

AMPCO PITTSBURGH CORP
Form 10-K
March 18, 2019

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2018

Commission File Number 1-898

AMPCO-PITTSBURGH CORPORATION

Pennsylvania (State of Incorporation)	25-1117717 (I.R.S. Employer ID No.)
726 Bell Avenue, Suite 301 Carnegie, PA 15106 (Address of principal executive offices)	(412) 456-4400 (Registrant's telephone number)

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

Title of each class Common stock, \$1 par value	Name of each exchange on which registered New York Stock Exchange
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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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

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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 such shorter period that the registrant was required to submit such files). Yes No

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

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

The aggregate market value of the voting stock of Ampco-Pittsburgh Corporation held by non-affiliates on June 29, 2018 (based upon the closing price of the Registrant's Common Stock on the New York Stock Exchange on that date) was approximately \$69 million.

As of March 11, 2019, 12,494,846 common shares were outstanding.

Documents Incorporated by Reference: Part III of this report incorporates by reference certain information from the Proxy Statement for the 2019 Annual Meeting of Shareholders.

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FORWARD-LOOKING STATEMENTS

The Private Securities Litigation Reform Act of 1995 (the “Act”) provides a safe harbor for forward-looking statements made by us or on our behalf. Management’s Discussion and Analysis of Financial Condition and Results of Operation and other sections of the Annual Report on Form 10-K as well as the consolidated financial statements and notes thereto may contain forward-looking statements that reflect our current views with respect to future events and financial performance.

All statements in this document other than statements of historical fact are statements that are, or could be, deemed “forward-looking statements” within the meaning of the Act. In this document, statements regarding future financial position, sales, costs, earnings, cash flows, other measures of results of operations, capital expenditures, debt levels, plans, objectives, outlook, targets, guidance or goals are forward-looking statements. Words such as “may,” “intend,” “believe,” “expect,” “anticipate,” “estimate,” “project,” “forecast” and other terms of similar meaning that indicate future events and trends are also generally intended to identify forward-looking statements. Forward-looking statements speak only as of the date on which such statements are made, are not guarantees of future performance or expectations, and involve risks and uncertainties. For us, these risks and uncertainties include, but are not limited to, those described under Item 1A. Risk Factors of this Annual Report on Form 10-K. In addition, there may be events in the future that we are not able to predict accurately or control which may cause actual results to differ materially from expectations expressed or implied by forward-looking statements. Except as required by applicable law, we assume no obligation, and disclaim any obligation, to update forward-looking statements whether as a result of new information, events or otherwise.

– PART I –

ITEM 1. BUSINESS

GENERAL DEVELOPMENT OF BUSINESS

Ampco-Pittsburgh Corporation (the “Corporation”) was incorporated in Pennsylvania in 1929. The Corporation, individually or together with its consolidated subsidiaries, is also referred to herein as the “Registrant.” The Corporation classifies its businesses in two segments: Forged and Cast Engineered Products and Air and Liquid Processing.

NARRATIVE DESCRIPTION OF BUSINESS

Forged and Cast Engineered Products Segment

Union Electric Steel Corporation produces ingot and forged products that service a wide variety of industries globally. It specializes in the production of forged hardened steel rolls used in rolling mills by producers of steel, aluminum and other metals throughout the world. In addition, it produces ingot and open-die forged products which are used in the oil and gas industry and the aluminum and plastic extrusion industries. Union Electric Steel Corporation is headquartered in Carnegie, Pennsylvania, with three manufacturing facilities in Pennsylvania and one in Indiana. It is one of the largest producers of forged hardened steel rolls in the world. In addition to a few domestic competitors, several major European, South American and Asian manufacturers also compete in both the domestic and foreign markets.

The following entities are direct or indirect operating subsidiaries of Union Electric Steel Corporation:

Union Electric Steel UK Limited produces cast rolls in a variety of iron and steel qualities for hot and cold strip mills, medium/heavy section mills and plate mills. It is located in Gateshead, England, and is a major supplier of cast rolls to

the metalworking industry worldwide. It primarily competes with European, Asian and North and South American companies in both domestic and foreign markets.

Åkers Sweden AB produces cast rolls in a variety of iron and steel qualities for hot strip finishing, roughing mills, plate mills and medium/heavy section mills. It is located in Åkers Styckebruk, Sweden.

Åkers Valji Ravne d.o.o. produces forged rolls for cluster mills and Z-Hi mills, work rolls for narrow and wide strip and aluminum mills, back-up rolls for narrow strip mills, and leveling rolls and shafts. It is located in Ravne, Slovenia.

Akers National Roll Company produces cast rolls for hot and cold strip mills, and plate mills. It is located in Avonmore, Pennsylvania. Certain operations were temporarily idled in mid-2017.

ASW Steel Inc. is a premier specialty steel producer located in Welland, Ontario, Canada.

Alloys Unlimited Processing, LLC is a distributor of tool steels, alloys and carbon round bar, located in Austintown, Ohio.

The segment also has an equity interest in three joint venture companies in China:

Shanxi Åkers TISCO Roll Co. Ltd., is a joint venture between Taiyuan Iron and Steel Co Ltd. and Åkers AB, a subsidiary of Union Electric Steel Corporation, that produces cast rolls for hot strip mills, steckel mills and medium plate mills. It is located in Taiyuan, Shanxi Province, China. Åkers AB holds a 59.88% interest in the joint venture.

Masteel Gongchang Roll Co., Ltd. is a joint venture among Union Electric Steel Corporation, Magang (Group) Holding Co., Ltd. and Jiangsu Gongchang Roll Co., Ltd. that produces large forged backup rolls for hot and cold strip mills. It is located in Maanshan, Anhui Province, China. Union Electric Steel (Hong Kong) Limited, a subsidiary of Union Electric Steel Corporation, holds a 33% interest in the joint venture.

Jiangsu Gongchang Roll Co., Ltd. is a joint venture that produces cast rolls for hot and cold strip mills, medium/heavy section mills and plate mills. It is located in Xinjian Town Yixing City, Jiangsu Province, China. Union Electric Steel UK Limited, a subsidiary of Union Electric Steel Corporation, holds a 24% interest in the joint venture.

In October 2018, the Board of Directors of the Corporation approved a plan to sell ASW Steel Inc. (“ASW”). The sale of ASW represents a strategic shift that will have a major impact on our results of operations and has been accounted for as a discontinued operation. See Note 2 (Discontinued Operations and Disposition) of this Annual Report on Form 10-K.

Air and Liquid Processing Segment

Aerofin Division of Air & Liquid Systems Corporation produces custom-engineered finned tube heat exchange coils and related heat transfer products for a variety of industries including nuclear power generation, industrial process and HVAC, and is located in Lynchburg, Virginia.

Buffalo Air Handling Division of Air & Liquid Systems Corporation produces large custom air handling systems used in commercial, institutional and industrial buildings and is located in Amherst, Virginia.

Buffalo Pumps Division of Air & Liquid Systems Corporation manufactures a line of centrifugal pumps for the refrigeration, power generation and marine defense industries and is located in North Tonawanda, New York.

All three of the divisions in this segment are principally represented by a common independent sales organization and have several major competitors.

Products

In both segments, the products are dependent on engineering, principally custom designed, and are sold to sophisticated commercial and industrial users located throughout the world. For additional information on the products produced and financial information about each segment, see Note 14 (Revenue) and Note 22 (Business Segments) of this Annual Report on Form 10-K.

Raw Materials

Raw materials used in both segments are generally available from many sources and neither segment is dependent upon any single supplier for any raw material. Substantial volumes of raw materials used by each segment are subject to significant variations in price. The Corporation’s subsidiaries generally do not purchase or commit for the purchase of a major portion of raw materials significantly in advance of the time they require such materials but do make forward commitments for certain commodities (copper and aluminum). See Note 12 (Derivative Instruments) of this

Annual Report on Form 10-K.

Patents and Trademarks

While the Corporation and its subsidiaries hold some patents, trademarks and licenses, in the opinion of management, they are not material to either segment.

Backlog

The backlog of orders at December 31, 2018, was approximately \$343 million, compared to a backlog of \$325 million at year-end 2017. Approximately 37% of the backlog is expected to be released after 2019.

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Competition

The Corporation faces considerable competition from a large number of companies in both segments. The Corporation believes, however, that its subsidiaries are significant participants in each of the niche markets which they serve. Competition in both segments is based on quality, service, price and delivery.

Environmental Protection Compliance Costs

Expenditures for environmental control matters were not material to either segment in 2018 and are not expected to be material in 2019.

Employees

On December 31, 2018, the Corporation and its subsidiaries had 1,922 active employees, of which approximately 120 are employees of ASW.

AVAILABLE INFORMATION

The Corporation files annual, quarterly and current reports, amendments to those reports, proxy statements and other information with the Securities and Exchange Commission (“SEC”). You may access and read the Corporation’s filings without charge through the SEC’s website at www.sec.gov.

The Corporation’s internet address is www.ampcopittsburgh.com. The Corporation makes available, free of charge on its internet website, access to these reports as soon as reasonably practicable after such material is filed with, or furnished to, the SEC. The information on the Corporation’s website is not part of this Annual Report on Form 10-K.

EXECUTIVE OFFICERS

The name, age, position with the Corporation⁽¹⁾ and business experience for the past five years of the Executive Officers of the Corporation are as follows:

J. Brett McBrayer (age 53). Mr. McBrayer has served as the Corporation’s Chief Executive Officer since July 2018. He previously served as President and Chief Executive Officer at Airtex Products and ASC Industries, a global manufacturer and distributor of automotive aftermarket and OEM fuel and water pumps, from 2012 to 2017. Mr. McBrayer also served as Vice President and General Manager of the Alcan Cable business at Rio Tinto Alcan, as Vice President and General Manager of the Specialty Metals Division at Precision Cast Parts Corporation, and held positions of various responsibility and leadership during his 20 years with Alcoa, Inc.

Rose Hoover (age 63). Ms. Hoover has been employed by the Corporation for more than thirty-five years. She has served as President and Chief Administrative Officer of the Corporation since August 2015 and Executive Vice President from 2011 to August 2015.

Michael G. McAuley (age 55). Mr. McAuley has served as Senior Vice President, Chief Financial Officer and Treasurer of the Corporation since March 2018 and as Vice President, Chief Financial Officer and Treasurer since April 2016. Previously, he served as Senior Vice President and Chief Financial Officer of RTI International Metals, Inc., a producer of titanium mill products and fabricated metal components, from July 2014 to October 2015, and has held several senior financial capacities over the preceding 25 years including at Goodrich Corporation and Air Products & Chemicals, Inc.

Maria Trainor (age 44). Ms. Trainor has served as Vice President, General Counsel and Secretary of the Corporation since June 2015. Prior to joining the Corporation, Ms. Trainor was a partner at K&L Gates, LLP, an international law firm, where she had practiced for nearly fourteen years.

Samuel C. Lyon (age 50). Mr. Lyon has served as President of Union Electric Steel Corporation since February 2019. He previously served as Vice President and Group President of Performance Engineered Products at Carpenter Technology Corporation, a developer, manufacturer and distributor of stainless steels and corrosion-resistant alloys, from July 2017 to January 2019. Prior to that, he served as Vice President and General Manager of Dynamet Incorporated, the titanium business unit of Carpenter Technology, from October 2016 to June 2017, and as Chief Operating Officer of UCI-Pumps business of UCI-Fram, an OEM and after-market automotive parts supplier, from March 2013 to September 2016.

Terrence W. Kenny (age 59). Mr. Kenny has been employed by the Corporation for more than thirty years. He has served as President of the Air & Liquid Systems Corporation for more than five years.

Timothy R. Clutterbuck (age 60). Mr. Clutterbuck has served as President of ASW Steel Inc. since November 2011.

(1) Officers serve at the discretion of the Board of Directors and none of the listed individuals serves as a director of a public company.

ITEM 1A. RISK FACTORS

From time to time, important factors may cause actual results to differ materially from future expected results based on performance expressed or implied by any forward-looking statements made by us, including known and unknown risks, uncertainties and other factors, many of which are not possible to predict or control. Several of these factors are described from time to time in our filings with the SEC, but the factors described in filings are not the only risks that the Corporation faces.

Cyclical demand for products and economic downturns may reduce the demand for, and sales of, our products, which could adversely affect our margins and profitability.

A significant portion of the Forged and Cast Engineered Products segment's sales consists of mill rolls to customers in the global steel and aluminum industry which can be periodically impacted by economic or cyclical downturns. Such downturns, the timing and length of which are difficult to predict, may reduce the demand for, and sales of, our forged and cast rolls both in the United States and the rest of the world. Lower demand for rolls may also adversely impact profitability as other competing roll producers lower selling prices in the marketplace in order to fill their manufacturing capacity. Cancellation of orders or deferral of delivery of rolls may occur and produce an adverse impact on financial results. In addition, sales of non-roll product, consisting of open-die forged product primarily for the oil and gas industry, are impacted by fluctuations in global energy prices.

Excess global capacity in steel industry could lower prices for our products, which would adversely affect our sales, margins and profitability, as well as collectability of receivables and salability of in-process inventory.

The global steel manufacturing capacity continues to exceed global consumption of steel products. Such excess capacity often results in manufacturers in certain countries exporting steel at prices significantly below their home market prices (often due to local government assistance or subsidies), which leads to global market destabilization and reduced sales and profitability of some of our and our subsidiaries' customers, which, in turn, affects our sales and profit margins, as well as collectability of receivables and salability of in-process inventory.

A reduction in the level of export sales, as well as other economic factors in foreign countries, may have an adverse impact on our financial results.

Exports are a significant proportion of our subsidiaries' sales. Historically, changes in foreign exchange rates, particularly in respect of the U.S. dollar, British pound, Swedish krona and the euro, have impacted the export of our products and may do so again in the future. Other factors that may adversely impact export sales and operating results include political and economic instability, export controls, changes in tax laws and tariffs and new indigenous producers in overseas markets. A reduction in the level of export sales may have an adverse impact on our financial results. In addition, exchange rate changes may allow foreign roll suppliers to compete in our home markets.

Fluctuation of the value of the U.S. dollar relative to other currencies may adversely affect our business, results of operations and financial condition.

Certain of our subsidiaries operate in foreign jurisdictions and, accordingly, earn revenues, pay expenses, own assets and incur liabilities in countries using currencies other than the U.S. dollar. Since our consolidated financial statements are presented in U.S. dollars, we must translate revenues and expenses into U.S. dollars at the average

exchange rate during each reporting period, and assets and liabilities into U.S. dollars at the exchange rate in effect at the end of each reporting period. Therefore, increases or decreases in the value of the U.S. dollar against other major currencies will affect the translated value for revenue, expenses and balance sheet items denominated in foreign currencies and could materially affect our financial results expressed in U.S. dollars.

Commodity price increases, as well as any reductions in electricity, gas supply or shortage of key production materials, could adversely impact our production, which would result in lower profitability.

Our subsidiaries use certain commodities in the manufacture of their products. These include steel scrap, ferroalloys, energy and graphite electrodes. Any sudden price increase may cause a reduction in profit margins or losses where fixed-priced contracts have been accepted or increases cannot be obtained in future selling prices. In addition, there may be curtailment in electricity or gas supply which would adversely impact production. Shortage of critical materials, while driving up costs, may be of such severity as to disrupt production, all of which may impact sales and profitability. The global supply shortage of graphite electrodes used for electric arc

furnace melting of our steels could materially impact results of operations should we be unable to secure sufficient supply for our production requirements.

We may not be able to realize the expected benefits from the acquisitions that we make, and we may experience difficulties in integrating the acquired businesses.

We have made in the past, and may continue to make, certain acquisitions and enter into joint ventures which are intended to complement or expand our businesses. These acquisitions involve a variety of challenges and risks. We may encounter difficulties integrating acquired businesses with our operations or applying our internal control processes to these acquisitions. Other risks associated with acquisitions are the diversion of management's attention from other business concerns, the potential loss of key employees and customers of the acquired companies, the possible assumption of unknown liabilities, and potential disputes with the sellers. We may not be able to complete certain acquisitions due to antitrust laws and regulations in various jurisdictions. Additionally, we may not realize the degree or timing of benefits we anticipate when we first enter into a transaction. Any of the foregoing could adversely affect our business and results of operations.

A work stoppage or another industrial action on the part of any of our unions may be disruptive to our operations.

Our subsidiaries have several key operations which are subject to multi-year collective bargaining agreements with their hourly work forces. While we believe we have good relations with our unions, there is the risk of industrial action or work stoppage at the expiration of an agreement if contract negotiations break down, which may disrupt manufacturing and impact results of operations.

Dependence on certain equipment may cause an interruption in our production if such equipment is out of operation for an extended period of time, which would result in lower sales and profitability.

Our subsidiaries' principal business relies on certain unique equipment such as an electric arc furnace and a spin cast work roll machine. Although a comprehensive critical spare inventory of key components for this equipment is maintained, if any such unique equipment is out of operation for an extended period, it may result in a significant reduction in our sales and earnings.

The ultimate liability of our subsidiaries for claims alleging personal injury from exposure to asbestos-containing components historically used in certain products of our subsidiaries could have a material adverse effect on our financial condition or liquidity in the future.

Our subsidiaries, and in some cases, we, are defendants in numerous claims alleging personal injury from exposure to asbestos-containing components historically used in certain products of our subsidiaries. Through year-end 2018, our insurance has covered a substantial majority of our settlement and defense costs. We believe that the estimated costs net of anticipated insurance recoveries of our pending and future asbestos legal proceedings should not have a material adverse effect on our financial condition or liquidity. However, there can be no assurance that our subsidiaries or we will not be subject to significant additional claims in the future or that our subsidiaries' ultimate liability with respect to asbestos claims will not present significantly greater and longer lasting financial exposure than provided in our financial statements. The ultimate net liability with respect to such pending and any unasserted claims is subject to various uncertainties, including the following:

- the number of claims that are brought in the future;
- the costs of defending and settling these claims;
- insolvencies among our insurance carriers and the risk of future insolvencies;

- the possibility that adverse jury verdicts could require damage payments in amounts greater than the amounts for which we have historically settled claims;
- possible changes in the litigation environment or federal and state law governing the compensation of asbestos claimants; and
- the risk that the bankruptcies of other asbestos defendants may increase our costs.

Because of the uncertainties related to such claims, it is possible that the ultimate liability could have a material adverse effect on our financial condition or liquidity in the future.

The loss of any of our key management or our inability to attract or retain qualified personnel may prevent us from implementing our business strategy.

Our success is dependent on the management, experience and leadership skills of our senior management team and key employees. The loss of any of these individuals or an inability to attract, retain and maintain additional personnel with similar industry experience could prevent us from implementing our business strategy. We cannot assure you that we will be able to retain our existing senior management and key personnel or to attract additional qualified personnel when needed.

Potential attacks on information technology infrastructure and other cyber-based business disruptions could have a material adverse effect on our financial condition and results of operations.

We depend on integrated information technology (“IT”) systems to conduct our business. IT systems failures, including risks associated with upgrading our systems or in successfully integrating IT and other systems in connection with the integration of businesses we acquire, network disruptions and breaches of data security could disrupt our operations by impeding our processing of transactions, our ability to protect customer or company information and our financial reporting. Our computer systems, including our back-up systems, could be damaged or interrupted by power outages, computer and telecommunications failures, computer viruses, internal or external security breaches, events such as fires, earthquakes, floods, tornadoes and hurricanes, and/or errors by our employees. Cyber-based risks, in particular, are evolving and include potential attacks to our IT infrastructure and to the IT infrastructure of third parties in attempts to gain unauthorized access to our confidential or other proprietary information, or information relating to our employees, customers and other third parties. Although we have taken steps to address these concerns, there can be no assurance that a system failure or data security breach will not have a material adverse effect on our financial condition or results of operations.

A change in the existing regulatory environment could negatively affect our operations and financial performance.

In 2018, the United States imposed tariffs of 25% on primary steel imports and 10% on primary aluminum imports into the U.S. As consumers of steel and aluminum in some of our products, our cost base is exposed to the impact of this action, or similar actions, on our margins, and we could potentially lose market share to foreign competitors not subject to similar tariffs increases. Our financial condition, results of operations and cash flows may continue to be affected by these tariffs, or similar actions. Additionally, should a new trade agreement not occur which mitigates or neutralizes the impact of the tariffs, or similar actions, our financial condition, results of operations and cash flows may continue to be negatively impacted.

New trade restrictions and regulatory burdens associated with “Brexit” could adversely impact our operations and financial performance.

On June 23, 2016, voters in the United Kingdom (“U.K.”) approved a referendum to exit from the European Union (“E.U.”), commonly known as “Brexit.” The U.K. is scheduled to leave the EU on March 29, 2019, unless the U.K. decides to halt the process and stay in the EU prior to that deadline. In November 2018, the EU and the U.K. agreed upon the terms of an agreement which sets out the terms of the U.K.’s withdrawal from the EU and includes a transitional period until December 31, 2020. If the agreement is not ratified by the EU and U.K. before the end of March 2019, then, absent the U.K. withdrawing its notice under Article 50 or members of the EU agreeing to extend the two-year notice period, the U.K. will leave the EU with no agreements in place beyond those temporary arrangements which have been or may be put in place. Given the lack of comparable precedent, it is unclear what financial, trade and legal implications of the U.K. leaving the EU with no agreements in place would have and how such withdrawal would affect our financial condition, results of operations and cash flows.

We may not be able successfully to consummate proposed divestitures or restructure operations.

We may, from time to time, divest businesses that become less of a strategic fit within our core portfolio or restructure operations to improve operating results. Our profitability may be impacted by gains or losses on the sale or restructuring of such businesses and our liquidity may be affected by the length of time we retain these businesses. Additionally, we may be required to record asset impairment or restructuring charges related to these businesses which may adversely impact our financial position, liquidity and results of operations.

We face limitations in availability of capital to fund our strategic plans.

We are parties to a Revolving Credit and Security Agreement (the "Credit Agreement"), a senior secured asset-based revolving credit facility collateralized by a first priority perfected security interest in substantially all of our assets. The Credit Agreement provides for initial borrowings not to exceed \$100 million, with an option to increase the credit facility by an additional \$50 million at our request and with the approval of the banks, but restricts us from incurring additional indebtedness outside of the Credit Agreement, unless otherwise approved by the banks. The Credit Agreement is subject to various affirmative and negative covenants and contains various

sub-limits, including those based on type of collateral and borrowings by geographic region. If the financial covenants become difficult to meet or if our borrowing needs increase beyond the prescribed limits, our results of operations and liquidity may be materially adversely affected. In addition, our access to public debt markets is limited based on our size, credit profile and not being a well-known seasoned issuer.

A substantial majority of our authorized shares of common stock under our articles of incorporation are either outstanding or reserved for issuance.

Our restated articles of incorporation currently authorize the issuance of 20,000,000 shares of common stock and 3,000,000 shares of preferred stock, of which 150,000 are designated as Series A Preferred Stock. As of the date of this filing, 12,494,846 shares of common stock and zero shares of Series A Preferred Stock are outstanding, a total of 797,354 shares of common stock are reserved for issuance upon the exercise of outstanding stock options and upon vesting of restricted stock units, and a total of 760,375 shares of common stock are reserved for issuance in connection with future issuances of shares under our 2016 Omnibus Incentive Plan. After taking into account the total number of shares of common stock issued and outstanding, in addition to the aggregate number of shares of common stock reserved for future issuance, less than 6,000,000 authorized shares of common stock remain available to be issued.

We currently intend to solicit the approval of our shareholders at our upcoming 2019 annual meeting of shareholders to increase the number of authorized shares to 40,000,000. Absent the approval, our ability to use our shares to raise additional capital in the future will be limited and, as result, may impair our financial flexibility, including our liquidity needs and our ability to repay our debt obligations, execute our business plan, make future acquisitions, and fund operations, any of which could have a material adverse effect on our business, results of operations, financial condition or prospects.

ITEM 1B. UNRESOLVED STAFF COMMENTS

The Corporation has no unresolved staff comments.

ITEM 2. PROPERTIES

The location and general character of the principal locations in each segment, all of which are owned unless otherwise noted, are listed below. In addition, we have sales offices in the following countries: Brazil, China, Egypt, France, Germany, Luxembourg, Slovenia, Sweden and Turkey. See Note 4 (Property, Plant and Equipment) and Note 8 (Borrowing Arrangements) of this Annual Report on Form 10-K for disclosure of properties held as collateral.

