

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, 2020

OR

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

Commission File Number 1-3610

HOWMET AEROSPACE INC.

(Exact name of registrant as specified in its charter)

Delaware
(State of incorporation)

25-0317820
(I.R.S. Employer Identification No.)

201 Isabella Street, Suite 200, Pittsburgh, Pennsylvania 15212-5872

(Address of principal executive offices) (Zip code)

Investor Relations-----(412) 553-1950

Office of the Secretary----- (412) 553-1940

(Registrant's telephone numbers, including area code)

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, par value \$1.00 per share	HWM	New York Stock Exchange
\$3.75 Cumulative Preferred Stock, par value \$100.00 per share	HWM PR	NYSE American

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 Exchange 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, and (2) has been subject to such filing requirements for the past 90 days. Yes No .

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No .

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

Large accelerated filer Accelerated filer Non-accelerated filer

Smaller reporting company Emerging growth company

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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 outstanding common stock, other than shares held by persons who may be deemed affiliates of the registrant, as of the last business day of the registrant's most recently completed second fiscal quarter was approximately \$7 billion. As of February 12, 2021, there were 433,614,667 shares of common stock, par value \$1.00 per share, of the registrant outstanding.

Documents incorporated by reference.

Part III of this Form 10-K incorporates by reference certain information from the registrant's definitive Proxy Statement for its 2021 Annual Meeting of Shareholders to be filed pursuant to Regulation 14A (Proxy Statement).

Explanatory Note

On April 1, 2020, Arconic Inc. completed the separation of its business into two independent, publicly-traded companies: Howmet Aerospace Inc. (the new name for Arconic Inc.) and Arconic Corporation. The financial results of Arconic Corporation for all periods prior to April 1, 2020, have been retrospectively reflected in the Statement of Consolidated Operations as discontinued operations and, as such, have been excluded from continuing operations and segment results for all periods prior to April 1, 2020. Additionally, the related assets and liabilities associated with Arconic Corporation in the December 31, 2019 Consolidated Balance Sheet are classified as assets and liabilities of discontinued operations. The cash flows, comprehensive income, and equity related to Arconic Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows, Statement of Consolidated Comprehensive Income, and Statement of Changes in Consolidated Equity, respectively, for all periods prior to April 1, 2020.

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Note on Incorporation by Reference

In this Form 10-K, selected items of information and data are incorporated by reference to portions of the Proxy Statement. Unless otherwise provided herein, any reference in this report to disclosures in the Proxy Statement shall constitute incorporation by reference of only that specific disclosure into this Form 10-K.

PART I

Item 1. Business.

General

Howmet Aerospace Inc. (formerly known as Arconic Inc.) is a Delaware corporation with its principal office in Pittsburgh, Pennsylvania and the successor to Arconic Pennsylvania (as defined below) which was formed in 1888 and formerly known as Alcoa Inc. In this report, unless the context otherwise requires, “Howmet”, the “Company”, “we”, “us” and “our” refer to Howmet Aerospace Inc., a Delaware corporation, and its consolidated subsidiaries.

The Company’s Internet address is <http://www.howmet.com>. Howmet makes available free of charge on or through its website its annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as well as proxy statements, as soon as reasonably practicable after the Company electronically files such material with, or furnishes it to, the Securities and Exchange Commission (“SEC”). The Company’s website is included in this annual report on Form 10-K as an inactive textual reference only. The information on, or accessible through, the Company’s website is not a part of, or incorporated by reference in, this annual report on Form 10-K. The SEC maintains an Internet site that contains these reports at <http://www.sec.gov>.

Forward-Looking Statements

This report contains (and oral communications made by Howmet may contain) statements that relate to future events and expectations and, as such, constitute forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include those containing such words as “anticipates,” “believes,” “could,” “estimates,” “expects,” “forecasts,” “goal,” “guidance,” “intends,” “may,” “outlook,” “plans,” “projects,” “seeks,” “sees,” “should,” “targets,” “will,” “would,” or other words of similar meaning. All statements that reflect Howmet’s expectations, assumptions or projections about the future, other than statements of historical fact, are forward-looking statements, including, without limitation, statements, forecasts and outlook relating to the condition of end markets; future financial results, operating performance, or estimated or expected future capital expenditures; future strategic actions; and Howmet’s strategies, outlook, and business and financial prospects. These statements reflect beliefs and assumptions that are based on Howmet’s perception of historical trends, current conditions and expected future developments, as well as other factors Howmet believes are appropriate in the circumstances. Forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties, and changes in circumstances that are difficult to predict. Although Howmet believes that the expectations reflected in any forward-looking statements are based on reasonable assumptions, it can give no assurance that these expectations will be attained and it is possible that actual results may differ materially from those indicated by these forward-looking statements due to a variety of risks and uncertainties.

For a discussion of some of the specific factors that may cause Howmet’s actual results to differ materially from those projected in any forward-looking statements, see the following sections of this report: [Part I, Item 1A](#) (Risk Factors), [Part II, Item 7](#) (Management’s Discussion and Analysis of Financial Condition and Results of Operations), including the disclosures under Segment Information and Critical Accounting Policies and Estimates, and [Note V](#) to the Consolidated Financial Statements in Part II, Item 8. Market projections are subject to the risks discussed in this report and other risks in the market. Howmet disclaims any intention or obligation to update publicly any forward-looking statements, whether in response to new information, future events or otherwise, except as required by applicable law.

Overview

Howmet is a leading global provider of advanced engineered solutions for the aerospace and transportation industries. The Company’s primary businesses focus on jet engine components, aerospace fastening systems, and titanium structural parts necessary for mission-critical performance and efficiency in aerospace and defense applications, as well as forged wheels for commercial transportation.

Howmet is a global company operating in 20 countries. Based upon the country where the point of shipment occurred, the United States and Europe generated 68% and 21%, respectively, of Howmet’s sales in 2020. In addition, Howmet has operating activities in numerous countries and regions outside the United States and Europe, including Canada, Mexico, China and Japan. Governmental policies, laws and regulations, and other economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, affect the results of operations in countries with such operating activities.

Background

The Arconic Inc. Separation Transaction

Howmet Aerospace Inc. is the new name for Arconic Inc., following Arconic Inc.’s separation of its businesses on April 1, 2020 (the “Arconic Inc. Separation Transaction”) into two independent, publicly traded companies – Howmet Aerospace Inc. and Arconic Corporation. Following this separation, Howmet retains the Engine Products, Fastening Systems, Engineered

Structures, and Forged Wheels businesses; and Arconic Corporation holds the Rolled Products, Aluminum Extrusions, and Building and Construction Systems businesses. The Company trades under the symbol “HWM” on the New York Stock Exchange, and Arconic Corporation trades under the symbol “ARNC” on the New York Stock Exchange.

The Arconic Inc. Separation Transaction was effected by a distribution of all outstanding shares of Arconic Corporation common stock to the Company’s stockholders (the “Distribution of Arconic”). The Company’s stockholders of record as of the close of business on March 19, 2020 (the “2020 Record Date”) received one share of Arconic Corporation common stock for every four shares of the Company’s common stock held as of the 2020 Record Date. The Company did not issue fractional shares of Arconic Corporation common stock in the Distribution of Arconic. Instead, each stockholder otherwise entitled to receive a fractional share of Arconic Corporation common stock received cash in lieu of fractional shares.

In connection with the Arconic Inc. Separation Transaction, Howmet and Arconic Corporation entered into several agreements that govern the relationship of the parties following the separation, including the following: Separation and Distribution Agreement, Tax Matters Agreement, Employee Matters Agreement, certain Patent, Know-How and Trade Secret License Agreements, certain Trademark License Agreements, Raw Material Supply Agreements, Second Supplemental Tax and Project Certificate and Agreement, and Lease and Property Management Agreement.

The 2017 Reincorporation of Howmet (then known as Arconic Inc.)

On December 31, 2017 (the “Effective Date”), Arconic Inc., a Pennsylvania corporation (“Arconic Pennsylvania”), effected the change of Arconic Pennsylvania’s jurisdiction of incorporation from Pennsylvania to Delaware (the “Reincorporation”) by merging (the “Reincorporation Merger”) with a direct wholly owned Delaware subsidiary, Arconic Inc. (in this section, “Arconic Delaware” or, following the Reincorporation, the “Company”), pursuant to an Agreement and Plan of Merger, dated as of October 12, 2017, by and between Arconic Pennsylvania and Arconic Delaware. Arconic Pennsylvania shareholders approved the Reincorporation Merger to effect the Reincorporation at a Special Meeting of Shareholders held on November 30, 2017. As a result of the Reincorporation, (i) Arconic Pennsylvania ceased to exist, (ii) Arconic Delaware automatically inherited the reporting obligations of Arconic Pennsylvania under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and (iii) Arconic Delaware is deemed to be the successor issuer to Arconic Pennsylvania.

The common stock, par value \$1.00 per share, of Arconic Pennsylvania (the “Arconic Pennsylvania Common Stock”) was listed for trading on the New York Stock Exchange and traded under the symbol “ARNC.” As of the Effective Date, this symbol, without interruption, represented shares of common stock, par value \$1.00 per share, of Arconic Delaware (the “Arconic Delaware Common Stock”). There was no change in the Exchange Act File Number assigned by the SEC as a result of the Reincorporation.

As of the Effective Date, the rights of the Company’s stockholders began to be governed by the General Corporation Law of the State of Delaware, the Certificate of Incorporation of Arconic Delaware and the Bylaws of Arconic Delaware.

Other than the change in corporate domicile, the Reincorporation did not result in any change in the business, physical location, management, financial condition or number of authorized shares of the Company, nor did it result in any change in location of its current employees, including management. On the Effective Date, (i) the directors and officers of Arconic Pennsylvania prior to the Reincorporation continued as the directors and officers of Arconic Delaware after the Reincorporation, (ii) each outstanding share of Arconic Pennsylvania Common Stock was automatically converted into one share of Arconic Delaware Common Stock, (iii) each outstanding share of Serial Preferred Stock, par value \$100 per share, of Arconic Pennsylvania was automatically converted into one share of Serial Preferred Stock, par value \$100 per share, of Arconic Delaware and (iv) all of Arconic Pennsylvania’s employee benefit and compensation plans immediately prior to the Reincorporation were continued by Arconic Delaware, and each outstanding equity award and notional share unit relating to shares of Arconic Pennsylvania Common Stock was converted into an equity award or notional share unit, as applicable, relating to an equivalent number of shares of Arconic Delaware Common Stock on the same terms and subject to the same conditions. Beginning on the Effective Date, each certificate representing Arconic Pennsylvania Common Stock or Arconic Pennsylvania Preferred Stock was deemed for all corporate purposes to evidence ownership of Arconic Delaware Common Stock or Arconic Delaware Preferred Stock, as applicable. The Company’s stockholders may, but are not required to, exchange their stock certificates as a result of the Reincorporation.

The Alcoa Inc. Separation Transaction

On November 1, 2016, Alcoa Inc. completed the separation of its business into two independent, publicly traded companies (the “Alcoa Inc. Separation Transaction”) – Arconic Inc. (the new name for Alcoa Inc. and which, through the transactions described above, later became Howmet Aerospace Inc.) and Alcoa Corporation. Following the Alcoa Inc. Separation Transaction, the Company retained the Global Rolled Products (other than the rolling mill at the Warrick, Indiana operations and the 25.1% ownership stake in the Ma’aden Rolling Company), the Engineered Products and Solutions and the Transportation and Construction Solutions segments. Alcoa Corporation comprised the Alumina and Primary Metals segments,

the rolling mill at the Warrick, Indiana operations, and the 25.1% stake in the Ma'aden Rolling Company in Saudi Arabia previously held by the Company.

The Alcoa Inc. Separation Transaction was effected by a pro rata distribution of 80.1% of the outstanding shares of Alcoa Corporation common stock to the Company's shareholders (the "Distribution of Alcoa"). The Company's shareholders of record as of the close of business on October 20, 2016 (the "2016 Record Date") received one share of Alcoa Corporation common stock for every three shares of the Company's common stock held as of the 2016 Record Date. The Company did not issue fractional shares of Alcoa Corporation common stock in the Distribution of Alcoa. Instead, each shareholder otherwise entitled to receive a fractional share of Alcoa Corporation common stock received cash in lieu of fractional shares.

The Company distributed 146,159,428 shares of common stock of Alcoa Corporation in the Distribution of Alcoa and retained 36,311,767 shares, or approximately 19.9%, of the common stock of Alcoa Corporation immediately following the Distribution of Alcoa. During 2017, the Company disposed all of its retained interest in Alcoa Corporation.

As a result of the Distribution of Alcoa, Alcoa Corporation became an independent public company trading under the symbol "AA" on the New York Stock Exchange, and the Company traded under the symbol "ARNC" on the New York Stock Exchange.

On October 31, 2016, in connection with the Alcoa Inc. Separation Transaction, Arconic Inc. entered into several agreements with Alcoa Corporation or its subsidiaries that govern the relationship of the parties following the Distribution of Alcoa, including the following: Separation and Distribution Agreement, Tax Matters Agreement, Employee Matters Agreement, and certain Patent, Know-How, Trade Secret License and Trademark License Agreements.

Description of the Business

The Company produces products that are used primarily in the aerospace (commercial and defense), commercial transportation, and industrial and other end markets. Such products include fastening systems (titanium, steel, and nickel superalloys), seamless rolled rings (mostly nickel superalloys); investment castings (nickel superalloys, titanium, and aluminum), including airfoils and structural parts; forged jet engine components (e.g., jet engine disks); machined and forged aircraft parts (titanium and aluminum); and forged aluminum commercial vehicle wheels, all of which are sold directly to customers and/or through distributors.

Aerospace (Commercial and Defense) End Market. Howmet's largest end market is aerospace, which represented approximately 69% of the Company's revenue in 2020. The Company produces a range of high performance multi-materials, highly engineered products, and vertically integrated machined solutions for aero engines and airframe structures, ranging from investment castings, advanced coatings, seamless rings, forgings, titanium extrusions, and titanium mill products, to fasteners that hold aircraft together. Wingtip to wingtip, nose to tail, Howmet can produce more than 90% of all structural and rotating aero engine components. Modernization of the commercial and defense platforms is driven by an array of challenging performance requirements. With its precision engineering, materials science expertise and advanced manufacturing processes, Howmet aims to help its customers achieve greater fuel economies, reduced emissions, passenger comfort and maintenance efficiencies.

Commercial Transportation End Market. The commercial transportation end market represented approximately 16% of the Company's revenue in 2020. The Company invented the forged aluminum wheel in 1948, and continues to advance technology to deliver breakthrough solutions that make trucks and buses lighter, more fuel efficient and sharper-looking. Howmet's forged aluminum wheels are a leading choice for commercial trucks and mass transportation vehicles because they can reduce weight and save fuel. The strength of the Company's rivets, bolts and fasteners offers another lightweighting solution that delivers performance.

Industrial and Other End Markets. Industrial and other end markets include industrial gas turbines, oil and gas, and other industrials, which represented approximately 15% of the Company's revenue in 2020.

Howmet has four reportable segments, which are organized by product on a worldwide basis: Engine Products, Fastening Systems, Engineered Structures and Forged Wheels.

Engine Products

Engine Products produces investment castings, including airfoils, and seamless rolled rings primarily for aircraft engines and industrial gas turbines. Engine Products produces rotating parts as well as structural parts. Engine Products principally serves the commercial and defense aerospace as well as industrial gas turbine end markets.

Fastening Systems

Fastening Systems produces aerospace and industrial fasteners, latches, bearings, fluid fittings and installation tools. A leading producer of highly engineered aerospace fasteners with a broad range of fastening systems, the segment also supplies the commercial transportation, renewable, and material handling industries. The business's high-tech, multi-material fastening

systems are found nose to tail on commercial and military aircraft, as well as on jet engines, industrial gas turbines, automobiles, commercial transportation vehicles, wind turbines, solar power systems, and construction and industrial equipment.

Engineered Structures

Engineered Structures produces titanium ingots and mill products for aerospace and defense applications and is vertically integrated to produce titanium forgings, extrusions forming and machining services for airframe, wing, aero-engine, and landing gear components. Engineered Structures also produces aluminum forgings, nickel forgings, and aluminum machined components and assemblies for aerospace and defense applications. The principal end markets served by Engineered Structures are commercial aerospace, defense aerospace, and land and sea defense.

Forged Wheels

Forged Wheels manufactures forged aluminum truck, bus, and trailer wheels and related products for the commercial transportation end market globally. The Company's portfolio of wheels is sold under the product brand name Alcoa® Wheels. Its Ultra ONE® Wheel with MagnaForce® alloy is the lightest portfolio of wheels on the market. The Company's proprietary Dura-Bright® surface treatment is unmatched in appearance and corrosion protection.

For additional discussion of each segment's business, see "Results of Operations—Segment Information" in [Part II, Item 7](#) (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note [D](#) to the Consolidated Financial Statements in Part II, Item 8.

Sales by End Market and Significant Customer Revenue

Sales by end markets for the years ended December 31, 2020, 2019, and 2018, were:

	For the Year Ended December 31,		
	2020	2019	2018
Aerospace - Commercial	50 %	59 %	59 %
Aerospace - Defense	19 %	13 %	11 %
Commercial Transportation	16 %	17 %	18 %
Industrial and Other	15 %	11 %	12 %

In 2020, General Electric Company, Raytheon Technologies Corporation and The Boeing Company represented approximately 11%, 9% and 8%, respectively, of the Company's third-party sales. The loss of any such significant customer could have a material adverse effect on such businesses. See [Part I, Item 1A](#) (Risk Factors).

The Company's Principal Facilities¹

Country	Facility Location	Segment	Products
Australia	Oakleigh	Fastening Systems	Fasteners
Canada	Georgetown, Ontario ²	Engine Products	Aerospace Castings
	Laval, Québec	Engine Products; Engineered Structures	Aerospace Castings and Machining
China	Suzhou ²	Engine Products; Fastening Systems; Forged Wheels	Fasteners, Rings and Forgings
France	Dives-sur-Mer	Engine Products	Aerospace and Industrial Gas Turbine Castings
	Evron	Engine Products	Aerospace and Specialty Castings
	Gennevilliers	Engine Products	Aerospace and Industrial Gas Turbine Castings
	Montbrison	Fastening Systems	Fasteners
	St. Cosme-en-Vairais ²	Fastening Systems	Fasteners
	Toulouse	Fastening Systems	Fasteners
	Us-par-Vigny	Fastening Systems	Fasteners
Germany	Bestwig	Engine Products	Aerospace Castings
	Erwitte	Engine Products	Machining of Aerospace Castings
	Hildesheim-Bavenstedt ²	Fastening Systems	Fasteners
	Kelkheim ²	Fastening Systems	Fasteners
Hungary	Nemesvámos	Fastening Systems	Fasteners
	Székesfehérvár	Engine Products; Forged Wheels	Aerospace and Industrial Gas Turbine Castings and Forgings
Japan	Jōetsu City ²	Forged Wheels	Forgings
	Nomi	Engine Products	Aerospace and Industrial Gas Turbine Castings
Mexico	Ciudad Acuña ²	Engine Products; Fastening Systems	Aerospace Castings/Rings and Fasteners
	Monterrey	Forged Wheels	Forgings
Morocco	Casablanca ²	Fastening Systems	Fasteners
United Kingdom	Ecclesfield	Engine Products	Metal, Billets
	Exeter ²	Engine Products	Aerospace and Industrial Gas Turbine Castings and Alloy
	Glossop	Engine Products	Metal, Billets
	Ickles	Engine Products	Metal, Billets
	Leicester ²	Fastening Systems	Fasteners
	Low Moor	Engineered Structures	Extrusions
	Redditch ²	Fastening Systems	Fasteners
	Telford	Fastening Systems	Fasteners
Welwyn Garden City	Engineered Structures	Aerospace Formed Parts	

Country	Facility Location	Segment	Products
United States	Tucson, AZ ²	Fastening Systems	Fasteners
	Carson, CA ²	Fastening Systems	Fasteners
	City of Industry, CA ²	Fastening Systems	Fasteners
	Fontana, CA	Engine Products	Rings
	Fullerton, CA ²	Fastening Systems	Fasteners
	Rancho Cucamonga, CA	Engine Products	Rings
	Sylmar, CA	Fastening Systems	Fasteners
	Torrance, CA	Fastening Systems	Fasteners
	Branford, CT	Engine Products	Aerospace Coatings
	Winsted, CT	Engine Products	Aerospace Machining
	Savannah, GA	Engineered Structures	Forgings, Disks
	La Porte, IN	Engine Products	Aerospace and Industrial Gas Turbine Castings
	Whitehall, MI	Engine Products	Aerospace and Industrial Gas Turbine Castings and Coatings, Titanium Alloy and Specialty Products
	Washington, MO	Engineered Structures	Aerospace Formed Parts, Titanium Mill Products
	Big Lake, MN	Engineered Structures	Aerospace Machining
	New Brighton, MN	Engineered Structures	Aerospace Machining
	Dover, NJ	Engine Products	Aerospace and Industrial Gas Turbine Castings and Alloy
	Verdi, NV	Engine Products	Rings
	Kingston, NY ²	Fastening Systems	Fasteners
	Rochester, NY	Engine Products	Rings
	Barberton, OH	Forged Wheels	Machining of Forgings
	Canton, OH ^{2,3}	Engineered Structures	Ferro-Titanium Alloys and Titanium Mill Products
	Cleveland, OH	Engine Products; Engineered Structures; Forged Wheels	Forgings, Investment Casting Equipment, and Aerospace Components
	Niles, OH	Engineered Structures	Titanium Mill Products
	Morristown, TN ²	Engine Products	Aerospace and Industrial Gas Turbine Ceramic Products
	Houston, TX ²	Engineered Structures	Extrusions
	Waco, TX ²	Fastening Systems	Fasteners
	Wichita Falls, TX	Engine Products	Aerospace and Industrial Gas Turbine Castings
	Hampton, VA ²	Engine Products	Aerospace and Industrial Gas Turbine Castings
	Martinsville, VA	Engineered Structures	Titanium Mill Products

¹ Principal facilities are listed by location, with certain locations having more than one facility. The list in the above table does not include 20 locations that serve as sales and administrative offices, distribution centers or warehouses.

² Leased property or partially leased property.

³ Canton Ferro-Titanium Alloys was sold on February 1, 2021.

Sources and Availability of Raw Materials

Important raw materials purchased in 2020 for each of the Company's reportable segments are listed below.

<u>Engine Products</u>	<u>Fastening Systems</u>	<u>Engineered Structures</u>	<u>Forged Wheels</u>
Ceramics	Aluminum Alloys	Energy	Energy
Cobalt	Energy	Nickel Alloys	Primary and Scrap Aluminum
Energy	Nickel Alloys and Stainless Steels	Primary Aluminum	
Nickel	Steels	Titanium Scrap	
Platinum	Titanium Alloys	Titanium Sponge	
Titanium		Vanadium Alloys	

Generally, raw materials are purchased from third-party suppliers under competitively priced supply contracts or bidding arrangements. The Company believes that the raw materials necessary to its business are and will continue to be available.

Patents, Trade Secrets and Trademarks

The Company believes that its domestic and international patent, trade secret and trademark assets provide it with a significant competitive advantage. The Company's rights under its patents, as well as the products made and sold under them, are important to the Company as a whole and, to varying degrees, important to each business segment. The patents owned by Howmet generally concern particular products, manufacturing equipment or techniques. Howmet's business as a whole is not, however, materially dependent on any single patent, trade secret or trademark. As a result of product development and technological advancement, the Company continues to pursue patent protection in jurisdictions throughout the world. As of the end of 2020, the Company's worldwide patent portfolio consists of approximately 959 granted patents and 183 pending patent applications.

