0.6 million that was recorded on the books at December 31, 2017.
Beginning January 1, 2018, the Tax Reform Act amended certain aspects of Section 162(m) (Section 162(m) generally disallows a tax deduction for annual compensation paid to "covered employees" in excess of $1.0 million) including eliminating an exception to the deduction limited for "qualified performance-based compensation." The deductibility of executive compensation, which has now been determined to be complete, resulted in recording an additional tax expense of $0.7 million.
We consider current earnings and the amount of previously taxed income (PTI), related to the deemed repatriated transition tax mentioned above, to not be permanently reinvested. As such, we have recorded a deferred tax liability for future taxes associated with a repatriation of those funds. Any outside basis difference related to our foreign investment above the PTI is treated as permanently reinvested.
The Act subjects a U.S. shareholder to tax on GILTI earned by certain foreign subsidiaries. The FASB Staff Q&A, Topic 740, No. 5, Accounting for Global Intangible Low-Taxed Income, states that an entity can make an accounting policy election to either recognize deferred taxes for temporary basis differences expected to reverse as GILTI in future years or to provide for the tax expense related to GILTI in the year the tax is incurred as a period expense only. We have elected to account for GILTI in the year the tax is incurred.
We believe that our accounting for the income tax effects of the Act is complete as of December 31, 2018.

12. Employee Defined Contribution Plans and Multi-Employer Pension Plans

We have a retirement savings plan (the "401k Plan") for all of our domestic subsidiaries under section 401(k) of the Internal Revenue Code that covers all U.S. salaried and most hourly employees. Participants may elect to defer a percentage of their compensation to the 401k Plan, subject to aggregate limits required by the Internal Revenue Code. The 401k Plan provides for discretionary matching contributions under certain circumstances, for employees based on location, pay status and membership in a collective bargaining unit. In addition, we provide a retirement contribution to certain employees based on location and age. We contributed $9.1 million, $8.7 million and $8.5 million to the 401k Plan in 2018, 2017 and 2016, respectively, which is recorded as compensation expense in the year incurred.
Bargaining unit employees in East Alton, IL and Alliance, OH participate in the IAM Pension Plan. The IAM Pension Plan is a multi-employer pension plan with negotiated fixed company costs per employee hour worked. The risks of participating in these multi-employer plans are different from single-employer plans, as we can be subject to additional risks if other employers do not meet their obligations. In addition, if a participating employer becomes insolvent and ceases to contribute to a multiemployer plan, the unfunded obligation of the plan will be borne by the

remaining participating employers. Under current law, an employer that withdraws or partially withdraws from a multi-employer pension plan may incur withdrawal liability to the plan. Given the facts that the IAM Pension Plan is 92% funded, many other participating employers are much larger than us, and the large number of participating employers in the plan, we do not view this to be a significant risk.

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We recorded expense for contributions to the IAM Pension Plan of $3.3 million, $3.4 million and $3.5 million in 2018, 2017 and 2016, respectively, which are included in cost of sales in the accompanying consolidated statements of operations. Our participation in the IAM Pension Plan for the annual period ended December 31, 2018, is outlined in the table below. There have been no significant changes that affect the comparability of 2018 and 2017 contributions. The IAM Pension Plan's year-end is December 31 and the plan reported $434.8 million and $413.7 million in employers' contributions for 2017 and 2016, respectively.

Pension Fund	IAM National Pension Fund
EIN/ Pension Plan Number	51-6031295 / 002
Pension Protection Act Zone Status (2018 and 2017)*	Green Zone
FIP/RP Status Pending/Implemented	No
Company Contributions (FY 2018)	$3.3 million
Company Contributions (FY 2017)	$3.3 million
Surcharge Imposed	No
Expiration Date of Collective-Bargaining Agreement	November 6, 2022

* Plans in the green zone are at least 80 percent funded.

As of the date of this filing, Forms 5500 were not available for the plan year ended in 2018.

13. Derivative Contracts

We maintain a risk-management strategy that uses commodity derivative contracts to minimize significant, unanticipated gains or losses arising from fluctuations in certain commodity prices.

We are also exposed to credit risk and market risk through our use of derivative contracts. Credit risk is the risk that the counterparty might fail to fulfill its performance obligations under the terms of the derivative contract. Market risk is the risk that the value of a derivative instrument might be adversely affected by a change in market prices and rates. We manage the market risk associated with derivative contracts by establishing and monitoring parameters that limit the types and degree of market risk that may be undertaken.

We use a cash flow hedge to minimize the variability in cash flows caused by fluctuations in market interest rates. This derivative, which is a designated cash flow hedge, is carried at fair value. The change in fair value is recorded to accumulated other comprehensive income (loss) and reclassified to current earnings if hedge accounting cannot be applied because the hedge contract is not highly effective.

We manage credit risk associated with derivative contracts by executing derivative instruments with counterparties that we believe are credit-worthy. The amount of such credit risk is limited to the fair value of the derivative contract plus the unpaid portion of amounts due to us pursuant to terms of the derivative contracts, if any. If the credit-worthiness of these counterparties deteriorates, we believe the exposure is mitigated by provisions in the derivative arrangements which allow for the legal right of offset of amounts due to us from the counterparties, if any, with any amounts payable to the counterparties.