Company and Location	Principal Use	Approximate Square Footage	Type of Construction
FORGED AND CAST ENGINEERED PRODUCTS SEGMENT			
Union Electric Steel Corporation Route 18 Burgettstown, PA 15021*	Manufacturing facilities	296,800 on 55 acres	Metal and steel

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726 Bell Avenue
Carnegie, PA 15106* Manufacturing facilities and offices 165,900 on 8.7 acres Metal and steel

U.S. Highway 30
Valparaiso, IN 46383* Manufacturing facilities 88,000 on 20 acres Metal and steel

1712 Greengarden Road
Erie, PA 16501* Manufacturing facilities 40,000 on 1 acre Metal and steel

Union Electric Steel UK
Limited
Coulthards Lane
Gateshead, England Manufacturing facilities and offices 274,000 on 10 acres Steel framed, metal and brick

Åkers Sweden AB
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Company and Location	Principal Use	Approximate	
		Square Footage	Type of Construction
Bruksallén 12SE-647 51 Åkers Styckebruk, Sweden	Manufacturing facilities and offices	394,000 on 162 acres	Steel framed, metal and brick
Åkers Valji Ravne d.o.o. Koroška c. 14 SI-2390 Ravne na Koroškem, Slovenia	Manufacturing facilities and offices	106,000 on 2.1 acres	Brick
Akers National Roll Company 400 Railroad Avenue Avonmore, PA 15618	Manufacturing facilities and offices	140,000 on 29.5 acres	Metal and steel
Shanxi Åkers TISCO Roll Co. Ltd. No. 2 Jian Cao Ping Taiyuan, Shanxi, China	Manufacturing facilities and offices	338,000 on 14.6 acres	Metal, steel and brick
Alloys Unlimited and Processing, LLC 3760 Oakwood Avenue Austintown, Ohio 44515*	Manufacturing facilities and offices	69,800 on 1.5 acres	Steel framed and cement block
ASW Steel Inc. 42 Centre Street Welland, ON, Canada L3B 5N9**	Manufacturing facilities and offices	813,500 on 76 acres	Metal and steel

AIR AND LIQUID PROCESSING SEGMENT

Air & Liquid Systems Corporation

Aerofin Division 4621 Murray Place Lynchburg, VA 24506	Manufacturing facilities and offices	146,000 on 15.3 acres	Brick, concrete and steel
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Buffalo Air Handling Division

Zane Snead Drive Amherst, VA 24531	Manufacturing facilities and offices	89,000 on 19.5 acres	Metal and steel
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Buffalo Pumps Division

874 Oliver Street N. Tonawanda, NY 14120	Manufacturing facilities and offices	94,000 on 9 acres	Metal, brick and cement block
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*Facility is leased.

**Discontinued operation as of December 31, 2018. See Note 2 (Discontinued Operations and Disposition) of this Annual Report on Form 10-K.

In 2018, Union Electric Steel Corporation completed a sale and leaseback financing transaction covering certain of its real estate assets, including its manufacturing facilities in Valparaiso, Indiana and Burgettstown, Pennsylvania, and its manufacturing facility and corporate headquarters located in Carnegie, Pennsylvania. Simultaneously with the sale, Union Electric Steel Corporation entered into a lease agreement pursuant to which Union Electric Steel Corporation would lease the properties from Store Capital Acquisitions, LLC, the purchaser of the properties.

Union Electric Steel Corporation subleases office space to the Corporation. The Corporation then further subleases a portion of its office space to Air & Liquid Systems Corporation for use as its headquarters.

All of the owned facilities are adequate and suitable for their respective purposes.

The Forged and Cast Engineered Products segment's facilities operated within 75% to 80% of their normal capacity during 2018. The facilities of the Air and Liquid Processing segment operated within 60% to 70% of their normal capacity. Normal capacity is defined

as capacity under approximately normal conditions with allowances made for unavoidable interruptions, such as lost time for repairs, maintenance, breakdowns, set-up, failure, supply delays, labor shortages and absences, Sundays, holidays, vacation and inventory taking. The number of work shifts is also taken into consideration.

ITEM 3. LEGAL PROCEEDINGS

LITIGATION

See Note 18 (Litigation) of this Annual Report on Form 10-K.

ENVIRONMENTAL

See Note 20 (Environmental Matters) of this Annual Report on Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

– PART II –

ITEM 5. MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Not applicable.

ITEM 6. SELECTED FINANCIAL DATA

Not applicable.

ITEM 7. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATION

(in thousands, except per share amounts)

EXECUTIVE OVERVIEW

Ampco-Pittsburgh Corporation and its subsidiaries (the “Corporation”) manufacture and sell highly engineered, high-performance specialty metal products and customized equipment utilized by industry throughout the world. We operate in two business segments – the Forged and Cast Engineered Products segment and the Air and Liquid Processing segment.

Forged and Cast Engineered Products

The Forged and Cast Engineered Products segment produces forged hardened steel rolls, cast rolls, open-die forged products, and specialty steel ingot and cast billet products. Forged hardened steel rolls are used mainly for rolling mills by producers of steel, aluminum and other metals. Cast rolls, which are produced in a variety of iron and steel qualities, are used mainly in hot and cold strip mills, medium/heavy section mills and plate mills. Ingot and forged engineered products are used in the oil and gas industry and the aluminum and plastic extrusion industries. Specialty steel ingot and cast billet products are used primarily by the open-die industry and downstream rolled-steel producers. The segment has operations in the United States, England, Sweden, Slovenia, Canada and an equity interest in three joint venture companies in China. Collectively, the segment primarily competes with European, Asian and North and South American companies in both domestic and foreign markets and distributes a significant portion of its products through sales offices located throughout the world.

Roll market conditions in the United States and Europe have improved as protectionist acts have financially strengthened our customer base. Backlog for mill rolls has increased roughly 12% from year end 2017 to year end 2018. However, tariffs imposed in 2018 on U.S. imports of primary steel products from Canada have adversely impacted our Canadian operations and the cost structure of our forged engineered products. In response, we are continuing to seek relief through available government channels. With respect to the oil and gas market, an inventory adjustment in the supply chain has continued to suppress order intake.

In October 2018, the Board of Directors of the Corporation approved a plan to sell ASW Steel Inc. (“ASW”). ASW is our specialty steel producer based in Canada which we acquired in November 2016. Loss of significant U.S. business due to a combination of tariffs imposed by the United States on imports of steel products and the loss of a key customer due to a plant closure have resulted in significant losses for the Canadian operation in 2018. While the

Corporation will continue to service the open-die forged products market, it will not have a dedicated supply of required specialty steel through a back-end integration of ASW. The Corporation, however, expects to enter into a longer-term supply agreement post-sale for the supply of steel ingots. Also, the Corporation will no longer manufacture and supply primary specialty steels to customers in the non-roll opened and closed die forgings and rebar markets and will exit the Canadian market. Collectively, the sale of ASW represents a strategic shift that will have a major impact on our results of operations and has been accounted for as a discontinued operation. See Note 2 to the Consolidated Financial Statements.

Air and Liquid Processing

The Air and Liquid Processing segment includes Aerofin, Buffalo Air Handling and Buffalo Pumps, all divisions of Air & Liquid Systems Corporation (“Air & Liquid”), a wholly owned subsidiary of the Corporation. Aerofin produces custom-engineered finned tube heat exchange coils and related heat transfer products for a variety of industries including OEM/commercial, nuclear power generation and industrial manufacturing. Buffalo Air Handling produces large custom-designed air handling systems for institutional (e.g., hospital, university), pharmaceutical and general industrial building markets. Buffalo Pumps manufactures centrifugal pumps for the fossil-fueled power generation, marine defense and industrial refrigeration industries. The segment has operations in Virginia and

New York with headquarters in Carnegie, Pennsylvania. The segment distributes a significant portion of its products through a common independent group of sales offices located throughout the United States and Canada.

For the Air and Liquid Processing segment, business activity in the specialty centrifugal pump industry has been negatively impacted by a decline in activity in the fossil-fueled power generation market, partially offset by increased activity in the marine defense market. For the heat exchanger business, there are early signs of growth in the industrial market. Additionally, demand for custom air handling systems remains steady although competitive pricing pressures continue. The focus for this segment is to grow revenues, increase margins, strengthen engineering and manufacturing capabilities, and continue to improve the sales distribution network.

CONSOLIDATED RESULTS OF OPERATIONS OVERVIEW

ASW has been accounted for as a discontinued operation. Accordingly, the operating results of ASW have been excluded from continuing operations for 2018 and 2017. Prior year amounts, percentages and backlog have been recast to exclude ASW.

The Corporation

	2018		2017	
Net Sales:				
Forged and Cast Engineered Products	\$ 329,530	79 %	\$ 297,283	77 %
Air and Liquid Processing	89,902	21 %	87,872	23 %
Consolidated	\$ 419,432	100 %	\$ 385,155	100 %
(Loss) Income from Continuing Operations:				
Forged and Cast Engineered Products	\$(6,605)		\$(6,887)	
Air and Liquid Processing ⁽¹⁾	(22,129)		10,682	
Corporate costs	(16,158)		(17,564)	
Consolidated	\$(44,892)		\$(13,769)	
Backlog:				
Forged and Cast Engineered Products	\$ 298,723	87 %	\$ 284,163	88 %
Air and Liquid Processing	44,356	13 %	40,438	12 %
Consolidated	\$ 343,079	100 %	\$ 324,601	100 %

(1) (Loss) income from continuing operations for the Air and Liquid Processing segment for 2018 includes a net pre-tax charge of \$32,910 for estimated costs of asbestos-related litigation through 2052, the estimated final date by which we expect to have settled all asbestos-related claims, net of estimated insurance recoveries (see Note 18 to the Consolidated Financial Statements).

Consolidated net sales for 2018 increased from 2017 principally due to higher sales for the Forged and Cast Engineered Products segment. Specifically, sales of forged engineered products improved approximately \$17,000 and mill rolls by approximately \$16,000 when compared to the prior year. For the Air and Liquid Processing segment, sales of air handling units increased approximately \$4,000 from the prior year while sales of heat exchange coils decreased by approximately \$2,000. Sales of centrifugal pumps were comparable in 2018 and 2017.

Consolidated loss from continuing operations for 2018 includes a charge of \$32,910 for the estimated costs of asbestos-related litigation through 2052, the estimated final date by which we expect to have settled all asbestos-related claims, net of estimated insurance recoveries (see Note 18 to the Consolidated Financial Statements). Corporate expenses decreased in the current year principally due to lower professional fees.

A discussion of sales, (loss) income from continuing operations and backlog for our two segments is included below.

Gross margin, excluding depreciation and amortization, as a percentage of net sales, was 16.1% and 17.7% for 2018 and 2017, respectively. The deterioration is principally attributable to the Forged and Cast Engineered Products segment which experienced lower production levels but benefited from a higher volume of shipments and improved pricing.

Selling and administrative expenses totaled \$58,068 (13.8% of net sales) and \$60,164 (15.6% of net sales) for 2018 and 2017, respectively. The decrease is primarily due to lower professional fees for Corporate.

The charge for asbestos litigation in 2018 represents an extension of the estimated costs of pending and future asbestos claims, net of additional insurance recoveries, from 2026 through 2052, the estimated final date by which we expect to have settled all asbestos-related claims. See Note 18 to the Consolidated Financial Statements.

Investment-related income for the current year includes a dividend of \$377 from the Corporation's U.K./Chinese cast roll joint venture company. No dividends were received in 2017.

Interest expense for the current year increased when compared to the prior year due to increased borrowings under our revolving credit facility, coupled with an increase in our average borrowing rate, and interest on a sale and leaseback financing transaction consummated in the third quarter of 2018.

Other income (expense) improved in 2018 from 2017 primarily due to a contract settlement with a third party of approximately \$2,425 and higher pension and other postretirement benefit income of approximately \$3,309. The balance of the change between the periods is attributable to fluctuations in foreign exchange gains and losses.

Our income tax provision for 2018 includes a one-time transition tax imposed on the deemed repatriated earnings of foreign subsidiaries. Originally, in 2017, as the result of the enactment of the Tax Cuts and Jobs Act (the "Tax Reform"), the deemed repatriated earnings of our foreign subsidiaries were included in the computation of our net operating losses generated in 2017. However, in 2018, the Internal Revenue Service issued additional guidance with respect to certain provisions of the Tax Reform. Specifically, the additional guidance allowed a taxpayer to exclude the deemed repatriated earnings from the computation of net operating losses generated in tax year 2017. We availed ourselves of the election which enabled us to carry back additional net operating losses resulting in a release of a previously established valuation allowance of \$1,419 and a higher refund of federal income taxes previously paid. However, as a result, we recognized the one-time tax of \$2,369 on the deemed repatriation of previously untaxed foreign earnings in our income tax provision in 2018. For 2018 and 2017, our income tax provision includes income tax expense (benefit) associated with our profitable operations. An income tax benefit is not able to be recognized on losses for certain of our remaining entities since they remain in a three-year cumulative loss position.

Gain on sale of joint venture represents principally proceeds received from the 2016 sale of a portion of our equity interest in a forged roll Chinese joint venture. Proceeds are being recognized when received since, at the time of the sale, collectability was not assured. The final installment of \$400 is due in 2019.

For 2018, we incurred a net loss from continuing operations of \$43,575, or \$3.50 per common share, which includes an after-tax charge of \$31,881, or \$2.56 per common share, for estimated costs of asbestos-related litigation through 2052, the estimated final date by which we expect to have settled all asbestos-related claims, net of estimated insurance recoveries. For 2017, we incurred a net loss of \$15,051, or \$1.22 per common share.

For 2018, net loss from discontinued operations approximated \$23,901, or \$1.92 per common share, and includes an after-tax charge of \$15,000, or \$1.21 per common share, for the write down of the assets of ASW to their estimated fair value less costs to sell. See Note 2 to the Consolidated Financial Statements. For 2017, net income from discontinued operations approximated \$3,749, or \$0.30 per common share.

Forged and Cast Engineered Products

	2018	2017
Net sales	\$329,530	\$297,283
Operating loss	\$(6,605)	\$(6,887)
Backlog	\$298,723	\$284,163

Net sales for 2018 increased 10.8% compared to 2017. The current year benefited from higher sales of mill rolls and, during the first half of the year, from forged engineered products. During the second half of the year, sales of forged engineered products, particularly frac blocs, declined primarily due to excess inventory in the supply chain.

Operating results for 2018 and 2017 were comparable. Operating results for 2018 benefited from higher volumes of shipments and improved pricing, which contributed approximately \$14,000; however, operating results were negatively impacted by unabsorbed costs from lower production levels, higher operating costs and equipment maintenance issues, which approximated the same amount.

Backlog at December 31, 2018, increased from the prior year due to improved demand for mill rolls, both forged and cast; however, backlog decreased approximately 50% for forged engineered products principally due to a retraction in the frac bloc market. As of December 31, 2018, approximately \$126,008 of the backlog is expected to be released after 2019.

Air and Liquid Processing

	2018	2017
Net sales	\$89,902	\$87,872
Operating (loss) income	\$(22,129)	\$10,682
Backlog	\$44,356	\$40,438

Net sales for 2018 improved when compared to 2017. Specifically, sales of air handling units increased over the prior year due to expanded marketing efforts resulting in improved order intake. Sales of centrifugal pumps approximated sales for 2017; while benefitting from a higher volume of shipments to U.S. Navy shipbuilders, sales of commercial pumps declined from a year ago. Sales of heat exchange coils declined from the prior year and continued to be adversely impacted by a lower volume of shipments to the nuclear and fossil-fueled power generation market. Operating results for 2018 include a charge of \$32,910 for the estimated costs of asbestos-related litigation through 2052, the estimated final date by which we expect to have settled all asbestos-related claims, net of estimated insurance recoveries (see Note 18 to the Consolidated Financial Statements). Otherwise, operating results improved based on a higher volume of shipments, product mix and cost containment efforts. Backlog at December 31, 2018, increased from December 31, 2017, with each of the product lines benefitting from higher order intake. The current backlog is expected to ship in 2019.

LIQUIDITY AND CAPITAL RESOURCES

Net cash flows provided by (used in) operating activities for continuing operations equaled \$6,710 and \$(19,047) for 2018 and 2017, respectively. The improvement is primarily attributable to a lower investment in trade working capital for the Forged and Cast Engineered Products segment of approximately \$13,300 and U.S. federal income tax refunds of approximately \$3,500 as a result of the carry back of additional net operating losses to earlier years. While we recognized a non-cash charge for the revaluation of our estimated costs of pending and future asbestos claims, net of additional insurance recoveries, this non-cash charge did not affect cash flows by the same amount. Instead, net asbestos-related payments equaled \$6,904 and \$5,828 in 2018 and 2017, respectively, and are expected to approximate \$7,000 in 2019.

Net cash flows used in investing activities for continuing operations were \$1,220 and \$11,293 in 2018 and 2017, respectively. The decrease is primarily due to proceeds from the sale of a division of ours for approximately \$7,200 (see Note 2 to the Consolidated Financial Statements) and a reduction in capital expenditures for our Forged and Cast Engineered Products segment. As of December 31, 2018, expected future capital expenditures approximated \$888, which are anticipated to be spent over the next 12 months.

Net cash flows (used in) provided by financing activities for continuing operations equaled \$(3,421) and \$8,925 for 2018 and 2017, respectively. During 2018, we completed a sale and leaseback financing transaction providing \$19,000. The majority of the proceeds was used to repay borrowings under our revolving credit facility or loaned to ASW. By comparison, a portion of our borrowings under the revolving credit facility in 2017 was loaned to ASW to repay debt. In June 2017, we announced that we would suspend quarterly dividends, beginning with the second quarter of 2017. Dividends paid in 2017 equaled \$0.18 per common share (including \$0.09 per common share for dividends declared in 2016 but paid in 2017) and dividends paid on restricted stock issued prior to June 2017 that vested in 2017. Dividends paid in 2018 represent dividends paid on restricted stock issued prior to June 2017 that vested in 2018. The three-year promissory notes, and accrued interest, issued in connection with a 2016 acquisition were paid on March 4, 2019.

The effect of exchange rate changes on cash and cash equivalents is primarily attributable to the fluctuation of the British pound and Swedish krona against the U.S. dollar.

Cash flows from discontinued operations represent the cash activity for ASW. The increase in net cash flows used in operating activities is primarily attributable to net losses incurred during 2018 and an increase in net trade working capital. While the net loss for ASW for 2018 includes the non-cash charge of \$15,000 for the write down of its assets to their estimated fair value less costs to sell, the non-cash charge did not affect cash flows for ASW. Net cash flows used in investing activities represent capital expenditures for each of the years. Net cash flows provided by financing activities for 2018 include borrowings under the revolving credit facility and intercompany advances from continuing operations. Similarly, net cash flows provided by financing activities for 2017 include intercompany advances from continuing operations which were used by ASW to repay its outstanding borrowings under its separate credit and term debt facilities.

As a result of the above, cash and cash equivalents of continuing operations increased by \$1,057 in 2018 and ended the year at \$19,713, in comparison to \$18,656 at December 31, 2017. Cash held by our foreign operations, excluding ASW, equaled \$10,662 and \$13,765 at December 31, 2018, and 2017, respectively. Cash held by our foreign operations is considered to be permanently reinvested; accordingly, a provision for estimated local and withholding tax has not been made. If we were to remit any foreign earnings to the U.S., the estimated tax impact would be insignificant.

Funds on hand, funds generated from future operations and availability under our revolving credit facility are expected to be sufficient to finance our operational and capital expenditure requirements and to repay our financial obligations. As of December 31, 2018, remaining availability under the revolving credit facility approximated \$35,000, net of availability reserves associated with the proceeds from the sale and leaseback financing transaction and the sale of a division of ours in 2018. The availability from these reserves was used toward the settlement of the three-year promissory notes and interest paid on March 4, 2019. While the revolving credit agreement limits the amount of distributions upstream, we have not historically relied on or have been dependent on distributions from our subsidiaries and are not expected to be in the future.

With respect to environmental matters, we are currently performing certain remedial actions in connection with the sale of real estate previously owned and periodically incur costs to maintain compliance with environmental laws and regulations. Environmental exposures are difficult to assess and estimate for numerous reasons, including lack of reliable data, the multiplicity of possible solutions, the years of remedial and monitoring activity required, and the identification of new sites. However, we believe the potential liability for remedial actions and environmental compliance measures of approximately \$324 accrued at December 31, 2018, is considered adequate based on information known to date (see Note 20 to the Consolidated Financial Statements).

The nature and scope of our business brings us into regular contact with a variety of persons, businesses and government agencies in the ordinary course of business. Consequently, we and certain of our subsidiaries from time to time are named in various legal actions. Generally, we do not anticipate that our financial condition or liquidity will be materially affected by the costs of known, pending or threatened litigation (see Note 18 to the Consolidated Financial Statements). However, claims have been asserted, principally against Air & Liquid, alleging personal injury from exposure to asbestos-containing components historically used in some products and there can be no assurance that future claims will not present significantly greater and longer lasting financial exposure than presently contemplated.

OFF-BALANCE SHEET ARRANGEMENTS

Our off-balance sheet arrangements include operating leases (see Note 16 to the Consolidated Financial Statements), the previously mentioned expected future capital expenditures, and letters of credit unrelated to the Industrial Revenue Bonds (see Note 10 to the Consolidated Financial Statements). These arrangements are not considered significant to our liquidity, capital resources, market risk or credit risk.

EFFECTS OF INFLATION

While inflationary and market pressures on costs are likely to be experienced, it is anticipated that ongoing improvements in manufacturing efficiencies and cost savings efforts will mitigate the effects of inflation on our 2019 operating results. The ability to pass on increases in the price of commodities to the customer is contingent upon current market conditions, with us potentially having to absorb some portion or all of the increase. Product pricing for the Forged and Cast Engineered Products segment is reflective of current costs, with a portion of orders subject to a variable-index surcharge program which helps to protect the segment and its customers against the volatility in the cost of certain raw materials. Additionally, long-term labor agreements exist at each of the key locations. Certain of these agreements will expire in 2019. As is consistent with past practice, we will negotiate with the intent to secure mutually beneficial arrangements covering multiple years. (See Note 10 to the Consolidated Financial Statements). Finally, commitments have been executed for certain commodities (copper and aluminum) to cover a portion of orders in the backlog (see Note 12 to the Consolidated Financial Statements).

APPLICATION OF CRITICAL ACCOUNTING POLICIES

We have identified critical accounting policies that are important to the presentation of our financial condition, changes in financial condition and results of operations and involve the most complex or subjective assessments. Critical accounting policies relate to assessing recoverability of property, plant and equipment, intangibles and assets of discontinued operations; pension and other postretirement benefits; litigation and loss contingencies; and income taxes.

Property, plant and equipment is reviewed for recoverability at least annually, as of October 1, or whenever events or circumstances indicate the carrying amount of the long-lived assets may not be recoverable. If the undiscounted cash flows generated from the use and eventual disposition of the assets are less than their carrying value, then the asset value may not be fully recoverable, potentially resulting in a write-down of the asset value. Estimates of future cash flows are based on expected market conditions over the remaining useful life of the primary asset(s). Accordingly, assumptions are made about pricing, volume and asset-resale values. Actual results may differ from these assumptions. We believe the amounts recorded in the accompanying consolidated financial statements for property, plant and equipment are recoverable and are not impaired as of December 31, 2018.

Intangible assets with finite lives are amortized using the straight-line method over their estimated useful life, which is determined by identifying the period over which most of the cash flows are expected to be generated. Additionally, intangible assets, both finite and indefinite lived, are assessed for impairment at least annually, as of October 1, or whenever events or circumstances indicate the carrying amount may not be recoverable. For finite-lived intangible assets, if the undiscounted cash flows attributable to the assets are less than their carrying value, then the asset value may not be fully recoverable, potentially resulting in a write-down of the asset value. For indefinite-lived intangible assets, if the discounted cash flows attributable to the assets are less than their carrying value, then the asset value may not be fully recoverable, potentially resulting in a write-down of the asset value. In assessing recoverability, we make assumptions regarding estimated future cash flows and discount rates. If these estimates or related assumptions change in the future, we may be required to record an impairment charge. Also, if the estimate of an intangible asset's remaining useful life changes, we will amortize the remaining carrying value of the intangible asset prospectively over the revised remaining useful life. We believe the amounts recorded in the accompanying consolidated financial statements for intangible assets are recoverable and are not impaired as of December 31, 2018, based on information known to date.

Assets of discontinued operations are reported at the lower of their carrying value or fair value less costs to sell. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Consideration is given to market comparables, asset valuations and asking price. If the amount received is less than the estimated fair value, then an additional loss will be recorded. If the amount received is more than the fair value estimated, then a gain will be recognized. We believe the amounts recorded in the accompanying consolidated financial statements for assets of discontinued operations are recoverable as of December 31, 2018.