The Company also has a significant number of trade secrets, mostly regarding manufacturing processes and material compositions that give many of its businesses important advantages in their markets. The Company continues to strive to improve those processes and generate new material compositions that provide additional benefits. With respect to domestic and international registered trademarks, the Company has many that have significant recognition within the markets that are served. Examples include the name Howmet[®] metal castings, Huck[®] fasteners, and Dura-Bright[®] wheels with easy-clean surface treatments. A significant trademark filing campaign for the names "Howmet" and "Howmet Aerospace" along with its "H" logo was initiated in 2019, in support of the corporate launch of Howmet Aerospace Inc. As of the end of 2020, the Company's worldwide trademark portfolio consists of approximately 1,372 registered trademarks and 329 pending trademark applications. The Company's rights under its trademarks are important to the Company as a whole and, to varying degrees, important to each business segment.

Competitive Conditions

The Company's segments - Engine Products, Fastening Systems, Engineered Structures and Forged Wheels - are subject to substantial and intense competition in the markets they serve. Although Howmet believes its advanced technology, manufacturing processes and experience provide advantages to Howmet's customers, such as high quality and superior mechanical properties that meet the Company's customers' most stringent requirements, many of the products Howmet makes can be produced by competitors using similar types of manufacturing processes as well as alternative forms of manufacturing. Despite intense competition, Howmet continues as a market leader in most of its principal markets. Several factors, including Howmet's technological expertise, state-of-the-art capabilities, engaged employees and long-standing customer relationships, enable the Company to maintain its competitive position.

Principal competitors include Berkshire Hathaway Inc., through its 2016 acquisition of Precision Castparts Corporation and subsidiaries, for titanium and titanium-based alloys, precision forgings, seamless rolled rings, investment castings and aerospace fasteners; VSMPO (Russia) for titanium and titanium-based alloys and precision forgings; the High-Performance Materials & Components segment of Allegheny Technologies, Inc. for titanium and titanium-based alloys, precision forgings, and investment castings; Lisi Aerospace (France) for aerospace fasteners; and Aubert & Duval (part of Eramet Group in France) for precision forgings. Other competitors include Doncasters Group Ltd. (UK) and Consolidated Precision Products Corp. (owned by Warburg Pincus and Berkshire Partners) for investment castings; Weber Metals (part of Otto Fuchs) for precision forgings; and Forgital and Frisa (Mexico) for seamless rings.

Forged Wheels competes against aluminum and steel wheel suppliers in the commercial transportation industry under the product brand name Alcoa[®] Wheels for the major regions that it serves (Americas, Europe, Japan, China, and Australia). Its larger aluminum wheel competitors are Accuride Corporation, Speedline (member of the Ronal Group), Nippon Steel Corporation, Dicastal, Alux, and Wheels India Limited. In recent years, Forged Wheels has seen an increase in the number of

aluminum wheel suppliers (both forged and cast aluminum wheels) from China, Taiwan, India and South Korea attempting to penetrate the global commercial transportation market.

Several of Howmet's largest customers have captive superalloy furnaces for producing airfoil investment castings for their own use. Many other companies around the world also produce superalloy investment castings, and some of these companies currently compete with Howmet in the aerospace and other markets, while others are capable of competing with the Company should they choose to do so.

International competition in the investment castings, fasteners, rings and forgings markets may also increase in the future as a result of strategic alliances among engine original equipment manufacturers ("OEMs"), aero-structure prime contractors, and overseas companies, especially in developing markets, particularly where "offset" or "local content" requirements create purchase obligations with respect to products manufactured in or directed to a particular country.

Environmental Matters

Information relating to environmental matters is included in Note V to the Consolidated Financial Statements under the caption "Environmental Matters." Capital expenditures for new or expanded facilities for environmental control for 2021 and 2022 are estimated to be less than \$5 million per year.

Human Capital

To recruit, attract, develop and retain world-class talent, the Company has created a culture that embraces diversity, drives inclusion, and empowers and engages our employees.

Training and Development

The Company offers an integrated approach, enabling our employees to own their development and create rewarding careers that draw on their aptitudes and support their ambitions. We provide learning and development opportunities and equip our managers to provide ongoing coaching and feedback, so employees maximize their performance and potential, delivering success for Howmet.

Diversity, Equity and Inclusion

Events in 2020, particularly in the United States, underscored the importance and power of diversity, equity and inclusion ("DEI"). Howmet's inclusive, respectful and values-based company culture fosters inclusive work environments that leverage the diversity of backgrounds, experience and thought within our organization. The Company partners with key external organizations that focus on DEI, including the Human Rights Campaign, the National Hispanic Corporate Council and Diversity Best Practices, to review and continuously improve our DEI initiatives. We continue to seek additional partners to further eliminate discrimination and implicit bias from the Company's policies and processes.

During 2020, we renewed our commitment to supporting our six employee resource groups ("ERGs") – Howmet African Heritage Network, Howmet Hispanic Network, Howmet Next Generation Network, Howmet Pride Network, Howmet Veterans Network and Howmet Women's Network. The ERGs provide workplace networks for employees who have shared characteristics, special interests or life experiences. They offer a conduit to professional development, strengthen business impact internally and externally, and promote commitments to a diverse workplace. During 2020, the ERGs provided a positive way for the Company to direct dedicated company resources toward employee education, community building and social impact initiatives.

The Company also provided diversity awareness training on implicit bias and added inclusion to our leadership competency development in 2020.

Health and Safety

Howmet's strong health and safety culture empowers our employees and contractors to take personal responsibility for their actions and the safety of their coworkers. This culture is supported by internal policies, standards, rules and procedures that clearly articulate our stringent requirements for working safely in all of our facilities worldwide. The Company embeds annual health and safety goals and objectives into its operating plans to progress against our ultimate goal of zero incidents. We prioritize our risk management processes toward the prevention of fatality and serious injury potential to focus on the hazards that have the potential for life-altering outcomes.

COVID-19 represented the biggest health challenge in the history of our Company, impacting our employees, suppliers and customers. This adverse situation became a unifying moment, as our employees worked tirelessly to establish internal and external programs and protocols to protect our people and processes, which were deemed essential for the aerospace, defense and transportation industries. Through our pandemic deployment system, the Company readied our plants around the world with a comprehensive toolbox based on risk. We structured our location pandemic programs around entry screening, self-assessment of symptoms, hygiene, masks, social distancing and robust implementation of tracing and quarantine protocols.

Special pandemic-related policies for leave and alternative schedules were put in place to incentivize staying at home when sick. In addition, for employees who could meet their work commitments remotely, we provided resources and equipment to enable them to work from home. Access to mental health and resilience support was communicated and made available through our employee assistance partners.

Employees

Total worldwide employment at the end of 2020 was approximately 19,700 employees in 24 countries. Many, but less than 50%, of these employees are represented by labor unions. The Company believes that relations with its employees and any applicable union representatives generally are good.

There are nine collective bargaining agreements in the United States with varying expiration dates. In the United States, the largest collective bargaining agreement is the agreement between Howmet and the United Autoworkers ("UAW") at our Whitehall, Michigan location. The Whitehall UAW agreement covers approximately 1,000 employees; the current agreement expires on March 31, 2023. In addition to the employees covered by the Whitehall UAW agreement, approximately 1,600 other employees in the United States are also represented by labor unions.

On a regional basis, collective bargaining agreements with varying expiration dates cover employees in Europe, North America, South America, and Asia.

Executive Officers of the Registrant

The names, ages, positions and areas of responsibility of the executive officers of the Company as of February 16, 2021 are listed below. The Company's executive officers are elected or appointed to serve until the next annual meeting of the Board of Directors (held in conjunction with the annual meeting of shareholders), except in the case of earlier death, retirement, resignation or removal.

Ken Giacobbe, 55, Executive Vice President and Chief Financial Officer. Mr. Giacobbe was elected Executive Vice President and Chief Financial Officer of Howmet effective November 1, 2016. Mr. Giacobbe joined Howmet in 2004 as Vice President of Finance for Global Extruded Products, part of Alcoa Forgings and Extrusions. He then served as Vice President of Finance for the Company's Building and Construction Systems business from 2008 until 2011. In 2011, he assumed the role of Group Controller for the Engineered Products and Solutions segment. From January 2013 until October 2016, Mr. Giacobbe served as Chief Financial Officer of the Engineered Products and Solutions segment. Before joining Howmet, Mr. Giacobbe held senior finance roles at Avaya and Lucent Technologies.

Neil E. Marchuk, 63, Executive Vice President and Chief Human Resources Officer. Mr. Marchuk was elected Executive Vice President and Chief Human Resources Officer of Howmet effective March 1, 2019. Prior to joining Howmet, from January 2016 to February 2019, he was Executive Vice President and Chief Human Resources Officer at Adient, an automotive manufacturer. From July 2006 to May 2015, Mr. Marchuk was Executive Vice President of Human Resource at TRW Automotive, and served as TRW's Vice President, Human Resources from September 2004 to July 2006. Prior to joining TRW, from December 2001 to August 2004, Mr. Marchuk was Director Corporate Human Resources for E.I. Du Pont De Nemours and Company ("E.I. Du Pont"). From September 1999 to November 2001, Mr. Marchuk was Director Global HR Delivery for E.I. Du Pont. From February 1999 to August 1999, Mr. Marchuk served E.I. Du Pont as its Global HR Director Global Services Division.

Paul Myron, 54, Vice President and Controller. Mr. Myron was elected Vice President and Controller of Howmet effective November 1, 2016. Mr. Myron joined Howmet as a systems analyst in Pittsburgh and in 1992 relocated to the Company's Davenport, Iowa facility as a product accountant. He served in numerous financial management positions from 1995 until 2000 when he was named Commercial Manager and Controller for the Atlantic division of the Alcoa World Alumina and Chemicals business. In 2002, Mr. Myron was appointed Vice President of Finance, Alcoa Primary Metals and later became Vice President of Finance, Alcoa World Alumina and Chemicals. In 2005 Mr. Myron was named Director of Financial Planning and Analysis, accountable for the Company's financial planning, analysis, and reporting worldwide. In February 2012, he became Director of Finance Initiatives for the Engineered Products and Solutions segment, overseeing specific financial initiatives and projects within the group. From July 2012 until his most recent appointment, Mr. Myron served as Vice President, Finance and Business Excellence for the Arconic Power and Propulsion business.

Tolga I. Oal, 49, Co-Chief Executive Officer. Mr. Oal was appointed Co-Chief Executive Officer of Howmet effective April 1, 2020. He served as President of Arconic Engineered Structures from May 2019 to April 2020. Prior to joining Howmet, Mr. Oal held leadership roles as President Driveline, President Americas and Senior Vice President Purchasing for American Axle & Manufacturing in Detroit, Michigan from September 2015 to April 2019. From June 2008 to September 2015, Mr. Oal held several leadership positions at TRW Automotive, including Vice President and General Manager of the Global Electronics Business Unit. Prior to his experience at TRW, Mr. Oal spent several years at Siemens VDO Automotive in Europe and the United States.

John C. Plant, 67, Chairman and Co-Chief Executive Officer. Mr. Plant was appointed Co-Chief Executive Officer of Howmet effective April 1, 2020. He was the Company's Chief Executive Officer from February 6, 2019 to April 1, 2020. He has served as Howmet's Chairman since October 2017 and as a member of the Board since February 2016. Mr. Plant previously served as Chairman of the Board, President and Chief Executive Officer of TRW Automotive from 2011 to 2015, and as its President and Chief Executive Officer from 2003 to 2011. TRW Automotive was acquired by ZF Friedrichshafen AG in May 2015. Mr. Plant was a co-member of the Chief Executive Office of TRW Inc. from 2001 to 2003 and an Executive Vice President of TRW from the company's 1999 acquisition of Lucas Varity to 2003. Prior to TRW, Mr. Plant was President of Lucas Varity Automotive and managing director of the Electrical and Electronics division from 1991 through 1997.

Katherine H. Ramundo, 53, Executive Vice President, Chief Legal Officer and Secretary. Ms. Ramundo was elected Executive Vice President, Chief Legal Officer and Secretary of Howmet effective November 1, 2016. Prior to joining Howmet, from January 2013 through August 2015, she was Executive Vice President, General Counsel and Secretary of ANN INC., the parent company of ANN TAYLOR and LOFT brands, based in New York. Prior to ANN INC., she served as Vice President, Deputy General Counsel and Assistant Secretary at Colgate-Palmolive, where she held various legal roles from November 1997 to January 2013. She began her career as a litigator in New York, practicing at major law firms, including Cravath, Swaine & Moore and Sidley & Austin.

On January 13, 2021, Ms. Ramundo notified the Company of her intention to resign from the Company, effective as of February 19, 2021, to pursue another professional opportunity.

Item 1A. Risk Factors.

Howmet's business, financial condition and results of operations may be impacted by a number of factors. In addition to the factors discussed elsewhere in this report, the following risks and uncertainties could materially harm the Company's business, financial condition or results of operations, including causing its actual results to differ materially from those projected in any forward-looking statements. The following list of risk factors is not all-inclusive or necessarily in order of importance. Additional risks and uncertainties not presently known to Howmet or that Howmet currently deems immaterial also may materially adversely affect the Company in future periods.

Risks Related to Our Business and Operations**Our business, results of operations, financial condition and/or cash flows have been and could continue to be materially adversely affected by the effects of the COVID-19 pandemic.**

Any outbreaks of contagious diseases, public health epidemics or pandemics and other adverse public health developments in countries where we, our employees, customers and suppliers operate could have a material and adverse effect on our business, results of operations, financial condition and/or cash flows. Specifically, the COVID-19 pandemic affecting the global community, including the United States, Europe and South America, is adversely impacting our operations, and the nature and extent of the impact over time is highly uncertain and beyond our control. The extent to which COVID-19 further affects our operations over time will depend on future developments, which are highly uncertain, including the duration of the pandemic, the continued severity of the virus, resurgences and emergence of variants of the virus, the efficacy and availability of vaccines, and the extent of actions that may be taken to contain its impact. These actions include, but are not limited to, declarations of states of emergency, business closures, manufacturing restrictions and a prolonged period of travel, commercial and/or other similar restrictions and limitations, many of which have been implemented across much of the globe and all of which have negatively affected our business. The longer the duration, the greater the impact on our business and the more heightened the risk of a continuing material adverse effect on our business, results of operations, financial conditions and/or cash flows, as well as on our business strategies and initiatives. We continue to monitor guidelines proposed by federal, state and local, as well as foreign, governments with respect to measures for continued operation, which may change over time depending on public health, safety and other considerations. We are continuing to focus on the safety and protection of our workforce by continuing to implement additional safety protocols in light of COVID-19.

As a result of COVID-19 and the measures designed to contain its spread, our global sales, including to customers in the aerospace and commercial transportation industries that are impacted by COVID-19, have been and are expected to continue to be negatively impacted due to the disruption in demand, which has had and over time could continue to have a material adverse effect on our business, results of operations, financial condition and/or cash flows. The COVID-19 pandemic has subjected our operations, financial performance and financial condition to a number of risks, including, but not limited to, those discussed below:

- *Business and operations risks:* We continue to monitor the evolving situation relating to COVID-19 to determine whether we will need to significantly modify our business practices or take actions as may be required by government authorities or that we determine are in the best interests of our employees, customers, partners, suppliers and shareholders. We have had a number of smaller manufacturing locations that have experienced periods of shutdowns. Future shutdowns will be dependent on facts and circumstances as they unfold, including based on the restrictions and limitations noted above. Additional shutdowns, while not required by governmental authorities, may be necessary to match our production to the reduced demand of our customers. In addition, due to the foregoing factors and potential further disruptions, we may be unable to perform fully on our contracts and our costs may increase. We may also face challenges in restoring our production levels if and when COVID-19 abates, including as a result of government-imposed or other limitations that prevent the return of all or a portion of our workforce, continue to disrupt demand and/or limit the capabilities of our suppliers. As a result of COVID-19 and its potential impact on the aerospace industry, the possibility exists that a sustained impact to our operations, financial results and market capitalization may require material impairments of our assets, including, but not limited to, goodwill, intangible assets, long-lived assets, and right-of-use assets. While we have already implemented plans to reduce costs, including certain headcount reductions, reductions in certain cash outflows, suspension of our common stock dividend and reductions in the levels of our capital expenditures, the longer-term impact of the COVID-19 pandemic is uncertain, but could continue to have a material adverse effect on our business, results of operations, financial condition and/or cash flows.
- *Customer and supplier risks:* We have limited visibility into future demand due to the disruptions resulting from COVID-19. The sharp decrease in air travel resulting from the COVID-19 pandemic and the measures that governments and private organizations worldwide have implemented in an attempt to contain its spread is adversely affecting, and will likely continue to adversely affect, airlines and airframers and their respective demand for our customers' products and services. Aircraft manufacturers are reducing production rates due to fewer expected aircraft deliveries and, as a result, demand for products in the OEM market has significantly decreased. Several of our aerospace and commercial transportation customers temporarily suspended operations at certain production sites,

reduced operations and production rates, and/or took cost-cutting actions, including, but not limited to, General Electric Company, Raytheon Technologies Corporation and The Boeing Company, which represented approximately 11%, 9% and 8%, respectively, of our third-party sales in 2020. Due to the foregoing factors and other cost-cutting measures, we are experiencing, and expect to continue experiencing, lower demand and volume for our products, customer requests for potential payment deferrals, pricing concessions or other contract modifications, and delays in deliveries and the achievement of other billing milestones. COVID-19 may also limit the ability of our counterparties generally to perform their obligations to us, including, but not limited to, our customers' ability to make timely payments to us. These trends may lead to charges, impairments and other adverse financial impacts over time, as noted above, as we have historically depended upon the strength of these industries, particularly the commercial aerospace industry. In addition, the ongoing COVID-19 pandemic may negatively impact customer contract negotiations, including the ability to negotiate acceptable terms in contract renewal negotiations and our ability to obtain new customers. Similarly, our suppliers may not have the materials, capacity, or capability to manufacture our products according to our schedule and specifications. To date, we have not experienced significant disruption to our supply chain. If our suppliers' operations were to be impacted, we may need to seek alternate suppliers, which may be more expensive, may not be available or may result in delays in shipments to us and subsequently to our customers, each of which would adversely affect our business, results of operations, financial condition and/or cash flows. The duration of the current disruptions to our customers and to our supply chain, and related financial impact to us, cannot be estimated at this time. Should such disruption continue for an extended period of time, the impact will have a material adverse effect on our business, results of operations, financial condition and/or cash flows. Ultimately, the demand for our products is, in turn, driven by demand for transportation and for people to travel within and between various countries. Should the COVID-19 pandemic cause a long-term deterioration in demand for transportation or travel due to fear or anxiety related to health concerns, governmental restriction, economic hardships, or increased use of electronic communication technologies embraced during the COVID-19 related shutdowns, the effects on our business may extend well beyond the current COVID-19 health crisis and immediate related governmental actions.

- *Market risks:* The current financial market dynamics and volatility pose heightened risks to our liquidity. For example, dramatically lower interest rates and lower expected asset valuations and returns can materially impact the calculation of long-term liabilities such as our pension. In addition, extreme volatility in financial markets has had and may continue to have adverse impacts on other asset valuations such as the value of the investment portfolios supporting our pension. Our long-term liabilities are sensitive to numerous factors and assumptions that can move in offsetting directions and should be considered as of the time of a relevant measurement event.
- *Liquidity and credit risks:* We currently have the ability to borrow up to \$1.0 billion under our Five-Year Revolving Credit Agreement (the "Credit Agreement"), which was amended in June 2020. A prolonged period of generating lower financial results and cash from operations could adversely affect our financial condition, including in respect of satisfying both required and voluntary pension funding requirements, could result in potential increases in net debt or reductions in EBITDA, and could otherwise negatively affect our ability to achieve our strategic objectives. If the foregoing or other factors negatively impact our ability to comply with the financial covenant in the Credit Agreement, our ability to draw under the Credit Agreement would be adversely affected. There can also be no assurance that we will not face credit rating downgrades as a result of weaker than anticipated performance of our business or other factors, including overall market conditions. Rating downgrades could further adversely affect our cost of funds and related margins, liquidity, competitive position and access to capital markets, and a significant downgrade could have an adverse commercial impact on our business. Conditions in the financial and credit markets may also limit the availability of funding or increase the cost of funding (including for receivables securitization or supply chain finance programs used to finance working capital) or our ability to refinance certain of our indebtedness, which could adversely affect our business, financial position, results of operations and/or cash flows. Although the U.S. federal and other governments have announced a number of funding programs to support businesses, our ability or willingness to access funding under such programs may be limited by regulations or other guidance, including eligibility criteria, or by further change or uncertainty related to the terms of these programs.

The COVID-19 pandemic may also exacerbate other risks disclosed herein, including, but not limited to, risks related to global economic conditions, competition, loss of customers, costs of supplies, manufacturing difficulties and disruptions, investment returns, our credit profile, our credit ratings and interest rates. We expect that the longer the period of disruption from COVID-19 continues, the more material the adverse impact will be on our business operations, financial performance, results of operations and/or cash flows. In addition, the COVID-19 pandemic may also affect our operating and financial results in a manner that is not presently known to us or that we currently do not expect to present significant risks to our business, results of operations, financial conditions and/or cash flows.

The markets for Howmet's products are highly cyclical and are influenced by a number of factors, including global economic conditions.

Howmet is subject to cyclical fluctuations in global economic conditions and lightweight metals end-use markets. Howmet sells many products to industries that are cyclical, such as the aerospace and commercial transportation industries, and the demand for its products is sensitive to, and quickly impacted by, demand for the finished goods manufactured by its customers in these industries, which may change as a result of changes in regional or worldwide economies, currency exchange rates, energy prices or other factors beyond its control.

In particular, Howmet derives a significant portion of its revenue from products sold to the aerospace industry, which can be highly cyclical and reflective of changes in the general economy. The commercial aerospace industry is historically driven by the demand from commercial airlines for new aircraft and spare parts. The U.S. and international commercial aviation industries may face challenges arising from competitive pressures and fuel costs. Demand for commercial aircraft and spare parts is influenced by airline industry profitability, trends in airline passenger traffic, the state of U.S., regional and world economies, the ability of aircraft purchasers to obtain required financing and numerous other factors including the effects of terrorism, health and safety concerns (including as a result of the COVID-19 pandemic), environmental constraints imposed upon aircraft operators, the retirement of older aircraft, the performance and cost of alternative materials, and technological improvements to aircraft. The military aerospace cycle is highly dependent on U.S. and foreign government funding; however, it is also driven by the effects of terrorism, a changing global geopolitical environment, U.S. foreign policy, the retirement of older military aircraft, and technological improvements to new engines.

Further, the demand for Howmet's commercial transportation products is driven by the number of vehicles produced by commercial transportation and automotive manufacturers. Commercial transportation and automotive sales and production are affected by many factors, including the age of the vehicle fleet and related scrappage rates, labor relations issues, fuel prices, regulatory requirements, government initiatives, trade agreements and levels of competition. The automotive industry is also sensitive to general economic conditions, including credit markets and interest rates, and consumer spending and preferences regarding vehicle ownership and usage, vehicle size, configuration and features.

Howmet is unable to predict the future course of industry variables, the strength of the U.S., regional or global economies, or the effects of government actions. Negative economic conditions, such as a major economic downturn, a prolonged recovery period, or disruptions in the financial markets, could have a material adverse effect on Howmet's business, financial condition or results of operations.

Howmet could encounter manufacturing difficulties or other issues that impact product performance, quality or safety, which could adversely affect Howmet's reputation, business and financial statements.

The manufacture of many of Howmet's products is a highly exacting and complex process. Problems may arise during manufacturing for a variety of reasons, including equipment malfunction, failure to follow specific protocols, specifications and procedures, including those related to quality or safety, problems with raw materials, supply chain interruptions, natural disasters, labor unrest and environmental factors. Such problems could have an adverse impact on the Company's ability to fulfill orders or meet product quality or performance. Product manufacturing or performance issues could result in recalls, customer penalties, contract cancellation and product liability exposure. Because of approval, license and qualification requirements applicable to manufacturers and/or their suppliers, alternatives to mitigate manufacturing disruptions may not be readily available to Howmet or its customers. Accordingly, manufacturing problems, product defects or other risks associated with our products, could result in significant costs to and liability for us that could have a material adverse effect on our business, financial condition or results of operations, including the payment of potentially substantial monetary damages, fines or penalties, as well as negative publicity and damage to our reputation, which could adversely impact product demand and customer relationships.