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The following tables provide a summary of our outstanding derivative contracts:

(in millions)	As of December 31, 2018 Net Notional Amount	As of December 31, 2017 Net Notional Amount
Cash flow hedge:		
Interest rate swap	$ 150.0	$ —
Commodity and energy derivative contracts:		
Metal	27.9	12.8
Energy and utilities	3.0	3.8
Total	$ 180.9	$ 16.6

(in millions)	As of December 31, 2018 Notional Position	As of December 31, 2017 Notional Position
Commodity and energy derivative contracts:		
Notional amount - long	$ 67.4	$ 46.1
Notional amount - (short)	(36.5)	(29.5)
Net long / (short)	$ 30.9	$ 16.6

The fair values of derivative contracts in the consolidated balance sheets include the impact of netting derivative assets and liabilities when a legally enforceable master netting arrangement exists. The following tables summarize the gross amounts of open derivative contracts, the net amounts presented in the consolidated balance sheets, and the collateral deposited with counterparties:

(in millions)	As of December 31, 2018 Gross Amounts of Recognized Assets	Gross Amounts Offset in Consolidated Balance Sheet	Net Amounts of Assets Presented in Consolidated Balance Sheet
Commodity and energy derivative contracts:			
Metal	$3.3	$ (3.3)	$ —
Energy and utilities	0.1	(0.1)	—
Collateral on deposit	0.1	(0.1)	—
Total	$3.5	$ (3.5)	$ —

Global Brass and Copper Holdings, Inc.
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(in millions)	As of December 31, 2018 Gross Amounts of Recognized Liabilities	Gross Amounts Offset in Consolidated Balance Sheet	Net Amounts of Liabilities Presented in Consolidated Balance Sheet
Cash flow hedge:			
Interest rate swap	$2.0	$ —	$ 2.0
Commodity and energy derivative contracts:			
Metal	4.2	(3.4)	0.8
Energy and utilities	0.3	(0.1)	0.2
Total	$6.5	$ (3.5)	$ 3.0
Consolidated balance sheet location:			
Accrued liabilities			$ 0.9
Other noncurrent liabilities			$ 2.1

(in millions)	As of December 31, 2017 Gross Amounts of Recognized Assets	Gross Amounts Offset in Consolidated Balance Sheet	Net Amounts of Assets Presented in Consolidated Balance Sheet
Commodity and energy derivative contracts:			
Metal	$5.3	$ (3.2)	$ 2.1
Energy and utilities	—	—	—
Total	$5.3	$ (3.2)	$ 2.1
Consolidated balance sheet location:			
Prepaid expenses and other current assets			$ 2.0
Other noncurrent assets			$ 0.1

(in millions)	As of December 31, 2017 Gross Amounts of Recognized Liabilities	Gross Amounts Offset in Consolidated Balance Sheet	Net Amounts of Liabilities Presented in Consolidated Balance Sheet
Commodity and energy derivative contracts:			
Metal	$3.3	$ (3.2)	$ 0.1
Energy and utilities	0.3	—	0.3
Total	$3.6	$ (3.2)	$ 0.4
Consolidated balance sheet location:			
Accrued liabilities			$ 0.2
Other noncurrent liabilities			$ 0.2

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The following table summarizes the effects of derivative contracts in the consolidated statements of comprehensive income and the consolidated statements of operations:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Cash flow hedge gains (losses) in other comprehensive income (loss) for:			
Interest rate swap	$(2.0)	$—	$—
Commodity and energy derivative contracts (gains) losses in cost of sales for:			
Metal	$0.3	$(4.0)	$(3.6)
Energy and utilities	(0.2)	0.6	(0.1)
Total commodity derivative contract (gains) losses in cost of sales	$0.1	$(3.4)	$(3.7)

As of December 31, 2018, we reported $1.5 million of cash flow hedge losses, net of tax, in accumulated other comprehensive income (loss) on the consolidated balance sheet. There were no cash flow hedge gains or losses reported in accumulated other comprehensive income (loss) on the consolidated balance sheet as of December 31, 2017.

14. Fair Value Measurements

ASC 820 specifies a fair value framework and hierarchy based upon the observability of inputs used in valuation techniques. In accordance with this guidance, fair value measurements are classified under the following hierarchy:

- Level 1 - Quoted prices for identical instruments in active markets.
- Level 2 - Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active and model-derived valuations in which all significant inputs or significant value-drivers are observable in active markets.
- Level 3 - Model-derived valuations in which one or more significant inputs or significant value-drivers are unobservable.

As of December 31, 2018 and December 31, 2017, the fair value of our commodity derivative contracts was a net liability of $1.0 million and a net asset of $1.7 million, respectively. In accordance with ASC 820, our commodity derivative contracts are considered Level 2 fair value measurements as they consist of both quoted price inputs and inputs provided by a third party that are derived principally from or corroborated by observable market data by correlation. These assumptions include, but are not limited to, those concerning interest rates, credit rates, discount rates, default rates, and other factors. All of our derivative commodity contracts have a set term of 24 months or less.

As of December 31, 2018, the fair value of our interest rate swap was a liability of $2.0 million. The interest rate swap is measured using a valuation model with observable inputs from active markets and is a Level 2 fair value measurement.

We neither hold assets or liabilities requiring a Level 3 measurement nor have we had any transfers between the hierarchy levels during 2018 or 2017.

For purposes of financial reporting, we have determined that the carrying value of cash, accounts receivable, accounts payable, and accrued expenses approximates fair value due to their short term nature. As of December 31, 2018 and December 31, 2017, the fair value of our money market funds, which are presented in cash and cash equivalents, was $58.7 million and $17.1 million, respectively. These cash equivalents are valued using quoted market prices at the respective balance sheet dates and are Level 1 fair value measurements.