Accounting for pension and other postretirement benefits involves estimating the cost of benefits to be provided well into the future and attributing that cost over the time period each employee works. To accomplish this, input from our actuaries is evaluated and extensive use is made of assumptions about inflation, long-term rate of return on plan assets, longevity, employee turnover and discount rates. The curtailment of certain defined benefit plans and the amendment of various other postretirement benefit plans has helped to mitigate the volatility in net periodic pension and other postretirement benefit costs resulting from changes in these assumptions.

The expected long-term rate of return on plan assets is an estimate of average rates of earnings expected to be earned on funds invested or to be invested to provide for the benefits included in the projected benefit obligation. Since these benefits will be paid over many years, the expected long-term rate of return is reflective of current investment returns and investment returns over a longer period. Also, consideration is given to target and actual asset allocations, inflation and real risk-free return. We believe the expected long-term rate of return ranging between 6.95% and 7.50% for our domestic plans and 4.65% for our UES-UK plan to be reasonable. Actual returns on plan assets for 2018 approximated (2.50%) for our domestic plans and (4.59%) for our UES-UK plan. Because of deteriorating conditions in the global financial markets during the year, we do not believe current returns to be indicative of future investment returns. The remaining foreign plans are not funded, and the obligations are not significant.

The discount rates used in determining future pension obligations and other postretirement benefits for each of our plans are based on rates of return for high-quality fixed-income investments currently available and expected to be available during the period to maturity of the pension and other postretirement benefits. High-quality fixed-income investments are defined as those investments which have received one of the two highest ratings given by a recognized rating agency with maturities of 10+ years. We believe the assumed discount rates ranging between 4.23% and 4.34% for our domestic plans, 4.09% and 4.33% for our other postretirement benefits plans and 3.00% for our foreign plans as of December 31, 2018, to be reasonable.

We believe that the amounts recorded in the accompanying consolidated financial statements related to pension and other postretirement benefits are based on appropriate assumptions although actual outcomes could differ. A percentage point decrease in the expected long-term rate of return would increase annual pension expense by approximately \$2,400. A 1/4 percentage point decrease in the discount rate would increase projected and accumulated benefit obligations by approximately \$8,300. Conversely, a percentage point increase in the expected long-term rate of return would decrease annual pension expense by approximately \$2,400, and a 1/4 percentage point increase in the discount rate would decrease projected and accumulated benefit obligations by approximately \$8,300.

Litigation and loss contingency accruals are made when it is determined that it is probable that a liability has been incurred and the amount can be reasonably estimated. Specifically, we and certain of our subsidiaries are involved in various claims and lawsuits incidental to their businesses. In addition, claims have been asserted, principally against Air & Liquid, alleging personal injury from exposure to asbestos-containing components historically used in some products manufactured by certain companies which now operate as divisions of Air & Liquid. To assist us in determining whether an estimate could be made of the potential liability for pending and unasserted future claims for Asbestos Liability along with applicable insurance coverage, and the amounts of any estimates, we hire a nationally recognized asbestos-liability expert and insurance consultant. Based on their analyses, reserves for probable and reasonably

estimable costs for the Asbestos Liability, including defense costs, and receivables for the insurance recoveries that are deemed probable are established. These amounts rely on assumptions which are based on currently known facts and strategy.

In 2018, we undertook a review of Asbestos Liability claims, defense costs and the likelihood for insurance recoveries. We extended our estimate of the Asbestos Liability, including the costs of settlement and defense costs relating to currently pending claims and future claims projected to be filed against us through 2052, the estimated final date by which we expect to have settled all asbestos-related claims. Key variables in these assumptions, including our ability to reasonably estimate Asbestos Liability through the expected final date by which we expect to have settled all asbestos-related claims, are summarized in Note 18 to the Consolidated Financial Statements. Key assumptions include the number and type of new claims to be filed each year, the average cost of disposing of each new claim, average annual defense costs, and the solvency risk with respect to the relevant insurance carriers. Other factors that may affect the Asbestos Liability and our ability to recover under our insurance policies include uncertainties surrounding the litigation process from jurisdiction to jurisdiction and from case to case, reforms that may be made by state and federal courts, and the passage of state or federal tort reform legislation. Actual expenses or insurance recoveries could be significantly higher or lower than those recorded if assumptions used in the calculations vary significantly from actual results.

We intend to evaluate the estimated Asbestos Liability and related insurance receivables as well as the underlying assumptions on a regular basis to determine whether any adjustments to the estimates are required. Due to the uncertainties surrounding asbestos litigation and insurance, these regular reviews may result in the incurrence of future charges or credits; however, we are currently unable to estimate such future changes. Adjustments, if any, to our estimate of recorded Asbestos Liability and/or insurance receivables could be material to our operating results for the periods in which the adjustments to the liability or receivable are recorded, and to our liquidity and consolidated financial position when such liabilities are paid.

Accounting for income taxes includes our evaluation of the underlying accounts, permanent and temporary differences, our tax filing positions and interpretations of existing tax law. A valuation allowance is recorded against deferred income tax assets to reduce them to the amount that is “more likely than not” to be realized. In doing so, assumptions are made about the future profitability of our operations and the nature of that profitability. Actual results may differ from these assumptions. If we determined we would not be able to realize all or part of the deferred income tax assets in the future, an adjustment to the valuation allowance would be established resulting in a charge to net income (loss). Likewise, if we determined we would be able to realize deferred income tax assets in excess of the net amount recorded, we would release a portion of the existing valuation allowance resulting in a credit to net income (loss). As of December 31, 2018, the valuation allowance approximates \$33,881 reducing our deferred income tax assets, net of deferred income tax liabilities, to \$3,024, an amount we believe is “more likely than not” to be realized.

We do not recognize a tax benefit in the financial statements related to a tax position taken or expected to be taken in a tax return unless it is “more likely than not” that the tax authorities will sustain the tax position solely on the basis of the position’s technical merits. Consideration is given primarily to legislation and statutes, legislative intent, regulations, rulings and case law as well as their applicability to the facts and circumstances of the tax position when assessing the sustainability of the tax position. In the event a tax position no longer meets the “more likely than not” criteria, we would reverse the tax benefit by recognizing a liability and recording a charge to earnings. Conversely, if we subsequently determined that a tax position meets the “more likely than not” criteria, we would recognize the tax benefit by reducing the liability and recording a credit to earnings. As of December 31, 2018, based on information known to date, we believe the amount of unrecognized tax benefits for tax positions taken or expected to be taken in a tax return which may be challenged by the tax authorities not to be significant.

See Note 19 to the Consolidated Financial Statements.

RECENTLY IMPLEMENTED and ISSUED ACCOUNTING PRONOUNCEMENTS

See Note 1 to the Consolidated Financial Statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not applicable.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

CONSOLIDATED BALANCE SHEETS

(in thousands, except par value)	December 31,	
	2018	2017
Assets		
Current assets:		
Cash and cash equivalents	\$19,713	\$18,656
Receivables, less allowance for doubtful accounts of \$978 in 2018 and \$962 in 2017	69,448	81,462
Inventories	94,196	93,452
Insurance receivable – asbestos	17,000	13,000
Other current assets	7,271	11,319
Current assets of discontinued operations	20,238	22,358
Total current assets	227,866	240,247
Property, plant and equipment, net	185,661	204,133
Insurance receivable – asbestos	135,508	87,342
Deferred income tax assets	3,188	1,590
Intangible assets, net	9,225	11,021
Investments in joint ventures	2,175	2,175
Other noncurrent assets	7,496	7,659
Noncurrent assets of discontinued operations	0	11,432
Total assets	\$571,119	\$565,599
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	\$38,900	\$35,443
Accrued payrolls and employee benefits	20,380	22,328
Debt – current portion	45,728	19,335
Asbestos liability – current portion	24,000	18,000
Other current liabilities	28,987	36,441
Current liabilities of discontinued operations	9,458	13,124
Total current liabilities	167,453	144,671
Employee benefit obligations	72,658	79,750
Asbestos liability	203,922	131,750
Deferred income tax liabilities	164	433
Long-term debt	31,881	46,818
Other noncurrent liabilities	2,072	416
Total liabilities	478,150	403,838
Commitments and contingent liabilities (Note 10)		
Shareholders' equity:		
Common stock – par value \$1; authorized 20,000 shares; issued and		
outstanding 12,495 shares in 2018 and 12,361 shares in 2017	12,495	12,361
Additional paid-in capital	154,889	152,992
Retained (deficit) earnings	(30,355)	38,348
Accumulated other comprehensive loss	(49,434)	(44,760)

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Total Ampco-Pittsburgh shareholders' equity	87,595	158,941
Noncontrolling interest	5,374	2,820
Total shareholders' equity	92,969	161,761
Total liabilities and shareholders' equity	\$571,119	\$565,599

See Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share amounts)	For The Year Ended December 31,	
	2018	2017
Net sales	\$419,432	\$385,155
Operating costs and expenses:		
Costs of products sold (excluding depreciation and amortization)	351,839	316,983
Selling and administrative	58,068	60,164
Depreciation and amortization	21,379	21,376
Charge for asbestos litigation	32,910	0
Loss on disposal of assets	128	401
	464,324	398,924
Loss from continuing operations	(44,892)	(13,769)
Other income (expense):		
Investment-related income	533	133
Interest expense	(4,130)	(3,085)
Other – net	4,682	(721)
	1,085	(3,673)
Loss from continuing operations before income taxes and gain on sale of joint venture	(43,807)	(17,442)
Income tax (provision) benefit	(268)	1,355
Gain on sale of joint venture	500	1,036
Net loss from continuing operations	(43,575)	(15,051)
(Loss) income from discontinued operations, net of tax	(23,901)	3,749
Net loss	(67,476)	(11,302)
Less: Net income attributable to noncontrolling interest	1,859	787
Net loss attributable to Ampco-Pittsburgh	\$(69,335)	\$(12,089)
Net loss from continuing operations per common share:		
Basic	\$(3.50)	\$(1.22)
Diluted	\$(3.50)	\$(1.22)
(Loss) income from discontinued operations per common share:		
Basic	\$(1.92)	\$0.30
Diluted	\$(1.92)	\$0.30
Net loss per common share attributable to Ampco-Pittsburgh:		
Basic	\$(5.57)	\$(0.98)
Diluted	\$(5.57)	\$(0.98)
Weighted average number of common shares outstanding:		
Basic	12,448	12,330
Diluted	12,448	12,330

See Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(in thousands)	For The Year Ended December 31,	
	2018	2017
Net loss	\$(67,476)	\$(11,302)
Other comprehensive (loss) income, net of income tax where applicable:		
Adjustments for changes in:		
Foreign exchange translation	(6,710)	11,041
Unrecognized employee benefit costs (including effects of foreign currency translation)	3,205	7,299
Unrealized holding gains on marketable securities	0	602
Fair value of cash flow hedges	(713)	804
Reclassification adjustments for items included in net loss:		
Amortization of unrecognized employee benefit costs	89	3,283
Realized gains from sale of marketable securities	0	(29)
Realized gains from settlement of cash flow hedges	(90)	(670)
Other comprehensive (loss) income	(4,219)	22,330
Comprehensive (loss) income	(71,695)	11,028
Less: Comprehensive income attributable to noncontrolling interest	1,682	904
Comprehensive (loss) income attributable to Ampco-Pittsburgh	\$(73,377)	\$10,124

See Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

	Accumulated					Total
	Common	Additional Paid-in Capital	Retained Earnings (Deficit)	Other Comprehensive Loss	Noncontrolling Interest	
(in thousands, except per share amounts)	Stock	Capital	Earnings (Deficit)	Loss	Interest	Total
Balance January 1, 2017	\$ 12,271	\$ 151,089	\$ 45,443	\$ (60,885)	\$ 1,916	\$ 149,834
Stock-based compensation		1,555				1,555
Comprehensive income:						
Net (loss) income			(12,089)		787	(11,302)
Other comprehensive income				22,213	117	22,330
Comprehensive income					904	11,028
Impact from adoption of ASU 2018-02 (Note 1)			6,088	(6,088)		0
Issuance of common stock including excess tax						
benefits of \$0	90	348				438
Cash dividends (\$0.09 per share)			(1,094)			(1,094)
Balance December 31, 2017	12,361	152,992	38,348	(44,760)	2,820	161,761
Impact from adoption of ASU 2016-01 (Note 1)			632	(632)		0
Balance January 1, 2018, adjusted	12,361	152,992	38,980	(45,392)	2,820	161,761
Stock-based compensation		1,539				1,539
Debt-to-equity conversion (Note 8)					872	872
Comprehensive (loss) income:						
Net (loss) income			(69,335)		1,859	(67,476)
Other comprehensive loss				(4,042)	(177)	(4,219)
Comprehensive income (loss)					1,682	(71,695)
Issuance of common stock including excess tax						
benefits of \$0	134	358				492
Balance December 31, 2018	\$ 12,495	\$ 154,889	\$ (30,355)	\$ (49,434)	\$ 5,374	\$ 92,969

See Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)	For The Year Ended	
	December 31, 2018	2017
Cash flows from operating activities:		
Net loss	\$(67,476)	\$(11,302)
(Loss) income from discontinued operations, net of tax	(23,901)	3,749
Net loss from continuing operations	(43,575)	(15,051)
Adjustments to reconcile net loss from continuing operations to net cash flows from operating activities:		
Depreciation and amortization	21,379	21,376
Charge for asbestos litigation	32,910	0
Deferred income tax (benefit) provision	(1,810)	3,177
Difference between pension and other postretirement expense and contributions	(6,145)	(1,857)
Stock-based compensation	2,115	2,400
Gain on sale of joint venture	(500)	(1,036)
Provisions for bad debts and inventories	105	60
Provision for warranties net of settlements	(1,505)	(654)
Loss on disposal of assets	128	401
Non-cash settlement with third party	(2,425)	0
Other – net	593	1,569
Changes in assets/liabilities:		
Receivables	8,918	(13,172)
Inventories	(5,402)	(13,835)
Other assets, including insurance receivable – asbestos	21,298	19,952
Accounts payable	5,217	1,174
Accrued payrolls and employee benefits	1,458	941
Other liabilities, including asbestos liability	(26,049)	(24,492)
Net cash flows provided by (used in) operating activities - continuing operations	6,710	(19,047)
Cash flows from investing activities:		
Purchases of property, plant and equipment	(9,719)	(13,011)
Proceeds from sale of property, plant and equipment	605	0
Proceeds from sale of Vertical Seal	7,200	0
Proceeds from sale of investment in joint venture	500	1,500
Purchases of long-term marketable securities	(113)	(109)
Proceeds from sale of long-term marketable securities	307	327
Net cash flows used in investing activities - continuing operations	(1,220)	(11,293)
Cash flows from financing activities:		
Proceeds from Revolving Credit and Security Agreement	31,471	25,349
Payments on Revolving Credit and Security Agreement	(37,500)	(5,000)
Proceeds from sale and leaseback financing transaction	19,000	0
Repayment of debt	(1,213)	(556)
Debt issuance costs	(477)	0
Dividends paid	(35)	(2,236)
Funding of discontinued operations	(14,667)	(8,632)
Net cash flows (used in) provided by financing activities - continuing operations	(3,421)	8,925

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Effect of exchange rate changes on cash and cash equivalents	(1,012)	1,492
Cash flows from discontinued operations:		
Net cash flows (used in) provided by operating activities - discontinued operations	(13,434)	3,208
Net cash flows used in investing activities - discontinued operations	(2,153)	(1,888)
Net cash flows provided by financing activities - discontinued operations	14,667	724
Net cash flows (used in) provided by discontinued operations	(920)	2,044
Net increase (decrease) in cash and cash equivalents	137	(17,879)
Cash and cash equivalents at beginning of year	20,700	38,579
Cash and cash equivalents at end of year	20,837	20,700
Less: cash and cash equivalents of discontinued operations	(1,124)	(2,044)
Cash and cash equivalents of continuing operations at end of year	\$19,713	\$18,656
Supplemental disclosures of cash flow information:		
Income tax payments	\$1,419	\$844
Interest payments	1,953	1,283
Non-cash investing activities:		
Purchases of property, plant and equipment in accounts payable	\$774	\$1,068
Non-cash financing activities:		
Conversion of minority shareholder loan to equity (Note 8)	\$872	\$0
See Notes to Consolidated Financial Statements.		

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(in thousands, except share and per share amounts)

Description of Business

Ampco-Pittsburgh Corporation and its subsidiaries (the “Corporation”) manufacture and sell highly engineered, high-performance specialty metal products and customized equipment utilized by industry throughout the world. It operates in two business segments, the Forged and Cast Engineered Products segment and the Air and Liquid Processing segment.

The Forged and Cast Engineered Products segment produces forged hardened steel rolls, cast rolls, open-die forged products, and specialty steel ingot and cast billet products. Forged hardened steel rolls are used mainly in rolling mills by producers of steel, aluminum and other metals. Cast rolls, which are produced in a variety of iron and steel qualities, are used mainly in hot and cold strip mills, medium/heavy section mills and plate mills. Ingot and forged engineered products are used in the oil and gas industry and the aluminum and plastic extrusion industries. Specialty steel ingot and cast billet products are used primarily by the open-die industry and downstream rolled-steel producers. The segment has operations in the United States, England, Sweden, Slovenia, Canada and an equity interest in three joint venture companies in China. Collectively, the segment primarily competes with European, Asian and North and South American companies in both domestic and foreign markets and distributes a significant portion of its products through sales offices located throughout the world.

The Air and Liquid Processing segment includes Aero-fin, Buffalo Air Handling and Buffalo Pumps, all divisions of Air & Liquid Systems Corporation (“Air & Liquid”), a wholly owned subsidiary of the Corporation. Aero-fin produces custom-engineered finned tube heat exchange coils and related heat transfer products for a variety of industries including OEM/commercial, nuclear power generation and industrial process. Buffalo Air Handling produces large custom-designed air handling systems for institutional (e.g., hospital, university), pharmaceutical and general industrial building markets. Buffalo Pumps manufactures centrifugal pumps for the fossil-fueled power generation, marine defense and industrial refrigeration industries. The segment has operations in Virginia and New York with headquarters in Carnegie, Pennsylvania. The segment distributes a significant portion of its products through a common independent group of sales offices located throughout the United States and Canada.

Discontinued Operations

In October 2018, the Board of Directors of the Corporation approved the sale of ASW Steel Inc. (“ASW”). ASW is a specialty steel producer based in Canada and is part of the Forged and Cast Engineered Products segment. The sale of ASW represents a strategic shift that will have a major impact on the Corporation’s results of operations and has been accounted for as a discontinued operation. See Note 2.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

The Corporation’s accounting policies conform to accounting principles generally accepted in the United States of America. The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities as of the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Significant items subject to estimates and assumptions include assessing the carrying value of long-lived assets including intangibles and assets of discontinued operations held for sale, valuing the assets and obligations related to employee benefit plans, accounting for loss contingencies associated with claims and lawsuits, and accounting for income taxes. Actual results could differ from

those estimates. A summary of the significant accounting policies followed by the Corporation is presented below.

Basis of Presentation

The financial information included herein reflects the consolidated financial position of the Corporation as of December 31, 2018, and 2017, and the consolidated results of its operations and cash flows for the years then ended. The Corporation has presented the assets and liabilities of ASW and its operating results and cash flows as discontinued operations in the accompanying financial statements as of and for the year ended December 31, 2018, and 2017. All footnotes exclude balances and activity of ASW unless otherwise noted. Additionally, certain prior year balances in the accompanying consolidated statement of operations and segment information for the year ended December 31 2017, have been recast to conform to the current year presentation for the adoption of Accounting Standards Update (“ASU”) 2018-14, Changes to the Disclosure Requirements for Defined Benefit Plans.

Consolidation

The accompanying consolidated financial statements include the assets, liabilities, revenues and expenses of all majority owned subsidiaries and joint ventures over which the Corporation exercises control and, when applicable, entities for which the Corporation has a controlling financial interest or is the primary beneficiary. Investments in joint ventures where the Corporation owns 20% to 50% of the voting stock and has the ability to exercise significant influence over the operating and financial policies of the joint venture are accounted for using the equity method of accounting. Investments in joint ventures where the Corporation does not have the ability to exercise significant influence over the operating and financial policies of the joint venture are accounted for using the cost method of accounting. Investments in joint ventures are reviewed for impairment whenever events or circumstances indicate the carrying amount of the investment may not be recoverable. If the estimated fair value of the investment is less than the carrying amount and such decline is determined to be “other than temporary,” then the investment may not be fully recoverable potentially resulting in a write-down of the investment value. Intercompany accounts and transactions are eliminated.

Cash and Cash Equivalents

Securities with purchased original maturities of three months or less are considered to be cash equivalents. The Corporation maintains cash and cash equivalents at various financial institutions which may exceed federally insured amounts.

Inventories

Inventories are valued at the lower of cost and net realizable value, which is defined as the estimated selling price in the ordinary course of business less reasonably predictable costs of completion, disposal and transportation. Cost includes the cost of raw materials, direct labor and overhead for those items manufactured but not yet sold or for which control has not yet transferred to the customer. Fixed production overhead is allocated to inventories based on normal capacity of the production facilities. In periods of abnormally high production, the amount of fixed overhead allocated to each unit of production is decreased so that inventories are not measured above cost. The amount of fixed overhead allocated to inventories is not increased as a consequence of abnormally low production or plant idling. Costs for abnormal amounts of spoilage, handling costs and freight costs are charged to expense when incurred. Cost of domestic raw materials, work-in-process and finished goods inventories is primarily determined by the last-in, first-out (LIFO) method. Cost of domestic supplies and foreign inventories is determined primarily by the first-in, first-out (FIFO) method.

Property, Plant and Equipment

Property, plant and equipment purchased new is recorded at cost with depreciation computed using the straight-line method over the following estimated useful lives: land improvements – 15 to 20 years, buildings – 25 to 50 years and machinery and equipment – 3 to 25 years. Property, plant and equipment acquired as part of a business combination is recorded at its estimated fair value with depreciation computed using the straight-line method over the estimated remaining useful lives based in part on third-party valuations. Expenditures that extend economic useful lives are capitalized. Routine maintenance is charged to expense. Gains or losses are recognized on retirements or disposals. Property, plant and equipment are reviewed for impairment at least annually, as of October 1, or whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable. If the undiscounted cash flows generated from the use and eventual disposition of the assets are less than their carrying value, then the asset value may not be fully recoverable potentially resulting in a write-down of the asset value. Estimates of future cash flows are based on expected market conditions over the remaining useful life of the primary asset(s). In addition, the remaining depreciation period for the impaired asset would be reassessed and, if necessary, revised. Proceeds from

government grants are recorded as a reduction in the purchase price of the underlying assets and amortized against depreciation over the lives of the related assets.

Intangible Assets

Intangible assets primarily consist of developed technology, customer relationships and trade name. Intangible assets with finite lives are amortized using the straight-line method over their estimated useful life, which is determined by identifying the period over which most of the cash flows are expected to be generated. Additionally, intangible assets, both finite and indefinite lived, are reviewed for impairment at least annually, as of October 1, or whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable. For finite-lived intangible assets, if the undiscounted cash flows attributable to the assets are less than their carrying value, then the asset value may not be fully recoverable, potentially resulting in a write-down of the asset value. For indefinite-lived intangible assets, if the discounted cash flows attributable to the assets are less than their carrying value, then the asset value may not be fully recoverable, potentially resulting in a write-down of the asset value. Also, if the estimate of an intangible asset's remaining useful life changes, the remaining carrying value of the intangible asset will be amortized prospectively over the revised remaining useful life.

Assets of Discontinued Operations Held for Sale

Assets are classified as “held for sale” when all of the following criteria for a plan of sale have been met: (1) management, having the authority to approve the action, commits to a plan to sell the assets; (2) the assets are available for immediate sale, in their present condition, subject only to terms that are usual and customary for sales of such assets; (3) an active program to locate a buyer and other actions required to complete the plan to sell the assets have been initiated; (4) the sale of the assets is probable and is expected to be completed within one year; (5) the assets are being actively marketed for a price that is reasonable in relation to their current fair value; and (6) actions required to complete the plan indicate that it is unlikely that significant changes to the plan will be made or the plan will be withdrawn. When all of these criteria have been met, the assets are classified as “held for sale” in the accompanying consolidated balance sheet. Assets classified as “held for sale” are reported at the lower of their carrying value or fair value less costs to sell. Depreciation of assets ceases upon designation as “held for sale”.

Debt Issuance Costs

Debt issuance costs are amortized as interest expense over the scheduled maturity period of the debt. The costs related to the line-of-credit arrangement are amortized over the term of the arrangement, regardless of whether there are any outstanding borrowings. Unamortized debt issuance costs are either recognized as a direct deduction from the carrying amount of the related debt or, if related to a line-of-credit facility, as an other noncurrent asset on the consolidated balance sheet.