A material disruption of Howmet's operations, particularly at one or more of its manufacturing facilities, could adversely affect Howmet's business.

If Howmet's operations, particularly one of its key manufacturing facilities, were to be disrupted as a result of significant equipment failures, natural disasters, power outages, fires, explosions, terrorism, theft, sabotage, adverse weather conditions, public health crises, labor disputes or other reasons, Howmet may be unable to effectively meet its obligations to or demand from its customers, which could adversely affect Howmet's financial performance.

Interruptions in production could increase Howmet's costs and reduce its sales. Any interruption in production capability could require the Company to incur costs for premium freight, make substantial capital expenditures, or purchase alternative material at higher costs to fill customer orders, which could negatively affect Howmet's profitability and financial condition. Furthermore, a delivery delay by us due to production interruptions could subject us to liability from customer claims that such delay resulted in losses to the customer. Howmet maintains property damage insurance that the Company believes to be adequate to provide for reconstruction of facilities and equipment, as well as business interruption insurance to mitigate losses resulting from significant production interruption or shutdown caused by an insured loss. However, any recovery under Howmet's insurance policies may not offset the lost profits or increased costs that may be experienced during the disruption of operations, which could adversely affect Howmet's business, results of operations, financial condition and cash flow.

Information technology system failures, cyber attacks and security breaches may threaten the integrity of Howmet’s intellectual property and other sensitive information, disrupt its business operations, and result in reputational harm and other negative consequences that could have a material adverse effect on its financial condition and results of operations.

Howmet relies on its information technology systems to manage and operate its business, process transactions, and summarize its operating results. Howmet’s information technology systems could be subject to damage or interruption from power outages; computer, network and telecommunications failures; computer viruses; catastrophic events, such as fires, floods, earthquakes, tornadoes, hurricanes, acts of war or terrorism; and usage errors by employees. If Howmet’s information technology systems are damaged or cease to function properly, the Company may have to make a significant investment to fix or replace them, and Howmet may suffer loss of critical data and interruptions or delays in its operations. Any material disruption in the Company’s information technology systems, or delays or difficulties in implementing or integrating new systems or enhancing current systems, could have an adverse effect on Howmet’s business, financial condition or results of operations.

Howmet also faces global cybersecurity threats, which may range from uncoordinated individual attempts to sophisticated and targeted measures, known as advanced persistent threats, directed at the Company. Cyber attacks and security breaches may include, but are not limited to, attempts to access information, computer viruses, denial of service and other electronic security breaches.

The Company believes that it faces a heightened threat of cyber attacks due to the industries it serves, the locations of its operations and its technological innovations. The Company has experienced cybersecurity attacks in the past, including breaches of its information technology systems in which information was taken, and may experience them in the future, potentially with more frequency or sophistication. Based on information known to date, past attacks have not had a material impact on Howmet’s financial condition or results of operations. However, due to the evolving nature of cybersecurity threats, the scope and impact of any future incident cannot be predicted.

Howmet employs a number of measures to protect and defend against cyber attacks, including technical security controls, data encryption, firewalls, intrusion prevention systems, anti-virus software and frequent backups. Additionally, the Company conducts regular periodic training of its employees regarding the protection of sensitive information, which includes training intended to prevent the success of “phishing” attacks. While the Company continually works to safeguard its systems and mitigate potential risks, there is no assurance that such actions will be sufficient to prevent cyber attacks or security breaches that manipulate or improperly use the Company’s systems or networks, compromise confidential or otherwise protected information, destroy or corrupt data, or otherwise disrupt its operations. The occurrence of such events could negatively impact Howmet’s reputation and its competitive position and could result in litigation with third parties, regulatory action, loss of business, potential liability and increased remediation costs, any of which could have a material adverse effect on its financial condition and results of operations. In addition, such attacks or breaches could require significant management attention and resources, and could result in the diminution of the value of the Company’s investment in research and development.

Howmet’s enterprise risk management program and disclosure controls and procedures address cybersecurity and include elements intended to ensure that there is an analysis of potential disclosure obligations arising from cyber attacks and security breaches. Howmet also maintains compliance programs to address the potential applicability of restrictions against trading while in possession of material, nonpublic information generally and in connection with a cyber attack or security breach.

However, a breakdown in existing controls and procedures around the Company’s cybersecurity environment may prevent Howmet from detecting, reporting or responding to cyber incidents in a timely manner and could have a material adverse effect on the Company’s financial condition or the market price of its securities.

Howmet is dependent on a limited number of suppliers for a substantial portion of raw materials essential to our operations, and supply chain disruptions could have a material adverse effect on our business.

Howmet has supply arrangements with a limited number of suppliers for raw materials. We maintain annual or long-term contracts for a majority of our supply requirements, and for the remainder we depend on spot purchases. There can be no assurance that we will be able to renew, or obtain replacements for, any of our long-term contracts when they expire on terms that are as favorable as our existing agreements, or at all.

From time to time, increasing demand levels have caused regional supply constraints in the industry and further increases in demand levels could exacerbate these issues. Such constraints could impact our production or force us to purchase primary metal and other supplies from alternative sources, which may not be available in sufficient quantities or on terms that are favorable to us. Howmet could also have exposure if a key supplier is unable to deliver sufficient quantities of a necessary material on a timely basis. In addition, a significant downturn in the business or financial condition of a key supplier exposes us to the risk of default by the supplier on its contractual agreement, and this risk is increased by weak and deteriorating economic conditions on a global, regional or industry sector level. Any of the foregoing supply chain disruptions or those due to capacity constraints, trade barriers, labor shortages, business continuity, quality, cyber attacks, delivery issues or disruptions due to weather-related, natural disaster, or pandemic events could adversely affect Howmet’s operations and profitability.

Howmet’s business could be adversely affected by increases in the cost or volatility in the availability of raw materials.

Howmet may be adversely affected by changes in the availability or cost of raw materials (including, but not limited to, nickel, titanium, aluminum, cobalt, vanadium and platinum), as well as freight costs associated with transportation of raw materials. The availability and costs of certain raw materials necessary for the production of Howmet’s products may be influenced by private or government entities including mergers and acquisitions, changes in geopolitical conditions or regulatory requirements (such as human rights regulations or environmental regulations), labor relations between the producers and their work forces, unstable governments in exporting nations, export quotas, sanctions, new or increased import duties, countervailing or anti-dumping duties, market forces of supply and demand, and inflation. In addition, from time to time, commodity prices may fall rapidly. When this happens, suppliers may withdraw capacity from the market until prices improve, which may cause periodic supply interruptions. Howmet may be unable to offset fully the effects of raw material shortages or higher costs through customer price increases, productivity improvements or cost reduction programs. Shortages or price fluctuations in raw materials could have a material adverse effect on Howmet’s operating results.

Howmet could be adversely affected by the loss of key customers or significant changes in the business or financial condition of its customers.

Howmet has long-term contracts with a significant number of its customers, some of which are subject to renewal, renegotiation or re-pricing at periodic intervals or upon changes in competitive supply conditions. Howmet’s failure to successfully renew, renegotiate or favorably re-price such agreements, or a material deterioration in or termination of these customer relationships, could result in a reduction or loss in customer purchase volume or revenue.

Additionally, a significant downturn or deterioration in the business or financial condition or loss of a key customer supplied by Howmet could affect Howmet’s financial results. Howmet’s customers may experience delays in the launch of new products, labor strikes, diminished liquidity or credit unavailability, weak demand for their products, or other difficulties in their businesses. For example, due to the grounding of the 737 MAX aircraft by regulatory authorities in March 2019, Boeing suspended production of the aircraft in January 2020 and resumed low-rate production in May 2020, which has resulted in a reduction in the Company’s sales. While regulatory authorities in the United States and certain other jurisdictions lifted grounding orders beginning in late 2020, our sales could continue to be negatively affected from the residual impacts of the 737 MAX grounding.

Howmet’s customers may also change their business strategies or modify their business relationships with Howmet, including to reduce the amount of Howmet’s products they purchase or to switch to alternative suppliers. If Howmet’s customers reduce, terminate or delay purchases from Howmet due to the foregoing factors or otherwise and Howmet is unsuccessful in enforcing its contract rights or replacing such business in whole or in part or replaces it with less profitable business, our financial condition and results of operations may be adversely affected.

Howmet could be adversely affected by reductions in defense spending.

Howmet’s products are used in a variety of military applications, including military aircraft. Although many of the programs in which Howmet participates extend several years, they are subject to annual funding through congressional appropriations. Changes in military strategy, policy and priorities, or reductions in defense spending, may affect current and future funding of these programs and could reduce the demand for Howmet’s products, which could adversely affect Howmet’s business, financial condition or results of operations.

Howmet may be unable to realize future targets or goals established for its business, or complete projects, at the levels, projected costs or by the dates targeted.

From time to time, Howmet may announce future targets or goals for its business, including revenue growth, cash generation, cost savings, restructuring plans, cost reductions and improvements in profitability. Future targets and goals reflect the Company’s beliefs and assumptions and are based on the Company’s then current expectations, its perception of historical trends, and estimates and projections about the environment, economies and markets in which Howmet operates, as well as other applicable factors. As such, they are inherently subject to significant business, economic, competitive and other uncertainties regarding future events, including the risks discussed in this report. The actual outcome may be materially different. Failure by the Company to achieve the targets or goals at the levels or by the dates targeted, if at all, may have a material adverse effect on its business, financial condition, results of operations or the market price of its securities.

In addition, the implementation of Howmet’s business strategy may involve the entry into and the execution of complex projects, which place significant demands on the Company’s management and personnel, and may depend on numerous factors beyond the Company’s control. There can be no assurance that such projects will be completed within budgeted costs, on a timely basis, or at all, whether due to the risks described in this report, or other factors. The failure to complete a material project as planned, or a significant delay in its execution, could have an adverse effect on Howmet’s business, financial condition or results of operations.

Howmet faces significant competition, which may have an adverse effect on profitability.

As discussed in [Part I, Item 1](#) (Business-Competitive Conditions) of this report, the markets for Howmet's products are highly competitive. Howmet's competitors include a variety of both U.S. and non-U.S. companies in our product markets. New product offerings, new technologies in the marketplace or new facilities may compete with or replace Howmet products. The willingness of customers to accept substitutes for the products sold by Howmet, the ability of large customers to exert leverage in the marketplace to affect the pricing for Howmet's products, and technological advancements or other developments by or affecting Howmet's competitors or customers could adversely affect Howmet's business, financial condition or results of operations.

In addition, Howmet may face increased competition due to industry consolidation. As companies attempt to strengthen or maintain their market positions in an evolving industry, companies could be acquired or merged. Companies that are strategic alliance partners in some areas of Howmet's business may acquire or form alliances with Howmet's competitors, thereby reducing their business with Howmet. Industry consolidation may result in stronger competitors who are better able to obtain favorable terms from suppliers or who are better able to compete as sole-source vendors for customers. Consolidation within Howmet's customer base may result in customers who are better able to command increased leverage in negotiating prices and other terms of sale, which could adversely affect Howmet's profitability. Moreover, if, as a result of increased leverage, customers require Howmet to reduce its pricing such that its gross margins are diminished, Howmet could decide not to sell certain products to a particular customer, or not to sell certain products at all, which would decrease Howmet's revenue and could benefit its competitors. Consolidation within Howmet's customer base may also lead to reduced demand for Howmet's products if a combined entity replaces Howmet's products with those of Howmet's competitors with which it has prior relationships. The result of these developments could have a material adverse effect on Howmet's business, operating results and financial condition.

Howmet may be unable to develop innovative new products or implement technology initiatives successfully.

Howmet's competitive position and future performance depends, in part, on the Company's ability to:

- identify and evolve with emerging technological and broader industry trends in Howmet's end markets;
- identify and successfully execute on a strategy to remain an essential and sustainable element of our customers' supply chains;
- fund, develop, manufacture and bring innovative new products to market quickly and cost-effectively;
- monitor disruptive technologies and understand customers' and competitors' abilities to deploy such technologies; and
- achieve sufficient return on investment for new products based on capital expenditures and research and development spending.

Howmet is working on new developments for a number of strategic projects, including advanced alloy development, engineered product design, and other advanced manufacturing technologies. While Howmet intends to continue to develop innovative new products and services, it may not be able to successfully differentiate its products or services from those of its competitors or match the level of research and development spending of its competitors, including those developing technology to displace Howmet's current products. In addition, Howmet may not be able to adapt to evolving markets and technologies or achieve and maintain technological advantages. There can be no assurance that any of Howmet's new products, development programs or technologies will be commercially adopted or be beneficial to Howmet.

Howmet's business depends, in part, on its ability to meet increased program demand successfully and to mitigate the impact of program cancellations, reductions and delays.

Howmet is currently under contract to supply components for a number of new and existing commercial, general aviation, military aircraft and aircraft engine programs. Many of these contracts contemplate production increases over the next several years. If Howmet fails to meet production levels or encounters difficulty or unexpected costs in meeting such levels, it could have a material adverse effect on the Company's business, financial condition or results of operations. Similarly, program cancellations, reductions or delays could also have a material adverse effect on Howmet's business.

Risks Related to Legal and Regulatory Matters

Product liability, product safety, personal injury, property damage, and recall claims and investigations may materially affect Howmet's financial condition and damage its reputation.

The manufacture and sale of our products expose Howmet to potential product liability, personal injury, property damage and related claims. These claims may arise from allegations of failure to meet product specifications, product design flaws and malfunction of products, as well as from misuse of our products, use of our products in an unintended, unapproved or unrecommended manner, or use of our products with systems not manufactured or sold by us. New data and information, including information about the ways in which Howmet's products are used, may lead Howmet, regulatory authorities, government agencies or other entities or organizations to publish guidelines or recommendations, or impose restrictions, related to the manufacturing or use of Howmet's products.

In the event that a Howmet product fails to perform as expected, regardless of fault, or is used in an unexpected manner, and such failure or use results in, or is alleged to result in, bodily injury and/or property damage or other losses, Howmet may be subject to product liability lawsuits and other claims, or may be required or requested by its customers to participate in a recall or other corrective action involving such product. In addition, if a Howmet product is perceived to be defective or unsafe, Howmet's sales could decrease, its reputation could be adversely impacted and it could be subject to further liability claims. Moreover, events that give rise to actual, potential or perceived product safety concerns could expose Howmet to government investigations or regulatory enforcement actions.

There can be no assurance that Howmet will be successful in defending any such proceedings or that insurance available to Howmet will be sufficient to cover any losses associated with such proceedings. An adverse outcome in one or more of these proceedings or investigations could: (i) have a material adverse effect on Howmet's business, financial condition or profitability; (ii) impose substantial monetary damages and/or non-monetary penalties; (iii) result in additional litigation, regulatory investigations or other proceedings involving Howmet; (iv) result in loss of customers; (v) require changes to our products or business operations; or (vi) damage Howmet's reputation and/or negatively impact the market price of Howmet's common stock. Even if Howmet successfully defends against these types of claims, Howmet could still be required to spend a substantial amount of money in connection with legal proceedings or investigations with respect to such claims; Howmet's management could be required to devote significant time, attention and operational resources responding to and defending against these claims and responding to these investigations; and Howmet's reputation could suffer. Product liability claims and related lawsuits and investigations, product recalls, and allegations of product safety or quality issues, regardless of their validity or ultimate outcome, may have a material adverse effect on Howmet's business, financial condition and reputation and on our ability to attract and retain customers.

Our business may be adversely affected if we fail to comply with government contracting regulations.

We derive a portion of our revenue from sales to U.S. and foreign governments and their respective agencies, as a subcontractor of their prime contractors. Such contracts are subject to various procurement laws and regulations and contract provisions relating to their formation, administration and performance. Failure to comply with these laws, regulations or provisions in our government contracts could result in the imposition of various civil and criminal penalties, termination of contracts, forfeiture of profits, suspension of payments, increased pricing pressure or suspension from future government contracting. If our government contracts are terminated, if we are suspended from government work, or if our ability to compete for new contracts is adversely affected, our financial condition and results of operation could be adversely affected.

Howmet's global operations expose Howmet to risks that could adversely affect its business, financial condition, results of operations, cash flows or the market price of its securities.

Howmet has operations or activities in numerous countries and regions outside the United States, including Europe, Canada, Mexico, China, and Japan. As a result, Howmet's global operations are affected by economic, political and other conditions in the foreign countries in which Howmet does business, as well as U.S. laws regulating international trade, including:

- economic and commercial instability risks, including those caused by sovereign and private debt default, corruption, and changes in local government laws, regulations and policies, such as those related to tariffs, sanctions and trade barriers (including tariffs imposed by the United States as well as retaliatory tariffs imposed by China or other foreign entities), taxation, data privacy, exchange controls, employment regulations and repatriation of assets or earnings;
- geopolitical risks such as political instability, civil unrest, expropriation, nationalization of properties by a government, imposition of sanctions, and renegotiation or nullification of existing agreements;
- war, terrorist activities, kidnapping of personnel or other dangerous conditions;
- major public health issues, such as an outbreak of a pandemic or epidemic (such as Sudden Acute Respiratory Syndrome, Avian Influenza, H7N9 virus, coronavirus (including COVID-19), and the Ebola virus), which could cause disruptions in Howmet's operations, workforce, supply chain or end markets;
- difficulties enforcing contractual rights and intellectual property, including a lack of remedies for misappropriation in certain jurisdictions;
- changes in trade and tax laws that may result in our customers being subjected to increased taxes, duties and tariffs and reduce their willingness to use our services in countries in which we are currently manufacturing their products;
- compliance with antitrust and competition regulations;
- rising labor costs or labor unrest, including strikes;
- compliance with foreign labor laws, which generally provide for increased notice, severance and consultation requirements as compared to U.S. laws;
- aggressive, selective or lax enforcement of laws and regulations by foreign governmental authorities;
- compliance with the Foreign Corrupt Practices Act and other anti-bribery and corruption laws;

- compliance with U.S. laws concerning trade, including the International Traffic in Arms Regulations, the Export Administration Regulations, and the sanctions, regulations and embargoes administered by the U.S. Department of Treasury's Office of Foreign Assets Control;
- imposition of currency controls; and
- adverse tax audit rulings.

Although the effect of any of the foregoing factors is difficult to predict, any one or more of them could adversely affect Howmet's business, financial condition, or results of operations. The Company's international operations subject Howmet to complex and dynamic laws and regulations that, in some cases, could result in conflict or inconsistency between applicable laws of different jurisdictions and/or legal obligations. While Howmet believes it has adopted appropriate risk management, compliance programs and insurance arrangements to address and reduce the associated risks, such measures may provide inadequate protection against costs, penalties, liabilities or other potential risks such as loss of export privileges or repatriation of assets that may arise from such events.

Howmet may face challenges to its intellectual property rights which could adversely affect the Company's reputation, business and competitive position.

Howmet owns important intellectual property, including patents, trademarks, copyrights and trade secrets. The Company's intellectual property plays an important role in maintaining Howmet's competitive position in a number of the markets that the Company serves. Howmet's competitors may develop technologies that are similar or superior to Howmet's proprietary technologies or design around the patents Howmet owns or licenses. Despite its controls and safeguards, Howmet's technology may be misappropriated by its employees, its competitors or other third parties. The pursuit of remedies for any misappropriation of Howmet intellectual property is expensive and the ultimate remedies may be deemed insufficient. Further, in jurisdictions where the enforcement of intellectual property rights is less robust, the risk of misappropriation of Howmet intellectual property increases, despite efforts the Company undertakes to protect it. Developments or assertions by or against Howmet relating to intellectual property rights, and any inability to protect or enforce Howmet's rights sufficiently, could adversely affect Howmet's business and competitive position.

Howmet may be exposed to significant legal proceedings, investigations or changes in U.S. federal, state or foreign law, regulation or policy.

Howmet's results of operations or liquidity in a particular period could be affected by new or increasingly stringent laws, regulatory requirements or interpretations, or outcomes of significant legal proceedings or investigations adverse to Howmet. The Company may experience an unfavorable change in effective tax rates or become subject to unexpected or rising costs associated with business operations or provision of health or welfare benefits to employees due to changes in laws, regulations or policies.

Howmet is also subject to a variety of legal and regulatory compliance risks in the United States and abroad in connection with its business and products. These risks include, among other things, potential claims relating to product liability, product testing, health and safety, environmental matters, employment matters, required record keeping and record retention, compliance with securities laws, intellectual property rights, government contracts and taxes, insurance or commercial matters, as well as compliance with U.S. and foreign laws and regulations, including those governing import and export, anti-bribery, antitrust and competition, sales and trading practices, human rights and modern slavery, sourcing of raw materials, third-party relationships, supply chain operations and the manufacture and sale of products. Howmet may be a party to litigation in a foreign jurisdiction where geopolitical risks might influence the ultimate outcome of such litigation. Howmet could be subject to fines, penalties, damages (in certain cases, treble damages), or suspension or debarment from government contracts.

The global and diverse nature of Howmet's operations means that these risks will continue to exist, and additional legal proceedings and contingencies may arise from time to time. While Howmet believes it has adopted appropriate risk management and compliance programs to address and reduce these risks, including insurance arrangements with respect to these risks, such measures may provide inadequate protection against liabilities that may arise. In addition, various factors or developments can lead the Company to change current estimates of liabilities or make such estimates for matters previously unsusceptible to reasonable estimates, such as a significant judicial ruling or judgment, a significant settlement, significant regulatory developments or changes in applicable law. A future adverse ruling or settlement or unfavorable changes in laws, regulations or policies, or other contingencies that the Company cannot predict with certainty could have a material adverse effect on the Company's financial condition, results of operations or cash flows in a particular period. Litigation and compliance efforts may require substantial attention from management and could result in significant legal expenses, settlement costs or damage awards that could have a material impact on the Company's financial position, results of operations and cash flows. For additional information regarding the legal proceedings involving the Company, see [Part I, Item 3](#) (Legal Proceedings) of this report and in Note [V](#) to the Consolidated Financial Statements in Part II, Item 8.

Unanticipated changes in Howmet's tax provisions or exposure to additional tax liabilities could affect Howmet's future profitability.

Howmet is subject to income taxes in both the United States and various non-U.S. jurisdictions. Its domestic and international tax liabilities are dependent upon the distribution of income among these different jurisdictions. Changes in applicable domestic or foreign tax laws and regulations, or their interpretation and application, including the possibility of retroactive effect, could affect the Company's tax expense and profitability. Howmet's tax expense includes estimates of additional tax that may be incurred for tax exposures and reflects various estimates and assumptions. The assumptions include assessments of future earnings of the Company that could impact the valuation of its deferred tax assets. The Company's future results of operations could be adversely affected by changes in the effective tax rate as a result of a change in the mix of earnings in countries with differing statutory tax rates, changes in the overall profitability of the Company, changes in tax legislation and rates, changes in generally accepted accounting principles, changes in the valuation of deferred tax assets and liabilities, the results of tax audits and examinations of previously filed tax returns or related litigation and continuing assessments of its tax exposures.

Corporate tax law changes continue to be analyzed in the United States and in many other jurisdictions. In particular, on December 22, 2017, the Tax Cuts and Jobs Act (the "2017 Act") was signed into law, significantly reforming the U.S. Internal Revenue Code of 1986, as amended. During 2018, the Internal Revenue Service (the "IRS") began a number of guidance projects which serve to both interpret and implement the 2017 Act. Those guidance projects, which include both Proposed and Final Treasury Regulations, continued into 2020. Howmet continues to review the ongoing interpretive guidance and evaluate its consequences. The ultimate impact of the 2017 Act may differ from reported amounts due to, among other things, changes resulting from such ongoing guidance. Further, we cannot predict the impact of any efforts to change or repeal the 2017 Act or enact alternative legislation by the new presidential administration or Congress.

Labor disputes and other employee relations issues could adversely affect Howmet's business, financial condition or results of operations.