Additionally, given the revolving nature and the variable interest rates, we have determined that the carrying value of the ABL Facility also approximates fair value. As of December 31, 2018, the fair value of our Term Loan B Facility approximated $304.2 million compared to a carrying value of $312.8 million. As of December 31, 2017, the fair value of our Term Loan B Facility approximated $318.7 million compared to a carrying value of $316.0 million. The fair value of the Term Loan B Facility was based upon quotes from financial institutions (Level 2 in the fair value hierarchy as defined by ASC 820).

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15. Commitments and Contingencies

Environmental Considerations

We are subject to a variety of environmental laws and regulations governing discharges to air and water, the handling, storage and disposal of hazardous or solid waste materials and the remediation of contamination associated with releases of hazardous substances. Although we believe we are in material compliance with all of the various regulations applicable to our business, there can be no assurance that requirements will not change in the future or that we will not incur significant costs to comply with such requirements. We employ responsible personnel at each facility, along with various environmental engineering consultants from time to time to assist with ongoing management of environmental, health and safety requirements. We expense environmental costs related to existing conditions resulting from past or current operations and from which no current or future benefit is discernible. Expenditures that extend the life of the related property are capitalized. We determine our liability on a location by location basis and record a liability at the time it is deemed probable and can be reasonably estimated. We are currently not aware of any environmental matters which may have a material impact on our financial position, results of operations, or liquidity.

On November 19, 2007 (the date of inception of GBC), we acquired the assets and operations relating to the worldwide metals business of Olin Corporation. Olin Corporation agreed to retain liability arising out of the existing conditions on certain of our properties for any remedial actions required by environmental laws, and agreed to indemnify the Company for all or part of a number of other environmental liabilities. Since 2007, Olin Corporation has been performing remedial actions at the facilities in East Alton, Illinois and Waterbury, Connecticut related to environmental conditions at such facilities, and has been participating in remedial actions at certain other properties as well. If Olin Corporation were to stop its environmental remedial activities at our properties, we could be required to assume responsibility for these activities, the cost of which could be material.

Although we are not currently subject to any material claims with respect to clean-up or remediation under CERCLA or similar laws for contamination at our leased or owned properties or at any off-site location, it is possible that we may be in the future. For example, in January 2018, Olin Brass experienced a leak of mineral oil at its Waterbury, Connecticut facility. Our personnel, the Waterbury fire department, the U.S. EPA, the Connecticut DEEP, and remediation contractors responded immediately. We incurred approximately $0.7 million of expenses in 2018 associated with this incident. Although we reached a final settlement with the U.S. EPA which resulted in a $6,000 fine, we remain in discussions with the Connecticut DEEP regarding ongoing remediation activity. We do not believe this incident will materially affect our long-term financial stability or cash flow.

Insurance Recoveries

In May 2016, Olin Brass' East Alton facility temporarily reduced production due to an equipment failure impacting an intermediate segment of the production process. The disruption resulted in a temporary reduction in customer shipments and in Olin Brass securing support via toll processing from other strip industry participants.

We sustained losses from this event. The equipment remained out of service for several weeks and resumed production in mid-June 2016. We are insured for property and business interruption losses related to these events subject to a deductible of up to $2.5 million per incident. We filed a claim with our insurance carrier to recover these losses. In 2017, we recorded total recoveries of $7.4 million related to the claim as a reduction to cost of goods sold of $3.5 million and an increase to other income of $3.9 million. All proceeds from the insurance recoveries were received as of December 31, 2017.

Legal Considerations

We are party to various legal proceedings arising in the ordinary course of business. We believe that none of our legal proceedings are individually material or that the aggregate exposure of all of our legal proceedings, including those that are probable and those that are only reasonably possible, is material to our financial condition, results of operations or cash flows.

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Global Brass and Copper Holdings, Inc.
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Operating Leases

We have operating leases covering certain facilities and equipment under non-cancelable lease agreements. As of December 31, 2018, future minimum lease payments under non-cancelable leases in effect are as follows:

(in millions)	Payment
2019	$ 3.2
2020	2.1
2021	1.5
2022	0.6
2023	0.3
Thereafter	0.2
Total minimum lease payments	$ 7.9

Rental expense under all operating leases was approximately $4.5 million, $3.3 million and $3.2 million in 2018, 2017, and 2016, respectively, and is recorded in the accompanying consolidated statements of operations as cost of sales or selling, general and administrative costs depending on the nature and use of the underlying asset being leased.

16. Share-based Compensation

The Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan ("2013 Plan") was adopted by the Board of Directors and approved by shareholders on April 10, 2013, and further amended and restated effective May 26, 2016. The 2013 Plan provides for an aggregate of 3,361,053 shares of our common stock to be available for awards in the form of options, restricted stock, restricted stock units, performance-based shares and other equity-based awards. Pursuant to the 2013 Plan, in 2018, 2017, and 2016, we granted restricted stock and performance-based shares to certain employees and members of our management and our Board of Directors, and in 2017 and 2016 we granted non-qualified options to certain employees. At December 31, 2018, 1,580,918 shares were available for future grant. We will satisfy the requirement for common stock for share-based payments by issuing shares out of authorized but unissued common stock or treasury stock.