Product Warranty

A warranty that ensures basic functionality is an assurance type warranty. A warranty that goes beyond ensuring basic functionality is considered a service type warranty. The Corporation provides assurance type warranties; it does not provide service type warranties. Provisions for assurance type warranties are recognized at the time the underlying sale is recorded. The provision is based on historical experience as a percentage of sales adjusted for potential claims when a liability is probable and for known claims.

Employee Benefit Plans

Funded Status

If the fair value of the plan assets exceeds the projected benefit obligation, the over-funded projected benefit obligation is recognized as an asset (prepaid pensions within other noncurrent assets) on the consolidated balance sheet. Conversely, if the projected benefit obligation exceeds the fair value of the plan assets, the under-funded projected benefit obligation is recognized as a liability (employee benefit obligations) on the consolidated balance sheet. Gains and losses arising from the difference between actuarial assumptions and actual experience and unamortized prior service costs are recorded as a separate component of accumulated other comprehensive loss.

Net Periodic Pension and Other Postretirement Costs

Net periodic pension and other postretirement costs includes service cost, interest cost, expected rate of return on the market-related value of plan assets, amortization of prior service costs, and recognized actuarial gains or losses. When actuarial gains or losses exceed 10% of the greater of the projected benefit obligation or the market-related value of plan assets, they are amortized to net periodic pension and other postretirement costs over the average remaining service period of the employees expected to receive benefits under the plan or over the remaining life expectancy of the employees expected to receive benefits if “all or almost all” of the plan’s participants are inactive. When actuarial gains or losses are less than 10% of the greater of the projected benefit obligation or the market-related value of plan

assets, they are included in net periodic pension and other postretirement costs indirectly as a result of lower/higher interest costs arising from a decrease/increase in the projected benefit obligation. The market-related value of plan assets is determined using a five-year moving average which recognizes gains or losses in the fair market value of assets at the rate of 20% per year.

Other Comprehensive Income (Loss)

Other comprehensive income (loss) includes changes in assets and liabilities from non-owner sources including foreign currency translation adjustments, unamortized prior service costs and unrecognized actuarial gains and losses associated with employee benefit plans, changes in the fair value of derivatives designated and effective as cash flow hedges, and, through December 31, 2017, unrealized holding gains and losses on securities designated as available for sale. Effective January 1, 2018, the Corporation adopted the provisions of ASU 2016-01, Recognition and Measurement of Financial Assets and Liabilities, which requires changes in unrealized holding gains and losses on securities designated as available for sale to be recorded through net income (loss) versus other comprehensive income (loss). The impact of the adoption of ASU 2016-01 is summarized under Recently Implemented Accounting Pronouncements in Note 1.

Certain components of other comprehensive income (loss) are presented net of income tax. Foreign currency translation adjustments exclude the effect of income tax since earnings of non-U.S. subsidiaries are deemed to be reinvested for an indefinite period of time.

Reclassification adjustments are amounts which are realized during the year and, accordingly, are deducted from other comprehensive income (loss) in the period in which they are included in net income (loss) or when a transaction no longer qualifies as a cash flow hedge. Foreign currency translation adjustments are included in net income (loss) upon sale or upon complete or substantially complete liquidation of an investment in a foreign entity. With respect to employee benefit plans, unamortized prior service costs are included in net income (loss), either immediately upon curtailment of the employee benefit plan or over the average remaining service period or life expectancy of the employees expected to receive benefits, and unrecognized actuarial gains and losses are included in net income (loss) indirectly as a result of lower/higher interest costs arising from a decrease/increase in the projected benefit obligation. Prior to the adoption of ASU 2016-01, unrealized holding gains and losses on securities were included in net income (loss) when the underlying security was sold. Changes in the fair value of derivatives are included in net income (loss) when the projected sale occurs or, if a foreign currency purchase contract, over the estimated useful life of the underlying asset.

Foreign Currency Translation

Assets and liabilities of the Corporation's foreign operations are translated at year-end exchange rates and the statements of operations are translated at the average exchange rates for the year. Gains or losses resulting from translating foreign currency financial statements are accumulated as a separate component of accumulated other comprehensive loss until the entity is sold or substantially liquidated.

Revenue Recognition

Revenue from sales is recognized when persuasive evidence of an arrangement exists, the sales price is fixed or determinable, collectability is reasonably assured, and control of the product has transferred to the customer. Persuasive evidence of an arrangement identifies the final understanding between the parties as to the specific nature and terms of the agreed-upon transaction that creates enforceable obligations. It can be in the form of an executed purchase order from the customer, combined with an order acknowledgment from the Corporation, a sales agreement or longer-term supply agreement between the customer and the Corporation, or a similar arrangement deemed to be normal and customary business practice for that particular customer or class of customer (collectively, a sales agreement). Sales agreements typically include a single performance obligation for the manufacturing of product which is satisfied upon transfer of control of the product to the customer.

The sales price required to be paid by the customer is fixed or determinable from the sales agreement. It is not subject to refund or adjustment, except for a variable-index surcharge provision which is known at the time of shipment and increases or decreases, as applicable, the selling price of a mill roll for corresponding changes in the published index cost of certain raw materials. The variable-index surcharge is recognized as revenue when the corresponding revenue for the inventory is recognized.

Likelihood of collectability is assessed prior to acceptance of an order. In certain circumstances, the Corporation may require a deposit from the customer, a letter of credit, or another form of assurance for payment. An allowance for doubtful accounts is maintained based on historical experience. Payment terms are standard to the industry and generally require payment 30 days after control transfers to the customer.

Transfer of control is assessed based on alternative use of the product manufactured and, under the terms of the sales agreement, an enforceable right to payment for performance to date. Transfer of control, and therefore revenue

recognition, occurs when title, ownership and risk of loss pass to the customer. Typically, this occurs when the product is shipped to the customer (i.e., FOB shipping point), delivered to the customer (i.e., FOB destination), or, for foreign sales, in accordance with trading guidelines known as Incoterms. Incoterms are standard trade definitions used in international contracts and are developed, maintained and promoted by the ICC Commission on Commercial Law and Practice. Shipping terms vary across the businesses and typically depend on the product, country of origin and type of transportation (truck or vessel). There are no customer-acceptance provisions other than customer inspection and testing prior to shipment. Post-shipment obligations are insignificant.

Amounts billed to the customer for shipping and handling are recorded within net sales and the related costs are recorded within costs of products sold (excluding depreciation and amortization). Amounts billed for taxes assessed by various government authorities (e.g., sales tax, value-added tax, etc.) are excluded from the determination of net income (loss) and instead are recorded as a liability until remitted to the government authority.

Stock-Based Compensation

Stock-based compensation, such as stock options, restricted stock units and performance shares, is recognized over the vesting period based upon the fair value of the award at the date of grant. For stock options, the fair value is determined by the Black Scholes option pricing model and is expensed over the vesting period of three years. For restricted stock units, the fair value is equal to the closing price of the Corporation's common stock on the New York Stock Exchange ("NYSE") on the date of grant and is expensed over the vesting period, typically three years. For performance share awards that vest subject to a performance condition, the fair value is equal to the closing price of the Corporation's stock on the NYSE on the date of grant. For performance share awards that vest subject to a market condition, fair value is determined using a Monte Carlo simulation model. The fair value of performance share awards is expensed over the performance period when it is probable that the performance condition will be achieved.

Derivative Instruments

Derivative instruments which include forward exchange (for foreign currency sales and purchases) and futures contracts are recorded on the consolidated balance sheet as either an asset or a liability measured at their fair value. The accounting for changes in the fair value of a derivative depends on the use of the derivative. To the extent that a derivative is designated and effective as a cash flow hedge of an exposure to future changes in value, the change in the fair value of the derivative is deferred in accumulated other comprehensive loss. Any portion considered to be ineffective, including that arising from the unlikelihood of an anticipated transaction to occur, is reported as a component of earnings (other income/expense) immediately.

Upon occurrence of the anticipated sale, the foreign currency sales contract designated and effective as a cash flow hedge is de-designated as a fair value hedge and the change in fair value previously deferred in accumulated other comprehensive loss is reclassified to earnings (net sales) with subsequent changes in fair value recorded as a component of earnings (other income/expense). Upon occurrence of the anticipated purchase, the foreign currency purchase contract is settled and the change in fair value deferred in accumulated other comprehensive loss is reclassified to earnings (depreciation and amortization expense) over the life of the underlying assets. Upon settlement of a futures contract, the change in fair value deferred in accumulated other comprehensive loss is reclassified to earnings (costs of products sold, excluding depreciation and amortization) when the corresponding inventory is sold and revenue is recognized. To the extent that a derivative is designated and effective as a hedge of an exposure to changes in fair value, the change in the derivative's fair value will be offset in the statement of operations by the change in the fair value of the item being hedged and is recorded as a component of earnings (other income/expense). Cash flows associated with the derivative instruments are recorded as a component of operating activities on the consolidated statement of cash flows.

The Corporation does not enter into derivative transactions for speculative purposes and, therefore, holds no derivative instruments for trading purposes.

Fair Value

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants as of the measurement date. A hierarchy of inputs is used to determine fair value measurements with three levels. Level 1 inputs are quoted prices in active markets for identical assets or liabilities and are considered the most reliable evidence of fair value. Level 2 inputs are observable prices that are not quoted on active exchanges. Level 3 inputs are unobservable inputs used for measuring the fair value of assets or liabilities.

Legal Costs

Legal costs expected to be incurred in connection with loss contingencies are accrued when such costs are probable and estimable.

Income Taxes

Income taxes are recognized during the year in which transactions enter into the determination of financial statement income. Deferred income tax assets and liabilities are recognized for the future tax consequences of temporary differences between the book carrying amount and the tax basis of assets and liabilities including net operating loss carryforwards. A valuation allowance is provided against a deferred income tax asset when it is “more likely than not” the asset will not be realized. Similarly, if a determination is made that it is “more likely than not” the deferred income tax asset will be realized, the related valuation allowance would be reduced and a benefit to earnings would be recorded. Penalties and interest are recognized as a component of the income tax provision.

In January 2018, the Financial Accounting Standards Board (the “FASB”) released guidance on the accounting for tax on the global intangible low-taxed income (“GILTI”) provisions of the Tax Cuts and Jobs Act (the “Tax Reform”). The GILTI provisions impose a

tax on foreign income in excess of a deemed return on tangible assets of foreign corporations. Any taxes on GILTI inclusions are accounted for as period costs.

Tax benefits are recognized in the financial statements for tax positions taken or expected to be taken in a tax return when it is “more likely than not” that the tax authorities will sustain the tax position solely on the basis of the position’s technical merits. Consideration is given primarily to legislation and statutes, legislative intent, regulations, rulings and case law as well as their applicability to the facts and circumstances of the tax position when assessing the sustainability of the tax position. In the event a tax position no longer meets the “more likely than not” criteria, the tax benefit is reversed by recognizing a liability and recording a charge to earnings. Conversely, if a tax position subsequently meets the “more likely than not” criteria, a tax benefit would be recognized by reducing the liability and recording a credit to earnings.

Earnings Per Common Share

Basic earnings per common share is computed by dividing net income (loss) by the weighted average number of common shares outstanding for the period. The computation of diluted earnings per common share is similar to basic earnings per common share except that the denominator is increased to include the dilutive effect of the net additional common shares that would have been outstanding assuming exercise of outstanding stock awards, calculated using the treasury stock method. The computation of diluted earnings per share would not assume the exercise of an outstanding stock award if the effect on earnings per common share would be antidilutive. Similarly, the computation of diluted earnings per share would not assume the exercise of outstanding stock awards if the Corporation incurred a net loss since the effect on earnings per common share would be antidilutive. The weighted average number of common shares outstanding assuming exercise of dilutive stock awards was 12,447,919 for 2018, and 12,330,401 for 2017. Weighted-average outstanding stock awards excluded from the diluted earnings per common share calculation, since the effect would have been antidilutive, were 904,086 for 2018, and 1,013,008 for 2017.

Recently Implemented Accounting Pronouncements

In August 2018, the FASB issued ASU 2018-14, Changes to the Disclosure Requirements for Defined Benefit Plans, which modifies the disclosure requirements for defined benefit and other postretirement plans. The amended guidance eliminates certain disclosures associated with accumulated other comprehensive income (loss), plan assets, related parties, and the effects of interest rate basis point changes on assumed health care costs. Additionally, new disclosure requirements have been added to address significant gains and losses related to changes in benefit obligations. The guidance becomes effective for interim and annual periods beginning after December 15, 2020; however, early adoption is permitted. All amendments are required to be adopted on a retrospective basis for all periods presented. The Corporation adopted the provisions of ASU 2018-14 in its 2018 accounts (see Note 9). The new guidance did not affect the Corporation’s financial position, operating results or liquidity.

In August 2018, the FASB issued ASU 2018-13, Changes to the Disclosure Requirements for Fair Value Measurement, which requires several changes to the hierarchy associated with Level 1, 2 and 3 fair value measurements and the related disclosure requirements. The guidance becomes effective for interim and annual periods beginning after December 15, 2019; however, early adoption is permitted. The Corporation adopted the provisions of ASU 2018-13 in its 2018 accounts (see Note 13). The new guidance did not affect the Corporation’s financial position, operating results or liquidity.

In January 2018, the FASB issued ASU 2018-02, Income Statement – Reporting Comprehensive Income, which allows for a reclassification from accumulated other comprehensive income (loss) to retained earnings for the stranded tax effects resulting from the Tax Reform. A stranded tax effect is defined as the difference in the tax effect of amounts recognized as other comprehensive income (loss) items, using the income tax rate in effect at the time of recognition

and the newly enacted income tax rate. The new guidance is relevant only to the reclassification of the income tax effects of the Tax Reform; accordingly, the underlying guidance that requires the effect of a change in tax laws or rates be included in income is not affected. As a result, \$6,088 was reclassified between accumulated other comprehensive loss and retained earnings for the year ended December 31, 2017.

In May 2017, the FASB issued ASU 2017-09, Scope of Modification Accounting, which provides guidance about which changes to the terms and conditions of a share-based payment award require an entity to apply modification accounting. No awards were modified in 2018; accordingly, the amended guidance did not affect the Corporation's financial position, operating results or liquidity.

In March 2017, the FASB issued ASU 2017-07, Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which requires an employer who offers defined benefit and postretirement benefit plans to report the service cost component of net periodic benefit cost in the same line item or items as other compensation costs arising from services rendered by employees during the period. The other components of net periodic benefit cost are required to be presented in the income statement separately from the service cost component and outside the subtotal of income from operations. The amendment also

permits only the service cost component of net periodic benefit cost to be eligible for capitalization, when applicable. The amended guidance does not change the amount of net periodic benefit cost to be recognized, only where it is to be recognized in the income statement. The amended guidance became effective for the Corporation on January 1, 2018, and was applied retrospectively for the presentation of the service cost component and the other components of net periodic pension and other postretirement costs in the income statement. As permitted by the guidance, the Corporation used the amounts disclosed in its pension and other postretirement benefits footnote (Note 9) as the estimate to apply retrospectively. The Corporation has historically capitalized the service cost component of net periodic benefit cost to inventory, when applicable, and will continue to do so prospectively. The guidance did not affect the Corporation's liquidity.

The effect of the retrospective guidance on the consolidated statements of operations for the year ended December 31, 2017, was as follows:

	Originally Presented ⁽¹⁾	Reclassification for ASU 2017-07	As Adjusted
Costs of products sold (excluding depreciation and amortization)	\$ 316,704	\$ 279	\$316,983
Selling and administrative	59,886	278	60,164
Loss from continuing operations	(13,212)	(557)	(13,769)
Other – net	(1,278)	557	(721)
Other income (expense)	(4,230)	557	(3,673)
Loss from continuing operations before income taxes and gain on sale of joint venture	(17,442)	0	(17,442)

The effect of the retrospective guidance on the operating results of the segments for the year ended December 31, 2017, was as follows:

	Originally Presented	Reclassification for ASU 2017-07	As Adjusted
Forged and Cast Engineered Products - operating loss ⁽¹⁾	\$ (5,669)	\$ (1,218)	\$ (6,887)
Air and Liquid Processing - operating income	10,427	255	10,682
Corporate costs	(17,970)	406	(17,564)

(1)Originally Presented figures have been recast for discontinued operations. See Note 2.

In August 2016, the FASB issued ASU 2016-15, Classification of Certain Cash Receipts and Cash Payments, which clarifies guidance on the classification of certain cash receipts and payments in the statement of cash flows. The amended guidance became effective for the Corporation on January 1, 2018, and did not impact the presentation of its cash flow statement, and it did not affect the Corporation's financial position, operating results or liquidity.

In January 2016, the FASB issued ASU 2016-01, Recognition and Measurement of Financial Assets and Liabilities, which simplifies the accounting and disclosures related to equity investments. ASU 2016-01 requires entities to carry certain investments in equity securities at fair value with changes in fair value recorded through net income (loss) versus other comprehensive income (loss). ASU 2016-01 does not apply to investments that qualify for the equity method of accounting or result in consolidation of the investee. The guidance became effective for the Corporation on January 1, 2018, and as required, was adopted by means of a cumulative-effect adjustment to retained earnings as of the beginning of 2018, as follows:

	Accumulated Other	
	Retained Earnings	Comprehensive Loss
As of January 1, 2018, as originally presented	\$ 38,348	\$ (44,760)
Cumulative effect of ASU 2016-01	632	(632)
As of January 1, 2018, as adjusted	\$ 38,980	\$ (45,392)

In May 2014, the FASB issued ASU 2014-09, Revenue from Contracts with Customers (Topic 606). ASU 2014-09 and its related amendments outline a single comprehensive model to account for revenue from customer contracts and establish principles for reporting information about the nature, amount, timing and uncertainty of revenue and cash flows arising from a company's contracts with customers. In accordance with Topic 606, a company recognizes revenue when control of the promised goods or services is transferred to the customer in an amount that reflects the consideration a company expects to be entitled to receive in exchange for those goods or services. It also requires comprehensive disclosures regarding revenue recognition. The guidance became effective January 1, 2018, and could have been implemented on either a full or modified retrospective basis (cumulative-effect adjustment to

January 1, 2018 retained earnings). The Corporation adopted the guidance using the modified retrospective approach and by applying it to those contracts that were not completed as of January 1, 2018. There was, however, no cumulative-effect adjustment to the Corporation's retained earnings as of January 1, 2018, since the new guidance did not change the Corporation's timing of revenue recognition, which continues to be at a point in time. See Note 14 for the additional disclosures.

In connection with the adoption of Topic 606, as of January 1, 2018, the Corporation elected the following practical expedients:

- to exclude the effects of a significant financing component from the amount of promised consideration when the Corporation expects, at contract inception, that the period between the Corporation's transfer of a promised product to a customer and the customer's payment for the product will be one year or less;
- to exclude any amounts collected from customers for sales and similar taxes from the transaction price;
- to treat incremental costs of obtaining a contract as expense, when incurred, if the amortization period would have been one year or less;
- to account for shipping and handling activities that occur after control of the related good transfers as fulfillment activities instead of assessing such activities as performance obligations;
- to apply the new revenue standard to a portfolio of contracts (or performance obligations) with similar characteristics if the Corporation reasonably expects that the effects on the financial statements of applying the guidance to the portfolio would not differ materially from applying the guidance to the individual contracts (or performance obligations) within that portfolio; and
- to assess whether promised goods or services are performance obligations only if they are material in the context of the contract with the customer.

Recently Issued Accounting Pronouncements

In August 2017, the FASB issued ASU 2017-12, Derivatives and Hedging, which amends and simplifies existing guidance to allow companies to present more accurately the economic effects of risk management activities in the financial statements. The amended guidance will be effective for interim and annual periods beginning after December 15, 2018, and is not expected to have a significant effect on the Corporation's financial position, operating results or liquidity.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), which requires lessees to recognize a right-of-use ("ROU") asset and lease liability for all leases other than those with a term less than one year and to disclose key information about certain leasing arrangements. The lease liability will be equal to the present value of lease payments. A ROU asset will be based on the lease liability adjusted for qualifying initial direct costs. The guidance becomes effective for the Corporation beginning January 1, 2019, and can be implemented on either a full or modified retrospective basis. The Corporation will use the modified retrospective method (a cumulative adjustment to its January 1, 2019 retained earnings); consequently, its comparative period financial statements will continue to be in accordance with the previous lease guidance in ASC Topic 840 "Leases." ASU 2016-02 also provides an election for a package of practical expedients which permits an entity to not reassess whether any expired or existing contracts contain leases, to carryforward the existing lease classification, and to not reassess initial direct costs associated with existing leases. The Corporation applied these practical expedients as part of its adoption. The Corporation currently expects that the adoption of the guidance will result in an increase to its consolidated assets and liabilities of approximately \$5,000-\$7,500. It does not expect the new guidance to have a material effect on its results of operations or cash flows at adoption or thereafter.

NOTE 2 – DISCONTINUED OPERATIONS AND DISPOSITION:

In 2016, the Corporation purchased the stock of ASW, a specialty steel producer based in Canada. The acquisition supported the Corporation's diversification efforts in the open-die forging market. In October 2018, the Board of Directors of the Corporation approved the sale of ASW. Loss of significant U.S. business due to a combination of tariffs imposed by the United States on imports of steel products and loss of a key customer due to a plant closure have resulted in significant losses for the Canadian operation in 2018. While the Corporation will continue to service the open-die forged products market, it will not have a dedicated supply of required specialty steel through a back-end integration of ASW. Additionally, the Corporation will no longer manufacture and supply primary specialty steels to customers in the non-roll opened and closed die forgings and rebar markets and will exit the Canadian market.

Collectively, the sale of ASW represents a strategic shift that will have a major impact on the Corporation's operations and financial results. As of December 31, 2018, the asset held for sale and discontinued operations criteria were met. Accordingly, as set forth in ASC 205, Presentation of Financial Statements, the assets and liabilities of ASW have been presented separately as assets and

liabilities of discontinued operations in the accompanying consolidated balance sheets as of December 31, 2018, and 2017. The assets and liabilities of ASW are classified as current as of December 31, 2018, because the Corporation expects to complete the sale in 2019. Additionally, the operating results and cash flows of ASW have been presented as discontinued operations, for the current and prior years, in the accompanying consolidated statements of operations and statements of cash flows. Previously, the operating results of ASW were included in the operating results of the Forged and Cast Engineered Products segment.

The assets and liabilities of ASW were as follows as of December 31, 2018, and 2017:

	2018	2017
Cash and cash equivalents	\$1,124	\$2,044
Receivables	6,928	5,161
Inventories	13,764	14,109
Other assets	1,708	1,044
Property, plant and equipment, net	11,714	0
Estimated charge for impairment	(15,000)	0
Current assets of discontinued operations	20,238	22,358
Property, plant and equipment, net	0	10,847
Other noncurrent assets	0	585
Noncurrent assets of discontinued operations	0	11,432
Total assets of discontinued operations	\$20,238	\$33,790
Accounts payable	\$8,890	\$12,036
Accrued payrolls and employee benefits	178	440
Other current liabilities	390	648
Current liabilities of discontinued operations	9,458	13,124
Total liabilities of discontinued operations	\$9,458	\$13,124

The following table presents the major classes of ASW's line items constituting the "(loss) income from discontinued operations, net of tax" in the consolidated statements of operations for the years ended December 31:

	2018	2017
Net sales	\$63,740	\$81,283
Costs of products sold (excluding depreciation and amortization)	68,381	75,005
Selling and administrative	2,441	1,424
Depreciation and amortization	1,311	1,011
Gain on disposal of assets	(153)	0
Charge for impairment	15,000	0
(Loss) income from discontinued operations	(23,240)	3,843
Other income (expense)	(661)	(94)
(Loss) income from discontinued operations before income taxes	(23,901)	3,749

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Income tax provision	0	0
(Loss) income from discontinued operations, net of tax	\$(23,901)	\$3,749

Net sales for the years ended December 31, 2018, and 2017, include \$22,805 and \$34,037, respectively, of product sold by ASW to Union Electric Steel Corporation (“UES”), a subsidiary of the Corporation. Costs of products sold (excluding depreciation and amortization) approximated the same. In connection with the sale, the Corporation expects to enter into a longer-term supply agreement for the supply of steel ingots. The charge for impairment was calculated based on estimated proceeds and adjusts the carrying value of ASW to its estimated fair value less costs to sell. As of December 31, 2018, the asset held for sale and discontinued operations criteria were met; accordingly, the fair value of ASW was measured at December 31, 2018, using unobservable, Level 3 inputs.