A significant portion of Howmet's employees are represented by labor unions in a number of countries under various collective bargaining agreements with varying durations and expiration dates. For more information, see "Employees" in [Part I, Item 1](#) (Business) of this report. While Howmet previously has been successful in renegotiating its collective bargaining agreements with various unions, Howmet may not be able to satisfactorily renegotiate all collective bargaining agreements in the United States and other countries when they expire. In addition, existing collective bargaining agreements may not prevent a strike or work stoppage at Howmet's facilities in the future. Howmet may also be subject to general country strikes or work stoppages unrelated to its business or collective bargaining agreements. Any such work stoppages (or potential work stoppages) could have a material adverse effect on Howmet's business, financial condition or results of operations.

Howmet is subject to privacy and data security/protection laws in the jurisdictions in which it operates and may be exposed to substantial costs and liabilities associated with such laws and regulations.

The regulatory environment surrounding information security and privacy is increasingly demanding, with frequent imposition of new and changing requirements. For example, the European Union's General Data Protection Regulation ("GDPR"), which became effective in May 2018, imposed significant new requirements on how companies process and transfer personal data, as well as significant fines for non-compliance. Compliance with changes in privacy and information security laws and standards may result in significant expense due to increased investment in technology and the development of new operational processes, which could have a material adverse effect on Howmet's financial condition and results of operations. In addition, the payment of potentially significant fines or penalties in the event of a breach of the GDPR or other privacy and information security laws, as well as the negative publicity associated with such a breach, could damage the Company's reputation and adversely impact product demand and customer relationships.

Failure to comply with domestic or international employment and related laws could result in penalties or costs that could have a material adverse effect on Howmet's business results.

Howmet is subject to a variety of domestic and foreign employment laws, such as the Fair Labor Standards Act (which governs such matters as minimum wages, overtime and other working conditions), state and local wage laws, the Employee Retirement Income Security Act, and regulations related to safety, discrimination, organizing, whistle-blowing, classification of employees, privacy and severance payments, citizenship requirements, and healthcare insurance mandates. Allegations that Howmet has violated such laws or regulations could damage the Company's reputation and lead to fines from or settlements with federal, state or foreign regulatory authorities or damages payable to employees, which could have a material adverse impact on Howmet's operations and financial condition.

Howmet is exposed to environmental, health and safety risks and is subject to a broad range of health, safety and environmental laws and regulations which may result in substantial costs and liabilities.

Howmet's operations worldwide are subject to numerous complex and increasingly stringent health, safety and environmental laws and regulations. The costs of complying with such laws and regulations, including participation in assessments and cleanups of sites, as well as internal voluntary programs, are significant and will continue to be so for the foreseeable future. Environmental laws may impose cleanup liability on owners and occupiers of contaminated property, including present, past or divested properties, regardless of whether the owners and occupiers caused the contamination or whether the activity that

caused the contamination was lawful at the time it was conducted. Environmental matters for which Howmet may be liable may arise in the future at its present sites, at sites owned or operated by its predecessors or affiliates, at sites that it may acquire in the future, or at third-party sites used by Howmet, its predecessors or affiliates for material and waste handling and disposal. Compliance with health, safety and environmental laws and regulations, including remediation obligations, may prove to be more challenging and costly than the Company anticipates. Howmet's results of operations or liquidity in a particular period could be affected by certain health, safety or environmental matters, including remediation costs and damages related to certain sites as well as other health and safety risks relating to its operations and products. Additionally, evolving regulatory standards and expectations can result in increased litigation and/or increased costs, including increased remediation costs, all of which can have a material and adverse effect on the Company's financial condition, results of operations and cash flows.

In addition, the industrial activities conducted at Howmet's facilities present a significant risk of injury or death to our employees, customers or third parties that may be on site. We have experienced serious injuries in the past, notwithstanding the safety protocols, practices and precautions we take. Our operations are subject to regulation by various federal, state and local agencies in the United States and regulation by foreign government entities abroad responsible for employee health and safety, including the Occupational Safety and Health Administration. From time to time, we have incurred fines for violations of various health and safety standards. In addition to industrial activities, the global COVID-19 pandemic will continue to significantly impact the health of our employees and increase the cost of health and safety measures within our operations. Significant community transmission in the vicinity of our operations is likely to impact the workforce availability due to quarantine and isolation practices. Social distancing, mask use, testing and other measures increase costs of operation. While we maintain insurance and have in place policies to minimize risks associated with industrial activities and COVID-19, we may nevertheless be unable to avoid material liabilities relating to any injury, death or other workers compensation claims. These types of incidents may not be covered by or may exceed our insurance coverage and could have a material adverse effect on our results of operations and financial condition or result in negative publicity and/or significant reputational harm.

Howmet may be affected by global climate change or by legal, regulatory, or market responses to such change.

Increased concern over climate change has led to new and proposed legislative and regulatory initiatives, such as cap-and-trade systems, additional limits on emissions of greenhouse gases or Corporate Average Fuel Economy ("CAFE") standards in the United States. New or revised laws and regulations in this area could directly and indirectly affect Howmet and its customers and suppliers, including by increasing the costs of production or impacting demand for certain products, which could result in an adverse effect on our financial condition, results of operations and cash flows. Compliance with any new or more stringent laws or regulations, or stricter interpretations of existing laws, could require additional expenditures by the Company or its customers or suppliers. Also, Howmet relies on natural gas, electricity, fuel oil and transport fuel to operate its facilities. Any increased costs of these energy sources because of new laws could be passed along to the Company and its customers and suppliers, which could also have a negative impact on Howmet's profitability.

Physical risk associated with climate change may result in an increase of the exposure and impact of events with damage due to flooding, extreme winds and extreme precipitation for Howmet locations, suppliers or customers. Prolonged periods of drought may result in wildfires, which may have an adverse effect on production capacity of Howmet sites, suppliers and customers. While we maintain insurance coverage, these types of incidents may not be covered by or may exceed our insurance coverage and could have a material adverse effect on our results of operations and financial condition.

Risks Related to Liquidity and Capital Resources

A decline in Howmet's financial performance or outlook or a deterioration in its credit profile could negatively impact the Company's access to capital markets, its liquidity and its borrowing costs.

Howmet has significant capital requirements and depends, in part, upon the issuance of debt to fund its operations and contractual commitments and pursue strategic actions. A decline in the Company's financial performance or outlook due to internal or external factors could affect the Company's access to, and the availability or cost of, financing on acceptable terms and conditions. There can be no assurance that Howmet will have access to the global capital market on terms the Company finds acceptable. Limitations on Howmet's ability to access the global capital markets, a reduction in the Company's liquidity or an increase in borrowing costs could materially and adversely affect Howmet's ability to maintain or grow its business, which in turn may adversely affect its financial condition and results of operations.

A downgrade of Howmet's credit ratings could limit its ability to obtain future financing, increase borrowing costs and costs relating to credit facilities, adversely affect the market price of Howmet securities, trigger collateral postings, or otherwise impair its business, financial condition, and results of operations.

Howmet's credit ratings are important to the Company's cost of capital. The major credit rating agencies evaluate our creditworthiness and give us specified credit ratings. These ratings are based on a number of factors, including our financial strength and financial policies as well as our strategies, operations, execution and timeliness of financial reporting. These credit ratings are limited in scope, and do not address all material risks related to investment in us, but rather reflect only the view of each rating agency at the time the rating is issued. Nonetheless, the credit ratings Howmet receives impact our borrowing costs

as well as the terms upon which we will have access to capital. Failure to maintain sufficiently high credit ratings could adversely affect the interest rate in future financings, our liquidity or our competitive position, and could also restrict our access to capital markets. For information on our credit ratings, see "Liquidity and Capital Resources" in [Part II, Item 7](#) (Management's Discussion and Analysis of Financial Condition and Results of Operations).

There can be no assurance that one or more of the credit rating agencies will not take negative actions with respect to Howmet's ratings in the future. Increased debt levels, macroeconomic conditions, a deterioration in the Company's debt protection metrics, a contraction in the Company's liquidity, or other factors could potentially trigger such actions. A rating agency may lower, suspend or withdraw entirely a rating or place it on negative outlook or watch if, in that rating agency's judgment, circumstances so warrant. A downgrade of Howmet's credit ratings by one or more rating agencies could result in adverse consequences, including: (i) adversely impact the market price of Howmet securities; (ii) adversely affect existing financing (for example, a downgrade by S&P or Moody's would subject Howmet to higher costs under the Credit Agreement); (iii) limit access to the capital (including commercial paper) or credit markets or otherwise adversely affect the availability of other new financing on favorable terms, if at all; (iv) result in more restrictive covenants in agreements governing the terms of any future indebtedness that the Company incurs; (v) increase the cost of borrowing or fees on undrawn credit facilities; or (vi) result in vendors or counterparties seeking collateral or letters of credit from Howmet.

Limitations on Howmet's ability to access the global capital markets, a reduction in Howmet's liquidity or an increase in borrowing costs could materially and adversely affect Howmet's ability to maintain or grow its business, which in turn may adversely affect its financial condition, liquidity and results of operations.

Howmet's business and growth prospects may be negatively impacted by limits in its capital expenditures.

Howmet requires substantial capital to invest in growth opportunities and to maintain and prolong the life and capacity of its existing facilities. Insufficient cash generation or capital project overruns may negatively impact Howmet's ability to fund as planned its sustaining and return-seeking capital projects. Over the long term, Howmet's ability to take advantage of improved market conditions or growth opportunities in its businesses may be constrained by earlier capital expenditure restrictions, which could adversely affect the long-term value of its business and the Company's position in relation to its competitors.

An adverse decline in the liability discount rate, lower-than-expected investment return on pension assets and other factors could adversely affect Howmet's results of operations or amount of pension funding contributions in future periods.

Howmet's results of operations may be negatively affected by the amount of expense Howmet records for its pension and other postretirement benefit plans, reductions in the fair value of plan assets and other factors. Howmet calculates income or expense for its plans using actuarial valuations in accordance with accounting principles generally accepted in the United States of America ("GAAP").

These valuations reflect assumptions about financial market and other economic conditions, which may change based on changes in key economic indicators. The most significant year-end assumptions used by Howmet to estimate pension or other postretirement benefit income or expense for the following year are the discount rate applied to plan liabilities and the expected long-term rate of return on plan assets. In addition, Howmet is required to make an annual measurement of plan assets and liabilities, which may result in a significant charge to shareholders' equity. For a discussion regarding how Howmet's financial statements can be affected by pension and other postretirement benefits accounting policies, see "Critical Accounting Policies and Estimates—Pension and Other Postretirement Benefits" in [Part II, Item 7](#) (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note [H](#) to the Consolidated Financial Statements in Part II, Item 8. Although GAAP expense and pension funding contributions are impacted by different regulations and requirements, the key economic factors that affect GAAP expense would also likely affect the amount of cash or securities Howmet would contribute to the pension plans.

Potential pension contributions include both mandatory amounts required under federal law and discretionary contributions to improve the plans' funded status. The Moving Ahead for Progress in the 21st Century Act ("MAP-21"), enacted in 2012, provided temporary relief for employers like Howmet who sponsor defined benefit pension plans related to funding contributions under the Employee Retirement Income Security Act of 1974 by allowing the use of a 25-year average discount rate within an upper and lower range for purposes of determining minimum funding obligations. In 2014, the Highway and Transportation Funding Act ("HATFA") extended the relief provided by MAP-21 and modified the interest rates that had been set by MAP-21. In 2015, the Bipartisan Budget Act of 2015 ("BBA 2015") extended the relief period provided by HATFA. Howmet believes that the relief provided by BBA 2015 will moderately reduce the cash flow sensitivity of the Company's U.S. pension plans' funded status over the next several years due to recent and potential future declines in discount rates. However, higher than expected pension contributions due to a decline in the plans' funded status as a result of unpredictable future declines in the discount rate or lower-than-expected investment returns on plan assets could have a material negative effect on the Company's cash flows. Adverse capital market conditions could result in reductions in the fair value of plan assets and increase the Company's liabilities related to such plans, which could adversely affect our liquidity and results of operations.

Howmet is exposed to fluctuations in foreign currency exchange rates and interest rates, as well as inflation, economic factors, and currency controls in the countries in which it operates.

Economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, competitive factors in the countries in which Howmet operates, and volatility or deterioration in the global economic and financial environment could affect Howmet's revenue, expenses and results of operations. Changes in the valuation of the U.S. dollar against other currencies, including the Euro, British pound, Canadian dollar, Chinese yuan (renminbi), and Japanese yen, may affect Howmet's profitability.

In addition, a portion of Howmet's indebtedness, including borrowings, if any, under the Company's Five-Year Credit Facility, bears interest at rates equal to the London Interbank Offering Rate ("LIBOR") plus an applicable margin based on the credit ratings of Howmet's outstanding senior unsecured long-term debt. Accordingly, the Company is subject to risk from changes in interest rates on the variable component of the rate. Further, LIBOR is the subject of recent national, international and other regulatory guidance and proposals for reform. These reforms and other pressures may cause LIBOR to disappear entirely or to perform differently than in the past. The consequences of these developments cannot be entirely predicted, but could include changes in the cost of Howmet's variable rate indebtedness.

Howmet also faces risks arising from the imposition of cash repatriation restrictions and exchange controls. Cash repatriation restrictions and exchange controls may limit the Company's ability to convert foreign currencies into U.S. dollars or to remit dividends and other payments by Howmet's foreign subsidiaries or businesses located in or conducted within a country imposing restrictions or controls. While Howmet currently has no need, and does not intend, to repatriate or convert cash held in countries that have significant restrictions or controls in place, should the Company need to do so to fund its operations, it may be unable to repatriate or convert such cash, or be unable to do so without incurring substantial costs. Howmet currently has operations in countries that have cash repatriation restrictions or exchange controls in place, including China, and, if the Company were to need to repatriate or convert such cash, these controls and restrictions may have an adverse effect on Howmet's operating results and financial condition.

Dividends and share repurchases fall within the discretion of our Board of Directors, depend on a number of factors, and are subject to limits under the Company's Credit Agreement.

Share repurchases and the declaration of dividends fall within the discretion of Howmet's Board of Directors, and the Board's decision regarding such matters depends on many factors, including Howmet's financial condition, earnings, capital requirements, debt service obligations, covenants associated with certain of the Company's debt obligations, industry practice, legal requirements, regulatory constraints and other factors that the Board deems relevant. In addition, under the Company's amendment to the Credit Agreement, during the period from June 30, 2020 through December 31, 2021 (unless the Company ends this period earlier in accordance with the amendment or otherwise), common stock dividends and share repurchases are permitted only if no borrowings are outstanding under the Credit Agreement and are limited to an aggregate amount of \$100 million through June 30, 2021, with such limit increasing to an aggregate amount of \$250 million after June 30, 2021 if the Consolidated Net Debt to Consolidated EBITDA ratio is no greater than 3.75 to 1.00. The Company suspended dividends in April 2020 to preserve cash and provide flexibility in light of the impact of the COVID-19 pandemic. Since June 30, 2020, the Company has repurchased approximately \$73 million of its common stock. There can be no assurance that the Company will declare dividends or repurchase stock in the future in any particular amounts, or at all.

General Risks

Failure to attract and retain a highly skilled and diverse global workforce, or provide adequate succession plans for key personnel could adversely affect Howmet's operations and competitiveness.

Howmet's global operations require highly skilled personnel with relevant industry and technical experience. Shortages in certain skills, in areas such as engineering, manufacturing and technology and other labor market inadequacies have created more competition for talent among us and other companies both within and outside of our industry. If the Company fails to attract, develop and retain a diverse global workforce with the skills and in the locations we need to operate and grow our business, our operations could be adversely impacted.

In addition, the continuity of key personnel and the preservation of institutional knowledge are vital to the success of the Company's growth and business strategy. The loss of key members of management and other personnel could significantly harm Howmet's business, and any unplanned turnover, or failure to develop adequate succession plans for key positions, could deplete the Company's institutional knowledge base, result in loss of technical or other expertise, delay or impede the execution of the Company's business plans and erode Howmet's competitiveness.

Howmet may be unable to realize the expected benefits from acquisitions, divestitures and strategic alliances.

Howmet has made, and may continue to plan and execute, acquisitions and divestitures and take other actions to grow its business or streamline its portfolio. There is no assurance that anticipated benefits will be realized. Acquisitions present significant challenges and risks, including the effective integration of the business into the Company, unanticipated costs and

liabilities, and the ability to realize anticipated benefits, such as growth in market share, revenue or margins, at the levels or in the timeframe expected. The Company may be unable to manage acquisitions successfully. Additionally, adverse factors may prevent Howmet from realizing the benefits of its growth projects, including unfavorable global economic conditions, currency fluctuations, or unexpected delays in target timelines.

With respect to portfolio optimization actions such as divestitures, curtailments and closures, Howmet may face barriers to exit from unprofitable businesses or operations, including high exit costs or objections from customers, suppliers, unions, local or national governments, or other stakeholders. In addition, Howmet may retain unforeseen liabilities for divested entities or businesses, including, but not limited to, if a buyer fails to honor all commitments. Howmet's business operations are capital intensive, and curtailment or closure of operations or facilities may include significant charges, including employee separation costs, asset impairment charges and other measures.

In addition, Howmet has participated in, and may continue to participate in, strategic alliances, joint ventures and other similar arrangements from time to time. Strategic alliances and joint ventures inherently involve special risks. Even if Howmet holds majority interests or maintains operational control in such arrangements, its partners may have opposing economic or business interests, exercise veto rights to block Howmet actions, take action contrary to Howmet's policies or objectives, or, as a result of financial or other difficulties, be unable to fulfill their obligations.

There can be no assurance that acquisitions, growth investments, divestitures, closures, strategic alliances, joint ventures or similar arrangements will be undertaken or completed in their entirety as planned or that they will be beneficial to Howmet, whether due to the above-described risks, unfavorable global economic conditions, increases in costs, currency fluctuations, geopolitical risks, or other factors.

Anti-takeover provisions could prevent or delay a change in control of Howmet, including a takeover attempt by a third party and limit the power of Howmet's shareholders.

Howmet's Certificate of Incorporation and Bylaws contain, and Delaware law contains, provisions that are intended to deter coercive takeover practices and inadequate takeover bids by making such practices or bids unacceptably expensive to the bidder and to encourage prospective acquirers to negotiate with Howmet's Board of Directors rather than to attempt a hostile takeover. For example, Howmet is subject to Section 203 of the Delaware General Corporation Law, which imposes certain restrictions on mergers and other business combinations between the Company and any holder of 15% or more of the Company's outstanding common stock, which could make it more difficult for another party to acquire Howmet. Additionally, the Company's Certificate of Incorporation authorizes Howmet's Board of Directors to issue preferred stock or adopt other anti-takeover measures without stockholder approval. These provisions may apply even if an offer may be considered beneficial by some stockholders and could delay or prevent an acquisition that Howmet's Board of Directors determines is not in the best interests of Howmet's shareholders. These provisions may also limit the price that investors might be willing to pay in the future for shares of Howmet common stock or prevent or discourage attempts to remove and replace incumbent directors.

Arconic Corporation may fail to perform under various transaction agreements that were executed as part of the Arconic Inc. Separation Transaction.

In connection with the Arconic Inc. Separation Transaction, we entered into a separation and distribution agreement with Arconic Corporation and also entered into various other agreements, including a tax matters agreement, an agreement related to the Davenport plant, an employee matters agreement, intellectual property license agreements, metal supply agreements and real estate and office leases. The separation and distribution agreement, the tax matters agreement and the employee matters agreement, together with the documents and agreements by which the internal reorganization of the Company prior to the separation was effected, determined the allocation of assets and liabilities between us and Arconic Corporation following the Arconic Inc. Separation Transaction for those respective areas and included any necessary indemnifications related to liabilities and obligations. We will rely on Arconic Corporation to satisfy its performance and payment obligations under these agreements. If Arconic Corporation is unable or unwilling to satisfy its obligations under these agreements, including its indemnification obligations, we could incur operational difficulties and/or losses.

In connection with the Arconic Inc. Separation Transaction, Arconic Corporation agreed to indemnify us for certain liabilities and we agreed to indemnify Arconic Corporation for certain liabilities. If we are required to pay under these indemnities to Arconic Corporation, our financial results could be negatively impacted. The Arconic Corporation indemnity may not be sufficient to hold us harmless from the full amount of liabilities for which Arconic Corporation is allocated responsibility, and Arconic Corporation may not be able to satisfy its indemnification obligations in the future.

Pursuant to the separation and distribution agreement and certain other agreements with Arconic Corporation, Arconic Corporation has agreed to indemnify us for certain liabilities, and we have agreed to indemnify Arconic Corporation for certain liabilities, in each case for uncapped amounts. Indemnities that we may be required to provide Arconic Corporation are not subject to any cap, may be significant and could negatively impact our business. Third parties could also seek to hold us responsible for any of the liabilities that Arconic Corporation has agreed to retain. Any amounts we are required to pay pursuant to these indemnification obligations and other liabilities could require us to divert cash that would otherwise have been used in

furtherance of the Company's operations. Further, the indemnity from Arconic Corporation may not be sufficient to protect us against the full amount of such liabilities, and Arconic Corporation may not be able to fully satisfy its indemnification obligations. Moreover, even if we ultimately succeed in recovering from Arconic Corporation any amounts for which we are held liable, we may be temporarily required to bear such losses. Each of these risks could negatively affect our business, results of operations and financial condition.

The Arconic Inc. Separation Transaction could result in substantial tax liability.

It was a condition to the Distribution of Arconic that we receive an opinion of our outside counsel, satisfactory to our Board of Directors, regarding the qualification of the distribution, together with certain related transactions, as a "reorganization" within the meaning of Sections 355 and 368(a)(1)(D) of the Internal Revenue Code of 1986, as amended (the "Code"). This condition was satisfied prior to the Distribution of Arconic. However, the opinion of counsel was based upon and relied on, among other things, various facts and assumptions, as well as certain representations, statements and undertakings by us and Arconic Corporation, including those relating to the past and future conduct by us and Arconic Corporation. If any of these facts, assumptions, representations, statements or undertakings is, or becomes, inaccurate or incomplete, or if we or Arconic Corporation breach any of our representations or covenants contained in the separation agreement and certain other agreements and documents or in any documents relating to the opinion of counsel, the opinion of counsel may be invalid and the conclusions reached therein could be jeopardized.

Notwithstanding our receipt of the opinion of counsel, the Internal Revenue Service (the "IRS") could determine that the Distribution of Arconic and/or certain related transactions should be treated as taxable transactions for U.S. federal income tax purposes if it determines that any of the representations, assumptions or undertakings upon which the opinion of counsel was based are false or have been violated. In addition, the opinion of counsel represents the judgment of such counsel and is not binding on the IRS or any court, and the IRS or a court may disagree with the conclusions in the opinion of counsel. Accordingly, notwithstanding receipt of the opinion of counsel, there can be no assurance that: (i) the IRS will not assert that the Distribution of Arconic and/or certain related transactions do not qualify for tax-free treatment for U.S. federal income tax purposes; or (ii) a court would not sustain such a challenge. In the event the IRS were to prevail with such challenge, we, our stockholders and Arconic Corporation, could be subject to significant U.S. federal income tax liability.

If the Distribution of Arconic fails to qualify as a transaction that is generally tax-free for U.S. federal income tax purposes under Sections 355 and 368(a)(1)(D) of the Code, in general, for U.S. federal income tax purposes, we would recognize taxable gain as if we had sold the Arconic Corporation common stock in a taxable sale for its fair market value, and our stockholders who received such Arconic Corporation shares in the Distribution of Arconic would be subject to tax as if they had received a taxable distribution equal to the fair market value of such shares.