Stock Options

Stock options are granted to certain employees with exercise prices equal to no less than the fair market value of common stock on the date of the grant. Stock options generally vest in three equal installments on the anniversary of the date of grant and have a maximum term of 10 years. We use the straight-line attribution method to recognize expense for all stock options. Stock options are generally subject to immediate forfeiture if employment terminates prior to vesting, except under certain conditions, in which case the options expire no more than 90 days after the date of such termination. The fair value of each option grant is estimated on the date of grant using the Black-Scholes option-pricing model and the following weighted-average inputs for the option pricing model:

	2017		2016	
Expected volatility	36	%	41	%
Risk-free interest rate	2.2	%	1.6	%
Dividend yield	0.4	%	0.6	%
Expected term	6.0 years		6.0 years	

Because we have only been a public company since May 2013, there is limited historical data on the volatility of our common stock. As a result, the expected volatility of the 2017 option grants was estimated based on the average volatility of the common stock of a group of our publicly traded peers and Company specific information. The expected volatility of the 2016 option grants was estimated based on the average volatility of the common stock of a group of our publicly traded peers. There were no options granted in 2018.

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The risk-free interest rate assumption in the Black-Scholes option-pricing model is based upon the U.S. Treasury Strips available with maturity period consistent with the expected term assumption. The dividend yield assumption is based on our expectation of dividend payouts.

Because we have only very limited historical information concerning stock option exercise behavior by our employees and such information is not readily available from a peer group of companies, we estimated the expected term using the "simplified" method permitted by Staff Accounting Bulletin Topic 14 issued by the SEC.

A summary of the stock option activity is summarized as follows:

	Shares	Weighted Average Exercise Price of Shares	Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in millions)
Outstanding at December 31, 2015	374,685	$ 13.90	8.5	$ 2.8
Granted	140,740	26.99		
Exercised	(41,066)	12.92		
Forfeited or expired	—	—		
Outstanding at December 31, 2016	474,359	$ 17.87	8.1	$ 7.8
Granted	92,879	33.93		
Exercised	(38,381)	19.51		
Forfeited or expired	—	—		
Outstanding at December 31, 2017	528,857	$ 20.57	7.4	$ 6.7
Granted	—	—		
Exercised	(81,100)	17.09		
Forfeited or expired	(19,374)	31.25		
Outstanding at December 31, 2018	428,383	$ 20.74	6.4	$ 2.8
Options exercisable at December 31, 2018	341,993	$ 18.11	6.1	$ 2.8

The weighted-average grant date fair value of stock options granted during 2017 and 2016 was $12.38 and $10.53, respectively. The total intrinsic value of stock options exercised in 2018, 2017 and 2016 was $1.4 million, $0.7 million and $0.7 million, respectively.

As of December 31, 2018, we had $0.3 million of total unrecognized compensation expense related to stock option grants that will be recognized over the weighted average period of 1.0 year.

Restricted Stock

Restricted stock is granted to certain employees and non-employee directors. The cost of these awards is determined using the market price of our common stock on the date of grant. Restricted stock shares granted represent newly issued shares and have the same cash dividend and voting rights as other common stock and are considered to be currently issued and outstanding. Restricted stock awards granted to employees vest over periods ranging from one to three years after the grant date, and awards granted to non-employee directors generally vest one year following the grant date. Management uses the straight-line attribution method to recognize expense for all restricted stock awards. The awards are generally subject to forfeiture if employment terminates prior to vesting, except under certain conditions. The cash dividends on restricted stock shares are forfeitable, and payments of cash dividends on restricted stock shares are withheld until the shares vest. Compensation is recognized over the period during which the employees and non-employee directors provide the requisite service to the Company.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

A summary of restricted stock activity under the 2013 Plan is presented below:

	Shares	Weighted Average Grant Date Fair Value
Nonvested restricted stock - December 31, 2015	203,258	$ 14.53
Granted	119,601	27.00
Vested	(118,097)	16.05
Forfeited	(7,438)	17.59
Nonvested restricted stock - December 31, 2016	197,324	$ 21.06
Granted	96,724	33.11
Vested	(117,852)	21.47
Forfeited	(5,416)	26.29
Nonvested restricted stock - December 31, 2017	170,780	$ 27.43
Granted	122,978	29.70
Vested	(125,410)	25.88
Forfeited	(17,871)	30.22
Nonvested restricted stock - December 31, 2018	150,477	$ 30.25

The total fair value of restricted stock that vested during 2018, 2017 and 2016 was $3.7 million, $3.9 million and $2.9 million, respectively.

At December 31, 2018, total unrecognized compensation cost related to nonvested restricted stock was $2.4 million and is expected to be recognized over a weighted average period of 1.5 years.

Performance Shares

Performance share awards are granted to certain employees and provide for the issuance of common stock if specified Company performance targets and market conditions are achieved. The number of common shares issued is dependent upon vesting and actual performance of the Company relative to the established targets.