On October 31, 2018, the Corporation sold certain net assets of the Vertical Seal division of Akers National Roll Company (“Vertical Seal”), a subsidiary of the Corporation, to Roser Technologies, Inc. and WIR II, LLC for approximately net book value, or \$7,200. As

part of the Forged and Cast Engineered Products segment, Vertical Seal manufactured custom-designed parts and provided specialty services to rolling mill customers located throughout North America. The sale of Vertical Seal did not qualify as a discontinued operation as it did not represent a strategic shift that has (or will have) a major effect on the Corporation's operations and financial results.

NOTE 3 – INVENTORIES:

	2018	2017
Raw materials	\$ 19,615	\$ 20,594
Work-in-progress	42,339	42,113
Finished goods	20,650	19,232
Supplies	11,592	11,513
Inventories	\$ 94,196	\$ 93,452

At December 31, 2018, and 2017, approximately 36% and 49%, respectively, of the inventories were valued using the LIFO method. The LIFO reserve approximated \$(26,058) and \$(16,063) at December 31, 2018, and 2017, respectively. During each of the years, inventory quantities decreased for certain locations resulting in a liquidation of LIFO layers which were at lower costs. The effect of the liquidations was to decrease costs of products sold (excluding depreciation and amortization) by approximately \$2,159 and \$490 for 2018 and 2017, respectively. There was no income tax expense recognized in the consolidated statements of operations due to the Corporation having a valuation allowance recorded against its deferred income tax assets for the jurisdiction where the income was recognized. See Note 19. Accordingly, the effect of the liquidations reduced net loss by approximately \$2,159, or \$0.17 per common share, for 2018 and approximately \$490, or \$0.04 per common share, for 2017.

NOTE 4 – PROPERTY, PLANT AND EQUIPMENT:

	2018	2017
Land and land improvements	\$ 10,207	\$ 10,443
Buildings	65,425	66,403
Machinery and equipment	332,378	332,957
Construction-in-process	3,499	4,193
Other	6,813	7,189
	418,322	421,185
Accumulated depreciation	(232,661)	(217,052)
Property, plant and equipment, net	\$ 185,661	\$ 204,133

The majority of the assets of the Corporation, except real property including the land and building of UES-UK, is pledged as collateral for the Corporation's revolving credit facility (see Note 8). Land and buildings of UES-UK, equal to approximately \$2,672 (£2,098) at December 31, 2018, are held as collateral by the trustees of the UES-UK defined benefit pension plan (see Note 9). The gross value of assets under capital lease and the related accumulated amortization approximated \$3,716 and \$1,340, respectively, as of December 31, 2018, and \$4,082 and \$1,101, respectively, as of December 31, 2017.

NOTE 5 – INTANGIBLE ASSETS:

	2018	2017
Customer relationships	\$6,234	\$6,543
Developed technology	4,322	4,429
Trade name	2,497	2,696
	13,053	13,668
Accumulated amortization	(3,828)	(2,647)
Intangible assets, net	\$9,225	\$11,021

The following summarizes changes in intangible assets for the years ended December 31:

	2018	2017
Balance at the beginning of the year	\$11,021	\$11,601
Changes in intangible assets (Vertical Seal)	(177)	0
Amortization of intangible assets	(1,221)	(1,219)
Other, primarily impact from changes in foreign currency		
exchange rates	(398)	639
Balance at the end of the year	\$9,225	\$11,021

Intangible assets include an indefinite-lived trade name of \$2,497 and \$2,696 as of December 31, 2018, and 2017, respectively, that is not subject to amortization. Changes during the year ended December 31, 2018, represent intangible assets of the Vertical Seal division of Akers National Roll Company which was sold in 2018. Identifiable intangible assets are expected to be amortized over a weighted average period of approximately 12 years or \$1,197 for 2019, \$1,197 for 2020, \$519 for 2021, \$383 for 2022, \$383 for 2023 and \$3,049 thereafter.

NOTE 6 – INVESTMENTS IN JOINT VENTURES:

The Corporation has interests in three joint ventures:

• Shanxi Åkers TISCO Roll Co., Ltd. (“ATR”) – a cast roll joint venture in China for which the Corporation accounts using the consolidated method of accounting. ATR principally manufactures and sells cast rolls for hot strip mills, steckel mills and medium plate mills.

• Masteel Gongchang Roll Co., Ltd. (“MG”) – a forged roll joint venture in China for which the Corporation accounts using the cost method of accounting. MG principally manufactures and sells large forged backup rolls for hot and cold strip mills.

• Jiangsu Gongchang Roll Co., Ltd (“Gongchang”) – a cast roll joint venture in China for which the Corporation accounts using the cost method of accounting. Gongchang principally manufactures and sells cast rolls for hot and cold strip mills, medium/heavy section mills and plate mills.

ATR

In 2007, Åkers AB, a subsidiary of UES, entered into an agreement with Taiyuan Iron & Steel Co., Ltd. (“TISCO”) to form ATR, with Åkers AB owning 59.88% and TISCO owning 40.12%. Since Åkers AB is the majority shareholder, has voting rights proportional to its ownership interest and exercises control over TISCO, Åkers AB is considered the primary beneficiary and, accordingly, accounts for its investment in ATR on the consolidated method of accounting.

MG

The Corporation has a 33% interest in MG which is recorded at cost, or approximately \$835. The Corporation does not participate in the management or daily operation of MG, has not guaranteed any of its obligations and has no ongoing responsibilities to it. Dividends may be declared by the Board of Directors of the joint venture after allocation of after-tax profits to various “funds” equal to the minimum amount required under Chinese law. No dividends were declared or received in 2018 or 2017.

Gongchang

The Corporation has a 24% interest in Gongchang which is recorded at cost, or \$1,340. The Corporation does not participate in the management or daily operation of Gongchang, has not guaranteed any of its obligations and has no ongoing responsibilities to it. Dividends may be declared by the Board of Directors of the joint venture after allocation of after-tax profits to various “funds” equal to the minimum amount required under Chinese law. Dividends of \$377 were declared and received in 2018. No dividends were declared or received in 2017.

NOTE 7 – OTHER CURRENT LIABILITIES:

	2018	2017
Customer-related liabilities	\$16,439	\$18,189
Accrued interest payable	2,333	2,697
Accrued sales commissions	1,637	2,301
Other	8,578	13,254
Other current liabilities	\$28,987	\$36,441

Customer-related liabilities include liabilities for product warranty claims and deposits received on future orders. The following summarizes changes in the liability for product warranty claims for the year ended December 31:

	2018	2017
Balance at the beginning of the year	\$11,379	\$11,439
Satisfaction of warranty claims	(5,069)	(3,941)
Provision for warranty claims	3,564	3,287
Other, primarily impact from changes in foreign currency		
exchange rates	(427)	594
Balance at the end of the year	\$9,447	\$11,379

Customer deposits represent amounts collected from, or invoiced to, a customer in advance of revenue recognition, and are recorded as an other current liability on the balance sheet. The liability for customer deposits is reversed when the Corporation satisfies its performance obligations and control of the inventory transfers to the customer, typically when title transfers. Performance obligations related to customer deposits are expected to be satisfied in less than one year.

Changes in customer deposits consisted of the following:

	2018	2017
Balance at beginning of the period	\$4,574	\$6,786
Satisfaction of performance obligations	(10,885)	(15,089)
Receipt of additional deposits	10,701	12,745
Other, primarily changes in foreign currency exchange rates	(86)	132
Balance at end of the period	\$4,304	\$4,574

NOTE 8 – BORROWING ARRANGEMENTS:

	2018	2017
Revolving Credit and Security Agreement	\$ 14,320	\$ 20,349
Sale and leaseback financing obligation	18,518	0
Promissory notes (and interest)	26,205	25,395
Industrial Revenue Bonds	13,311	13,311
Minority shareholder loan	4,056	5,325
Capital leases	1,199	1,773
Outstanding borrowings	77,609	66,153
Debt – current portion	(45,728)	(19,335)
Long-term debt	\$ 31,881	\$ 46,818

Future principal payments, assuming demand loans are called in 2019 and the Industrial Revenue Bonds are not able to be remarketed, are \$45,728 for 2019, \$1,990 for 2020, \$16,162 for 2021, \$1,796 for 2022, \$1,646 for 2023, and \$10,287 thereafter.

Revolving Credit and Security Agreement

The Corporation has a five-year Revolving Credit and Security Agreement (the “Credit Agreement”) with a syndicate of banks that expires in May 2021. The Credit Agreement provides for initial borrowings not to exceed \$100,000 with an option to increase the credit facility by an additional \$50,000 at the request of the Corporation and with the approval of the banks. The Credit Agreement

includes sublimits for letters of credit not to exceed \$40,000, European borrowings not to exceed \$15,000, and Canadian borrowings not to exceed \$15,000.

In 2018, the banks provided their consent to a sale and leaseback financing transaction, whereby UES sold certain of its real estate assets to Store Capital Acquisitions, LLC. In connection with providing the consent, the Credit Agreement was amended to increase the interest rate margin by one-half percent per annum for any borrowings, add certain additional reporting requirements regarding beneficial ownership of the Corporation, and update certain schedules to the Credit Agreement. All other material terms, conditions, and covenants with respect to the Credit Agreement remain unchanged.

Availability under the Credit Agreement is based on eligible accounts receivable, inventory and fixed assets. As amended, amounts outstanding under the credit facility bear interest at the Corporation's option at either (i) LIBOR plus an applicable margin ranging between 1.75% to 2.25% based on the quarterly average excess availability or (ii) the base rate plus an applicable margin ranging between 0.75% to 1.25% based on the quarterly average excess availability. Additionally, the Corporation is required to pay a commitment fee ranging between 0.25% and 0.375% based on the daily unused portion of the credit facility. As of December 31, 2018, the Corporation had outstanding borrowings under the Credit Agreement of \$14,320 (including £3,000 of European borrowings for its U.K. subsidiary and \$4,500 of Canadian borrowings for ASW). Interest accrued on the outstanding balance during the year at an average rate of interest of approximately 3.34%. Additionally, the Corporation had utilized a portion of the credit facility for letters of credit (Note 10). As of December 31, 2018, remaining availability under the Credit Agreement approximated \$35,000, net of availability reserves associated with proceeds from the sale and leaseback financing transaction and the sale of certain net assets of Vertical Seal. The availability from these reserves was used toward the settlement of the promissory notes and interest paid on March 4, 2019.

Borrowings outstanding under the Credit Agreement are collateralized by a first priority perfected security interest in substantially all of the assets of the Corporation and its subsidiaries (other than real property). Additionally, the Credit Agreement contains customary affirmative and negative covenants and limitations, including, but not limited to, investments in certain of its subsidiaries, payment of dividends, incurrence of additional indebtedness, upstream distributions from subsidiaries, and acquisitions and divestitures. The Corporation must also maintain a certain level of excess availability. If excess availability falls below the established threshold, or in an event of default, the Corporation will be required to maintain a minimum fixed charge coverage ratio of not less than 1.00 to 1.00. The Corporation was in compliance with the applicable bank covenants as of December 31, 2018.

Sale and Leaseback Financing Obligation

In September 2018, UES completed a sale and leaseback financing transaction for certain of its real property, including the land and buildings of its manufacturing facilities in Valparaiso, Indiana and Burgettstown, Pennsylvania, and its manufacturing facility and corporate headquarters located in Carnegie, Pennsylvania (the "Properties"). Simultaneously with the sale, UES entered into a lease agreement pursuant to which UES would lease the Properties from the buyer. The lease provides for an initial term of 20 years; however, UES may extend the lease for four successive periods of approximately five years each. If fully extended, the lease would expire in September 2058. UES also has the option to repurchase the Properties, which it may exercise in 2025, for a price equal to the greater of (i) the Fair Market Value of the Properties, or (ii) 115% of Lessor's Total Investment for the Facilities, with such terms defined in the lease agreement.

The sale and leaseback financing transaction does not qualify for sale and leaseback accounting due to UES' ability to repurchase the Properties in 2025. Accordingly, the net asset value of the Properties is not removed and a gain or loss on the sale of the Properties is not recognized. Instead, proceeds are recognized as a debt obligation on the consolidated balance sheet.

Gross proceeds equaled \$19,000. The initial annual payment approximates \$1,646, due monthly in advance, which is included in debt – current portion on the consolidated balance sheet. Annual payments will increase each anniversary date by an amount equal to the lesser of 2% or 1.25% of the change in the consumer price index, as defined in the lease agreement. The effective interest rate approximated 6% for 2018.

Deferred financing fees of approximately \$477 were incurred, which are recognized as a reduction of the financing obligation, and are being amortized over seven years.

Promissory Notes

In connection with a March 2016 acquisition, the Corporation issued three-year promissory notes amounting to \$22,619. In 2018, the Corporation and the sellers mutually agreed to reduce the promissory notes by an amount owed to the Corporation resulting in a principal balance of \$21,917. The notes bear interest at 6.5%, compounding annually, with principal and interest payable at maturity. As of December 31, 2018, accrued interest approximated \$4,288, which is included in debt – current portion. As of December 31,

2017, accrued interest approximated \$2,776, which was included in long-term debt. Principal and accrued interest of \$26,474 were paid on March 4, 2019.

Industrial Revenue Bonds

As of December 31, 2018, the Corporation had the following Industrial Revenue Bonds (IRBs) outstanding: (i) \$4,120 tax-exempt IRB maturing in 2020, interest at a floating rate which averaged 1.47% during the current year; (ii) \$7,116 taxable IRB maturing in 2027, interest at a floating rate which averaged 2.06% during the current year; and (iii) \$2,075 tax-exempt IRB maturing in 2029, interest at a floating rate which averaged 1.46% during the current year. The IRBs are secured by letters of credit of equivalent amounts and are remarketed periodically at which time interest rates are reset. If the IRBs are not able to be remarketed, although considered remote by the Corporation and its bankers, the bondholders can seek reimbursement immediately from the letters of credit which serve as collateral for the bonds. Accordingly, the IRBs are recorded as current debt.

Minority Shareholder Loan

ATR has a loan outstanding with its minority shareholder. The loan originally matured in 2008 but has been renewed continually for one-year periods. Interest does not compound and has accrued on the outstanding balance, since inception, at the three-to-five-year loan interest rate set by the People's Bank of China in effect at the time of renewal. The loan balance approximated \$4,056 (RMB 27,901) at December 31, 2018, and \$5,325 (RMB 34,655) at December 31, 2017. During 2018, ATR repaid \$449 (RMB 3,090) in principal and \$145 (RMB 1,000) in accrued interest. Additionally, the shareholders of ATR converted a portion of their loans outstanding with ATR to equity. The conversion was in proportion to their respective ownership interest, with TISCO converting \$872 (RMB 6,000) of its loans to equity. The interest rate for 2018 approximated 5% and accrued interest as of December 31, 2018, and 2017, approximated \$2,297 (RMB 15,800) and \$2,682 (RMB 17,457) which is recorded in other current liabilities.

Capital Leases

The Corporation leases equipment under various noncancelable lease agreements ending 2019 to 2022. Effective interest rates range between 1.30% and 5.20%.

NOTE 9 – PENSION AND OTHER POSTRETIREMENT BENEFITS:

U.S. Pension Benefits

The Corporation has two qualified domestic defined benefit pension plans that cover substantially all of its U.S. employees. Over the past few years, measures have been taken to freeze benefit accruals and participation in the plans and replace benefit accruals with employer contributions to defined contribution plans. As of December 31, 2018, all benefit accruals and participation in the plans have been curtailed except for two locations. The defined benefit pension plans remain covered by the Employee Retirement Income Security Act of 1974 (“ERISA”); accordingly, the Corporation’s policy is to fund at least the minimum actuarially computed annual contribution required under ERISA. Minimum contributions for 2018 approximated \$1,211. No minimum contributions were required for 2017. Minimum contributions for 2019 are expected to approximate \$1,260. Estimated benefit payments for subsequent years are \$14,576 for 2019, \$14,522 for 2020, \$14,725 for 2021, \$14,789 for 2022, \$14,803 for 2023 and \$73,146 for 2024 – 2028. The fair value of the plan assets as of December 31, 2018, and 2017, approximated \$182,541 and \$199,138, respectively, in comparison to accumulated benefit obligations of \$226,618 and \$245,317 for the same periods. Employer contributions to the defined contribution plans totaled \$3,169 and \$2,588 for 2018 and 2017, respectively, and are expected to approximate \$2,943 in 2019.

The Corporation also maintains nonqualified defined benefit pension plans for selected executives in addition to the benefits provided under one of the Corporation's qualified defined benefit pension plans. The objectives of the nonqualified plans are to provide supplemental retirement benefits or restore benefits lost due to limitations set by the Internal Revenue Service. The assets of the nonqualified plans are held in a grantor tax trust known as a "Rabbi" trust and are subject to claims of the Corporation's creditors, but otherwise must be used only for purposes of providing benefits under the plans. No contributions were made to the trust in 2018 or 2017, and none are expected in 2019. The fair market value of the trust at December 31, 2018, and 2017, which is included in other noncurrent assets, was \$3,659 and \$4,204, respectively. The plan is treated as a non-funded pension plan for financial reporting purposes. Accumulated benefit obligations approximated \$6,852 and \$7,202 at December 31, 2018, and 2017, respectively. Estimated benefit payments for subsequent years, which would represent employer contributions, are approximately \$445 for 2019, \$464 for 2020, \$489 for 2021, \$511 for 2022, \$519 for 2023 and \$2,591 for 2024 – 2028.

Employees at one location participate in a multi-employer plan, I.A.M. National Pension Fund, in lieu of the Corporation's defined benefit pension plans. A multi-employer plan generally receives contributions from two or more unrelated employers pursuant to one or more collective bargaining agreements. The assets contributed by one employer may be used to fund the benefits provided to

employees of other employers in the plan because the plan assets, once contributed, are not restricted to individual employers. The latest report of summary plan information (for the 2017 plan year) provided by I.A.M. National Pension Fund indicates:

- More than 1,650 employer locations contribute to the plan;
- Approximately 100,000 active employees participate in the plan; and
- Assets of approximately \$11.9 billion and a funded status of approximately 92%.

Less than 100 of the Corporation's employees participate in the plan and contributions are based on a rate per hour. The Corporation's contributions to the plan were less than \$250 for 2018 and 2017 and represent less than five percent of total contributions to the plan by all contributing employers. Contributions are expected to approximate \$279 in 2019.

Foreign Pension Benefits

Employees of UES-UK participated in a defined benefit pension plan that was curtailed effective December 31, 2004, and replaced with a defined contribution pension plan. The UES-UK plans are non-U.S. plans and therefore are not covered by ERISA. Instead, when necessary, the Trustees and UES-UK agree to a recovery plan that estimates the amount of employer contributions, based on U.K. regulations, necessary to eliminate the funding deficit of the plan with such estimates subject to change based on the future investment performance of the plan's assets. The U.S. dollar equivalent of employer contributions to the defined benefit pension plan approximated \$982 and \$1,521 in 2018 and 2017, respectively. The plan is fully funded as of December 31, 2018; accordingly, no contributions are expected in 2019. The fair value of the plan's assets as of December 31, 2018, and 2017, approximated \$49,651 (£38,991) and \$56,419 (£41,820), respectively, in comparison to accumulated benefit obligations of \$47,459 (£37,269) and \$57,540 (£42,650) for the same periods. Estimated benefit payments for subsequent years are \$1,973 for 2019, \$1,833 for 2020, \$1,802 for 2021, \$1,731 for 2022, \$2,351 for 2023 and \$11,766 for 2024 – 2028. Contributions to the defined contribution pension plan approximated \$363 and \$311 in 2018 and 2017, respectively, and are expected to approximate \$391 in 2019.

The Corporation has two additional foreign defined benefit pension plans, which are unfunded. Projected and accumulated benefit obligations approximated \$6,878 and \$7,073 at December 31, 2018, and 2017, respectively. Estimated benefit payments for subsequent years, for both plans combined, are \$276 for 2019, \$288 for 2020, \$289 for 2021, \$282 for 2022, \$274 for 2023 and \$1,543 for 2024 – 2028.

Other Postretirement Benefits

The Corporation provides a monthly reimbursement of postretirement health care benefits for up to a 5-year period principally to the bargaining groups of two subsidiaries. The plans cover participants and their spouses who retire under an existing pension plan on other than a deferred vested basis and at the time of retirement have also rendered 10 or more years of continuous service irrespective of age. Retiree life insurance is provided to substantially all retirees.

The Corporation also provides life insurance and health care benefits to former employees of certain discontinued operations. This obligation had been estimated and provided for at the time of disposal.

The Corporation's postretirement health care and life insurance plans are not funded or subject to any minimum regulatory funding requirements. Estimated benefit payments for subsequent years, which would represent employer contributions, are approximately \$1,411 for 2019, \$1,313 for 2020, \$1,119 for 2021, \$1,092 for 2022, \$1,053 for 2023 and \$5,577 for 2024-2028.

Significant Activity

In 2018, the Corporation offered a temporary early retirement incentive program to full-time salaried participants at certain locations that either met the eligibility requirements for an unreduced pension or attained age 55 and had 3.5 years of service under the plan. Participants selecting the early retirement incentive will receive an unreduced pension, a lump sum payment ranging between \$10 and \$25 dependent upon the participant's combined age and years of service, and one year of health insurance benefits. The early retirement incentive program increased employee benefit obligations and associated expense by \$1,476 and is recorded as a special termination benefit.

In connection with the ratification of a collective bargaining agreement for employees of the UES Harmon Creek Steelworkers Location, employee participation in a qualified domestic defined benefit pension plan was frozen effective May 31, 2018. Benefit accruals have been replaced with employer non-elective contributions to a defined contribution plan equaling 3% of compensation and a matching contribution of up to 4% of compensation. The plan freeze resulted in remeasurement of the liability, reducing the liability by \$1,726, and a curtailment loss of \$21.

Actuarial (gains) losses were comprised of the following components:

	U.S. Pension		Foreign Pension		Other Postretirement	
	Benefits		Benefits		Benefits	
	2018	2017	2018	2017	2018	2017
Changes in assumptions	\$(16,642)	\$12,566	\$(5,298)	\$616	\$(914)	\$(1,103)
GMP equalization	0	0	982	0	0	0
Change from RPI to CPI	0	0	0	(8,760)	0	0
Other	(420)	1,259	(1,446)	190	(229)	(1,067)
Total actuarial (gains) losses	\$(17,062)	\$13,825	\$(5,762)	\$(7,954)	\$(1,143)	\$(2,170)

Changes in assumptions used to determine plan liabilities, particularly for discount rates, increase (decrease) projected benefit obligations. A 1/4 percentage point decrease in the discount rate would increase projected and accumulated benefit obligations by approximately \$8,300. Conversely, a 1/4 percentage point increase in the discount rate would decrease projected and accumulated benefit obligations by approximately \$8,300.

In 2018, the High Court of Justice in the United Kingdom issued a ruling requiring equalization of benefits for participants under U.K. defined benefit pension plans. The inequities arose from statutory differences related to Guaranteed Minimum Pension (GMP) benefits that are included in U.K. defined benefit pension plans. The impact of the GMP equalization for the UES-UK defined benefit pension plan approximated \$982, which was recognized as a prior service cost and will be amortized over the average remaining lifetime of the participants, or approximately 25 years at December 31, 2018.

In 2017, the Trustees of the UES-UK defined benefit pension plan and UES-UK agreed that, effective January 1, 2018, future increases to participants' non-GMP pensions would be based on the increase in the Consumer Price Index (CPI) instead of the Retail Price Index (RPI). The effect of the change reduced employee benefit obligations by approximately \$8,760 for the year ended December 31, 2017, and was recognized as past service cost to be amortized over the average remaining lifetime of the participants.

Reconciliations

The following provides a reconciliation of projected benefit obligations (“PBO”), plan assets and the funded status of the plans for the Corporation’s defined benefit plans calculated using a measurement date as of the end of the respective years.