Under current U.S. federal income tax law, even if the Distribution of Arconic, together with certain related transactions, otherwise qualifies for tax-free treatment under Sections 355 and 368(a)(1)(D) of the Code, the Distribution of Arconic may nevertheless be rendered taxable to us as a result of certain post-distribution transactions, including certain acquisitions of shares or assets of ours or Arconic Corporation. Under the tax matters agreement entered into between us and Arconic Corporation in connection with the Arconic Inc. Separation Transaction, Arconic Corporation may be required to indemnify us for any taxes resulting from the Arconic Inc. Separation Transaction (and any related costs and other damages) to the extent such amounts resulted from (i) an acquisition of all or a portion of the equity securities or assets of Arconic Corporation, whether by merger or otherwise (and regardless of whether we participated in or otherwise facilitated the acquisition), (ii) other actions or failures to act by Arconic Corporation, or (iii) any of Arconic Corporation's representations, covenants or undertakings contained in the separation agreement and certain other agreements and documents or in any documents relating to the opinion of counsel being incorrect or violated. However, the indemnity from Arconic Corporation may not be sufficient to protect us against the full amount of such additional taxes or related liabilities, and Arconic Corporation may not be able to fully satisfy its indemnification obligations. Moreover, even if we ultimately succeed in recovering from Arconic Corporation any amounts for which we are held liable, we may be temporarily required to bear such losses. In addition, we and our subsidiaries may incur certain tax costs in connection with the Arconic Inc. Separation Transaction, including non-U.S. tax costs resulting from transactions (including the internal reorganization) in non-U.S. jurisdictions, which may be material. Each of these risks could negatively affect our business, results of operations and financial condition.

The Alcoa Inc. Separation Transaction could result in substantial tax liability.

It was a condition to the Distribution of Alcoa that (i) the private letter ruling from the Internal Revenue Service (the "IRS") regarding certain U.S. federal income tax matters relating to the Alcoa Inc. Separation Transaction and the Distribution of Alcoa received by Howmet remain valid and be satisfactory to Howmet's Board of Directors and (ii) Howmet receive an opinion of its outside counsel, satisfactory to the Board of Directors, regarding the qualification of the Distribution of Alcoa, together with certain related transactions, as a transaction that is generally tax-free, for U.S. federal income tax purposes, under Sections 355 and 368(a)(1)(D) of the Internal Revenue Code of 1986, as amended (the "Code"). Both of these conditions were satisfied prior to the Distribution of Alcoa. However, the IRS private letter ruling and the opinion of counsel were based upon and relied on, among other things, various facts and assumptions, as well as certain representations, statements and

undertakings of Howmet and Alcoa Corporation, including those relating to the past and future conduct of Howmet and Alcoa Corporation. If any of these representations, statements or undertakings is, or becomes, inaccurate or incomplete, or if Howmet or Alcoa Corporation breaches any of its representations or covenants contained in any of the Alcoa Inc. Separation Transaction-related agreements and documents or in any documents relating to the IRS private letter ruling and/or the opinion of counsel, the IRS private letter ruling and/or the opinion of counsel may be invalid and the conclusions reached therein could be jeopardized.

Notwithstanding Howmet's receipt of the IRS private letter ruling and the opinion of counsel, the IRS could determine that the Distribution of Alcoa and/or certain related transactions should be treated as taxable transactions for U.S. federal income tax purposes if it determines that any of the representations, assumptions or undertakings upon which the IRS private letter ruling or the opinion of counsel was based are false or have been violated. In addition, the IRS private letter ruling does not address all of the issues that are relevant to determining whether the Distribution of Alcoa, together with certain related transactions, qualifies as a transaction that is generally tax-free for U.S. federal income tax purposes, and the opinion of counsel represents the judgment of such counsel and is not binding on the IRS or any court and the IRS or a court may disagree with the conclusions in the opinion of counsel. Accordingly, notwithstanding receipt by Howmet of the IRS private letter ruling and the opinion of counsel, there can be no assurance that (i) the IRS will not assert that the Distribution of Alcoa and/or certain related transactions do not qualify for tax-free treatment for U.S. federal income tax purposes; or (ii) a court would not sustain such a challenge. In the event the IRS were to prevail with such challenge, Howmet, Alcoa Corporation and Howmet shareholders could be subject to significant U.S. federal income tax liability.

If the Distribution of Alcoa, together with certain related transactions, fails to qualify as a transaction that is generally tax-free, for U.S. federal income tax purposes, under Sections 355 and 368(a)(1)(D) of the Code, in general, for U.S. federal income tax purposes, Howmet would recognize taxable gain as if it had sold the Alcoa Corporation common stock in a taxable sale for its fair market value and Howmet shareholders who received Alcoa Corporation shares in the distribution would be subject to tax as if they had received a taxable distribution equal to the fair market value of such shares.

Under current U.S. federal income tax law, even if the Distribution of Alcoa, together with certain related transactions, otherwise qualifies for tax-free treatment under Sections 355 and 368(a)(1)(D) of the Code, the Distribution of Alcoa may nevertheless be rendered taxable to Howmet and its shareholders as a result of certain post-Distribution of Alcoa transactions, including certain acquisitions of shares or assets of Howmet or Alcoa Corporation. The possibility of rendering the Distribution of Alcoa taxable as a result of such transactions may limit Howmet's ability to pursue certain equity issuances, strategic transactions or other transactions that would otherwise maximize the value of Howmet's business. Under the Tax Matters Agreement that Howmet entered into with Alcoa Corporation, Alcoa Corporation may be required to indemnify Howmet against any additional taxes and related amounts resulting from (i) an acquisition of all or a portion of the equity securities or assets of Alcoa Corporation, whether by merger or otherwise (and regardless of whether Alcoa Corporation participated in or otherwise facilitated the acquisition), (ii) other actions or failures to act by Alcoa Corporation or (iii) any of Alcoa Corporation's representations, covenants or undertakings contained in any of the Alcoa Inc. Separation Transaction-related agreements and documents or in any documents relating to the IRS private letter ruling and/or the opinion of counsel being incorrect or violated. However, the indemnity from Alcoa Corporation may be insufficient to protect Howmet against the full amount of such additional taxes or related liabilities, and Alcoa Corporation may be unable to satisfy its indemnification obligations fully. Moreover, even if Howmet ultimately succeeds in recovering from Alcoa Corporation any amounts for which Howmet is held liable, Howmet may be temporarily required to bear such losses. In addition, Howmet and Howmet's subsidiaries may incur certain tax costs in connection with the Alcoa Inc. Separation Transaction, including tax costs resulting from separations in non-U.S. jurisdictions, which may be material. Each of these risks could negatively affect Howmet's business, results of operations and financial condition.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Howmet's principal office and corporate center is located at 201 Isabella Street, Suite 200, Pittsburgh, Pennsylvania 15212-5858.

Howmet leases some of its facilities; however, it is the opinion of management that the leases do not materially affect the continued use of the properties or the properties' values.

Howmet believes that its facilities are suitable and adequate for its operations. Although no title examination of properties owned by Howmet has been made for the purpose of this report, the Company knows of no material defects in title to any such properties. See Notes [A](#) and [O](#) to the Consolidated Financial Statements in [Part II, Item 8](#) of this Form 10-K.

Howmet has active plants and holdings in various geographic areas. See the table regarding the Company's principal facilities in Part I, Item 1. (Business).

Item 3. Legal Proceedings.

In the ordinary course of its business, Howmet is involved in a number of lawsuits and claims, both actual and potential. For a discussion of legal proceedings, see Note [V](#) to the Consolidated Financial Statements in Part II, Item 8, in addition to the matters set forth below.

Environmental Matters

Howmet is involved in proceedings under the Comprehensive Environmental Response, Compensation and Liability Act, also known as Superfund ("CERCLA") or analogous state provisions regarding the usage, disposal, storage or treatment of hazardous substances at a number of sites in the U.S. The Company has committed to participate, or is engaged in negotiations with federal or state authorities relative to its alleged liability for participation, in clean-up efforts at several such sites. See the Environmental Matters section of Note [V](#) to the Consolidated Financial Statements for more information.

Other Matters

As previously reported, Howmet, its subsidiaries and former subsidiaries are defendants in lawsuits filed on behalf of persons alleging injury as a result of occupational or other exposure to asbestos. Howmet, its subsidiaries and former subsidiaries have numerous insurance policies over many years that provide coverage for asbestos related claims. The Company has significant insurance coverage and believes that Howmet's reserves are adequate for its known asbestos exposure related liabilities. The costs of defense and settlement have not been and are not expected to be material to the results of operations, cash flows, and financial position of the Company.

Matters Related to Alcoa Corporation

Prior to the Alcoa Inc. Separation Transaction on November 1, 2016, the Company was known as Alcoa Inc. We have included the matters discussed below in which the Company remains party to proceedings relating to Alcoa Corporation. The Separation and Distribution Agreement, dated October 31, 2016, entered into between the Company and Alcoa Corporation in connection with the Alcoa Inc. Separation Transaction, provides for cross-indemnities between the Company and Alcoa Corporation for claims subject to indemnification. The Company does not expect any of such matters to result in a net claim against it.

St. Croix Proceedings

Red Dust Docket Cases. (St. Croix) f/k/a Abednego, Laurie L.A., et al. v. St. Croix Alumina, L.L.C., et al. On January 14, 2010, Alcoa Inc. was served with a multi-plaintiff action complaint involving several thousand individual persons claiming to be residents of St. Croix who are alleged to have suffered personal injury or property damage from Hurricane Georges or winds blowing material from the St. Croix Alumina, L.L.C. ("SCA") facility on the island of St. Croix (U.S. Virgin Islands) since the time of the hurricane. This complaint, *Abednego, et al. v. Alcoa, et al.*, was filed in the Superior Court of the Virgin Islands, St. Croix Division. Following an unsuccessful attempt by Alcoa Inc. and SCA to remove the case to federal court, the case has been lodged in the Superior Court. The complaint names as defendants the same entities that were sued in a February 1999 action arising out of the impact of Hurricane Georges on the island and added as a defendant the current owner of the alumina facility property.

On March 1, 2012, Alcoa Inc. was served with a separate multi-plaintiff action complaint involving approximately 200 individual persons alleging claims essentially identical to those set forth in the *Abednego v. Alcoa* complaint. This complaint, *Abraham, et al. v. Alcoa, et al.*, was filed on behalf of plaintiffs previously dismissed in the federal court proceeding involving the original litigation over Hurricane Georges impacts. The matter was originally filed in the Superior Court of the Virgin Islands, St. Croix Division, on March 30, 2011.

Alcoa Inc. and other defendants in the *Abraham* and *Abednego* cases filed or renewed motions to dismiss each case in March 2012 and August 2012 following service of the *Abraham* complaint on Alcoa Inc. and remand of the *Abednego* complaint to

Superior Court, respectively. By order dated August 10, 2015, the Superior Court dismissed plaintiffs' complaints without prejudice to re-file the complaints individually, rather than as a multi-plaintiff filing. The order also preserves the defendants' grounds for dismissal if new, individual complaints are filed. On July 7, 2017, the Court issued an order and associated memoranda on plaintiff's multiple motions for extension of time to file the individual complaints. Following the court's July 7, 2017 order, a total of 429 complaints were filed and accepted by the court by the deadline of July 30, 2017 (and consolidated into the *Red Dust Claims* docket (Master Case No.: SX-15-CV-620)). These complaints include claims of about 1,260 individual plaintiffs.

On November 5, 2018, notice of an order of reassignment was entered, transferring the claims to the newly created Complex Litigation Division of the Superior Court of the Virgin Islands, Division of St. Croix. On January 28, 2019, the plaintiffs filed a motion asking for a determination that expert testimony will not be required on the issue of causation, which defendants opposed. The Court has not ruled on that motion.

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.

The Company’s common stock is listed on the New York Stock Exchange under the symbol “HWM.”

Prior to the Arconic Inc. Separation Transaction on April 1, 2020, the Company was known as Arconic Inc. and was listed under the stock symbol “ARNC.”

On October 5, 2016, the Company’s common shareholders approved a 1-for-3 reverse stock split of the Company’s outstanding and authorized shares of common stock (the “Reverse Stock Split”). The Company’s common stock began trading on a Reverse Stock Split-adjusted basis on October 6, 2016, in which every three shares of issued and outstanding common stock were combined into one issued and outstanding share of common stock, without any change in the par value per share.

Prior to the Alcoa Inc. Separation Transaction on November 1, 2016, the Company was known as Alcoa Inc. and was listed under the stock symbol “AA.”

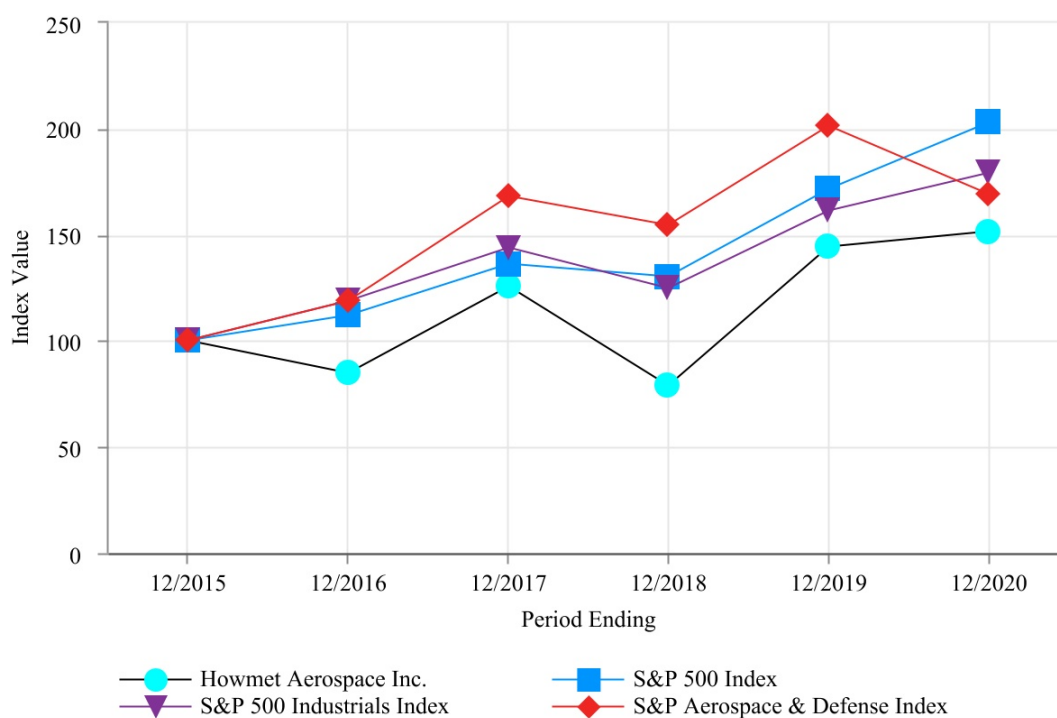
The number of holders of record of common stock was approximately 10,920 as of February 12, 2021.

Stock Performance Graph

The following graph compares the most recent five-year performance of the Company’s common stock with (1) the Standard & Poor’s (S&P) 500[®] Index, (2) the S&P 500[®] Industrials Index, a group of 73 companies categorized by Standard & Poor’s as active in the “industrials” market sector, and (3) the S&P Aerospace & Defense Index, which comprises General Dynamics Corporation, Howmet Aerospace Inc., Huntington Ingalls Industries, L3Harris Technologies, Inc., Lockheed Martin Corporation, Northrop Grumman Corporation, Raytheon Technologies Corporation, Teledyne Technologies Incorporated, Textron Inc., The Boeing Company, and Transdigm Group Inc.

The graph assumes, in each case, an initial investment of \$100 on December 31, 2015, and the reinvestment of dividends. The historical prices of the Company presented in the graph and table have been adjusted to reflect the impact of the Arconic Inc. Separation Transaction, the Reverse Stock Split, and the Alcoa Inc. Separation Transaction. The graph, table and related information shall not be deemed to be “filed” with the SEC, nor shall such information be incorporated by reference into future filings under the Securities Act of 1933 or Securities Exchange Act of 1934, each as amended, except to the extent that the Company specifically incorporates it by reference into such filing.

Cumulative Total Return
Based upon an initial investment of \$100 at December 31, 2015 with dividends reinvested



As of December 31,	2015	2016	2017	2018	2019	2020
Howmet Aerospace, Inc.	\$ 100.00	\$ 84.78	\$ 125.78	\$ 78.70	\$ 144.47	\$ 151.66
S&P 500® Index	100.00	111.96	136.40	130.42	171.49	203.04
S&P 500® Industrials Index	100.00	118.86	143.86	124.74	161.38	179.23
S&P Aerospace & Defense Index	100.00	118.90	168.11	154.54	201.41	169.05

Issuer Purchases of Equity Securities

The following table presents information with respect to the Company's open-market repurchases of its common stock during the quarter ended December 31, 2020:

(in millions except share and per share amounts)

Period	Total Number of Shares Purchased	Average Price Paid Per Share ⁽¹⁾	Total Number of Shares Purchased as Part of Publicly Announced Repurchase Plans or Programs	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs ⁽¹⁾⁽²⁾
October 1 - October 31, 2020	—	\$ —	—	\$ 299.5
November 1 - November 30, 2020	937,831	\$ 23.99	937,831	\$ 277.0
December 1 - December 31, 2020	—	\$ —	—	\$ 277.0
Total for quarter ended December 31, 2020	937,831	\$ 23.99	937,831	

⁽¹⁾ Excludes commissions cost

⁽²⁾ On May 20, 2019, the Company announced that its Board of Directors authorized the repurchase of \$500 million of the Company's outstanding common stock (the "Share Repurchase Program") by means of trading plans established from time to time in accordance with Rule 10b5-1 under the Securities Exchange Act of 1934, as amended, block trades, private transactions, open market repurchases and/or accelerated share repurchase agreements or other derivative transactions. There was no stated expiration for the Share Repurchase Program under which the Company may repurchase shares from time to time and pursuant to such terms, as and if it deems appropriate. The Share Repurchase Program may be suspended, modified or terminated at any time without prior notice. After giving effect to the share repurchases made through December 31, 2020, approximately \$277 million remains available under the prior authorization by the Board for the Share Repurchase Program. The amount of share repurchases by the Company may be limited under the terms of the Five-Year Revolving Credit Agreement (See Note [R](#) to the Consolidated Financial Statements for additional detail).

Item 6. Selected Financial Data.

The Company has elected to comply with the Regulation S-K amendment to eliminate Item 301.

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

(dollars in millions, except per-share amounts)

Overview

Our Business

Howmet is a global leader in lightweight metals engineering and manufacturing. Howmet’s innovative, multi-material products, which include nickel, titanium, aluminum, and cobalt, are used worldwide in the aerospace (commercial and defense), commercial transportation, and industrial and other end markets.

Howmet is a global company operating in 20 countries. Based upon the country where the point of shipment occurred, the United States and Europe generated 68% and 21%, respectively, of Howmet’s sales in 2020. In addition, Howmet has operating activities in numerous countries and regions outside the United States and Europe, including Canada, Mexico, China and Japan. Governmental policies, laws and regulations, and other economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, affect the results of operations in countries with such operating activities.

Management Review of 2020 and Outlook for the Future

In 2020, Sales decreased 26% over 2019 primarily as a result of lower volumes in the commercial aerospace and commercial transportation markets driven by the impacts of COVID-19 and 737 MAX and 787 production declines along with a decrease in sales of \$116 due to the divestiture of the forgings business in the United Kingdom in December 2019, all partially offset by 14% and 28% sales growth in the defense aerospace and industrial gas turbine markets, respectively, as well as favorable product pricing.

In the segments, Segment operating profit decreased 36% from 2019 due to lower volumes in the commercial aerospace and commercial transportation markets driven by the impacts of COVID-19 and 737 MAX and 787 production declines and unfavorable product mix, partially offset by favorable product pricing, net cost savings and 14% and 28% sales growth in the defense aerospace and industrial gas turbine markets, respectively.

Management continued its focus on liquidity and cash flows as well as improving its operating performance through cost reductions, streamlined organizational structures, margin enhancement, and profitable revenue generation. Management has continued its intensified focus on capital efficiency. This focus and the related results enabled Howmet to end 2020 with a solid financial position.

The following financial information reflects certain key highlights of Howmet’s 2020 results:

- Sales of \$5,259 down 26% from 2019, with significant reductions in sales in commercial aerospace and commercial transportation markets, driven by COVID-19 and 737 MAX and 787 production declines;
- Net income from continuing operations of \$211, or \$0.48 per diluted share;
- Income from continuing operations before income taxes of \$171, a decrease of \$39, or 19%, from 2019;
- Total segment operating profit of \$890, a decrease of \$500, or 36%, from 2019⁽¹⁾;
- Cash provided from operations of \$9; cash used for financing activities of \$369; and cash provided from investing activities of \$271;
- Cash on hand at the end of the year of \$1,610; and
- Total debt of \$5,075, primarily due to a decrease of \$865 from 2019, reflecting repayments of \$2,040 along with \$20 of other debt, partially offset by issuance of debt during the second quarter of 2020 of \$1,200 notes due 2025.

⁽¹⁾ See below in *Results of Operations for the reconciliation of Total segment operating profit to Income from continuing operations before income taxes*.

The Company rapidly executed on the separation plan that was announced during February 2019 with completion of the separation on April 1, 2020. The Company separated into two independent, publicly-traded companies, Howmet Aerospace Inc. and Arconic Corporation (the “Arconic Inc. Separation Transaction”). Howmet Aerospace is comprised of the Engineered Products and Forgings businesses (engine products, fastening systems, engineered structures, and forged wheels) and is listed under the stock ticker of “HWM.” Arconic Corporation is comprised of the former Global Rolled Products segment (global rolled products, aluminum extrusions, and building and construction systems) and is under the new company name Arconic Corporation, listed on the New York Stock Exchange under the symbol “ARNC.”

Results of Operations

Earnings Summary

Sales. Sales for 2020 were \$5,259 compared with \$7,098 in 2019, a decrease of \$1,839, or 26%. The decrease was primarily a result of lower volumes in the commercial aerospace and commercial transportation markets driven by the impacts of

COVID-19 and 737 MAX and 787 production declines along with a decrease in sales of \$116 due to the divestiture of the forgings business in the U.K. in December 2019, all partially offset by growth in the defense aerospace and industrial gas turbine markets and favorable product pricing.

Sales for 2019 were \$7,098 compared with \$6,778 in 2018, an increase of \$320, or 5%. The increase was primarily due to volume growth in aerospace, commercial transportation, and industrial end markets; and favorable pricing when fulfilling volume above contractual share and renewing contracts; partially offset by lower sales from the divestitures of forgings businesses in the United Kingdom (divested in December 2019) and Hungary (divested in December 2018); and unfavorable foreign currency movements.

Cost of Goods Sold (COGS). COGS as a percentage of Sales was 73.7% in 2020 compared with 73.5% in 2019. The increase was primarily due to the impact of COVID-19 and lower volumes, partially offset by net cost savings, favorable product pricing, intentional product exits, and the impairment of energy business assets of \$10 in the second quarter of 2019. In 2019, the Company sustained a fire at a fasteners plant in France. Additionally, in mid-February 2020, a fire occurred at the Company's forged wheels plant located in Barberton, Ohio. The Company submitted insurance claims related to these plant fires and received partial settlements of \$39 in 2020 compared to \$25 in 2019, which were in excess of the insurance deductible. In 2020, the Company recorded charges of \$41 related to plant fires compared to \$26 in 2019. The downtime reduced production levels and affected productivity at the plants.

COGS as a percentage of Sales was 73.5% in 2019 compared with 75.4% in 2018. The decrease was primarily due to lower raw material costs; net costs savings; favorable product pricing; and costs incurred in 2018 that did not recur in 2019 related to settlements of certain customer claims, partially offset by an unfavorable product mix and the impairment of energy business assets of \$10. Additionally, in 2019, the Company sustained a fire at a fasteners plant in France and recorded charges of \$26 for higher operating costs, equipment and inventory damage, and repairs and cleanup costs. The Company submitted an insurance claim and received partial settlement of \$25, which was in excess of its \$10 insurance deductible. The insurance claim included \$8 of margin not recognized from lost revenue due to the fire.

Selling, General Administrative, and Other Expenses (SG&A). SG&A expenses were \$277, or 5.3% of Sales, in 2020 compared with \$400, or 5.6% of Sales, in 2019. The decrease in SG&A of \$123, or 31%, was primarily due to overhead cost reductions and lower net legal and other advisory costs related to Grenfell Tower of \$20, partially offset by higher costs associated with the Arconic Inc. Separation Transaction through June 30, 2020 of \$2.