The fair value of performance share awards granted is determined based on the market price of our common stock on the date of grant. Additionally, the awards include a market condition that must also be achieved in order to earn more than the performance shares granted; therefore, the fair value of any shares earned in excess of 100% was determined on the date of grant using a Monte Carlo simulation model. The expected volatility is based on the historical volatility of our stock price movements over the two years prior to the grant date. The risk-free interest rate is based on the U.S. Treasury Strips as of the grant date with a term measured to the end of the performance period. Specific to the estimated 2018, 2017, and 2016 performance shares earned in excess of 100%, the fair value and weighted-average inputs used were as follows:

	2018	2017	2016
Grant date fair value	$29.25	$33.92	$20.05
Expected volatility	35 %	34 %	30 %
Risk-free interest rate	2.1 %	1.1 %	0.9 %
Dividend yield	— %	— %	— %

The amount of compensation expense recognized for performance shares reflects our assessment of the probability that performance targets will be achieved. If the performance conditions of the performance awards are met, the performance shares granted in 2018, 2017, and 2016 will vest in two equal installments on the second and third anniversaries of the grant date. Performance shares that have not vested are generally subject to forfeiture if employment terminates, except under certain conditions. Cash dividends accrue on performance shares once the performance conditions have been met, but the dividends are forfeitable if the performance shares do not vest. We recognize compensation expense related to performance share grants using the graded-vesting method over the vesting periods.

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A summary of the performance share award activity is summarized as follows:

	Shares	Weighted-Average Grant-Date Fair Value
Nonvested performance shares - December 31, 2015	218,840	$ 13.67
Granted (a)	146,916	26.97
Earned (b)	205,833	5.54
Vested	(5,104)	11.00
Unearned or forfeited	(10,072)	16.58
Nonvested performance shares - December 31, 2016	556,413	$ 14.15
Granted (a)	98,518	33.92
Earned (b)	65,017	10.03
Vested	(291,859)	9.88
Unearned or forfeited	(12,719)	28.05
Nonvested performance shares - December 31, 2017	415,370	$ 20.76
Granted (a)	152,261	29.25
Earned	—	—
Vested	(221,339)	14.78
Unearned or forfeited	(82,793)	30.80
Nonvested performance shares - December 31, 2018	263,499	$ 27.54

(a) Reflected at target levels.
(b) Includes shares earned in excess of target from prior year grant.

The total fair value of performance shares that vested during 2018, 2017 and 2016 was $6.6 million, $9.9 million and $0.1 million, respectively.

At December 31, 2018, total unrecognized compensation cost related to the performance share awards granted of approximately $4.1 million is expected to be recognized over a weighted average period of 1.4 years.

Share-Based Compensation Expense

The following table summarizes share-based compensation expense, reported as a component of selling, general, and administrative expense, related to our stock options, restricted stock and performance share awards:

	Year Ended December 31,		
(in millions)	2018	2017	2016
Stock options	$0.5	$1.2	$1.3
Restricted stock	3.2	3.0	2.4
Performance shares	3.0	4.0	3.2
Total pre-tax share-based compensation expense	$6.7	$8.2	$6.9
Net tax benefit related to share-based compensation expense	$1.2	$3.2	$2.6

Tax benefits realized from the exercise of stock options and the vesting of restricted stock and performance shares were $2.9 million, $5.8 million and $1.6 million in 2018, 2017 and 2016, respectively.

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

17. Acquisition

On November 1, 2017, our A.J. Oster subsidiary acquired certain assets and assumed certain liabilities of Alumet. Headquartered in Parsippany, New Jersey, Alumet is a non-ferrous metals service center that provides coated aluminum, aluminum, copper and brass sheet, and strip products to the building and housing and automotive markets through its cut to length, slitting, and coating capabilities. The acquisition of Alumet expands A.J. Oster's geographic presence into the South and Southeast through Alumet's facilities in Atlanta and Texas while also providing additional outlets for Alumet's products through A.J. Oster's facilities in Chicago and Mexico. The Alumet acquisition was part of our strategic efforts to profitably grow through acquisitions and expands our geographic presence in targeted regions, strengthens our position in the aluminum market, and enhances our position in the non-ferrous metals distribution business.

We accounted for the Alumet acquisition as a business combination using the acquisition method in accordance with ASC 805, Business Combinations. The results of operations of Alumet have been included in the Consolidated Statement of Operations since November 1, 2017. Alumet net sales and net income from acquisition date on November 1, 2017 through December 31, 2017 were $19.0 million and $0.5 million, respectively.

We acquired certain assets and liabilities of Alumet for approximately $41.7 million. The following table summarizes the estimated fair values of the assets acquired and liabilities assumed at the date of acquisition:

(in millions)	
Purchase price to allocate	$41.7
Fair value of assets acquired and liabilities assumed:	
Accounts receivable	$16.9
Inventories	30.7
Prepaid expenses and other current assets	0.3
Property, plant and equipment	5.7
Intangible assets	1.7
Other noncurrent assets	0.1
Accounts payable	(8.0)
Accrued liabilities	(4.0)
Capital lease liability	(1.7)
Total fair value of assets acquired and liabilities assumed	$41.7
Goodwill	$—

The $1.7 million of acquired intangible assets consists of customer relationships of $1.0 million (15-year useful life), trade name of $0.3 million (15-year useful life), non-compete agreements of $0.2 million (2-year useful life), and leasehold interests of $0.2 million (2.5-year useful life).

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

Pro Forma Information

The following unaudited pro forma results of operations reflect the November 1, 2017 Alumet acquisition as if it had occurred on January 1, 2016. The pro forma information is not necessarily indicative of the results that actually would have occurred, nor does it indicate future operating results.