	U.S. Pension		Foreign Pension		Other Postretirement	
	Benefits ^(a)		Benefits ^(b)		Benefits	
	2018	2017	2018	2017	2018	2017
Change in projected benefit obligations:						
PBO at January 1	\$254,976	\$244,440	\$64,613	\$66,910	\$16,979	\$19,059
Service cost	1,225	1,651	477	150	457	492
Interest cost	8,473	8,413	1,391	1,845	494	571
Plan amendments	0	0	0	0	0	165
Special termination benefits	1,350	0	0	0	126	0
Plan curtailments	(1,726)	0	0	0	0	0
Foreign currency exchange rate changes	0	0	(3,434)	5,948	0	0
Actuarial (gains) losses	(17,062)	13,825	(5,762)	(7,954)	(1,143)	(2,170)
Participant contributions	0	0	0	0	104	92
Benefits paid from plan assets	(13,043)	(12,950)	(2,282)	(1,813)	0	0
Benefits paid by the Corporation	(403)	(403)	(666)	(473)	(1,207)	(1,230)
PBO at December 31	\$233,790	\$254,976	\$54,337	\$64,613	\$15,810	\$16,979
Change in plan assets:						
Fair value of plan assets at January 1	\$199,138	\$188,722	\$56,419	\$48,055	\$0	\$0
Actual return on plan assets	(4,765)	23,366	(2,477)	3,998	0	0
Foreign currency exchange rate changes	0	0	(2,991)	4,673	0	0
Corporate contributions	1,614	403	1,648	1,979	1,103	1,138
Participant contributions	0	0	0	0	104	92
Gross benefits paid	(13,446)	(13,353)	(2,948)	(2,286)	(1,207)	(1,230)
Fair value of plan assets at December 31	\$182,541	\$199,138	\$49,651	\$56,419	\$0	\$0
Funded status of the plans:						
Fair value of plan assets	\$182,541	\$199,138	\$49,651	\$56,419	\$0	\$0
Less benefit obligations	233,790	254,976	54,337	64,613	15,810	16,979
Funded status at December 31	\$(51,249)	\$(55,838)	\$(4,686)	\$(8,194)	\$(15,810)	\$(16,979)

(a) Includes the nonqualified defined benefit pension plan.

(b) Includes the overfunded U.K. defined benefit pension plan and two smaller underfunded defined benefit pension plans.

The following provides a summary of amounts recognized in the consolidated balance sheets.

	U.S. Pension	Foreign Pension	Other Postretirement
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	Benefits		Benefits		Benefits	
	2018	2017	2018	2017	2018	2017
Employee benefit obligations:						
Prepaid pensions ^(a)	\$0	\$0	\$2,192	\$0	\$0	\$0
Accrued payrolls and employee benefits ^(b)	(436)	(432)	0	0	(1,395)	(1,371)
Employee benefit obligations ^(c)	(50,813)	(55,406)	(6,878)	(8,194)	(14,415)	(15,608)
	\$(51,249)	\$(55,838)	\$(4,686)	\$(8,194)	\$(15,810)	\$(16,979)
Accumulated other comprehensive loss: ^(d)						
Net actuarial loss (gain)	\$45,041	\$47,252	\$22,149	\$25,914	\$(2,123)	\$(1,211)
Prior service cost (credit)	91	156	(7,402)	(9,174)	(12,202)	(13,809)
	\$45,132	\$47,408	\$14,747	\$16,740	\$(14,325)	\$(15,020)

(a) Represents the overfunded U.K. defined benefit pension plan which is recorded as a noncurrent asset in the consolidated balance sheet.

(b) Recorded as a current liability in the consolidated balance sheet.

(c) Recorded as a noncurrent liability in the consolidated balance sheet.

(d) Amounts are pre-tax.

Investment Policies and Strategies

The investment policies and strategies are determined and monitored by the Board of Directors for the U.S. pension plans and by the Trustees (as appointed by UES-UK and the employees of UES-UK) for the UES-UK pension plan, each of whom employ their own investment managers to manage the plan's assets in accordance with the policy guidelines. The U.S. defined benefit pension plans follow a glide-path strategy whereby target asset allocations are rebalanced based on projected payment obligations and the funded status of the plans. Pension assets of the UES-UK plan are invested with the objective of maximizing long-term returns while minimizing material losses to meet future benefit obligations as they become due. Investments in equity securities are primarily in common stocks of publicly traded U.S. and international companies across a broad spectrum of industry sectors. Investments in fixed-income securities are principally A-rated or better bonds with maturities of less than ten years, preferred stocks and convertible bonds. The Corporation believes there are no significant concentrations of risk associated with the Plans' assets.

Attempts to minimize risk include allowing temporary changes to the allocation mix in response to market conditions, diversifying investments among asset categories (e.g., equity securities, fixed-income securities, alternative investments, cash and cash equivalents) and within these asset categories (e.g., economic sector, industry, geographic distribution, size) and consulting with independent financial and legal counsels to assure that the investments and their expected returns and risks are consistent with the goals of the Board of Directors or Trustees.

With respect to the U.S. pension plans, the following investments are prohibited unless otherwise approved by the Board of Directors: stock of the Corporation, futures and options except for hedging purposes, unregistered or restricted stock, warrants, margin trading, short-selling, real estate excluding public or real estate partnerships, and commodities including art, jewelry and gold. The foreign pension plan invests in specific funds. Any investments other than those specifically identified would be considered prohibited.

The following summarizes target asset allocations (within +/-5% considered acceptable) and major asset categories. Certain investments are classified differently for target asset allocation purposes and external reporting purposes. In the latter part of 2018, the Corporation changed investment managers; accordingly, at December 31, 2018, there is temporarily a higher amount in cash and cash equivalents.

	U.S. Pension Benefits			Foreign Pension Benefits		
	Percentage Target of Plan			Percentage Target of Plan		
	Allocation Assets			Allocation Assets		
	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2017
Equity Securities	45 %	25 %	58 %	44 %	50 %	49 %
Fixed-Income Securities	42 %	45 %	21 %	35 %	35 %	33 %
Alternative Investments	10 %	10 %	16 %	21 %	15 %	17 %
Other (primarily cash and cash equivalents)	3 %	20 %	5 %	0 %	0 %	1 %

Fair Value Measurement of Plan Assets

Equity securities, exchange-traded funds and mutual funds are actively traded on exchanges and price quotes for these investments are readily available. Similarly, fixed-income mutual funds consist of debt securities of U.S. and U.K. corporations and price quotes for these investments are readily available. Commingled funds are not traded publicly, but the underlying assets (such as stocks and bonds) held in these funds are traded on active markets and the prices for the underlying assets are readily observable. For securities not actively traded, the fair value may be based on third-party appraisals, discounted cash flow analysis, benchmark yields and inputs that are currently observable in markets for similar securities.

Investment Strategies

The significant investment strategies of the various funds are summarized below.

Fund	Investment Strategy	Primary Investment Objective
Temporary Investment Funds	Invests primarily in a diversified portfolio of investment grade money market instruments.	Achieve a market level of current income while maintaining stability of principal and liquidity.
Various Equity Funds	Each fund maintains a diversified holding in common stock of applicable companies (e.g., common stock of small capitalization companies if a small-cap fund, common stock of medium capitalization companies if a mid-cap fund, common stock of foreign corporations if an international fund, etc.).	Outperform the fund's related index.
Various Fixed Income Funds	Invests primarily in a diversified portfolio of fixed-income securities of varying maturities or in commingled funds which invest in a diversified portfolio of fixed-income securities of varying maturities.	For the U.S. Plans – to achieve a rate of return that matches or exceeds the expected growth in plan liabilities. For the Foreign Plan – to achieve capital growth by tracking closely the performance of the applicable FTSE index.
Alternative Investments – Managed Funds	Invests in equities and equity-like asset classes and strategies (such as public equities, venture capital, private equity, real estate, natural resources and hedged strategies) and fixed-income securities approved by the Board of Directors of the Corporation.	Generate a minimum annual inflation adjusted return of 5% and outperform a traditional 70/30 equities/bond portfolio.
Alternative Investments – Hedge and Absolute Return Funds	Invests in a diversified portfolio of alternative investment styles and strategies approved by the Trustees of the UES-UK defined and Absolute Return benefit pension plan.	Generate long-term capital appreciation while maintaining a low correlation with the traditional global financial markets.

Categories of Plan Assets

Asset categories based on the nature and risks of the U.S. Pension Benefit Plans' assets as of December 31, 2018, are summarized below.

	Quoted Prices in		Significant	
	Active Markets for	Significant Other	Unobservable	
	Identical Inputs	Observable Inputs	Inputs	Total
	(Level 1)	(Level 2)	(Level 3)	
Equity Securities:				
U.S.				
Consumer discretionary	\$ 891	\$ 0	\$ 0	\$891
Consumer staples	602	0	0	602
Energy	415	0	0	415
Financial	1,075	0	0	1,075
Healthcare	1,718	0	0	1,718
Industrials	780	0	0	780
Information technology	1,632	0	0	1,632
Materials	177	0	0	177
Mutual funds	36,883	0	0	36,883
Telecommunications	560	0	0	560
Utilities	264	0	0	264
Total Equity Securities	44,997	0	0	44,997
Fixed Income Securities:				
Corporate bonds	0	44,786	0	44,786
Treasury bonds	25,605	0	0	25,605
Agency bonds	0	10,334	0	10,334
Total Fixed Income Securities	25,605	55,120	0	80,725
Alternative Investments:				
Managed funds ^(a)	0	0	23,673	23,673
Total Alternative Investments	0	0	23,673	23,673
Other:				
Cash and cash equivalents ^(b)	33,146	0	0	33,146
Total Other	33,146	0	0	33,146
	\$ 103,748	\$ 55,120	\$ 23,673	\$182,541

(a) Includes approximately 74.0% in alternative investments (real assets, commodities and resources, absolute return funds) and 26.0% in cash and cash equivalents.

(b) Includes investments in temporary funds.

Categories of Plan Assets

Asset categories based on the nature and risks of the U.S. Pension Benefit Plans' assets as of December 31, 2017, are summarized below.

	Quoted Prices in Active Markets for Identical Inputs (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Equity Securities:				
U.S.				
Consumer discretionary	\$ 637	\$ 0	\$ 0	\$637
Consumer staples	896	0	0	896
Energy	427	0	0	427
Financial	1,362	0	0	1,362
Healthcare	1,192	0	0	1,192
Industrials	819	0	0	819
Information technology	2,061	0	0	2,061
Materials	248	0	0	248
Mutual funds	91,258	0	0	91,258
Telecommunications	198	0	0	198
Utilities	204	0	0	204
Total Equity Securities	99,302	0	0	99,302
Fixed Income Securities:				
Corporate bonds	0	10,801	0	10,801
Mutual funds	18,884	0	0	18,884
Treasury bonds	6,976	0	0	6,976
Agency bonds	0	926	0	926
Total Fixed Income Securities	25,860	11,727	0	37,587
Alternative Investments:				
Managed funds ^(a)	0	0	49,838	49,838
Total Alternative Investments	0	0	49,838	49,838
Other:				
Cash and cash equivalents ^(b)	11,012	0	0	11,012
Commingled funds	0	174	0	174
Other ^(c)	2	0	1,223	1,225
Total Other	11,014	174	1,223	12,411
	\$ 136,176	\$ 11,901	\$ 51,061	\$199,138

(a) Includes approximately 47.3% in equity and equity-like asset securities, 41.1% in alternative investments (real assets, commodities and resources, absolute return funds) and 9.6% in fixed income securities and 2.0% in other, primarily cash and cash equivalents.

(b) Includes investments in temporary funds.

(c) Includes accrued receivables and pending broker settlements.

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Asset categories based on the nature and risks of the Foreign Pension Benefit Plan's assets as of December 31, 2018, are summarized below.

	Quoted Prices in Active Markets for Identical Inputs (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Equity Securities:				
Commingled Funds (U.K.)	\$ 0	\$ 3,949	\$ 0	\$3,949
Commingled Funds (International)	0	20,645	0	20,645
Total Equity Securities	0	24,594	0	24,594
Fixed-Income Securities:				
Commingled Funds (U.K.)	0	17,332	0	17,332
Alternative Investments:				
Hedge and Absolute Return Funds	0	0	7,569	7,569
Cash and cash equivalents	156	0	0	156
	\$ 156	\$ 41,926	\$ 7,569	\$49,651

Asset categories based on the nature and risks of the Foreign Pension Benefit Plan's assets as of December 31, 2017, are summarized below.

	Quoted Prices in Active Markets for Identical Inputs (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Equity Securities:				
Commingled Funds (U.K.)	\$ 0	\$ 4,617	\$ 0	\$4,617
Commingled Funds (International)	0	23,015	0	23,015
Total Equity Securities	0	27,632	0	27,632
Fixed-Income Securities:				
Commingled Funds (U.K.)	0	18,851	0	18,851
Alternative Investments:				
Hedge and Absolute Return Funds	0	0	9,637	9,637
Cash and cash equivalents	299	0	0	299
	\$ 299	\$ 46,483	\$ 9,637	\$56,419

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The table below sets forth a summary of changes in the fair value of the Level 3 plan assets for U.S. and foreign pension plans for the year ended December 31, 2018.

	U.S. Pension Benefits		Foreign Pension Benefits	
	2018	2017	2018	2017
Fair value as of January 1	\$49,838	\$33,830	\$9,637	\$8,593
Contributions	0	16,000	0	0
Withdrawals	(26,131)	(5,364)	(1,037)	0
Realized gains (losses)	9,061	1,304	(436)	0
Change in net unrealized (losses) gains	(9,095)	4,068	(98)	229
Other, primarily impact from changes in foreign currency				
exchange rates	0	0	(497)	815
Fair value as of December 31	\$23,673	\$49,838	\$7,569	\$9,637

Net Periodic Pension and Other Postretirement Benefit Costs

The actual return on the fair value of plan assets is included in determining the funded status of the plans. In determining net periodic pension costs, the expected long-term rate of return on the market-related value of plan assets is used. Differences between the actual return on plan assets and the expected long-term rate of return on plan assets are classified as part of unrecognized actuarial gains or losses and are recorded as a component of accumulated other comprehensive loss on the consolidated balance sheet. When these gains or losses exceed 10% of the greater of the projected benefit obligation or the market-related value of plan assets, they are amortized to

net periodic pension and other postretirement costs over the average remaining service period or life expectancy of the employees expected to receive benefits under the plans. When the gains or losses are less than 10% of the greater of the projected benefit obligation or the market-related value of plan assets, they are included in net periodic pension and other postretirement costs indirectly as a result of lower/higher interest costs arising from a decrease/increase in the projected benefit obligation.

Net periodic pension and other postretirement benefit costs include the following components for each of the years.

	U.S. Pension		Foreign Pension		Other Postretirement	
	Benefits		Benefits		Benefits	
	2018	2017	2018	2017	2018	2017
Service cost	\$1,225	\$1,651	\$477	\$150	\$457	\$492
Interest cost	8,473	8,413	1,391	1,845	494	571
Expected return on plan assets	(13,282)	(12,503)	(2,580)	(2,239)	0	0
Amortization of:						
Prior service cost (credit)	44	52	(336)	0	(1,607)	(1,607)
Actuarial loss (gain)	1,471	4,111	727	751	(231)	(24)
Special termination benefits	1,350	0	0	0	126	0
Curtailment loss	21	0	0	0	0	0
	\$(698)	\$1,724	\$(321)	\$507	\$(761)	\$(568)

Assumptions

Assumptions are reviewed on an annual basis. The expected long-term rate of return on plan assets is an estimate of average rates of earnings expected to be earned on funds invested or to be invested to provide for the benefits included in the projected benefit obligation. Since these benefits will be paid over many years, the expected long-term rate of return is reflective of current investment returns and investment returns over a longer period. Consideration is also given to target and actual asset allocations, inflation and real risk-free return. The discount rates used in determining future pension obligations and other postretirement benefits for each of the plans are based on rates of return on high-quality fixed-income investments currently available and expected to be available during the period to maturity of the pension and other postretirement benefits. High-quality fixed-income investments are defined as those investments which have received one of the two highest ratings given by a recognized rating agency with maturities of 10+ years.

The discount rates and weighted-average wage increases used to determine the benefit obligations as of December 31, 2018, and 2017, are summarized below.

U.S. Pension		Foreign Pension		Other Postretirement	
Benefits		Benefits		Benefits	
2018	2017	2018	2017	2018	2017

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Discount rate	4.23-4.34%	3.63-3.72%	3.00	2.45%	4.09-4.33%	3.46-3.69%
Wage increases	n/a	3.00%	n/a	n/a	n/a	n/a

In addition, the assumed health care cost trend rate at December 31, 2018, for other postretirement benefits is 6% for 2019 gradually decreasing to 4.75% in 2021. In selecting rates for current and long-term health care assumptions, the Corporation considers known health care cost increases, the design of the benefit programs, the demographics of its active and retiree populations and expectations of inflation rates in the future.

The following assumptions were used to determine net periodic pension and other postretirement benefit costs for the year ended December 31:

	U.S. Pension		Foreign Pension		Other Postretirement	
	Benefits		Benefits		Benefits	
	2018	2017	2018	2017	2018	2017
Discount rate	3.63-4.34%	4.02-4.25%	2.45%	2.50-2.65%	3.46-3.69%	3.90-4.13%
Expected long-term rate of return	6.95-7.50%	6.95-7.50%	4.65%	4.45%	n/a	n/a
Wages increases	n/a	3.00%	n/a	n/a	n/a	n/a

NOTE 10 – COMMITMENTS AND CONTINGENT LIABILITIES:

Outstanding standby and commercial letters of credit as of December 31, 2018, approximated \$21,000, the majority of which serves as collateral for the IRB debt. In addition, outstanding surety bonds guaranteeing certain obligations of two of the Corporation's foreign pension benefit plans approximated \$4,000 (SEK 33,900) as of December 31, 2018.

Approximately 39% of the Corporation's employees, including ASW, are covered by collective bargaining agreements that have expiration dates ranging from August 2019 to May 2022. Collective bargaining agreements expiring in 2019 (representing approximately 55% of the covered employees) will be negotiated with the intent to secure mutually beneficial, long-term arrangements.

See Note 12 regarding derivative instruments, Note 18 regarding litigation and Note 20 for environmental matters.

NOTE 11 – ACCUMULATED OTHER COMPREHENSIVE LOSS:

Net change and ending balances for the various components of other comprehensive income (loss) and for accumulated other comprehensive loss as of and for the years ended December 31, 2017, and 2018, are summarized below.

	Foreign Currency Translation	Unrecognized Components of Employee Benefit Plans	Unrealized Holding Gains on Securities	Derivatives	Accumulated Other Comprehensive Loss
Balance at January 1, 2017	(22,973)	(38,636)	59	551	(60,999)
Net Change	11,041	10,582	573	134	22,330
Impact from adoption of ASU 2018-02	0	(6,142)	0	54	(6,088)
Balance at December 31, 2017	(11,932)	(34,196)	632	739	(44,757)
Cumulative effect of ASU 2016-01	0	0	(632)	0	(632)
Balance at January 1, 2018, adjusted	(11,932)	(34,196)	0	739	(45,389)
Net Change	(6,710)	3,294	0	(803)	(4,219)
Balance at December 31, 2018	\$ (18,642)	\$ (30,902)	\$ 0	\$ (64)	\$ (49,608)

On January 1, 2018, ASU 2016-01 became effective, which requires entities to record changes in fair value for certain investments in equity securities through net income (loss) versus other comprehensive income (loss). Accordingly, no amounts for changes in fair value of the Corporation's marketable securities were reclassified from accumulated other comprehensive loss to net loss for the year ended December 31, 2018. For the year ended December 31, 2017, the Corporation reclassified an insignificant amount of realized gains from the sale of marketable securities to the consolidated statement of operations. Prior year amounts for the amortization of unrecognized employee benefit costs have been adjusted to include the effects of ASU 2017-07, which became effective on January 1, 2018. The following summarizes the line items affected on the consolidated statements of operations for components reclassified from accumulated other comprehensive loss for each of the years ended December 31. Amounts in parentheses represent credits to net loss.

	2018	2017
Amortization of unrecognized employee benefit costs:		
Other expense	\$89	\$3,283
Income tax provision	0	0
Net of income tax	\$89	\$3,283
Realized gains from settlement of cash flow hedges:		
Depreciation and amortization (foreign currency purchase contracts)	\$(23)	\$(31)
Costs of products sold (excluding depreciation and		
amortization) (futures contracts – copper and aluminum)	(67)	(639)
Total before income tax	(90)	(670)
Income tax provision	0	0
Net of income tax	\$(90)	\$(670)

There was no income tax expense (benefit) associated with the various components of other comprehensive income (loss) for either year due to the Corporation having a valuation allowance recorded against its deferred income tax assets for the jurisdiction where the expense is recognized. Foreign currency translation adjustments exclude the effect of income taxes since earnings of non-U.S. subsidiaries are deemed to be reinvested for an indefinite period of time.

NOTE 12 – DERIVATIVE INSTRUMENTS:

Certain operations of the Corporation are subject to risk from exchange rate fluctuations in connection with sales in foreign currencies. To minimize this risk, foreign currency sales contracts are entered into which are designated as cash flow or fair value hedges. As of December 31, 2018, approximately \$32,983 of anticipated foreign-denominated sales has been hedged which are covered by fair value contracts settling at various dates through January 2020.

Additionally, certain divisions of the Air and Liquid Processing segment are subject to risk from increases in the price of commodities (copper and aluminum) used in the production of inventory. To minimize this risk, futures contracts are entered into which are designated as cash flow hedges. At December 31, 2018, approximately 51% or \$2,547 of anticipated copper purchases over the next nine months and 56% or \$507 of anticipated aluminum purchases over the next six months are hedged.

The Corporation previously entered into foreign currency purchase contracts to manage the volatility associated with euro-denominated progress payments to be made for certain machinery and equipment. As of December 31, 2010, all contracts had been settled and the underlying fixed assets were placed in service.

No portion of the existing cash flow or fair value hedges is considered to be ineffective, including any ineffectiveness arising from the unlikelihood of an anticipated transaction to occur. Additionally, no amounts have been excluded from assessing the effectiveness of a hedge. The Corporation does not enter into derivative transactions for speculative purposes and, therefore, holds no derivative instruments for trading purposes.

The following summarizes location and fair value of the foreign currency sales contracts recorded on the consolidated balance sheets as of December 31:

	Location	2018	2017
Fair value hedge contracts	Other current assets	\$44	\$961
	Other current liabilities	950	89
	Other noncurrent liabilities	70	1
Fair value hedged item	Receivables	232	(269)
	Other current assets	967	169
	Other noncurrent assets	105	16
	Other current liabilities	12	907

The change in the fair value of the cash flow contracts is recorded as a component of accumulated other comprehensive loss. Amounts recognized as and reclassified from accumulated other comprehensive loss are recorded as a component of other comprehensive income (loss) and are summarized below. Amounts are after-tax, where applicable. Certain amounts recognized as comprehensive income (loss) for 2018 and 2017 have no tax effect due to the Corporation recording a valuation allowance against its deferred income tax assets in the related jurisdictions. See Note 19. The difference between the balances at December 31, 2017, and January 1, 2018, represents the impact from the adoption of ASU 2018-02.

For the Year Ended December 31, 2018	Beginning of	Recognized	Reclassified of	End of
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	the Year			the Year
Foreign currency purchase contracts	\$ 239	\$ 0	\$ 23	\$216
Future contracts – copper and aluminum	500	(713)	67	(280)
Change in fair value	\$ 739	\$ (713)	\$ 90	\$(64)
For the Year Ended December 31, 2017				
Foreign currency purchase contracts	\$ 216	\$ 0	\$ 31	\$185
Future contracts – copper and aluminum	335	804	639	500
Change in fair value	\$ 551	\$ 804	\$ 670	\$685

The change in fair value reclassified or expected to be reclassified from accumulated other comprehensive loss to earnings is summarized below. All amounts are pre-tax.

	Location of Gain (Loss) in Statements of Operations	Estimated to be Reclassified in the Next 12 Months	Year Ended December 31, 2018	2017
Foreign currency purchase contracts	Depreciation and amortization	\$ 27	\$23	\$31
Futures contracts – copper and aluminum	Costs of products sold (excluding depreciation and amortization)	(280)	67	639

Losses on foreign exchange transactions included in other expense approximated \$(1,480) and \$(747) for 2018 and 2017, respectively.

NOTE 13 – FAIR VALUE:

The following summarizes financial assets and liabilities reported at fair value on a recurring basis in the accompanying consolidated balance sheets at December 31:

2018	Quoted Prices in Active Markets for	Significant Other	Significant Observable Inputs	Unobservable Inputs	Total
	(Level 1)	(Level 2)	(Level 3)	(Level 3)	
Investments					
Other noncurrent assets	\$ 3,659	\$ 0	\$ 0	\$ 0	\$3,659
Foreign currency exchange contracts					
Other current assets	0	1,011	0	0	1,011
Other noncurrent assets	0	105	0	0	105
Other current liabilities	0	962	0	0	962
Other noncurrent liabilities	0	70	0	0	70

2017

Investments				
Other noncurrent assets	\$ 4,204	\$ 0	\$ 0	\$ 4,204
Foreign currency exchange contracts				
Other current assets	0	1,130	0	1,130
Other noncurrent assets	0	16	0	16
Other current liabilities	0	996	0	996
Other noncurrent liabilities	0	1	0	1

The investments held as other noncurrent assets represent assets held in the “Rabbi” trust for the purpose of providing benefits under the non-qualified defined benefit pension plan. The fair value of the investments is based on quoted prices of the investments in active markets. The fair value of foreign currency exchange contracts is determined based on the fair value of similar contracts with similar terms and remaining maturities. The fair value of futures contracts is based on market quotations. The fair value of the variable-rate debt approximates its carrying value. Additionally, the fair value of trade receivables and trade payables approximates their carrying value.