SG&A expenses were \$400, or 5.6% of Sales, in 2019 compared with \$371, or 5.5% of Sales, in 2018. The increase in SG&A of \$29, or 8%, was primarily due to costs associated with the Arconic Inc. Separation Transaction of \$5 and higher annual incentive compensation accruals and executive compensation costs, partially offset by lower costs driven by overhead cost reductions and lower net legal and other advisory costs related to Grenfell Tower of \$10, primarily due to insurance reimbursements.

Research and Development Expenses (R&D). R&D expenses were \$17 in 2020 compared with \$28 in 2019. The decrease of \$11, or 39%, was primarily due to the continued consolidation of the Company's primary R&D facility in conjunction with ongoing cost reduction efforts.

R&D expenses were \$28 in 2019 compared with \$41 in 2018. The decrease of \$13, or 32%, was primarily due to the consolidation of the Company's primary R&D facility in conjunction with ongoing cost reduction efforts.

Provision for Depreciation and Amortization (D&A). The provision for D&A was \$279 in 2020 compared with \$295 in 2019. The decrease of \$16, or 5%, was primarily driven by asset impairments of the Disks long-lived assets group during the second quarter of 2019 (see Notes [Q](#) and [P](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K) and the impact of divestitures as well as lower corporate software amortization and research center depreciation, which were partially offset by increased Forged Wheels D&A due to the capacity expansion in Hungary, capacity expansions at two U.S. facilities and an additional \$6 D&A related to the Barberton fire.

The provision for D&A was \$295 in 2019 compared with \$314 in 2018. The decrease of \$19, or 6% was primarily due to the impact of divestitures, as well as asset impairments of the Disks long-lived asset group during the second quarter of 2019 (see Note [Q](#) and [P](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K).

Restructuring and Other Charges. Restructuring and other charges were \$182 in 2020 compared with \$582 in 2019 and \$163 in 2018.

Restructuring and other charges in 2020 consisted primarily of a \$113 charge for layoff costs, a \$74 charge for U.K. and U.S. pension plans' settlement accounting; a \$5 post-closing adjustment related to the sale of the Company's U.K. forgings business; a \$5 charge for impairment of assets associated with an agreement to sell an aerospace components business in the U.K that did not occur and the business was returned to held for use; \$5 charge related to the impairment of a cost method investment, which were partially offset by a benefit of \$21 related to the reversal of a number of prior period programs;

Restructuring and other charges in 2019 consisted primarily of a \$428 charge for impairment of the Disks long-lived asset group; a \$69 charge for layoff costs; a \$46 charge for impairment of assets associated with an agreement to sell the U.K. forgings business; a \$14 charge for impairment of properties, plants, and equipment related to the Company's primary research and development facility; a \$13 loss on sale of assets primarily related to a small additive business; a \$12 charge for other exit costs from lease terminations primarily related to the exit of the corporate aircraft; a \$9 settlement accounting charge for U.S. pension plans; a \$5 charge for impairment of a cost method investment; and a \$7 charge for other exit costs; which were partially offset by a benefit of \$16 related to the elimination of the life insurance benefit for the U.S. salaried and non-bargaining hourly retirees of the Company and its subsidiaries.

Restructuring and other charges in 2018 consisted primarily of a \$96 charge for pension plan settlement accounting; a \$23 charge for pension curtailment; a \$43 loss on sale of a Hungary forgings business; a \$18 charge for layoff costs; a \$12 charge for contract termination costs and asset impairments associated with the shutdown of a facility in Acuna, Mexico; which were offset partially by a \$28 postretirement curtailment benefit.

See Note [E](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Interest Expense. Interest expense was \$381 in 2020 compared with \$338 in 2019. The increase of \$43, or 13%, was primarily due to premiums paid on the early redemption of debt of \$59 which was offset by lower debt outstanding in 2020 driven by the early redemption of \$1,000, \$889 and \$151 of the principal amount of the 6.150% Notes, 5.400% Notes due in 2021 and 5.870% Notes due in 2022, respectively, in April and May 2020, which was offset by the issuance on April 24, 2020 of the 6.875% Notes due 2025 in the aggregate principal amount of \$1,200.

Interest expense was \$338 in 2019 compared with \$377 in 2018. The decrease of \$39, or 10%, was primarily due to lower debt outstanding, driven by the repayment of the aggregate outstanding principal amount of the 1.63% Convertible Notes of approximately \$403 on October 15, 2019, as well as costs incurred of \$19 in 2018 related to the premium paid on the early redemption of the Company's then outstanding 5.72% Senior Notes due in 2019 that did not recur in 2019.

On January 15, 2021, the Company completed the early redemption of all of the remaining \$361 aggregate principal amount of the 5.400% Notes due in April 2021 (the "5.400% Notes") as well as \$5 in accrued interest. The redemption of these 5.400% Notes will save approximately \$5 in interest expense, net in the first quarter of 2021 and \$19 annually.

Other Expense (Income), Net. Other expense (income), net was \$74 in 2020 compared with \$31 in 2019. The increase in expense of \$43 was primarily driven by the write-off of an indemnification receivable related to a Spanish tax reserve reflecting Alcoa Corporation's 49% share and Arconic Corporation's 33.66% share of a Spanish tax reserve of \$53 and lower interest income of \$19, which were partially offset by lower deferred compensation expense of \$14 and favorable foreign currency movements of \$16.

Other expense (income), net was \$31 in 2019 compared with Other expense (income), net of \$(30) in 2018. The increase in Other expense, net of \$61 was primarily due to an increase in deferred compensation expense of \$32 and the benefit recognized in 2018 from establishing a tax indemnification receivable reflecting Alcoa Corporation's 49% share of a Spanish tax reserve of \$29.

Income Taxes. Howmet's effective tax rate was 23.4% (benefit on pre-tax income) in 2020 compared with the U.S. federal statutory rate of 21%. The effective rate differs from the U.S. federal statutory rate primarily as a result of a \$64 benefit related to the release of an income tax reserve following a favorable Spanish tax case decision, a \$30 benefit related to the recognition of a previously uncertain U.S. tax position, and a \$30 benefit for a U.S. tax law change related to the issuance of final regulations that provide for an exclusion of certain high-taxed foreign earnings from the calculation of Global Intangible Low-Taxed Income ("GILTI"), partially offset by U.S. tax on foreign earnings, \$8 of charges related to the remeasurement of deferred tax balances as a result of the Arconic Inc. Separation Transaction, the tax impact of \$49 of nondeductible loss related to the reversal of indemnification receivables associated with the favorable Spanish tax case decision, and the tax impact of other nondeductible expenses.

Howmet's effective tax rate was 40.0% (provision on pre-tax income) in 2019 compared with the U.S. federal statutory rate of 21%. The effective rate differs from the U.S. federal statutory rate primarily as a result of foreign income taxed in higher rate

jurisdictions and subject to U.S. taxes including GILTI, foreign losses with no tax benefit, and other nondeductible expenses, partially offset by a \$24 benefit associated with the deduction of foreign taxes that were previously claimed as a U.S. foreign tax credit, and a \$12 benefit for a foreign tax rate change.

Howmet's effective tax rate was 27.8% (provision on pre-tax income) in 2018 compared with the U.S. federal statutory rate of 21%. The effective tax rate differs from the U.S. federal statutory rate primarily as a result of a \$60 charge to establish a tax reserve in Spain, a \$59 net charge resulting from the Company's finalized analysis of the U.S. Tax Cuts and Jobs Act of 2017 (the "2017 Act"), and foreign income taxed in higher rate jurisdictions and subject to U.S. taxes including GILTI, partially offset by a \$74 benefit related to the reversal of a foreign recapture obligation, a \$38 benefit to reverse a foreign tax reserve that was effectively settled, and a \$10 benefit for the release of U.S. valuation allowances.

Howmet anticipates that the effective tax rate in 2021 will be between 26.5% and 28.5%. However, changes in the current economic environment, tax legislation or rate changes, currency fluctuations, ability to realize deferred tax assets, movements in stock price impacting tax benefits or deficiencies on stock-based payment awards, and the results of operations in certain taxing jurisdictions may cause this estimated rate to fluctuate.

Net Income from Continuing Operations. Net income from continuing operations was \$211, or \$0.48 per diluted share, for 2020 compared to \$126, or \$0.27 per diluted share, in 2019. The increase in results of \$85, or 67%, was primarily due to the non-recurring 2019 impact of the \$428 charge for impairment of the Disks long-lived asset group included in Restructuring and other charges, a decrease of \$123 due to lower SG&A costs, favorable product pricing, and a net \$10 related to the settlement of the Spanish corporate income tax audit, partially offset by a decrease in volumes in the commercial aerospace and commercial transportation markets, the impact of COVID-19, and an increase in premiums paid on the early redemption of debt of \$59.

Net income from continuing operations was \$126, or \$0.27 per diluted share, for 2019 compared to \$309, or \$0.63 per diluted share, for 2018. The decrease in results of \$183, or 59%, was primarily due to higher Restructuring charges primarily due to the non-recurring 2019 impact of the \$428 charge for impairment of the Disks long-lived asset group, higher SG&A costs related primarily to annual incentive compensation accruals and executive compensation costs, higher Other expense, net due to an increase in deferred compensation expense, and the benefit recognized in 2018 from establishing a tax indemnification receivable reflecting Alcoa Corporation's 49% share of a Spanish tax reserve of \$29 that did not recur in 2019, partially offset by volume growth, favorable product pricing, net cost savings, lower D&A due to the impact of divestitures as well as asset impairments related to the Disks long-lived asset group, lower Interest expense due to lower debt outstanding and costs incurred of \$19 in 2018 related to the premium paid on the early redemption of debt that did not recur in 2019, and lower Income taxes primarily as a result of a benefit related to a U.S. tax election which caused the deemed liquidation of a foreign subsidiary's assets into its U.S. tax parent.

Net Income. Net income was \$261 for 2020 composed of \$211 of income from continuing operations and \$50 from discontinued operations, or \$0.48 and \$0.11 per diluted share, respectively.

Net income was \$470 for 2019 composed of \$126 of income from continuing operations and \$344 from discontinued operations, or \$0.27 and \$0.76 per diluted share, respectively.

Net income was \$642 for 2018 composed of \$309 of income from continuing operations and \$333 from discontinued operations, or \$0.63 and \$0.67 per diluted share, respectively.

See details of discontinued operations in Note [C](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Segment Information

The Company's operations consist of four worldwide reportable segments: Engine Products, Fastening Systems, Engineered Structures and Forged Wheels. Segment performance under Howmet's management reporting system is evaluated based on a number of factors; however, the primary measure of performance is Segment operating profit. Howmet's definition of Segment operating profit is Operating income excluding Special items. Special items include Restructuring and Other charges and Impairment of Goodwill. Segment operating profit may not be comparable to similarly titled measures of other companies. Differences between segment totals and consolidated Howmet are in Corporate.

In the second quarter of 2020, the Company realigned its operations consistent with how the Co-Chief Executive Officers assess operating performance and allocating capital in conjunction with the Arconic Inc. Separation Transaction (see Note [C](#) to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K). Prior period financial information has been recast to conform to current year presentation.

The Company produces aerospace engine parts and components and aerospace fastening systems for Boeing 737 MAX airplanes. In late December 2019, Boeing announced a temporary suspension of production of the 737 MAX airplanes. This decline in production had a negative impact on sales and segment operating profit in the Engine Products, Fastening Systems and Engineered Structures segments for the full year ended December 31, 2020. While regulatory authorities in the United

States and certain other jurisdictions lifted grounding orders beginning in late 2020, our sales could continue to be negatively affected from the residual impacts of the 737 MAX grounding.

Income from continuing operations before income taxes totaled \$171 in 2020, \$210 in 2019, and \$428 in 2018. Segment operating profit for all reportable segments totaled \$890 in 2020, \$1,390 in 2019, and \$1,105 in 2018. The following information provides Sales and Segment operating profit for each reportable segment for each of the three years in the period ended December 31, 2020. See below for the reconciliation of Income from continuing operations before income taxes to Total segment operating profit.

Engine Products

	2020	2019	2018
Third-party sales	\$ 2,406	\$ 3,320	\$ 3,092
Segment operating profit	\$ 417	\$ 621	\$ 464

Engine Products produces investment castings, including airfoils, and seamless rolled rings primarily for aircraft engines (aerospace commercial and defense) and industrial gas turbines. Engine Products produces rotating parts as well as structural parts, which are sold directly to customers. Generally, the sales and costs and expenses of this segment are transacted in the local currency of the respective operations, which are mostly the U.S. dollar, British pound and Euro.

Third-party sales for the Engine Products segment decreased \$914 or 28% in 2020 compared with 2019, primarily due to lower volumes in the commercial aerospace end market driven by the impact of COVID-19 and the suspension of 737 MAX production, along with a decrease in sales of \$116 from the divestiture of the forgings business in the U.K. (December 2019) (see Note U to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K), partially offset by higher volumes in the defense aerospace and industrial gas turbines end markets as well as favorable product pricing.

Third-party sales for the Engine Products segment increased \$228 or 7% in 2019 compared with 2018, primarily as a result of higher commercial and defense aerospace volumes and favorable product pricing, partially offset by unfavorable foreign currency movements and lower sales of \$47 from divestitures of forgings businesses in the United Kingdom (divested in December 2019) and Hungary (divested in December 2018).

Operating profit for the Engine Products segment decreased \$204, or 33%, in 2020 compared with 2019, primarily due to lower commercial aerospace sales volumes from the suspension of 737 MAX production, and COVID-19 productivity impacts, partially offset by cost reductions, favorable product pricing, and favorable sales volumes in the defense aerospace and industrial gas turbines end markets.

Operating profit for the Engine Products segment increased \$157 or 34% in 2019 compared with 2018, due to net cost savings, higher sales volumes as noted previously, favorable product pricing, and lower raw material costs, partially offset by the unfavorable impact of new product introductions in aerospace engines and unfavorable product mix.

On December 1, 2019, the Company completed the divestiture of its forgings business in the United Kingdom. The forgings business primarily produces steel, titanium, and nickel based forged components for aerospace, mining, and off-highway markets. This business generated third-party sales of \$116 and \$131 in 2019 and 2018, respectively, and had 540 employees at the time of the divestiture.

On December 31, 2018, as part of the Company's then ongoing strategy and portfolio review, the Company completed the sale of its forgings business in Hungary that manufactured high volume steel forgings for drivetrain components in the European heavy-duty truck and automotive market. This business generated third-party sales of \$32 in 2018, and had 180 employees at the time of the divestiture.

In 2021 compared to 2020, demand in industrial gas turbines and defense aerospace end markets is expected to increase while the commercial aerospace end market is expected to be down driven by the impact of COVID-19. Favorable product pricing and cost reductions are expected to continue.

Fastening Systems

	2020	2019	2018
Third-party sales	\$ 1,245	\$ 1,561	\$ 1,531
Segment operating profit	\$ 247	\$ 396	\$ 357

Fastening Systems produces aerospace fastening systems, as well as commercial transportation fasteners. The business's high-tech, multi-material fastening systems are found nose to tail on aircraft and aero engines. The business's products are also critical components of automobiles, commercial transportation vehicles, and construction and industrial equipment. Fastening Systems are sold directly to customers and through distributors. Generally, the sales and costs and expenses of this segment are transacted in the local currency of the respective operations, which are mostly the U.S. dollar, British pound and euro.

Third-party sales for the Fastening Systems segment decreased \$316 or 20% in 2020 compared with 2019, primarily due to lower sales volumes in the commercial aerospace end market driven by the impact of COVID-19 and the suspension of 737 MAX production, along with lower volumes in the commercial transportation end market also impacted by the effects of COVID-19, only slightly offset by volume growth in the Industrial end market and favorable product pricing.

Third-party sales for this segment increased \$30, or 2%, in 2019 compared with 2018, primarily attributable to higher volumes in the aerospace and commercial transportation end markets, partially offset by unfavorable foreign currency movements.

Operating profit for the Fastening Systems segment decreased \$149, or 38%, in 2020 compared with 2019, primarily due to lower commercial aerospace and commercial transportation sales volumes and COVID-19 productivity impacts, partially offset by cost reductions and favorable product pricing.

Operating profit for the Fastening Systems segment increased \$39, or 11%, in 2019 compared with 2018, due to net cost savings and higher volumes as noted previously, partially offset by an unfavorable product mix.

In 2021 compared to 2020, demand in the commercial aerospace end market is expected to be down driven by the impact of COVID-19. Favorable cost reductions are expected to continue.

Engineered Structures

	2020	2019	2018
Third-party sales	\$ 927	\$ 1,255	\$ 1,209
Segment operating profit	\$ 73	\$ 120	\$ 64

Engineered Structures produces titanium ingots and mill products for aerospace and defense applications and is vertically integrated to produce titanium forgings, extrusions forming and machining services for airframe, wing, aero-engine, and landing gear components. Engineered Structures also produces aluminum forgings, nickel forgings, and aluminum machined components and assemblies for aerospace and defense applications. The segments products are sold directly to customers and through distributors and sales, costs, and expenses of this segment are generally transacted in the local currency of the respective operations, which are mostly the U.S. dollar, British pound and the euro.

Third-party sales for the Engineered Structures segment decreased \$328, or 26%, in 2020 compared with 2019, primarily due to lower sales volumes in the commercial aerospace end market driven by COVID-19, Boeing 787 production declines and 737 MAX production suspension, partially offset by an increase in the defense aerospace sales volume and favorable product pricing.

Third-party sales for the Engineered Structures segment increased \$46, or 4%, in 2019 compared with 2018, primarily the result of higher aerospace end market sales volumes and favorable product pricing, partially offset by unfavorable foreign currency movements.

Operating profit for the Engineered Structures segment decreased \$47, or 39%, in 2020 compared with 2019, primarily due to lower commercial aerospace sales volumes and COVID-19 productivity impacts, partially offset by cost reductions, and favorable product pricing.

Operating profit for the Engineered Structures segment increased \$56 or 88%, in 2019 compared with 2018, primarily due to net cost savings, favorable product pricing, lower raw material costs, and higher aerospace end market sales volumes, partially offset by unfavorable product mix.

In 2021 compared to 2020, demand in the commercial aerospace end market is expected to be down driven by the impact of COVID-19. Favorable cost reductions are expected to continue.

Forged Wheels

	2020	2019	2018
Third-party sales	\$ 679	\$ 969	\$ 966
Segment operating profit	\$ 153	\$ 253	\$ 220

Forged Wheels provides forged aluminum wheels and related products for heavy-duty trucks, trailers, and buses globally. Forged Wheels' products are sold directly to OEMs and through distributors with the sales and costs and expenses of this segment transacted in local currency.

Third-party sales for the Forged Wheels segment decreased \$290, or 30%, in 2020 compared with 2019, primarily due to lower volumes in the commercial transportation end market driven by COVID-19 and production downtime related to the Barberton plant fire (discussed below).

Third-party sales for the Forged Wheels segment increased \$3, effectively flat in 2019 compared with 2018, primarily the result of stable volumes in the commercial transportation end market.

Operating profit for the Forged Wheels segment decreased \$100, or 40%, in 2020 compared with 2019, primarily due to lower commercial transportation sales volumes and COVID-19 productivity impacts, partially offset by cost reductions.

Operating profit for the Forged Wheels segment increased \$33 or 15%, in 2019 compared with 2018, primarily due to net cost savings and lower raw material costs.

In mid-February 2020, a fire occurred at the Company's forged wheels plant located in Barberton, Ohio. The downtime reduced production levels and affected productivity at the plant. The Company has insurance with a deductible of \$10.

In 2021 compared to 2020, demand in the commercial transportation markets served by Forged Wheels is expected to increase in most regions. Commercial transportation OEMs are expected to increase output as global economies recover from 2020 COVID-19 lows.

Reconciliation of Total segment operating profit to Income from continuing operations before income taxes

	2020	2019	2018
Income from continuing operations before income taxes	\$ 171	\$ 210	\$ 428
Interest expense	381	338	377
Other expense (income), net	74	31	(30)
Consolidated operating income	\$ 626	\$ 579	\$ 775
Unallocated amounts:			
Restructuring and other charges	182	582	163
Corporate expense	82	229	167
Total segment operating profit	\$ 890	\$ 1,390	\$ 1,105

Total segment operating profit is a non-GAAP financial measure. Management believes that this measure is meaningful to investors because management reviews the operating results of the segments of the Company excluding Corporate results.

See Restructuring and Other Charges, Interest Expense, and Other Expense (Income), Net, discussions above under Results of Operations for reference.

Corporate expense decreased \$147, or 64%, in 2020 compared with 2019 primarily due to lower annual incentive compensation accruals and executive compensation costs, lower costs driven by overhead cost reductions, lower contract services and outsourcing costs; lower research and development expenses; and lower net legal and other advisory costs along with costs incurred in 2019 that did not recur in 2020, including the impacts of facility fires, net of insurance of \$6 and collective bargaining agreement negotiation costs of \$9. Costs associated with the Arconic Inc. Separation Transaction of \$7, were an increase of \$2 compared to 2019.

Corporate expense increased \$62, or 37%, in 2019 compared with 2018 primarily due to costs associated with the Arconic Inc. Separation Transaction of \$5; higher annual incentive compensation accruals and executive compensation costs; net impacts associated with a fire at a fasteners plant of \$9 (net of insurance reimbursements); and collective bargaining agreement negotiation costs of \$9; partially offset by costs incurred in 2018 that did not recur in 2019 related to settlements of certain customer claims of \$38; lower costs driven by overhead cost reductions; lower research and development expenses; and lower net legal and other advisory costs related to Grenfell Tower of \$10.

Environmental Matters

See the Environmental Matters section of Note [V](#) to the Consolidated Financial Statements in Part II, Item 8 of this Form 10-K.

Liquidity and Capital Resources

Howmet maintains a disciplined approach to cash management and strengthening of its balance sheet. Management continued to focus on actions to improve Howmet's cost structure and liquidity, providing the Company with the ability to operate effectively. Such actions included procurement efficiencies and overhead rationalization to reduce costs, working capital initiatives, and maintaining a sustainable level of capital expenditures.

Cash provided from operations and financing activities is expected to be adequate to cover Howmet's operational and business needs over the next 12 months. For an analysis of long-term liquidity, see Contractual Obligations and Off-Balance Sheet Arrangements below.

At December 31, 2020, cash and cash equivalents of Howmet were \$1,610, of which \$253 was held by Howmet's non-U.S. subsidiaries. If the cash held by non-U.S. subsidiaries were to be repatriated to the U.S., the company does not expect there to be additional material income tax consequences.

The cash flows related to Arconic Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows for all periods prior to the Arconic Inc. Separation Transaction.

During 2020 the Company identified a misclassification in the presentation of changes in accounts payable and capital expenditures in its previously issued Statement of Consolidated Cash Flows, and has revised its Statement of Consolidated Cash Flows for 2019. See Note [A](#) to the Consolidated Financial Statements in Part II, Item 8 of this Form 10-K for additional detail.

Operating Activities

Cash provided from operations in 2020 was \$9 compared with \$461 in 2019 and \$217 in 2018.

The decrease in cash used for operations of \$452, or 98%, between 2020 and 2019 was primarily due to lower operating results of \$874, partially offset by lower working capital of \$355 and lower noncurrent assets of \$46, noncurrent liabilities of \$10 and pension contributions of \$11. The components of the change in working capital included favorable changes in receivables of \$739, inventories of \$77, and taxes, including income taxes of \$100, offset by accounts payable of \$380, accrued expenses of \$175 and prepaid expenses and other current assets of \$6.

The increase of \$244, or 112%, between 2019 and 2018 was primarily due to higher operating results of \$279 and lower pension contributions of \$30 and noncurrent assets of \$13, partially offset by higher working capital of \$57 and noncurrent liabilities of \$21. The components of the change in working capital included unfavorable changes in accounts payable of \$340 and taxes, including income taxes of \$106, partially offset by favorable changes in receivables of \$165 accrued expenses of \$148, inventories of \$71 and prepaid expenses and other current assets of \$5.