	Year Ended December 31,	
(in millions, except per share data)	2017	2016
Net sales:		
As reported	$1,578.6	$1,338.3
Pro forma	1,709.7	1,466.4
Net income attributable to Global Brass and Copper Holdings, Inc.:		
As reported	$51.1	$32.2
Pro forma	55.5	37.2
Net income attributable to Global Brass and Copper Holdings, Inc. per common share - Basic:		
As reported	$2.35	$1.50
Pro forma	$2.55	$1.74
Net income attributable to Global Brass and Copper Holdings, Inc. per common share - Diluted:		
As reported	$2.31	$1.49
Pro forma	$2.51	$1.72

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Global Brass and Copper Holdings, Inc.
Notes to Consolidated Financial Statements

18. Quarterly Financial Information (Unaudited)

(in millions, except per share data)	2018 First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Net sales	$471.8		$459.4		$429.9		$404.3	
Gross profit	49.0	(a)	57.9	(a)	42.9	(a)	36.9	(a)
Income before provision for income taxes	21.2		29.1	(b)	16.8		8.8	
Net income	15.9		21.1		14.9		6.7	
Net income attributable to Global Brass and Copper Holdings, Inc.	15.8		21.0		14.8		6.6	
Net income attributable to Global Brass and Copper Holdings, Inc. per common share:								
Basic	$0.72		$0.95		$0.67		$0.30	
Diluted	$0.71		$0.94		$0.66		$0.29	

(in millions, except per share data)	2017 First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Net sales	$419.5		$374.8		$359.4		$424.9	
Gross profit	50.6	(c)	44.2	(c)	43.6	(c)	45.8	(c)
Income before provision for income taxes	22.7		24.6		19.0	(d)	19.3	
Net income	17.7		15.8		12.4		5.8	
Net income attributable to Global Brass and Copper Holdings, Inc.	17.5		15.7		12.3		5.6	
Net income attributable to Global Brass and Copper Holdings, Inc. per common share:								
Basic	$0.81		$0.72		$0.56		$0.26	
Diluted	$0.79		$0.71		$0.56		$0.25	

(a) Includes lower of cost or market adjustments for certain domestic, non-copper metal inventory, which increased gross profit by $0.9 million and $0.2 million in the first and second quarters, respectively, and decreased gross profit by $1.2 million and $2.8 million in the third and fourth quarters, respectively. Includes $0.1 million loss from liquidation of LIFO inventory layers in the fourth quarter.

(b) Includes $0.5 million loss from extinguishment of debt in the second quarter.

(c) Includes lower of cost or market adjustments for certain domestic, non-copper metal inventory, which increased gross profit by $0.8 million, $0.7 million, and $2.8 million in the first, third, and fourth quarters, respectively, and decreased gross profit by $0.7 million in the second quarter. Includes $1.0 million loss from liquidation of LIFO inventory layers in the fourth quarter.

(d) Includes $0.2 million loss from extinguishment of debt in the third quarter.

Basic and diluted EPS are computed independently for each of the periods presented. Accordingly, the sum of the quarterly EPS amounts may not equal the total for the year.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Management, with the participation of the principal executive officer and principal financial officer, must periodically evaluate the Company’s “disclosure controls and procedures” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (“Exchange Act”). Disclosure controls and procedures are defined as controls and other procedures of a reporting company that are designed to ensure that information required to be disclosed by the reporting company in its reports filed or submitted to the SEC under the Exchange Act (such as this Form 10-K) is (i) recorded, processed, summarized, and reported in the time periods specified in the SEC’s rules and forms, and (ii) accumulated and communicated to management, including its principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosures.

Our management, with the participation of the Chief Executive Officer and the Chief Financial Officer, carried out an evaluation of the effectiveness of the design and operation of the Company’s disclosure controls and procedures as of December 31, 2018. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost benefit relationship of possible controls and procedures. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that, as of December 31, 2018, the design and operation of our disclosure controls and procedures were effective to provide reasonable assurance that the desired control objectives were achieved.

Management’s Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Our internal control over financial reporting is 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. Management assessed the design and effectiveness of the Company’s internal control over financial reporting as of December 31, 2018.

In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”) in Internal Control-Integrated Framework (2013 framework). Based on this evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2018 based on criteria in Internal Control -Integrated Framework issued by the COSO.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears under Item 8 of this Annual Report on Form 10-K.

Changes in internal controls

In the third quarter of 2018, we implemented a new consolidation software system, which required changes to certain of our business processes and internal controls over financial reporting. Although our internal control over financial reporting has been affected by the implementation of this system, we do not believe that the implementation of this system will have an adverse effect on our internal control over financial reporting. There have been no changes in our internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