NOTE 14 – REVENUE:

Net sales by geographic area for the years ended December 31, 2018, and 2017, are outlined below. When disaggregating revenue, consideration was given to information regularly reviewed by the chief operating decision maker to evaluate the financial performance of the operating segments and make resource allocation decisions.

Geographic Areas:	Net Sales ⁽¹⁾	
	2018	2017
United States	\$ 209,536	\$ 194,982
Foreign	209,896	190,173
	\$ 419,432	\$ 385,155

	Net Sales by Product Line ⁽²⁾	
	2018	2017
Forged and cast mill rolls	\$270,241	\$254,638
Forged engineered products	59,289	42,645
Heat exchange coils	26,761	28,998
Centrifugal pumps	35,868	35,607
Air handling systems	27,273	23,267
	\$419,432	\$385,155

(1) Net sales are attributed to countries based on location of the customer. Sales to individual countries were less than 10% of consolidated net sales for each of the years.

(2) For 2018 and 2017, no customers within the Forged and Cast Engineered Products exceeded 10% of its net sales. For the Air and Liquid Processing segment, one customer accounted for 13% of its net sales in 2018 and no customers exceeded 10% of net sales for 2017.

NOTE 15 – STOCK-BASED COMPENSATION:

In May 2016, the shareholders of the Corporation approved the adoption of the Ampco-Pittsburgh Corporation 2016 Omnibus Incentive Plan (the “Incentive Plan”), which authorizes the issuance of up to 1,100,000 shares of the Corporation’s common stock for awards under the Incentive Plan. The Incentive Plan replaces the 2011 Omnibus Incentive Plan (the “Predecessor Plan”). No new awards will be granted under the Predecessor Plan. Any awards outstanding under the Predecessor Plan will remain subject to and be paid under the Predecessor Plan, and any shares subject to outstanding awards under the Predecessor Plan that subsequently expire, terminate, or are surrendered or forfeited for any reason without issuance of shares (equal to 140,251 shares at December 31, 2018) will automatically become available for issuance under the Incentive Plan.

Awards under the Incentive Plan may include incentive non-qualified stock options, stock appreciation rights, restricted shares and restricted stock units, performance awards, other stock-based awards or short-term cash incentive awards. If any award is canceled, terminates, expires or lapses for any reason prior to the issuance of shares, or if shares are issued under the Incentive Plan and thereafter are forfeited to the Corporation, the shares subject to such awards and the forfeited shares will not count against the aggregate number of shares available under the Incentive Plan. Shares tendered or withheld to pay the option exercise price or tax withholding will continue to count against the aggregate number of shares of common stock available for grant under the Incentive Plan. Any shares repurchased by the Corporation with cash proceeds from the exercise of options will not be added back to the pool of shares available for grant under the Incentive Plan.

The Incentive Plan may be administered by the Board of Directors or the Compensation Committee of the Board of Directors. The Compensation Committee has the authority to determine, within the limits of the express provisions of the Incentive Plan, the individuals to whom the awards will be granted and the nature, amount and terms of such awards. The Incentive Plan also provides for equity-based awards during any one year to non-employee members of the Board of Directors, based on the grant date fair value, not to exceed \$200. The limit does not apply to shares received by a non-employee director at his or her election in lieu of all or a portion of the director’s retainer for board service. The number of shares of common stock issued to non-employee directors was 72,170 and 50,000 in 2018 and 2017, respectively.

The Compensation Committee has granted time-vesting restricted stock units (RSUs) and performance-vesting restricted stock units (PSUs) to select individuals. Each RSU represents the right to receive one share of common stock of the Corporation at a future date after the RSU has become earned and vested, subject to the terms and

conditions of the RSU award agreement. The RSUs typically vest over a three-year period. The PSUs can be earned depending upon the achievement of a performance or market condition and a time-vesting condition as follows: (i) achievement of a targeted return on invested capital or a basic earnings per share during the performance period beginning in the year of grant and continuing for two subsequent years; (ii) achievement of a three-year cumulative relative total shareholder return as ranked against other companies included in the Corporation's peer group; and (iii) remaining continuously employed with the Corporation through the end of the year following three years from the date of grant. Earlier vesting of the stock units is permitted under certain conditions, such as upon a change of control of the Corporation, or as approved by the Board of Directors.

The grant date fair value for the RSUs equals the closing price of the Corporation's common stock on the NYSE on the date of grant. The grant date fair value for PSUs subject to a market condition is determined using a Monte Carlo simulation model and the grant date fair value for PSUs that vest subject to a performance condition is equal to the closing price of the Corporation's stock on the NYSE on the date of grant. The determination of the fair value of these awards takes into consideration the likelihood of achievement of the market or performance condition and is adjusted for subsequent changes in the estimated or actual outcome of the condition. Unrecognized compensation expense associated with the RSUs and PSUs equaled \$2,246 at December 31, 2018, and is expected to be recognized over a weighted average period of approximately 2 years.

A summary of outstanding incentive options (RSUs and PSUs) as of December 31, 2017, and 2018, and activity for the years then ended, is as follows:

	Number of RSUs	Weighted Average Fair Value	Number of PSUs	Weighted Average Fair Value
Outstanding at January 1, 2017	155,845	\$ 17.53	39,348	\$ 21.62
Granted	76,473	14.00	97,788	14.93
Converted to common stock	(58,677)	17.25	0	N/A
Forfeited/cancelled	(14,935)	16.76	(34,622)	14.99
Outstanding at December 31, 2017	158,706	16.00	102,514	17.47
Granted	117,501	9.70	94,703	10.06
Converted to common stock	(83,786)	16.38	0	N/A
Forfeited/cancelled	(19,716)	13.65	(70,630)	18.79
Outstanding at December 31, 2018	172,705	\$ 11.77	126,587	\$ 11.19

A summary of outstanding stock options as of December 31, 2017, and 2018, and activity for the years then ended, is as follows:

	Number of Shares Under Options	Weighted Average Exercise Price	Remaining Contractual Life In Years	Intrinsic Value
Outstanding at January 1, 2017	1,005,836	\$ 24.07	4.2	\$ 0
Granted	0	N/A		
Exercised	0	N/A		
Forfeited/cancelled	(190,501)	26.03		
Outstanding at December 31, 2017	815,335	23.61	3.3	0
Granted	0	N/A		
Exercised	0	N/A		
Forfeited/cancelled	(209,750)	32.47		
Outstanding at December 31, 2018	605,585	\$ 20.54	2.8	\$ 0
Exercisable at December 31, 2018	605,585	\$ 20.54	2.8	\$ 0
Vested or expected to vest at December 31, 2018	605,585	\$ 20.54	2.8	\$ 0

Stock-based compensation expense for all awards, including expense for shares to be issued to non-employee directors, approximated \$2,115 and \$2,400 for 2018 and 2017, respectively. There was no income tax benefit recognized in the consolidated statements of operations due to the Corporation having a valuation allowance recorded against its deferred income tax assets for the jurisdiction where the expense was recognized. See Note 19.

NOTE 16 – OPERATING LEASES:

The Corporation leases certain factory and office space and certain equipment. Operating lease expense was \$1,412 in 2018 and \$1,244 in 2017. Operating lease payments for subsequent years are \$582 for 2019, \$426 for 2020, \$374 for 2021, \$355 for 2022, \$345 for 2023 and \$4,249 thereafter.

NOTE 17 – RESEARCH AND DEVELOPMENT COSTS:

Expenditures relating to the development of new products, identification of products or process alternatives and modifications and improvements to existing products and processes are expensed as incurred. These expenses approximated \$2,664 for 2018 and \$3,386 for 2017.

NOTE 18 – LITIGATION:

The Corporation and its subsidiaries are involved in various claims and lawsuits incidental to their businesses and are also subject to asbestos litigation as described below. In February 2017, the Corporation, its indirect subsidiary Akers National Roll Company, as well as the Akers National Roll Company Health & Welfare Benefits Plan were named as defendants in a class action complaint filed in the United States District Court for the Western District of Pennsylvania, where the plaintiffs (currently retired former employees of Akers National Roll Company and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial, and

Service Workers International Union, AFL-CIO) alleged that the defendants breached collective bargaining agreements and violated the benefit plan by modifying medical benefits of the plaintiffs and similarly situated retirees. The defendants moved to dismiss the case, and plaintiffs petitioned the court to compel arbitration. On June 13, 2017, the District Court compelled arbitration and denied the defendants' motion to dismiss as moot. Defendants appealed this decision to the Third Circuit Court of Appeals on June 21, 2017. The Third Circuit Court of Appeals reversed the District Court's decision to compel arbitration on August 29, 2018. The plaintiffs filed a petition for rehearing, which was denied. Rather than litigating the merits of the case at the United States District Court for the Western District of Pennsylvania, the Corporation reached a settlement agreement in principle with the plaintiffs, which remains subject to approval by the court. As expected, the final resolution of this settlement agreement will not have a material adverse effect on our results of operations, financial position, liquidity or capital resources.

Asbestos Litigation

Claims have been asserted alleging personal injury from exposure to asbestos-containing components historically used in some products manufactured by predecessors of Air & Liquid ("Asbestos Liability"). Air & Liquid, and in some cases the Corporation, are defendants (among a number of defendants, often in excess of 50) in cases filed in various state and federal courts.

Asbestos Claims

The following table reflects approximate information about the claims for Asbestos Liability against Air & Liquid and the Corporation for the two years ended December 31, 2018, and 2017:

	2018	2017
Total claims pending at the beginning of the period	6,907	6,618
New claims served	1,338	1,365
Claims dismissed	(1,123)	(718)
Claims settled	(350)	(358)
Total claims pending at the end of the period ⁽¹⁾	6,772	6,907
Gross settlement and defense costs (in 000's)	\$24,324	\$21,431
Average gross settlement and defense costs per claim resolved (in 000's)	\$16.51	\$19.92

(1)Included as "open claims" are approximately 668 and 479 claims in 2018 and 2017, respectively, classified in various jurisdictions as "inactive" or transferred to a state or federal judicial panel on multi-district litigation, commonly referred to as the MDL.

A substantial majority of the settlement and defense costs reflected in the above table was reported and paid by insurers. Because claims are often filed and can be settled or dismissed in large groups, the amount and timing of settlements, as well as the number of open claims, can fluctuate significantly from period to period.

Asbestos Insurance

The Corporation and Air & Liquid are parties to a series of settlement agreements ("Settlement Agreements") with insurers that have coverage obligations for Asbestos Liability (the "Settling Insurers"). Under the Settlement Agreements, the Settling Insurers accept financial responsibility, subject to the terms and conditions of the respective agreements, including overall coverage limits, for pending and future claims for Asbestos Liability. The Settlement Agreements encompass the substantial majority of insurance policies that provide coverage for claims for Asbestos

Liability.

The Settlement Agreements include acknowledgements that Howden North America, Inc. (“Howden”) is entitled to coverage under policies covering Asbestos Liability for claims arising out of the historical products manufactured or distributed by Buffalo Forge, a former subsidiary of the Corporation (the “Products”), which was acquired by Howden. The Settlement Agreements do not provide for any prioritization on access to the applicable policies or any sublimits of liability as to Howden or the Corporation and Air & Liquid, and, accordingly, Howden may access the coverage afforded by the Settling Insurers for any covered claim arising out of a Product. In general, access by Howden to the coverage afforded by the Settling Insurers for the Products will erode coverage under the Settlement Agreements available to the Corporation and Air & Liquid for Asbestos Liability.

Asbestos Valuations

In 2006, the Corporation retained Hamilton, Rabinovitz & Associates, Inc. (“HR&A”), a nationally recognized expert in the valuation of asbestos liabilities, to assist the Corporation in estimating the potential liability for pending and unasserted future claims for Asbestos Liability. Based on this analysis, the Corporation recorded a reserve for Asbestos Liability claims pending or projected to be

asserted through 2013 as of December 31, 2006. HR&A's analysis has been periodically updated since that time. In 2018, the Corporation engaged Nathan Associates Inc. ("Nathan") to update the liability valuation, and additional reserves were established by the Corporation as of December 31, 2018, for Asbestos Liability claims pending or projected to be asserted through 2052. The methodology used by Nathan in its projection in 2018 of the operating subsidiaries' liability for pending and unasserted potential future claims for Asbestos Liability, which is substantially the same as the methodology employed by HR&A in prior estimates, relied upon and included the following factors:

- interpretation of a widely accepted forecast of the population likely to have been exposed to asbestos;
 - epidemiological studies estimating the number of people likely to develop asbestos-related diseases;
- analysis of the number of people likely to file an asbestos-related injury claim against the subsidiaries and the Corporation based on such epidemiological data and relevant claims history from January 1, 2016, to August 19, 2018;
- an analysis of pending cases, by type of injury claimed and jurisdiction where the claim is filed;
- an analysis of claims resolution history from January 1, 2016, to August 19, 2018, to determine the average settlement value of claims, by type of injury claimed and jurisdiction of filing; and
- an adjustment for inflation in the future average settlement value of claims, at an annual inflation rate based on the Congressional Budget Office's ten year forecast of inflation.

Using this information, Nathan estimated in 2018 the number of future claims for Asbestos Liability that would be filed through the year 2052, as well as the settlement or indemnity costs that would be incurred to resolve both pending and future unasserted claims through 2052. This methodology has been accepted by numerous courts.

In conjunction with developing the aggregate liability estimate referenced above, the Corporation also developed an estimate of probable insurance recoveries for its Asbestos Liability. In developing the estimate, the Corporation considered Nathan's projection for settlement or indemnity costs for Asbestos Liability and management's projection of associated defense costs (based on the current defense to indemnity cost ratio), as well as a number of additional factors. These additional factors included the Settlement Agreements in effect, policy exclusions, policy limits, policy provisions regarding coverage for defense costs, attachment points, prior impairment of policies and gaps in the coverage, policy exhaustions, insolvencies among certain of the insurance carriers, and the nature of the underlying claims for Asbestos Liability asserted against the subsidiaries and the Corporation as reflected in the Corporation's asbestos claims database, as well as estimated erosion of insurance limits on account of claims against Howden arising out of the Products. In addition to consulting with the Corporation's outside legal counsel on these insurance matters, the Corporation consulted with a nationally recognized insurance consulting firm it retained to assist the Corporation with certain policy allocation matters that also are among the several factors considered by the Corporation when analyzing potential recoveries from relevant historical insurance for Asbestos Liability. Based upon all of the factors considered by the Corporation, and taking into account the Corporation's analysis of publicly available information regarding the credit-worthiness of various insurers, the Corporation estimated the probable insurance recoveries for Asbestos Liability and defense costs through 2052.

With the assistance of Nathan, the Corporation extended its estimate of the Asbestos Liability, including the costs of settlement and defense costs relating to currently pending claims and future claims projected to be filed against the Corporation through the estimated final date by which the Corporation expects to have settled all asbestos-related claims in 2052. The Corporation's previous estimate was for asbestos claims filed or projected to be filed against the Corporation through 2026. Our ability to reasonably estimate this liability through the expected final date of settlement for all asbestos-related claims of this litigation instead of a ten-year period was based on several factors:

- There have been generally favorable trends developments in the trend of case law which has been a contributing factor in stabilizing the asbestos claims activity and related settlement and defense costs;
-

There have been significant actions taken by certain state legislatures and courts that have reduced the number and type of claims that can proceed to trial;

•The Corporation has coverage-in-place agreements with almost all of its excess insurers which enables the Corporation to project a stable relationship between settlement and defense costs paid by the Corporation and reimbursements from its insurers; and

•Annual settlements with respect to groups of cases with certain plaintiff firms have helped to stabilize indemnity payments and defense costs.

Taking these factors into consideration, the Corporation believes there is greater predictability of outcomes from settlements, a reduction in the volatility of defense costs, and it has gained substantial experience as an asbestos defendant. As a result, the

Corporation believes the uncertainty in estimating the Asbestos Liability beyond 10 years has been reduced and it now has sufficient information to estimate the Asbestos Liability through 2052, the estimated final date by which the Corporation expects to have settled all asbestos-related claims.

The Corporation's reserve at December 31, 2018, for the total costs, including defense costs, for Asbestos Liability claims pending or projected to be asserted through 2052, was \$227,922. Defense costs are estimated at 80% of settlement costs. The Corporation's receivable at December 31, 2018, for insurance recoveries attributable to the claims for which the Corporation's Asbestos Liability reserve has been established, including the portion of incurred defense costs covered by the Settlement Agreements in effect through December 31, 2018, and the probable payments and reimbursements relating to the estimated indemnity and defense costs for pending and unasserted future Asbestos Liability claims, was \$152,508.

The following table summarizes activity relating to insurance recoveries for each of the years ended December 31, 2018, and 2017.

	2018	2017
Insurance receivable – asbestos, beginning of the year	\$ 100,342	\$ 115,945
Settlement and defense costs paid by insurance carriers	(17,420)	(15,603)
Changes in estimated coverage	69,586	0
Insurance receivable – asbestos, end of the year	\$ 152,508	\$ 100,342

The insurance receivable recorded by the Corporation does not assume any recovery from insolvent carriers and a substantial majority of the insurance recoveries deemed probable is from insurance companies rated A – (excellent) or better by A.M. Best Corporation. There can be no assurance, however, that there will not be further insolvencies among the relevant insurance carriers, or that the assumed percentage recoveries for certain carriers will prove correct. The difference between insurance recoveries and projected costs is not due to exhaustion of all insurance coverage for Asbestos Liability.

The amounts recorded by the Corporation for Asbestos Liability and insurance receivable rely on assumptions that are based on currently known facts and strategy. The Corporation's actual expenses or insurance recoveries could be significantly higher or lower than those recorded if assumptions used in the Corporation's or Nathan's calculations vary significantly from actual results. Key variables in these assumptions are identified above and include the number and type of new claims to be filed each year, the average cost of disposing of each such new claim, average annual defense costs, compliance by relevant parties with the terms of the Settlement Agreements, and the solvency risk with respect to the relevant insurance carriers. Other factors that may affect the Corporation's Asbestos Liability and ability to recover under its insurance policies include uncertainties surrounding the litigation process from jurisdiction to jurisdiction and from case to case, reforms that may be made by state and federal courts, and the passage of state or federal tort reform legislation.

The Corporation intends to evaluate its estimated Asbestos Liability and related insurance receivable as well as the underlying assumptions on a regular basis to determine whether any adjustments to the estimates are required. Due to the uncertainties surrounding asbestos litigation and insurance, these regular reviews may result in the Corporation incurring future charges; however, the Corporation is currently unable to estimate such future charges. Adjustments, if any, to the Corporation's estimate of its recorded Asbestos Liability and/or insurance receivable could be material to operating results for the periods in which the adjustments to the liability or receivable are recorded, and to the Corporation's liquidity and consolidated financial position.

NOTE 19 – INCOME TAXES:

On December 22, 2017, the U.S. federal government enacted the Tax Reform, to become effective as of January 1, 2018, which, among other things, lowered the U.S. corporate statutory income tax rate from 35% to 21%, implemented a modified territorial tax system and imposed a one-time tax on deemed repatriated earnings of foreign subsidiaries. In response to the Tax Reform, Staff Accounting Bulletin No. 118 (SAB 118) was issued to address the application of U.S. Generally Accepted Accounting Principles in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Reform. Accordingly, for 2017, the Corporation recorded provisional amounts for certain effects of the Tax Reform by making a reasonable estimate of the: (i) one-time repatriation transition tax; (ii) increased bonus depreciation for assets placed in service on or after September 27, 2017; and (iii) effects on the Corporation's existing deferred income tax balances. In 2018, the Corporation recorded adjustments to the provisional amounts and completed its accounting for tax effects of the Tax Reform.

In 2017, the Tax Reform negatively impacted the Corporation's income tax provision by approximately \$1,565, principally related to the one-time repatriation transition tax offset by income tax benefits resulting from 100% bonus depreciation. Originally, there was no cash outlay due to the Tax Reform; however, it reduced the amount of the Corporation's carry back refund that it would have been

able to receive. Additionally, there was no significant impact from remeasuring its U.S. deferred income tax assets and liabilities at the new enacted statutory income tax rate since these net deferred income tax assets were fully valued.

After further guidance was issued in 2018 from the Internal Revenue Service, the Corporation elected with the filing of its 2017 U.S. Corporate income tax return to record separately the one-time repatriation transition tax liability of approximately \$2,369 which, as permitted, will be remitted over eight years. As a result, the Corporation increased its income tax receivable related to the carry back of the 2017 net operating loss and generated AMT credits by the combined amount of \$1,419. Lastly, the Corporation further increased the 2017 U.S. federal net operating loss carryforward by approximately \$741; however, there was no net tax impact as this deferred tax asset is fully valued. During 2018, the Corporation received approximately \$3,500 of U.S. federal income tax refunds.

(Loss) income from continuing operations before income taxes and gain on sale of joint venture is comprised of the following:

	2018	2017
Domestic	\$(48,169)	\$(16,988)
Foreign	4,362	(454)
Loss from continuing operations before income taxes and gain on sale of joint venture	\$(43,807)	\$(17,442)

At December 31, 2018, the Corporation has federal net operating loss carryforwards of \$18,745, of which \$12,011 can be carried forward indefinitely, but will be limited to 80 percent of taxable income in any given year. The balance of \$6,734 will begin to expire in 2035. Additionally, at December 31, 2018, the Corporation had state net operating loss carryforwards of \$40,550, which begin to expire in 2019, foreign net operating loss carryforwards from continuing operations of \$52,332, which begin to expire in 2019, and capital loss carryforwards of \$768, which do not expire.

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

	2018	2017
Current:		
Federal	\$1,166	\$(4,698)
State	73	(440)
Foreign	839	606
Current income tax provision (benefit)	2,078	(4,532)
Deferred:		
Federal	(10,881)	1,259
State	(2,189)	(112)
Foreign	3,350	1,876
Increase in valuation allowance	7,910	154
Deferred income tax (benefit) provision	(1,810)	3,177
Total income tax provision (benefit)	\$268	\$(1,355)

During 2018, the Corporation released the valuation allowance previously established against the net deferred income tax assets of ATR on the basis that it was “more likely than not” the assets would be realized due to continued earnings

and forecasts sufficient to utilize the net deferred income tax assets.

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The difference between statutory U.S. federal income tax and the Corporation's effective income tax was as follows:

	2018	2017
Computed at statutory rate	\$(8,943)	\$(5,635)
Tax differential on non-U.S. earnings	56	(108)
State income taxes	(2,131)	(398)
Meals and entertainment	76	138
Alternative minimum tax credits	(433)	0
Increase in valuation allowance	7,910	154
Repatriation transition tax impact	1,383	3,284
Adjustments to net operating losses	1,879	0
Reclassification of discontinued operations increase in valuation allowance	0	930
Other – net	471	280
Total income tax provision (benefit)	\$268	\$(1,355)

Deferred income tax assets and liabilities as of December 31, 2018, and 2017, are summarized below. Unremitted earnings of the Corporation's non-U.S. subsidiaries and affiliates are deemed to be permanently reinvested and, accordingly, no deferred income tax liability has been recorded. If the Corporation were to remit any foreign earnings to the U.S., the estimated tax impact would be insignificant.

	2018	2017
Assets:		
Employment – related liabilities	\$10,667	\$10,971
Pension liability – foreign	996	1,633
Pension liability – domestic	8,527	9,004
Liabilities related to discontinued operations	144	186
Capital loss carryforwards	305	308
Asbestos-related liability	18,894	12,179
Net operating loss – domestic	3,936	674
Net operating loss – state	3,057	2,782
Net operating loss – foreign	9,514	12,232
Inventory related	3,905	2,711
Impairment charge associated with investment in MG	1,050	1,155
Other	3,208	3,357
Gross deferred income tax assets	64,203	57,192
Valuation allowance	(33,881)	(26,933)
	30,322	30,259
Liabilities:		
Depreciation	(25,420)	(26,784)
Intangible assets – finite life	(1,181)	(1,564)
Intangible assets – indefinite life	(550)	(605)
Other	(147)	(149)

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Gross deferred income tax liabilities	(27,298)	(29,102)
Net deferred income tax assets	\$3,024	\$1,157

Unrecognized tax benefits and changes in unrecognized tax benefits for the years ended December 31, 2018, and 2017, are insignificant. If the unrecognized tax benefits were recognized, the effect on the Corporation's effective income tax rate would also be insignificant. The amount of penalties and interest recognized in the consolidated balance sheets as of December 31, 2018, and 2017, and in the consolidated statements of operations for 2018 and 2017 is insignificant.