Financing Activities

Cash used for financing activities was \$369 in 2020 compared with \$1,568 in 2019 and \$649 in 2018.

The use of cash in 2020 was primarily related to the repayments on borrowings under certain revolving credit facilities (see below) and repayments on debt, primarily the aggregate outstanding principal amount of the 6.15% Notes due 2020 of approximately \$2,040 (see Note [R](#) to the Consolidated Financial Statements in Part II, Item 8. Financial Statements and Supplementary Data), cash distributed to Arconic Corporation at the Arconic Inc. Separation Transaction of \$500, repurchase of common stock of \$73 (see Note [J](#) to the Consolidated Financial Statements in Part II, Item 8. Financial Statements and Supplementary Data), debt issuance costs of \$61, premiums paid on the redemption of debt of \$59, and dividends paid to shareholders of \$11. These items were partially offset by long-term debt issuance of \$2,400 (of which \$1,200 went with Arconic Corporation at the Arconic Inc. Separation Transaction) and proceeds from the exercise of employee stock options of \$33.

The use of cash in 2019 was primarily related to the repurchase of \$1,150 of common stock (see Note [J](#) to the Consolidated Financial Statements in Part II, Item 8. Financial Statements and Supplementary Data); repayments on borrowings under certain revolving credit facilities (see below) and repayments on debt, primarily the aggregate outstanding principal amount of the 1.63% Convertible Notes of approximately \$403 (see Note [R](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data)); and dividends paid to shareholders of \$57. These items were partially offset by proceeds from the exercise of employee stock options of \$56.

The use of cash in 2018 was principally the result of \$1,103 in repayments on borrowings under certain revolving credit facilities (see below) and repayments on debt, primarily related to the early redemption of the then remaining outstanding 5.72% Notes due in 2019 (see Note [R](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and

Supplementary Data of this Form 10-K)) and \$119 in dividends to shareholders. These items were partially offset by \$600 in additions to debt, primarily from borrowings under certain revolving credit facilities.

The Company maintains a Five-Year Revolving Credit Agreement (the "Credit Agreement") with a syndicate of lenders and issuers named therein. On June 26, 2020, the Company entered into an amendment to its Credit Agreement to modify certain terms which provided relief from its existing financial covenant through December 31, 2021 and reduced total commitment available from \$1,500 to \$1,000. See Note R to the Consolidated Financial Statements in Part II, Item 8. Financial Statements and Supplementary Data of this Form 10-K. In addition to the Credit Agreement, the Company has other credit facilities from time to time.

The Company may in the future repurchase additional portions of its debt or equity securities from time to time, in either the open market or through privately negotiated transactions, in accordance with applicable SEC and other legal requirements. The timing, prices, and sizes of purchases depend upon prevailing trading prices, general economic and market conditions, and other factors, including applicable securities laws.

The Company's costs of borrowing and ability to access the capital markets are affected not only by market conditions but also by the short- and long-term debt ratings assigned to the Company by the major credit rating agencies.

The Company's credit ratings from the three major credit rating agencies are as follows:

	Long-Term Debt	Short-Term Debt	Outlook	Date of Last Update
Standard and Poor's	BB+	B	Negative	September 9, 2020
Moody's	Ba3	Speculative Grade Liquidity-2	Negative	April 23, 2020
Fitch	BBB-	B	Stable	April 22, 2020

Investing Activities

Cash provided from investing activities was \$271 in 2020 compared with \$528 in 2019 and \$565 in 2018.

The source of cash in 2020 was primarily cash receipts from sold receivables of \$422 and proceeds from the sale a rolling mill business in Itapissuma, Brazil for \$50 and a hard alloy extrusions plant in South Korea for \$62 which were related to Arconic Corporation (see Notes C and U to the Consolidated Financial Statements in Part II, Item 8 (Financial Statements and Supplementary Data)), partially offset by capital expenditures of \$267.

The source of cash in 2019 was primarily cash receipts from sold receivables of \$995, proceeds from the sale of assets and businesses of \$103 primarily from the sale of a forgings business in the U.K. for \$64 and the sale of inventories and properties, plants, and equipment related to a small energy business for \$13 as well as contingent consideration of \$20 related to the sale of the Texarkana, Texas rolling mill (which was part of Arconic Corporation at the Arconic Inc. Separation Transaction) (see Notes C and U to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data)), and the sale of fixed income securities of \$73, partially offset by capital expenditures of \$641, including expansion of a wheels plant in Hungary, expansion of aerospace airfoils capacity in the United States, and transition of the Tennessee plant to industrial production (which was part of Arconic Corporation at the Arconic Inc. Separation Transaction).

The source of cash in 2018 was primarily cash receipts from sold receivables of \$1,016 and proceeds from the sale of the Texarkana, Texas rolling mill and cast house of \$302 which was related to Arconic Corporation, partially offset by capital expenditures of \$768, including the horizontal heat treat furnace at the Davenport, Iowa plant (which was part of Arconic Corporation at the Arconic Inc. Separation Transaction) and an expansion of a wheels plant in Székesfehérvár, Hungary.

Contractual Obligations and Off-Balance Sheet Arrangements

Contractual Obligations

Howmet is required to make future payments under various contracts, including long-term purchase obligations, financing arrangements, and lease agreements. Howmet also has commitments to fund its pension plans, provide payments for other postretirement benefit plans, and fund capital projects.

As of December 31, 2020, a summary of Howmet's outstanding contractual obligations is as follows (these contractual obligations are grouped in the same manner as they are classified in the Statement of Consolidated Cash Flows in order to provide a better understanding of the nature of the obligations and to provide a basis for comparison to historical information):

	Total	2021	2022-2023	2024-2025	Thereafter
Operating activities:					
Raw material purchase obligations	\$ 205	\$ 159	\$ 38	\$ 8	\$ —
Other purchase obligations	54	51	3	—	—
Operating leases	163	44	59	28	32
Interest related to total debt	1,941	286	519	400	736
Estimated minimum required pension funding	514	140	229	145	—
Other postretirement benefit payments	146	17	32	30	67
Layoff and other restructuring payments	54	54	—	—	—
Uncertain tax positions	2	—	—	—	2
Financing activities:					
Total debt	5,102	376	476	2,450	1,800
Investing activities:					
Capital projects	169	123	46	—	—
Totals	\$ 8,350	\$ 1,250	\$ 1,402	\$ 3,061	\$ 2,637

Obligations for Operating Activities

Raw material purchase obligations consist mostly of aluminum, cobalt, nickel, and various other metals with expiration dates ranging from less than one year to five years. Many of these purchase obligations contain variable pricing components, and, as a result, actual cash payments may differ from the estimates provided in the preceding table. The Company generally passes through metal costs in customer contracts with limited exceptions. In connection with the Arconic Inc. Separation Transaction, the Company entered into several agreements with Arconic Corporation that govern the relationship between the Company and Arconic Corporation following the separation, including Raw Material Supply Agreements.

Operating leases represent multi-year obligations for certain land and buildings, plant equipment, vehicles, and computer equipment.

Interest related to total debt is based on interest rates in effect as of December 31, 2020 and is calculated on debt with maturities that extend to 2042.

Estimated minimum required pension funding and postretirement benefit payments are based on actuarial estimates using current assumptions for discount rates, long-term rate of return on plan assets, and health care cost trend rates, among others. It is Howmet's policy to fund amounts for pension plans sufficient to meet the minimum requirements set forth in applicable country benefits laws and tax laws. Periodically, Howmet contributes additional amounts as deemed appropriate. The estimates reported in the preceding table include amounts sufficient to meet the minimum required. Howmet has determined that it is not practicable to present pension funding and other postretirement benefit payments beyond 2024 and 2029, respectively.

Layoff and other restructuring payments to be paid within one year primarily relate to severance costs, special layoff benefit payments, and lease termination costs.

Uncertain tax positions taken or expected to be taken on an income tax return may result in additional payments to tax authorities. The amount in the preceding table includes interest and penalties accrued related to such positions as of December 31, 2020. The total amount of uncertain tax positions is included in the "Thereafter" column as the Company is not able to reasonably estimate the timing of potential future payments. If a tax authority agrees with the tax position taken or expected to be taken or the applicable statute of limitations expires, then additional payments will not be necessary.

Obligations for Financing Activities

Howmet has historically paid quarterly dividends on its preferred and common stock. Including dividends on preferred stock, the Company paid \$11 in dividends to shareholders during 2020. Because all dividends are subject to approval by Howmet's Board of Directors, amounts are not included in the preceding table unless such authorization has occurred. As of December 31, 2020, there were 432,906,377 shares of outstanding common stock and 546,024 shares of outstanding Class A preferred stock. In 2020, the preferred stock dividend was \$3.75 per share. Dividend of \$0.02 per share on the Company's common stock was paid in the first quarter of 2020. As the duration of the COVID-19 pandemic is uncertain, the Company is taking a series of actions to address the financial impact, including the suspension of dividends on common stock in April 2020. See [Part I, Item 1A](#) (Risk Factors).

Obligations for Investing Activities

Capital projects in the preceding table only include amounts approved by management as of December 31, 2020. Funding levels may vary in future years based on anticipated construction schedules of the projects. It is expected that significant expansion projects will be funded through various sources, including cash provided from operations. Total capital expenditures are anticipated to be approximately 4% of sales in 2021.

Off-Balance Sheet Arrangements

At December 31, 2020, the Company had outstanding bank guarantees related to tax matters, outstanding debt, workers' compensation, environmental obligations, energy contracts, and customs duties, among others. The total amount committed under these guarantees, which expire at various dates between 2021 and 2040 was \$44 at December 31, 2020.

Pursuant to the Separation and Distribution Agreement between the Company and Alcoa Corporation, the Company is required to provide certain guarantees for Alcoa Corporation, which had a combined fair value of \$12 and \$9 at December 31, 2020 and 2019, respectively, and were included in Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet. For a long-term supply agreement, the Company is required to provide a guarantee up to an estimated present value amount of approximately \$1,398 and \$1,353 at December 31, 2020 and December 31, 2019, respectively, in the event of an Alcoa Corporation payment default. This guarantee expires in 2047. For this guarantee, subject to its provisions, the Company is secondarily liable in the event of a payment default by Alcoa Corporation. The Company currently views the risk of an Alcoa Corporation payment default on its obligations under the contract to be remote. In December 2019, Arconic Inc. entered into a one-year insurance policy with a limit of \$80 relating to the long-term energy supply agreement. The premium is expected to be paid by Alcoa Corporation. In December 2020, a surety bond with a limit of \$80 relating to the long-term energy supply agreement was obtained by Alcoa Corporation to protect Howmet's obligation. This surety bond will be renewed on an annual basis.

Howmet has outstanding letters of credit primarily related to workers' compensation, environmental obligations, and leasing obligations. The total amount committed under these letters of credit, which automatically renew or expire at various dates, mostly in 2021, was \$105 at December 31, 2020.

Pursuant to the Separation and Distribution Agreements between the Company and Arconic Corporation and between the Company and Alcoa Corporation, the Company is required to retain letters of credit of \$53 that had previously been provided related to the Company, Arconic Corporation, and Alcoa Corporation workers' compensation claims which occurred prior to the respective separation transactions of April 1, 2020 and November 1, 2016. Arconic Corporation and Alcoa Corporation workers' compensation claims and letter of credit fees paid by the Company are being proportionally billed to and are being reimbursed by Arconic Corporation and Alcoa Corporation. Also, the Company was required to provide letters of credit for certain Arconic Corporation environmental obligations and, as a result, the Company has \$29 of outstanding letters of credit relating to liabilities (which are included in the \$105 in the above paragraph). \$13 of these outstanding letters of credit are pending cancellation and will be deemed cancelled once returned by the beneficiary. Arconic Corporation has issued surety bonds to cover these environmental obligations. Arconic Corporation is being billed for these letter of credit fees paid by the Company and will reimburse the Company for any payments made under these letters of credit.

Howmet has outstanding surety bonds primarily related to tax matters, contract performance, workers' compensation, environmental-related matters, and customs duties. The total amount committed under these surety bonds, which expire at various dates, primarily in 2021, was \$43 at December 31, 2020.

Pursuant to the Separation and Distribution Agreements between the Company and Arconic Corporation and between the Company and Alcoa Corporation, the Company was required to provide surety bonds of \$26 (which are included in the \$43 in the above paragraph) that had previously been provided, related to the Company, Arconic Corporation and Alcoa Corporation workers' compensation claims which occurred prior to the respective separation transactions of April 1, 2020 and November 1, 2016. Arconic Corporation and Alcoa Corporation workers' compensation letters of credit and surety bond fees paid by the Company are being proportionally billed to and are being reimbursed by Arconic Corporation and Alcoa Corporation.

Critical Accounting Policies and Estimates

The preparation of the Consolidated Financial Statements in accordance with accounting principles generally accepted in the United States of America requires management to make certain judgments, estimates, and assumptions regarding uncertainties that affect the amounts reported in the Consolidated Financial Statements and disclosed in the accompanying Notes. These estimates are based on historical experience and, in some cases, assumptions based on current and future market experience, including considerations relating to the impact of COVID-19. The impact of COVID-19 is rapidly changing and of unknown duration and macroeconomic impact and as a result, these considerations remain highly uncertain. Areas that require significant judgments, estimates, and assumptions include the testing of goodwill, other intangible assets, and properties, plants, and equipment for impairment; estimating fair value of businesses acquired or divested; pension plans and other postretirement benefits obligations; stock-based compensation; and income taxes.

Management uses historical experience and all available information to make these judgments, estimates, and assumptions, and actual results may differ from those used to prepare the Company's Consolidated Financial Statements at any given time. Despite these inherent limitations, management believes that Management's Discussion and Analysis of Financial Condition and Results of Operations and the Consolidated Financial Statements and accompanying Notes provide a meaningful and fair perspective of the Company.

A summary of the Company's significant accounting policies is included in Note [A](#) to the Consolidated Financial Statements. Management believes that the application of these policies on a consistent basis enables the Company to provide the users of the Consolidated Financial Statements with useful and reliable information about the Company's operating results and financial condition.

Goodwill. Goodwill is not amortized; instead, it is reviewed for impairment annually (in the fourth quarter) or more frequently if indicators of impairment exist or if a decision is made to sell or realign a business. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include deterioration in general economic conditions, negative developments in equity and credit markets, adverse changes in the markets in which an entity operates, increases in input costs that have a negative effect on earnings and cash flows, or a trend of negative or declining cash flows over multiple periods, among others. The fair value that could be realized in an actual transaction may differ from that used to evaluate the impairment of goodwill.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. Howmet had four reporting units (Engine Products, Fastening Systems, Engineered Structures, and Forged Wheels) for 2020.

In reviewing goodwill for impairment, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not (greater than 50%) that the estimated fair value of a reporting unit is less than its carrying amount. If an entity elects to perform a qualitative assessment and determines that an impairment is more likely than not, the entity is then required to perform the quantitative impairment test (described below), otherwise no further analysis is required. An entity also may elect not to perform the qualitative assessment and, instead, proceed directly to the quantitative impairment test. The ultimate outcome of the goodwill impairment review for a reporting unit should be the same whether an entity chooses to perform the qualitative assessment or proceeds directly to the quantitative impairment test.

The Company determines annually, based on facts and circumstances, which of its reporting units will be subject to the qualitative assessment. For those reporting units where a qualitative assessment is either not performed or for which the conclusion is that an impairment is more likely than not, a quantitative impairment test will be performed. Howmet's policy is that a quantitative impairment test be performed for each reporting unit at least once during every three-year period.

Under the qualitative assessment, various events and circumstances (or factors) that would affect the estimated fair value of a reporting unit are identified (similar to impairment indicators above). These factors are then classified by the type of impact they would have on the estimated fair value using positive, neutral, and adverse categories based on current business conditions. Additionally, an assessment of the level of impact that a particular factor would have on the estimated fair value is determined using high, medium, and low weighting. Furthermore, management considers the results of the most recent quantitative impairment test completed for a reporting unit and compares the weighted average cost of capital ("WACC") between the current and prior years for each reporting unit.

During the first quarter of 2020, Howmet's market capitalization declined significantly compared to the fourth quarter of 2019. Over the same period, the equity value of our peer group companies, and the overall U.S. stock market also declined significantly amid market volatility. In addition, as a result of the COVID-19 pandemic and measures designed to contain the spread, sales globally to customers in the aerospace and commercial transportation industries impacted by COVID-19 have been and are expected to be negatively impacted as a result of disruption in demand. As a result of these macroeconomic factors, we performed a qualitative impairment test to evaluate whether it is more likely than not that the fair value of any of our

reporting units is less than its carrying value. As a result of this assessment, the Company performed a quantitative impairment test in the first quarter for the Engineered Structures reporting unit and concluded that though the margin between the fair value of the reporting unit and carrying value had declined from approximately 60% to approximately 15%, it was not impaired. Consistent with prior practice, a discounted cash flow model was used to estimate the current fair value of the reporting unit. The significant assumptions and estimates utilized to determine fair value were developed utilizing current market and forecast information reflecting the disruption in demand that has had and is expected to have a negative impact on the Company's global sales in the aerospace industry. During the second and third quarters of 2020, there were no indicators of impairment identified for the Engineered Structures reporting unit.

During the 2020 annual review of goodwill in the fourth quarter, management proceeded directly to the quantitative impairment test for all four of its reporting units. The estimated fair values for each of the four reporting units exceeded their respective carrying values by 50% or greater; thus, there was no goodwill impairment. The annual goodwill impairment tests performed in the fourth quarter of 2019 and 2018 also indicated that goodwill was not impaired for any of the Company's reporting units.

Under the quantitative impairment test, the evaluation of impairment involves comparing the current fair value of each reporting unit to its carrying value, including goodwill. Howmet uses a discounted cash flow ("DCF") model to estimate the current fair value of its reporting units when testing for impairment, as management believes forecasted cash flows are the best indicator of such fair value. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including sales growth, production costs, capital spending, and discount rate. Most of these assumptions vary significantly among the reporting units. Cash flow forecasts are generally based on approved business unit operating plans for the early years and historical relationships in later years. The WACC rate for the individual reporting units is estimated with the assistance of valuation experts. Howmet would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value without exceeding the total amount of goodwill allocated to that reporting unit.

Properties, Plants, and Equipment and Other Intangible Assets. Properties, plants, and equipment and Other intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets (asset group) may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets (asset group) to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets (asset group) exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is measured as the excess of the carrying value of the assets (asset group) over their fair value, with fair value determined using the best information available, which generally is a DCF model. The determination of what constitutes an asset group, the associated estimated undiscounted net cash flows, and the estimated useful lives of the assets also require significant judgments.

During the second quarter of 2019, the Company updated its five-year strategic plan and determined that there was a decline in the forecasted financial performance for the Disks asset group within the Engine Products and Forgings segment at that time. As such, the Company evaluated the recoverability of the Disks asset group long-lived assets by comparing the carrying value to the undiscounted cash flows of the Disks asset group. The carrying value exceeded the undiscounted cash flows and therefore the Disks asset group long-lived assets were deemed to be impaired. The impairment charge was measured as the amount of carrying value in excess of fair value of the long-lived assets, with fair value determined using a DCF model and a combination of sales comparison and cost approach valuation methods including an estimate for economic obsolescence. The impairment charge of \$428, of which \$247 and \$181 related to the Engine Products and Engineered Structures segments, respectively, which was recorded in the second quarter of 2019, impacted properties, plants, and equipment; intangible assets; and certain other noncurrent assets by \$198, \$197, and \$33, respectively. The impairment charge was recorded in Restructuring and other charges in the Statement of Consolidated Operations.

Discontinued Operations and Assets Held for Sale. The fair values of all businesses to be divested are estimated using accepted valuation techniques such as a DCF model, valuations performed by third parties, earnings multiples, or indicative bids, when available. A number of significant estimates and assumptions are involved in the application of these techniques, including the forecasting of markets and market share, sales volumes and prices, costs and expenses, and multiple other factors. Management considers historical experience and all available information at the time the estimates are made; however, the fair value that is ultimately realized upon the divestiture of a business may differ from the estimated fair value reflected in the Consolidated Financial Statements.

Pension and Other Postretirement Benefits. Liabilities and expenses for pension and other postretirement benefits are determined using actuarial methodologies and incorporate significant assumptions, including the interest rate used to discount the future estimated liability, the expected long-term rate of return on plan assets, and several assumptions relating to the employee workforce (health care cost trend rates, retirement age, and mortality).

The interest rate used to discount future estimated liabilities for the U.S. is determined using a Company-specific yield curve model (above-median) developed with the assistance of an external actuary, while both the U.K. and Canada utilize models

developed by the respective actuary. The cash flows of the plans' projected benefit obligations are discounted using a single equivalent rate derived from yields on high quality corporate bonds, which represent a broad diversification of issuers in various sectors, including finance and banking, industrials, transportation, and utilities, among others. The yield curve model parallels the plans' projected cash flows, which have a global average duration of 12 years. The underlying cash flows of the bonds included in the model exceed the cash flows needed to satisfy the Company's plans' obligations multiple times. In 2020, 2019, and 2018, the discount rate used to determine benefit obligations for pension and other postretirement benefit plans was 2.40%, 3.00%, and 4.00%, respectively. The impact on the liabilities of a change in the discount rate of 1/4 of 1% would be approximately \$90 and either a charge or credit of approximately \$1 to earnings in the following year.

The expected long-term rate of return on plan assets is generally applied to a five-year market-related value of plan assets (a fair value at the plan measurement date is used for certain non-U.S. plans). The process used by management to develop this assumption is one that relies on a combination of historical asset return information and forward-looking returns by asset class. As it relates to historical asset return information, management focuses on various historical moving averages when developing this assumption. While consideration is given to recent performance and historical returns, the assumption represents a long-term, prospective return. Management also incorporates expected future returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment.

For 2020, 2019, and 2018, management used 6.00%, 5.60%, and 5.90%, respectively, as its expected long-term rate of return on plan assets, which was based on the prevailing and planned strategic asset allocations, as well as estimates of future returns by asset class. These rates fell within the respective range of the 20-year moving average of actual performance and the expected future return developed by asset class. For 2021, management anticipates that 6.00% will be the expected long-term rate of return for the plan assets. A change in the assumption for the expected long-term rate of return on plan assets of 1/4 of 1% would impact earnings by approximately \$4 for 2021.

In 2020, a net loss of \$46 (after-tax) was recorded in other comprehensive loss, primarily due to the decrease in the discount rate, partially offset by the plan asset performance that was greater than expected, and by amortization of actuarial losses. After adjusting for the impact of Arconic Corporation's obligation, the net pension and other postretirement benefit obligation decreased less than 2% during 2020. In 2019, a net loss of \$388 (after-tax) was recorded in other comprehensive loss, primarily due to the decrease in the discount rate, which was partially offset by the plan asset performance that was greater than expected, and by the amortization of actuarial losses. In 2018, a net loss of \$114 (after-tax) was recorded in other comprehensive loss, primarily due to the impact of the adoption of new accounting guidance that permits a reclassification to Retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act of 2017, as well as the plan asset performance that was less than expected, which were partially offset by the increase in the discount rate and the amortization of actuarial losses.

Stock-Based Compensation. Howmet recognizes compensation expense for employee equity grants using the non-substantive vesting period approach, in which the expense is recognized ratably over the requisite service period based on the grant date fair value. Forfeitures are accounted for as they occur. The fair value of new stock options is estimated on the date of grant using a lattice-pricing model. The fair value of performance awards containing a market condition is valued using a Monte Carlo valuation model. Determining the fair value at the grant date requires judgment, including estimates for the average risk-free interest rate, dividend yield, volatility, and exercise behavior. These assumptions may differ significantly between grant dates because of changes in the actual results of these inputs that occur over time.

Compensation expense recorded in 2020, 2019, and 2018 was \$46 (\$42 after-tax), \$69 (\$63 after-tax), and \$40 (\$31 after-tax), respectively.

Income Taxes. The provision (benefit) for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision (benefit) for income taxes represents income taxes paid or payable (or received or receivable) based on current year pre-tax income plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid, and result from differences between the financial and tax bases of Howmet's assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted.