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PART III
Item 10. Directors, Executive Officers and Corporate Governance.
Management
Information regarding our management and directors, included under the heading "Directors, Executive Officers and Corporate Governance," is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Audit Committee
Information with respect to the Audit Committee and Audit Committee financial experts, included under the heading "Audit Committee" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Section 16(a) Beneficial Ownership Reporting Compliance
Information regarding Section 16(a) compliance, included under the heading "Section 16(a) Beneficial Ownership Reporting Compliance" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Codes of Conduct
The Board has adopted a Code of Business Conduct and Ethics, which applies to all employees, including our executive officers (which includes our Principal Executive Officer, our Principal Financial Officer and our Principal Accounting Officer). Our Code of Business Conduct and Ethics can be found on our website at http://www.gbcholdings.com. We will post any amendment to or waiver from the provisions of the Code of Business Conduct and Ethics that applies to the executive officers above on the same website and will provide it to shareholders free of charge upon written request by contacting Global Brass and Copper Holdings, Inc. at 475 N. Martingale Road, Suite 1200, Schaumburg, IL 60173, Attention: Investor Relations.
Item 11. Executive Compensation.
Information with respect to compensation of our executive officers and directors, included under the headings "Compensation Discussion and Analysis," "Executive Compensation," "Compensation Committee Interlocks and Insider Participation" and "Compensation Committee Report" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.
Information with respect to security ownership of certain beneficial owners and management, included under the heading "Security Ownership of Certain Beneficial Owners, Directors and Management" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018. Information with respect to securities authorized for issuance under equity compensation plans, included under the heading "Equity Compensation Plan Information Table" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Item 13. Certain Relationships and Related Transactions, and Director Independence.
Information regarding certain relationships and related transactions, and director independence, included under the heading, "Certain Relationships and Related Party Transactions" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.
Item 14. Principal Accounting Fees and Services.
Information with respect to principal accounting fees and services, included under the heading "Fees of Independent Accountants" in the Proxy Statement, is incorporated by reference herein from our 2019 proxy statement to be filed with the SEC not later than 120 days after the end of our fiscal year ended December 31, 2018.

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PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Annual Report on Form 10-K:

1. Financial Statements: the report of independent registered public accounting firm, financial statements and notes are contained in Item 8 of this Annual Report.
2. Financial statement schedules are omitted because they are not applicable or the required information is presented in the financial statements or related notes.
3. Exhibits

Exhibit Number	Description
2.1*	Purchase Agreement, between Global Brass and Copper Acquisition Co. and Olin Corporation, dated as of October 15, 2007.
3.1****	Amended and Restated Certificate of Incorporation of Global Brass and Copper Holdings, Inc.
3.2*********	Amended and Restated Bylaws of Global Brass and Copper Holdings, Inc.
4.1****	Form of Certificate of Common Stock of Global Brass and Copper Holdings, Inc.
10.1***************	Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan, as amended and restated May 26, 2016.
10.2*	Severance Agreement, by and between John J. Wasz and Global Brass and Copper, Inc., dated August 31, 2011.
10.3******	Employment Agreement between Global Brass and Copper, Inc. and John J. Wasz, dated May 8, 2014.
10.4*******	Severance Agreement, by and between Robert T. Micchelli and Global Brass and Copper, Inc., dated March 17, 2014.
10.5***********	Severance Agreement, by and among Christopher J. Kodosky, Global Brass and Copper Holdings, Inc., and Global Brass and Copper, Inc., dated July 11, 2016.
10.6*	Severance Agreement, by and between Devin K. Denner and Global Brass and Copper, Inc., dated July 29, 2011.
10.7**	Amendment No. 1 to Severance Agreement, by and between Devin K. Denner and Global Brass and Copper, Inc., dated February 9, 2012.
10.8**********	Severance Agreement, by and between Scott B. Hamilton and Global Brass and Copper, Inc., dated October 10, 2011.
10.9**********	Severance Agreement, by and between Kevin W. Bense and Global Brass and Copper, Inc., dated September 20, 2013.
10.10**********	Severance Agreement, by and between William G. Toler and Global Brass and Copper, Inc., dated September 9, 2013.

10.11**************	Agreement, Waiver and Release of Claims dated December 12, 2017 between the Company and Scott B. Hamilton.
10.12***	ABL Credit Agreement, dated as of July 18, 2016, among the Company, Global Brass and Copper, Inc., as Borrower, the loan guarantors party thereto, the lenders party thereto, Bank of America, N.A. and Wells Fargo Bank, National Association, as Co-Syndication Agents, and JPMorgan Chase Bank, N.A., as Administrative Agent.
10.13***	Term Loan B Credit Agreement, dated as of July 18, 2016, among the Company, Global Brass and Copper, Inc., as Borrower, the loan guarantors party thereto, the lenders party thereto, Bank of America, N.A. Wells Fargo Bank, National Association, and Deutsche Bank Securities Inc., as Co-Syndication Agents, Branch Banking and Trust Company, Keybank National Association and William Blair & Company, L.L.C. as Co-Documentation Agents, and JPMorgan Chase Bank, N.A., as Administrative Agent.