The Corporation is subject to taxation in the United States, various states and foreign jurisdictions, and remains subject to examination by tax authorities for tax years 2015 – 2018. The Corporation is currently under audit by the Internal Revenue Service of its consolidated federal tax returns for the 2014 – 2016 tax years. Additionally, the Corporation's subsidiary, UES, is currently under audit by the Pennsylvania Department of Revenue for the 2015 and 2016 tax years. No material changes are anticipated.

NOTE 20 – ENVIRONMENTAL MATTERS:

The Corporation is currently performing certain remedial actions in connection with the sale of real estate previously owned and periodically incurs costs to maintain compliance with environmental laws and regulations. Environmental exposures are difficult to assess and estimate for numerous reasons, including lack of reliable data, the multiplicity of possible solutions, the years of remedial and monitoring activity required, and identification of new sites. In the opinion of management, the potential liability for remedial actions and environmental compliance measures of approximately \$324 at December 31, 2018, is considered adequate based on information known to date.

NOTE 21 – RELATED PARTIES:

ATR has a loan outstanding with its minority shareholder. The loan originally matured in 2008 but has been renewed continually for one-year periods. Interest does not compound and has accrued on the outstanding balance, since inception, at the three-to-five-year loan interest rate set by the People’s Bank of China in effect at the time of renewal. The loan balance approximated \$4,056 (RMB 27,901) at December 31, 2018, and \$5,325 (RMB 34,655) at December 31, 2017. During 2018, ATR repaid \$449 (RMB 3,090) in principal and \$145 (RMB 1,000) in accrued interest. Additionally, the shareholders converted a portion of their loans outstanding with ATR to equity. The conversion was in proportion to their respective ownership interest, with TISCO converting \$872 (RMB 6,000) of its loans to equity. The interest rate for 2018 approximated 5%, and accrued interest approximated \$2,297 (RMB 15,800) and \$2,682 (RMB 17,457) as of December 31, 2018, and 2017, which is recorded in other current liabilities. Purchases from ATR’s minority shareholder and its affiliates, which were in the ordinary course of business, approximated \$11,248 (RMB 77,356) and \$7,752 (RMB 52,418) in 2018 and 2017, respectively. Excluding the loan and interest outstanding, the amount payable to ATR’s minority shareholder and its affiliates approximated \$208 (RMB 1,429) and \$296 (RMB 1,929) at December 31, 2018, and 2017, respectively. Sales to ATR’s minority shareholder and its affiliates, which were in the ordinary course of business, approximated \$11,697 (RMB 77,464) and \$8,564 (RMB 57,909) for 2018 and 2017, respectively. No amounts were due from ATR’s minority shareholder or its affiliates as of December 31, 2018, or 2017.

NOTE 22 – BUSINESS SEGMENTS:

The Corporation organizes its business into two operating segments—Forged and Cast Engineered Products and Air and Liquid Processing. Summarized financial information concerning the Corporation’s reportable segments is shown in the following tables. Corporate assets included under Identifiable Assets represent primarily cash and cash equivalents and other items not allocated to reportable segments. Long-lived assets exclude deferred income tax assets. Corporate costs are comprised of operating costs of the corporate office and other costs not allocated to the segments. The accounting policies are the same as those described in Note 1.

Net Sales	(Loss) Income from Continuing Operations Before Income
	Taxes and Gain on Sale of

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			Joint Venture	
	2018	2017	2018	2017
Forged and Cast Engineered Products	\$329,530	\$297,283	\$(6,605)	\$(6,887)
Air and Liquid Processing ⁽¹⁾	89,902	87,872	(22,129)	10,682
Total Reportable Segments	419,432	385,155	(28,734)	3,795
Corporate costs, including other income (expense)	0	0	(15,073)	(21,237)
Consolidated total	\$419,432	\$385,155	\$(43,807)	\$(17,442)

Depreciation and

	Capital Expenditures		Amortization Expense		Identifiable Assets ⁽²⁾	
	2018	2017	2018	2017	2018	2017
Forged and Cast Engineered Products	\$8,801	\$12,277	\$20,189	\$20,113	\$348,017	\$380,437
Air and Liquid Processing	911	560	996	1,072	187,449	132,341
Corporate	7	174	194	191	15,415	19,031
	\$9,719	\$13,011	\$21,379	\$21,376	\$550,881	\$531,809

Geographic Areas:	Long-Lived Assets ⁽³⁾		(Loss) Income from Continuing Operations Before Income Taxes and Gain on Sale of Joint Venture	
	2018	2017	2018	2017
United States	\$268,731	\$235,646	\$(48,234)	\$(18,122)
Foreign	71,334	76,684	\$4,427	\$680
	\$340,065	\$312,330	\$(43,807)	\$(17,442)

- (1) (Loss) income from continuing operations before income taxes and gain on sale of joint venture for the Air and Liquid Processing segment for 2018 includes a charge of \$32,910 for the estimated costs of asbestos-related litigation through 2052, the estimated final date by which the Corporation expects to have settled all asbestos-related claims, net of estimated insurance recoveries.
- (2) Identifiable assets exclude assets of discontinued operations. Identifiable assets for the Forged and Cast Engineered Products segment include investments in joint ventures of \$2,175 at December 31, 2018, and 2017. The change in the identifiable assets of the Air and Liquid Processing segment relates primarily to the movement in asbestos-related insurance receivables, the balances of which equaled \$152,508 and \$100,342 at December 31, 2018, and 2017, respectively.
- (3) Foreign long-lived assets represent primarily assets of the foreign operations, excluding assets of discontinued operations. Long-lived assets of the U.S. include noncurrent asbestos-related insurance receivables of \$135,508 and \$87,342 for 2018 and 2017, respectively.

QUARTERLY INFORMATION – UNAUDITED

Not applicable.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Ampco-Pittsburgh Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Ampco-Pittsburgh Corporation and subsidiaries (the "Corporation") as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity, and cash flows for the years then ended, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Corporation as of December 31, 2018 and 2017, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Corporation's internal control over financial reporting as of December 31, 2018, based on the criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 18, 2019, expressed an unqualified opinion on the Corporation's internal control over financial reporting.

Basis for Opinion

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

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

/s/ Deloitte & Touche LLP

Pittsburgh, Pennsylvania

March 18, 2019

We have served as the Corporation's auditor since 1999.

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

The Corporation did not experience any changes in, or disagreements with its accountants on, accounting and financial disclosure during the period covered.

ITEM 9A. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures. An evaluation of the effectiveness of the Corporation's disclosure controls and procedures as of the end of the period covered by this report was carried out under the supervision, and with the participation, of management, including the principal executive officer and principal financial officer. Disclosure controls and procedures are defined under Securities and Exchange Commission ("SEC") rules as controls and other procedures that are designed to ensure that information required to be disclosed by a company in the reports that it files under the Exchange Act is recorded, processed, summarized and reported within required time periods. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Exchange Act is accumulated and communicated to the issuer's management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate, to allow timely decisions regarding required disclosure. Based on that evaluation, the Corporation's management, including the principal executive officer and principal financial officer, has concluded that the Corporation's disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2018.

Management's Annual Report on Internal Control Over Financial Reporting. The Corporation's management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a – 15(f) under the Securities Exchange Act of 1934, as amended). Internal control over financial reporting cannot provide absolute assurance of achieving financial reporting objectives because of its inherent limitations. Effective internal control over financial reporting can only provide reasonable assurance that the objectives of the control process are met. Internal control over financial reporting is a process that involves human diligence and compliance and is subject to lapses in judgment and breakdowns resulting from human failures. Internal control over financial reporting also can be circumvented by collusion or improper management override. Because of such limitations, there is a risk that material misstatements may not be prevented or detected on a timely basis by internal control over financial reporting. However, these inherent limitations are known features of the financial reporting process. Therefore it is possible to design into the process safeguards to reduce, though not eliminate, this risk. Further, the design of internal control over financial reporting includes the consideration of the benefits of each control relative to the cost of the control.

Management assessed the effectiveness of internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria set forth in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on those criteria and management's assessment, management, including the principal executive officer and principal financial officer, concluded that the Corporation's internal control over financial reporting was effective as of December 31, 2018.

The Corporation's independent registered public accounting firm, Deloitte & Touche LLP, has issued an attestation report on the Corporation's internal control over financial reporting which is included herein.

Changes in Internal Control Over Financial Reporting. There were no changes in the Corporation's internal control over financial reporting during the quarter ended December 31, 2018, that have materially affected, or are reasonably likely to materially affect, its internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Ampco-Pittsburgh Corporation

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Ampco-Pittsburgh Corporation and subsidiaries (the “Corporation”) 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 Corporation maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on the criteria established in Internal Control — Integrated Framework (2013) issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended December 31, 2018, of the Corporation and our report dated March 18, 2019, expressed an unqualified opinion on those financial statements.

Basis for Opinion

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ Deloitte & Touche LLP

Pittsburgh, Pennsylvania

March 18, 2019

ITEM 9B. OTHER INFORMATION

None

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– PART III –

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information about the Corporation’s directors required by Item 401 of Regulation S-K and not otherwise set forth below is contained under the caption “Proposal 1: Election of Directors” in the Corporation’s definitive Proxy Statement for the 2019 Annual Meeting of Shareholders (the “Proxy Statement”) which the Company anticipates filing with the Securities and Exchange Commission, pursuant to Regulation 14A, not later than 120 days after the end of the Corporation’s fiscal year, and is incorporated herein by reference. The information required by Item 401 of Regulation S-K regarding executive officers is set forth in Part I, Item 1 of this report under “Executive Officers.”

The information required by Item 405 of Regulation S-K is contained under the caption “Security Ownership of Certain Beneficial Owners and Management” of the Proxy Statement and is incorporated by reference.

The Corporation and its subsidiaries have adopted a Code of Business Conduct and Ethics that applies to all of their officers, directors and employees, as well as an additional Code of Ethics that applies to the Corporation’s Chief Executive Officer and Chief Financial Officer, are available on the Corporation’s website at www.ampcopittsburgh.com.

The information required by Items 407(c)(3), (d)(4) and (d)(5) of Regulation S-K is included under the captions “Corporate Governance – Director Nominating Procedures” and “Board Committees; Director Compensation; Stock Ownership Guidelines – Audit Committee” of the Proxy Statement and is incorporated by reference.

ITEM 11. EXECUTIVE COMPENSATION

The information required for this Item 11 is contained in the Proxy Statement under the captions “Director Compensation,” “Compensation Overview,” and “Potential Payments upon Termination, Resignation or Change in Control.”

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDERS MATTERS

The information required by Item 201(d) of Regulation S-K relating to securities authorized for issuance under equity compensation plans is contained under the caption “Outstanding Equity Awards at Fiscal Year End” of the Proxy Statement and is incorporated by reference.

The information required by Item 403 of Regulation S-K is contained under the captions “Security Ownership of Certain Beneficial Owners and Management” of the Proxy Statement and is incorporated by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by Item 404(a) of Regulation S-K is contained under the caption “Certain Relationships and Related Transactions” in the Proxy Statement and is incorporated by reference.

The information required by Item 407(a) of Regulation S-K is contained under the caption “Corporate Governance – Board Independence” of the Proxy Statement and is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by Item 14 is contained in the Proxy Statement under the caption “Ratification of the Appointment of Deloitte & Touche as the Independent Registered Public Accounting Firm for 2019” is incorporated herein.

– PART IV –

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

THE FOLLOWING DOCUMENTS ARE FILED AS PART OF THIS REPORT:

1. Financial Statements

- Consolidated Balance Sheets
- Consolidated Statements of Operations
- Consolidated Statements of Comprehensive Income (Loss)
- Consolidated Statements of Shareholders’ Equity
- Consolidated Statements of Cash Flows
- Notes to Consolidated Financial Statements
- Report of Independent Registered Public Accounting Firm

2. Financial Statement Schedules

The following additional financial data should be read in conjunction with the consolidated financial statements in this Annual Report on Form 10-K. Schedules not included with this additional financial data have been omitted because they are not applicable or the required information is shown in the financial statements or notes thereto:

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3. Exhibits
Exhibit No.

- 2.1 Share Sale and Purchase Agreement, dated December 2, 2015, by and between, inter alia, Åkers Holdings AB and Ampco-Pittsburgh Corporation, incorporated by reference to Current Report on Form 8-K filed on December 8, 2015.
- 2.2 Addendum to Share Sale and Purchase Agreement, dated March 1, 2016, among Ampco-Pittsburgh Corporation, Ampco UES Sub, Inc., Altor Fund II GP Limited, and Åkers Holding AB, incorporated by reference to Current Report on Form 8-K filed on March 7, 2016.
- 2.3 Second Addendum to Share Sale and Purchase Agreement, dated March 3, 2016, among Ampco-Pittsburgh Corporation, Ampco UES Sub, Inc., Altor Fund II GP Limited, and Åkers Holding AB, incorporated by

reference to Current Report on Form 8-K filed on March 7, 2016.

- 2.4 Purchase Agreement, dated November 1, 2016, by and among Ampco UES Sub, Inc., ASW Steel Inc., CK Pearl Fund, Ltd., CK Pearl Fund LP, and White Oak Strategic Master Fund, L.P., incorporated by reference to Current Report on Form 8-K filed on November 4, 2016.
- 3.1 Restated Articles of Incorporation, effective as of August 11, 2017, incorporated by reference to Quarterly Report on Form 10-Q for the quarter ended September 30, 2017.
- 3.2 Amended and Restated By-laws, incorporated by reference to Current Report on Form 8-K filed on December 23, 2015.
- 10.2 Shareholder Support Agreement, dated March 3, 2016, by and between Ampco-Pittsburgh Corporation and Altor Fund II GP Limited, incorporated by reference to Current Report on Form 8-K filed on March 7, 2016.
- 10.3 1988 Supplemental Executive Retirement Plan, as amended and restated December 17, 2008, and further amended on July 1, 2015, incorporated by reference to the 2008 Annual Report on Form 10-K and Quarterly Report on Form 10-Q filed on August 10, 2015.
- 10.4 Ampco-Pittsburgh Corporation 2008 Omnibus Incentive Plan, incorporated by reference to the Definitive Proxy Statement for the 2008 Annual Meeting of Shareholders filed on March 10, 2008.
- 10.5 Ampco-Pittsburgh Corporation 2011 Omnibus Incentive Plan, incorporated by reference to the Definitive Proxy Statement for the 2011 Annual Meeting of Shareholders filed on March 22, 2011.

- 10.6 Ampco-Pittsburgh Corporation 2016 Omnibus Incentive Plan, incorporated by supplement to the Definitive Proxy Statement for the 2016 Annual Meeting of Shareholders filed on March 25, 2016.
- 10.7 Change in Control Agreement between Ampco-Pittsburgh Corporation and Maria Trainor, dated June 1, 2015, incorporated by reference to the Quarterly Report on Form 10-Q filed on August 10, 2015.
- 10.8 Amended and Restated Change in Control Agreement between Ampco-Pittsburgh Corporation and Rose Hoover, dated November 4, 2015, incorporated by reference to the Quarterly Report on Form 10-Q filed on November 6, 2015.
- 10.9 Amended and Restated Change in Control Agreement between Ampco-Pittsburgh Corporation and Dee Ann Johnson, dated November 4, 2015, incorporated by reference to the Quarterly Report on Form 10-Q filed on November 6, 2015.
- 10.10 Amended and Restated Change in Control Agreement among Ampco-Pittsburgh Corporation, Air & Liquid Systems Corporation, and Terrence W. Kenny, dated November 4, 2015, incorporated by reference to the Quarterly Report on Form 10-Q filed on November 6, 2015.
- 10.11 Change in Control Agreement between Ampco-Pittsburgh Corporation and Michael G. McAuley, dated April 25, 2016, incorporated by reference to the Current Report on Form 8-K filed on April 25, 2016.
- 10.12 Amendment No. 1 to Amended and Restated Union Electric Steel Corporation Retirement Restoration Plan for Robert G. Carothers, effective as of July 1, 2015, incorporated by reference to the Quarterly Report on Form 10-Q filed on August 10, 2015.
- 10.13 Retirement and Consulting Agreement, effective as of May 1, 2016, by and between Union Electric Steel Corporation and Robert G. Carothers, incorporated by reference to Current Report on Form 8-K filed on May 3, 2016.
- 10.14 Revolving Credit and Security Agreement, effective as of May 20, 2016, among Ampco-Pittsburgh Corporation and PNC Bank, National Association, as administrative agent, and certain lenders, the guarantors, and the other agents party thereto, incorporated by reference to Current Report on Form 8-K filed on May 24, 2016.
- 10.15 First Amendment to Revolving Credit and Security Agreement, dated October 31, 2016, by and among Ampco-Pittsburgh Corporation and PNC Bank, National Association, as administrative agent, and certain lenders, the guarantors, and the other agents party thereto, incorporated by reference to Current Report on Form 8-K filed on November 4, 2016.
- 10.16 Second Amendment to Revolving Credit and Security Agreement, dated March 2, 2017, by and among Ampco-Pittsburgh Corporation and PNC Bank, National Association, as administrative agent, and certain lenders, the guarantors, and the other agents party thereto, incorporated by reference to Current Report on Form 8-K filed on March 7, 2017.
- 10.17 Form of Notice of Grant of Restricted Stock Unit Award (Time-Vesting), incorporated by reference to Annual Report on Form 10-K filed on March 16, 2017.

- 10.18 Form of Notice of Grant of Restricted Stock Unit Award (Performance-Vesting), incorporated by reference to Annual Report on Form 10-K filed on March 16, 2017.
- 10.19 Amendment No. 1 to Retirement and Consulting Agreement by and between Union Electric Steel Corporation and Robert G. Carothers, effective as of June 1, 2017, incorporated by reference to Quarterly Report on Form 10-Q filed on August 9, 2017.
- 10.20 Change in Control Agreement between Ampco-Pittsburgh Corporation and J. Brett McBrayer, dated July 1, 2018, incorporated by reference to Amendment No. 1 to the Quarterly Report on Form 10-Q filed on August 17, 2018.
- 10.21 Change in Control Agreement among Ampco-Pittsburgh Corporation, Union Electric Steel Corporation and Timothy R. Clutterbuck, dated June 22, 2018, incorporated by reference to Amendment No. 1 to the Quarterly Report on Form 10-Q/A filed on August 17, 2018.
- 10.22 Offer Letter between Ampco-Pittsburgh Corporation and J. Brett McBrayer, dated June 16, 2018, incorporated by reference to Amendment No. 1 to Quarterly Report on Form 10-Q/A filed on August 17, 2018.
- 10.23 Ampco-Pittsburgh Corporation Executive Severance Plan, effective June 21, 2018, incorporated by reference to Current Report on Form 8-K filed on June 27, 2018.
- 10.24 Retirement and Consulting Agreement, effective June 30, 2018, between Ampco-Pittsburgh Corporation and John S. Stanik, incorporated by reference to Current Report on Form 8-K filed on July 16, 2018.
- 10.25 Master Lease Agreement between Union Electric Steel Corporation and Store Capital Acquisitions, LLC, dated September 28, 2018, incorporated by reference to Quarterly Report on Form 10-Q filed on November 9, 2018.

- 10.26 Unconditional Guaranty of Payment and Performance between Ampco-Pittsburgh Corporation and Store Capital Acquisitions, LLC, dated September 28, 2018, incorporated by reference to Quarterly Report on Form 10-Q filed on November 9, 2018.
- 10.27 Third Amendment to the Revolving Credit and Security Agreement, dated September 28, 2018, by and among Ampco-Pittsburgh Corporation and PNC Bank, National Association, as administrative agent, and certain lenders, guarantors and other agents party thereto, incorporated by reference to Quarterly Report on Form 10-Q filed on November 9, 2018.
- 10.28 Confidential Separation and Release Agreement between Union Electric Steel Corporation and Rodney L. Scagline, effective as of January 21, 2019, filed herewith.
- 10.29 Amendment No. 2 to Retirement and Consulting Agreement by and between Union Electric Steel Corporation and Robert G. Carothers, effective as of January 1, 2019, filed herewith.
- 10.30 Change in Control Agreement, among Ampco-Pittsburgh Corporation, Union Electric Steel Corporation and Samuel C. Lyon, dated as of March 6, 2019, filed herewith.
- 21 Significant Subsidiaries
- 23.1 Consent of Deloitte & Touche LLP
- 23.2 Consent of Nathan Associates Inc.
- 31.1 Certification of Principal Executive Officer pursuant to Section 302 of The Sarbanes-Oxley Act of 2002.
- 31.2 Certification of Principal Financial Officer pursuant to Section 302 of The Sarbanes-Oxley Act of 2002.
- 32.1 Certification of Principal Executive Officer pursuant to Section 906 of The Sarbanes-Oxley Act of 2002.
- 32.2 Certification of Principal Financial Officer pursuant to Section 906 of The Sarbanes-Oxley Act of 2002.
- 101 Interactive Data File (XBRL)

ITEM 16. FORM 10-K SUMMARY

Not applicable.

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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.

AMPCO-PITTSBURGH
 March 18, 2019 CORPORATION
 By: /s/ J. Brett McBrayer
 Name: J. Brett McBrayer
 Title: Chief Executive Officer

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

SIGNATURE	TITLE	DATE
/s/ J. Brett McBrayer J. Brett McBrayer	Director and Chief Executive Officer (Principal Executive Officer)	March 18, 2019
/s/ Michael G. McAuley Michael G. McAuley	Senior Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	March 18, 2019
/s/ James J. Abel James J. Abel	Director	March 18, 2019
/s/ Leonard M. Carroll Leonard M. Carroll	Director	March 18, 2019
/s/ Elizabeth A. Fessenden Elizabeth A. Fessenden	Director	March 18, 2019
/s/ Michael I. German Michael I. German	Director	March 18, 2019
/s/ William K. Lieberman William K. Lieberman	Director	March 18, 2019

/s/ Laurence E. Paul Laurence E. Paul	Director	March 18, 2019
/s/ Stephen E. Paul Stephen E. Paul	Director	March 18, 2019
/s/ Carl H. Pforzheimer, III Carl H. Pforzheimer, III	Director	March 18, 2019
/s/ Ernest G. Siddons Ernest G. Siddons	Director	March 18, 2019

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Ampco-Pittsburgh Corporation

Opinion on the Financial Statement Schedule

We have audited the consolidated financial statements of Ampco-Pittsburgh Corporation and subsidiaries (the "Corporation") as of December 31, 2018 and 2017, and for the years then ended, and the Corporation's internal control over financial reporting as of December 31, 2018, and have issued our reports thereon dated March 18, 2019; such reports are included elsewhere in this Form 10-K. Our audits also included the financial statement schedule of the Corporation listed in the Index at Item 15. This financial statement schedule is the responsibility of the Corporation's management. Our responsibility is to express an opinion on the Corporation's financial statement schedule based on our audits. In our opinion, such financial statement schedule, when considered in relation to the financial statements taken as a whole, presents fairly, in all material respects, the information set forth therein.

/s/ Deloitte & Touche LLP

Pittsburgh, Pennsylvania

March 18, 2019

SCHEDULE II

Valuation and Qualifying Accounts

For the Years Ended December 31, 2018, and 2017

(in thousands)

Description	Additions					Balance at End of Period
	Balance at Beginning of Period	Charged to Costs and Expenses	Charged to Accounts	Deductions	Other ⁽⁴⁾	
Year ended December 31, 2018						
Allowance for doubtful accounts	\$962	\$ 275	\$ (1)	(1)\$ (255)	\$ (3)	\$978
Valuation allowance against gross deferred income						
tax assets	\$26,933	\$ 0	\$ 7,910	(2)\$ (181)	\$ (781)	\$33,881
Year ended December 31, 2017⁽⁵⁾						
Allowance for doubtful accounts	\$621	\$ 317	\$ (28)	(1)\$ 50	\$ 2	\$962
Valuation allowance against gross deferred income						
tax assets	\$33,696	\$ 0	\$ 154	(2)\$ (7,468)	(3)\$ 551	\$26,933

(1) Represents collection of receivables previously provided for in the allowance for doubtful accounts.

(2) Represents valuation allowances established for deferred income tax assets since it is more likely than not that the assets will not be realized.

(3) Represents decrease in valuation allowance during 2017, primarily due to the reduction in the U.S. corporate statutory income tax rate from 35% to 21%..

(4) Represents primarily the impact from changes in foreign currency exchange rates.

(5) Balances and activity for the year ended December 31, 2017, have been recast to exclude ASW Steel Inc. which, as of December 31, 2018, has been recorded as a discontinued operation. See Note 2 (Discontinued Operations and Disposition) of this Annual Report on Form 10-K.