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Exhibit Number	Description
10.14************	Intercreditor Agreement, dated as of July 18, 2016, by and among JPMorgan Chase Bank, N.A., as Administrative Agent for the ABL Secured Parties (as defined below), JPMorgan Chase Bank, N.A., as Administrative Agent for the Term Loan Secured Parties and each of the Loan Parties party thereto.
10.15************	Term Loan Pledge and Security Agreement, dated as of July 18, 2016, by and among Global Brass and Copper, Inc., as Borrower, each grantor party thereto and JPMorgan Chase Bank, N.A., as administrative agent.
10.16************	ABL Pledge and Security Agreement, dated as of July 18, 2016, by and among Global Brass and Copper, Inc., as Borrower, each grantor party thereto and JPMorgan Chase Bank, N.A., as administrative agent.
10.17*************	Amendment No. 1 to Term Loan B Credit Agreement, dated as of July 18, 2017, among the Company, Global Brass and Copper, Inc., as Borrower, the loan guarantors party thereto, the lenders party thereto, Bank of America, N.A. Wells Fargo Bank, National Association, and Deutsche Bank Securities Inc., as Co-Syndication Agents, Branch Banking and Trust Company, Keybank National Association and William Blair & Company, L.L.C. as Co-Documentation Agents, and JPMorgan Chase Bank, N.A., as Administrative Agent.
10.18****************	Amendment No. 2 to Term Loan Credit Agreement, dated May 29, 2018, among Global Brass and Copper, Inc., as Borrower, the other Loan Parties party thereto, and JPMorgan Chase Bank, N.A., as Administrative Agent.
10.19*************	Amendment No. 1 to ABL Credit Agreement, dated as of July 18, 2017, among the Company, Global Brass and Copper, Inc., as Borrower, the loan guarantors party thereto, the lenders party thereto, Bank of America, N.A. and Wells Fargo Bank, National Association, as Co-Syndication Agents, and JPMorgan Chase Bank, N.A., as Administrative Agent.
10.20*	Indenture of Lease, between The Lares Group II and A.J. Oster Company, dated March 1, 1995, as amended.
10.21************	Fourth Amendment to Lease between The Lares Group II and A.J. Oster Company, dated March 1, 2014.
10.22*	Single Tenant Lease, between La Palmea Flex, L.P. and A.J. Oster West LLC, dated February 1, 2009.
10.23************	First Amendment to Single Tenant Lease, between La Palmea Flex, L.P. and A.J. Oster West LLC, dated December 10, 2013.
10.24****	Form of Indemnity Agreement.
10.25*****	Investor Rights Agreement, dated as of May 29, 2013, by and between Global Brass and Copper Holdings, Inc. and Halkos Holdings, LLC.

^10.26********	Form of Performance Share Award Agreement under the Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan.
^10.27***********	Form of Performance Share Award Agreement under the Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan, as amended.
^10.28********	Form of Nonqualified Option Award Agreement under the Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan.
^10.29********	Form of Employee Restricted Stock Award Agreement under the Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan.
^10.30********	Form of Director Restricted Stock Award Agreement under the Global Brass and Copper Holdings, Inc. 2013 Omnibus Equity Incentive Plan.
21.1	List of Subsidiaries of Global Brass and Copper Holdings, Inc.
23.1	Consent of PricewaterhouseCoopers LLP.
31.1	Certification of Chief Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002.

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Exhibit Number	Description
32.1†	Certification of Chief Executive Officer and Chief Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase.
101.DEF	XBRL Taxonomy Extension Definition Linkbase.
101.LAB	XBRL Taxonomy Extension Label Linkbase.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase.

*	Filed with Amendment No. 1 to Form S-1 (No. 333-177594) of Global Brass and Copper Holdings, Inc. on January 6, 2012 and incorporated by reference herein.
**	Filed with Amendment No. 2 to Form S-1 (No. 333-177594) of Global Brass and Copper Holdings, Inc. on February 10, 2012 and incorporated by reference herein.
***	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on July 22, 2016 and incorporated by reference herein.
****	Filed with Amendment No. 6 to Form S-1 (No. 333-177594) of Global Brass and Copper Holdings, Inc. on May 8, 2013 and incorporated by reference herein.
*****	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on May 29, 2013 and incorporated by reference herein.
******	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on May 14, 2014 and incorporated by reference herein.
*******	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on March 19, 2014 and incorporated by reference herein.
********	Filed on Form 10-K of Global Brass and Copper Holdings, Inc. on March 19, 2014 and incorporated by reference herein.
*********	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on March 10, 2015 and incorporated by reference herein.
**********	Filed on Form 10-K of Global Brass and Copper Holdings, Inc. on March 16, 2015 and incorporated by reference herein.
***********	Filed on Form 10-Q of Global Brass and Copper Holdings, Inc. on August 5, 2016 and incorporated by reference herein.
************	Filed on Form 10-K of Global Brass and Copper Holdings, Inc. on March 7, 2017 and incorporated by reference herein.
*************	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on July 18, 2017 and incorporated by reference herein.
**************	Filed on Form 8-K of Global Brass and Copper Holdings, Inc. on December 19, 2017 and incorporated by reference herein.
***************	Incorporated by reference to Appendix A to the Definitive Proxy Statement on Schedule 14A of Global Brass and Copper Holdings, Inc. for its 2016 Annual Meeting of Stockholders filed on April 8, 2016.
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	Filed on Form 10-Q of Global Brass and Copper Holdings, Inc. on August 3, 2018 and incorporated by reference herein.
^	Compensatory plan or arrangement
†	This certification is deemed not filed for purposes of section 18 of the Securities Exchange Act of 1934, as amended (Exchange Act), or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended (Securities Act) or the Exchange Act.

Item 16. Form 10-K Summary.

None.

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SIGNATURES

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

GLOBAL BRASS AND
COPPER HOLDINGS, INC

By: /s/ Christopher J. Kodosky
Christopher J. Kodosky
Chief Financial Officer

Date: February 28, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of Global Brass and Copper Holdings, Inc. and in the capacities indicated on February 28, 2019.

Name	Position
/s/ John J. Wasz John J. Wasz	Chief Executive Officer and President (principal executive officer) and Director
/s/ Christopher J. Kodosky Christopher J. Kodosky	Chief Financial Officer (principal financial officer and principal accounting officer)
/s/ John H. Walker John H. Walker	Chairman of the Board
/s/ Vicki L. Avril Vicki L. Avril	Director
/s/ Donald L. Marsh Donald L. Marsh	Director
/s/ Bradford T. Ray Bradford T. Ray	Director
/s/ Martin E. Welch, III Martin E. Welch, III	Director
/s/ Ronald C. Whitaker Ronald C. Whitaker	Director