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carry-back periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Howmet's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance.

Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also re-measured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

The 2017 Act created a new requirement that certain income earned by foreign subsidiaries, Global Intangible Low Taxed Income ("GILTI"), must be included in the gross income of the U.S. shareholder. In 2018, Howmet made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset GILTI inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that support the realizability of deferred tax assets.

Tax benefits related to uncertain tax positions taken or expected to be taken on a tax return are recorded when such benefits meet a more likely than not threshold. Otherwise, these tax benefits are recorded when a tax position has been effectively settled, which means that the statute of limitations has expired or the appropriate taxing authority has completed their examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related tax benefits are recognized.

Recently Adopted Accounting Guidance. See the Recently Adopted Accounting Guidance section of Note [B](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Recently Issued Accounting Guidance. See the Recently Issued Accounting Guidance section of Note [B](#) to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Not material.

Item 8. Financial Statements and Supplementary Data.

Management's Reports to Howmet Shareholders

Management's Report on Financial Statements and Practices

The accompanying Consolidated Financial Statements of Howmet Aerospace Inc. and its subsidiaries (the "Company") were prepared by management, which is responsible for their integrity and objectivity. The statements were prepared in accordance with accounting principles generally accepted in the United States of America and include amounts that are based on management's best judgments and estimates. The other financial information included in the annual report is consistent with that in the financial statements.

Management also recognizes its responsibility for conducting the Company's affairs according to the highest standards of personal and corporate conduct. This responsibility is characterized and reflected in key policy statements issued from time to time regarding, among other things, conduct of its business activities within the laws of the host countries in which the Company operates and potentially conflicting outside business interests of its employees. The Company maintains a systematic program to assess compliance with these policies.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. In order to evaluate the effectiveness of internal control over financial reporting, as required by Section 404 of the Sarbanes-Oxley Act, management has conducted an assessment, including testing, using the criteria in *Internal Control—Integrated Framework (2013)*, issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). The Company's system of internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The Company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the Company's assets that could have a material effect on the financial statements.

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

Based on the assessment, management has concluded that the Company maintained effective internal control over financial reporting as of December 31, 2020, based on criteria in *Internal Control—Integrated Framework (2013)* issued by the COSO.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2020 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included herein.

/s/ John C. Plant

John C. Plant
Executive Chairman and Co-Chief Executive Officer

/s/ Tolga Oal

Tolga Oal
Co-Chief Executive Officer

/s/ Ken Giacobbe

Ken Giacobbe
Executive Vice President and Chief Financial Officer

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Howmet Aerospace Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Howmet Aerospace Inc. and its subsidiaries (the “Company”) as of December 31, 2020 and 2019, and the related consolidated statements of operations, of comprehensive income, of changes in equity and of cash flows for each of the three years in the period ended December 31, 2020, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note B to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019.

Basis for Opinions

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

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

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

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

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

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Goodwill Impairment Assessments – Engineered Structures Reporting Unit

As described in Notes A and P to the consolidated financial statements, the Company's consolidated goodwill balance was \$4,102 million as of December 31, 2020, and the amount of the goodwill associated with the Engineered Structures reporting unit was \$304 million. Goodwill is reviewed for impairment annually (in the fourth quarter) or more frequently if indicators of impairment exist. During the first quarter of 2020, management performed a quantitative impairment test for the Engineered Structures reporting unit and concluded that it was not impaired. The evaluation of impairment involves comparing the current fair value of each reporting unit to its carrying value, including goodwill. Fair value is estimated using a discounted cash flow model. The determination of fair value using this technique requires management to use significant estimates and assumptions related to forecasting operating cash flows, including sales growth, production costs, capital spending, and discount rate.

The principal considerations for our determination that performing procedures relating to the goodwill impairment assessments of the Engineered Structures reporting unit is a critical audit matter are the significant judgment by management when developing the fair value measurements of the reporting unit. This in turn led to a high degree of auditor judgment, effort and subjectivity in performing procedures and evaluating audit evidence related to management's cash flow projections and significant assumptions related to sales growth, production costs, and discount rate for the first quarter assessment, and sales growth and production costs for the annual impairment assessment. In addition, the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's goodwill impairment assessments, including controls over the valuation of the Company's Engineered Structures reporting unit. These procedures also included, among others, testing management's process for developing the fair value estimates; evaluating the appropriateness of the discounted cash flow models and performing sensitivity analyses over the assumptions; testing the completeness and accuracy of underlying data used in the models; and evaluating the reasonableness of the significant assumptions used by management related to sales growth, production costs, and discount rate for the first quarter assessment and sales growth and production costs for the annual impairment assessment. Evaluating management's assumptions related to sales growth and production costs involved evaluating whether the assumptions used by management were reasonable by considering (i) the current and past performance of the reporting unit, (ii) the consistency with relevant industry data, and (iii) considering whether the assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in the evaluation of the discounted cash flow models and, for the first quarter assessment, the discount rate assumption.

/s/ PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 16, 2021

We have served as the Company's auditor since 1950.

Howmet Aerospace Inc. and subsidiaries
Statement of Consolidated Operations
(in millions, except per-share amounts)

For the year ended December 31,	2020	2019	2018
Sales (D)	\$ 5,259	\$ 7,098	\$ 6,778
Cost of goods sold (exclusive of expenses below)	3,878	5,214	5,114
Selling, general administrative, and other expenses	277	400	371
Research and development expenses	17	28	41
Provision for depreciation and amortization	279	295	314
Restructuring and other charges (E)	182	582	163
Operating income	626	579	775
Interest expense (F)	381	338	377
Other expense (income), net (G)	74	31	(30)
Income before income taxes	171	210	428
(Benefit) provision for income taxes (I)	(40)	84	119
Income from continuing operations after income taxes	\$ 211	\$ 126	\$ 309
Income from discontinued operations after income taxes (C)	50	344	333
Net income	\$ 261	\$ 470	\$ 642
Amounts Attributable to Howmet Aerospace Common Shareholders (K):			
Net income	\$ 259	\$ 477	\$ 651
Earnings per share - basic			
Continuing operations	\$ 0.48	\$ 0.28	\$ 0.64
Discontinued operations	\$ 0.11	\$ 0.77	\$ 0.69
Earnings per share - diluted			
Continuing operations	\$ 0.48	\$ 0.27	\$ 0.63
Discontinued operations	\$ 0.11	\$ 0.76	\$ 0.67
Average Shares Outstanding (J):			
Average shares outstanding - basic	435	446	483
Average shares outstanding - diluted	439	463	503

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

Howmet Aerospace Inc. and subsidiaries
Statement of Consolidated Comprehensive Income
(in millions)

For the year ended December 31,	2020	2019	2018
Net income	\$ 261	\$ 470	\$ 642
Other comprehensive (loss) income, net of tax (L):			
Change in unrecognized net actuarial loss and prior service cost/benefit related to pension and other postretirement benefits	(46)	(388)	255
Foreign currency translation adjustments	58	(13)	(146)
Net change in unrealized gains on debt securities	—	3	(1)
Net change in unrecognized gains/losses on cash flow hedges	4	(3)	(23)
Total Other comprehensive income (loss), net of tax	<u>16</u>	<u>(401)</u>	<u>85</u>
Comprehensive income	<u>\$ 277</u>	<u>\$ 69</u>	<u>\$ 727</u>

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

Howmet Aerospace Inc and subsidiaries
Consolidated Balance Sheet
(in millions)

December 31,	2020	2019
Assets		
Current assets:		
Cash and cash equivalents	\$ 1,610	\$ 1,577
Receivables from customers, less allowances of \$1 in 2020 and \$1 in 2019 (M)	328	583
Other receivables (M)	29	349
Inventories (N)	1,488	1,607
Prepaid expenses and other current assets	217	285
Current assets of discontinued operations (C)	—	1,442
Total current assets	3,672	5,843
Properties, plants, and equipment, net (O)	2,592	2,629
Goodwill (A and P)	4,102	4,067
Deferred income taxes (I)	272	209
Intangibles, net (P)	571	599
Other noncurrent assets (A and Q)	234	316
Noncurrent assets of discontinued operations (C)	—	3,899
Total assets	\$ 11,443	\$ 17,562
Liabilities		
Current liabilities:		
Accounts payable, trade	\$ 599	\$ 976
Accrued compensation and retirement costs	205	285
Taxes, including income taxes	102	65
Accrued interest payable	89	112
Other current liabilities (A and Q)	289	229
Short-term debt (R and S)	376	1,034
Current liabilities of discontinued operations (C)	—	1,424
Total current liabilities	1,660	4,125
Long-term debt, less amount due within one year (R and S)	4,699	4,906
Accrued pension benefits (H)	985	1,030
Accrued other postretirement benefits (H)	198	200
Other noncurrent liabilities and deferred credits (A and Q)	324	438
Noncurrent liabilities of discontinued operations (C)	—	2,258
Total liabilities	7,866	12,957
Contingencies and commitments (V)		
Equity		
Howmet Aerospace shareholders' equity:		
Preferred stock (J)	55	55
Common stock (J)	433	433
Additional capital (J)	4,668	7,319
Retained earnings (A)	364	113
Accumulated other comprehensive loss (A and L)	(1,943)	(3,329)
Total Howmet Aerospace shareholders' equity	3,577	4,591
Noncontrolling interests	—	14
Total equity	3,577	4,605
Total liabilities and equity	\$ 11,443	\$ 17,562

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

Howmet Aerospace Inc and subsidiaries
Statement of Consolidated Cash Flows
(in millions)

For the year ended December 31,	2020	2019	2018
Operating activities			
Net income	\$ 261	\$ 470	\$ 642
Adjustments to reconcile net income to cash used for operations:			
Depreciation and amortization	338	536	576
Deferred income taxes	2	(19)	31
Restructuring and other charges	164	620	9
Net loss from investing activities - asset sales	8	7	10
Net periodic pension benefit cost (H)	51	115	130
Stock-based compensation	45	60	50
Other	59	13	75
Changes in assets and liabilities, excluding effects of acquisitions, divestitures, and foreign currency translation adjustments:			
(Increase) in receivables	(238)	(977)	(1,142)
Decrease (increase) in inventories	74	(3)	(74)
(Increase) decrease in prepaid expenses and other current assets	(2)	4	(1)
(Decrease) increase in accounts payable, trade	(381)	(1)	339
(Decrease) in accrued expenses	(217)	(42)	(190)
Decrease (increase) in taxes, including income taxes	98	(2)	104
Pension contributions	(257)	(268)	(298)
Decrease (increase) in noncurrent assets	39	(7)	(20)
(Decrease) in noncurrent liabilities	(35)	(45)	(24)
Cash provided from operations	9	461	217
Financing Activities			
Net change in short-term borrowings (original maturities of three months or less)	(15)	2	(7)
Additions to debt (original maturities greater than three months) (R)	2,400	400	600
Payments on debt (original maturities greater than three months) (R)	(2,043)	(806)	(1,103)
Debt issuance costs (C and R)	(61)	—	—
Premiums paid on early redemption of debt (R)	(59)	—	(17)
Proceeds from exercise of employee stock options	33	56	16
Dividends paid to shareholders	(11)	(57)	(119)
Repurchase of common stock (J)	(73)	(1,150)	—
Net cash transferred to Arconic Corporation at separation	(500)	—	—
Other	(40)	(13)	(19)
Cash used for financing activities	(369)	(1,568)	(649)
Investing Activities			
Capital expenditures (A and D)	(267)	(641)	(768)
Proceeds from the sale of assets and businesses (U)	114	103	309
Sales of investments	—	73	9
Cash receipts from sold receivables (M)	422	995	1,016
Other	2	(2)	(1)
Cash provided from Investing Activities	271	528	565
Effect of exchange rates on cash, cash equivalents and restricted cash	(3)	—	(4)
Net change in cash, cash equivalents and restricted cash	(92)	(579)	129
Cash, cash equivalents and restricted cash at beginning of year	1,703	2,282	2,153
Cash, cash equivalents and restricted cash at end of year	\$ 1,611	\$ 1,703	\$ 2,282

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

Howmet and subsidiaries
Statement of Changes in Consolidated Equity
(in millions, except per-share amounts)

	Howmet Shareholders							Total equity
	Preferred stock	Common stock	Additional capital	Retained earnings (accumulated deficit)	Accumulated Other Comprehensive Loss	Noncontrolling interests		
Balance at December 31, 2017	\$ 55	\$ 481	\$ 8,266	\$ (1,264)	\$ (2,644)	\$ 14	\$ 4,908	
Adoption of accounting standard (B)	—	—	—	\$ 367	(367)	—	—	
Net income	—	—	—	642	—	—	642	
Other comprehensive income (L)	—	—	—	—	85	—	85	
Cash dividends declared:								
Preferred—Class A @ \$3.75 per share	—	—	—	(2)	—	—	(2)	
Common @ \$0.24 per share	—	—	—	(117)	—	—	(117)	
Stock-based compensation (J)	—	—	50	—	—	—	50	
Common stock issued: compensation plans (J)	—	2	3	—	—	—	5	
Other	—	—	—	—	—	(2)	(2)	
Balance at December 31, 2018	\$ 55	\$ 483	\$ 8,319	\$ (374)	\$ (2,926)	\$ 12	\$ 5,569	
Adoption of accounting standard (B)	—	—	—	75	(2)	—	73	
Net income	—	—	—	470	—	—	470	
Other comprehensive loss (L)	—	—	—	—	(401)	—	(401)	
Cash dividends declared:								
Preferred—Class A @ \$3.75 per share	—	—	—	(2)	—	—	(2)	
Common @ \$0.12 per share	—	—	—	(56)	—	—	(56)	
Repurchase and retirement of common stock (J)	—	(55)	(1,095)	—	—	—	(1,150)	
Stock-based compensation (J)	—	—	57	—	—	—	57	
Common stock issued: compensation plans (J)	—	5	36	—	—	—	41	
Other	—	—	2	—	—	2	4	
Balance at December 31, 2019	\$ 55	\$ 433	\$ 7,319	\$ 113	\$ (3,329)	\$ 14	\$ 4,605	
Net income	—	—	—	261	—	—	261	
Other comprehensive income (L)	—	—	—	—	16	—	16	
Cash dividends declared:								
Preferred—Class A @ \$3.75 per share	—	—	—	(2)	—	—	(2)	
Common @ \$0.02 per share	—	—	—	(8)	—	—	(8)	
Repurchase and retirement of common stock (J)	—	(3)	(70)	—	—	—	(73)	
Stock-based compensation (J)	—	—	45	—	—	—	45	
Common stock issued: compensation plans (J)	—	3	(9)	—	—	—	(6)	
Distribution to Arconic Corporation (C)	—	—	(2,617)	—	1,370	(14)	(1,261)	
Balance at December 31, 2020	\$ 55	\$ 433	\$ 4,668	\$ 364	\$ (1,943)	\$ —	\$ 3,577	

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

Howmet Aerospace and subsidiaries
Notes to the Consolidated Financial Statements
(dollars in millions, except per-share amounts)

A. Summary of Significant Accounting Policies

Basis of Presentation. The Consolidated Financial Statements of Howmet Aerospace Inc. (formerly known as Arconic Inc.) and subsidiaries (“Howmet” or the “Company”) are prepared in conformity with accounting principles generally accepted in the United States of America (“GAAP”) and require management to make certain judgments, estimates, and assumptions. These estimates are based on historical experience and, in some cases, assumptions based on current and future market experience, including considerations relating to the impact of the global pandemic coronavirus (“COVID-19”). The impact of COVID-19 is rapidly changing and of unknown duration and macroeconomic impact and as a result, these considerations remain highly uncertain. We have made our best estimates using all relevant information available at the time, but it is possible that our estimates will differ from our actual results and affect the Consolidated Financial Statements in future periods and potentially require adverse adjustments to the recoverability of goodwill, intangible and long-lived assets, the realizability of deferred tax assets and other judgments and estimations and assumptions. These may affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements. They also may affect the reported amounts of sales and expenses during the reporting period. Actual results could differ from those estimates upon subsequent resolution of identified matters.

The separation of Arconic Inc. into two standalone, publicly-traded companies, Howmet Aerospace Inc. and Arconic Corporation, (the “Arconic Inc. Separation Transaction”) occurred on April 1, 2020. The Engineered Products and Forgings (“EP&F”) segment remained in the existing company which was renamed Howmet Aerospace Inc. The Global Rolled Products (“GRP”) segment was the Spin Co. and was named Arconic Corporation. In the second quarter of 2020, in conjunction with the Arconic Inc. Separation Transaction, the Company realigned its operations by separating the former EP&F segment into four new segments: Engine Products, Fastening Systems, Engineered Structures and Forged Wheels. See Note [D](#) for further details.

The financial results of Arconic Corporation for all periods prior to the Arconic Inc. Separation Transaction have been retrospectively reflected in the Statement of Consolidated Operations as discontinued operations and, as such, have been excluded from continuing operations and segment results for all periods presented. In addition, the related assets and liabilities associated with Arconic Corporation in the December 2019 Consolidated Balance Sheet are classified as assets and liabilities of discontinued operations. The cash flows, comprehensive income, and equity related to Arconic Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows, Statement of Consolidated Comprehensive Income, and Statement of Changes in Consolidated Equity, respectively, for all periods prior to the Arconic Inc. Separation Transaction. See Note [C](#) for additional information related to the Arconic Inc. Separation Transaction and discontinued operations.

The Company derived approximately 69%, 71% and 70% of its revenue from products sold to the aerospace end-market for the years ended December 31, 2020, 2019 and 2018. As a result of COVID-19 and its impact on the aerospace industry to-date, the possibility exists that there could be a sustained impact to our operations and financial results. Since the start of the pandemic, certain original equipment manufacturer (“OEM”) customers have reduced production or suspended manufacturing operations in North America and Europe on a temporary basis. While the pandemic has resulted in the temporary closure of a small number of the Company’s manufacturing facilities, all of our manufacturing facilities are currently operating. Since the duration of the pandemic is uncertain, the Company is taking a series of actions to address the financial impact, including announcing certain headcount reductions and reducing certain cash outflows by suspending dividends on common stock and reducing the level of its capital expenditures to preserve cash and maintain liquidity.

The Company identified a misclassification in the presentation of changes in accounts payable and capital expenditures in its previously issued Statement of Consolidated Cash Flows during 2020. Although management has determined that such misclassification did not materially misstate the Statement of Consolidated Cash Flows for the year ended December 31, 2019, the Company has revised it resulting in a \$55 increase to previously reported capital expenditures and decrease to cash provided from investing activities with a corresponding reduction (decrease) in accounts payable, trade and increase in cash provided by operations.

A \$16 deferred tax error was identified related to periods prior to 2018 during 2020. Although management has determined it was not material to any periods, the Company has revised its Statement of Changes in Consolidated Equity for the years ended December 31, 2019 and 2018 to present the correction as a reduction to Retained Earnings as of December 31, 2017. The accompanying Consolidated Balance Sheet at December 31, 2019 also reflects the revision for such tax item.

Principles of Consolidation. The Consolidated Financial Statements include the accounts of Howmet Aerospace Inc. and companies in which Howmet Aerospace Inc. has a controlling interest. Intercompany transactions have been eliminated. Investments in affiliates in which Howmet Aerospace Inc. cannot exercise significant influence that do not have readily

determinable fair values are accounted for at cost less impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer.

Management also evaluates whether a Howmet Aerospace Inc. entity or interest is a variable interest entity and whether Howmet Aerospace Inc. is the primary beneficiary. Consolidation is required if both of these criteria are met. Howmet Aerospace Inc. does not have any variable interest entities requiring consolidation.

Cash Equivalents. Cash equivalents are highly liquid investments purchased with an original maturity of three months or less.

Inventory Valuation. Inventories are carried at the lower of cost and net realizable value with the cost of inventories determined under a combination of the first-in, first-out ("FIFO"), last-in, first-out ("LIFO") and average-cost methods. See Note [N](#) for further details.

Properties, Plants, and Equipment. Properties, plants, and equipment are recorded at cost. Depreciation is recorded principally on the straight-line method at rates based on the estimated useful lives of the assets.

The following table details the weighted-average useful lives of structures and machinery and equipment by reporting segment (numbers in years):

	<u>Structures</u>	<u>Machinery and equipment</u>
Engine Products	30	16
Fastening Systems	28	17
Engineered Structures	28	18
Forged Wheels	29	18

Gains or losses from the sale of asset groups are generally recorded in Restructuring and other charges while the sale of individual assets are recorded in Other expense (income), net (see policy below for assets classified as held for sale and discontinued operations). Repairs and maintenance are charged to expense as incurred. Interest related to the construction of qualifying assets is capitalized as part of the construction costs.

Properties, plants, and equipment are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets (asset group) may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets (asset group) to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets (asset group) exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is measured as the excess of the carrying value of the assets (asset group) over their fair value, with fair value determined using the best information available, which generally is a discounted cash flow ("DCF") model. The determination of what constitutes an asset group, the associated estimated undiscounted net cash flows, and the estimated useful lives of the assets also require significant judgments. See Note [O](#) for further details.

Goodwill. Goodwill is not amortized; instead, it is reviewed for impairment annually (in the fourth quarter) or more frequently if indicators of impairment exist or if a decision is made to sell or realign a business. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include deterioration in general economic conditions, negative developments in equity and credit markets, adverse changes in the markets in which an entity operates, increases in input costs that have a negative effect on earnings and cash flows, or a trend of negative or declining cash flows over multiple periods, among others. The fair value that could be realized in an actual transaction may differ from that used to evaluate the impairment of goodwill.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. Howmet had four reporting units composed of the Engine Products, Fastening Systems, Engineered Structures and Forged Wheels segments.

In reviewing goodwill for impairment, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not (greater than 50%) that the estimated fair value of a reporting unit is less than its carrying amount. If an entity elects to perform a qualitative assessment and determines that an impairment is more likely than not, the entity is then required to perform the quantitative impairment test (described below), otherwise no further analysis is required. An entity also may elect not to perform the qualitative assessment and, instead, proceed directly to the quantitative impairment test. The ultimate outcome of the goodwill impairment review for a reporting unit should be the same whether an entity chooses to perform the qualitative assessment or proceeds directly to the quantitative impairment test.

Howmet determines annually, based on facts and circumstances, which of its reporting units will be subject to the qualitative assessment. For those reporting units where a qualitative assessment is either not performed or for which the conclusion is that

an impairment is more likely than not, a quantitative impairment test will be performed. Howmet's policy is that a quantitative impairment test be performed for each reporting unit at least once during every three-year period.

Under the qualitative assessment, various events and circumstances (or factors) that would affect the estimated fair value of a reporting unit are identified (similar to impairment indicators above). These factors are then classified by the type of impact they would have on the estimated fair value using positive, neutral, and adverse categories based on current business conditions. Additionally, an assessment of the level of impact that a particular factor would have on the estimated fair value is determined using high, medium, and low weighting. Furthermore, management considers the results of the most recent quantitative impairment test completed for a reporting unit and compares the weighted average cost of capital ("WACC") between the current and prior years for each reporting unit.

During the first quarter of 2020, Howmet's market capitalization declined significantly compared to the fourth quarter of 2019. Over the same period, the equity value of our peer group companies, and the overall U.S. stock market also declined significantly amid market volatility. In addition, as a result of the COVID-19 pandemic and measures designed to contain the spread, sales globally to customers in the aerospace and commercial transportation industries impacted by COVID-19 have been and are expected to continue to be negatively impacted as a result of disruption in demand. As a result of these macroeconomic factors, we performed a qualitative impairment test to evaluate whether it is more likely than not that the fair value of any of our reporting units is less than its carrying value. As a result of this assessment, the Company performed a quantitative impairment test in the first quarter for the Engineered Structures reporting unit and concluded that though the margin between the fair value of the reporting unit and carrying value had declined from approximately 60% to approximately 15%, it was not impaired. Consistent with prior practice, a discounted cash flow model was used to estimate the current fair value of the reporting unit. The significant assumptions and estimates utilized to determine fair value were developed utilizing current market and forecast information reflecting the disruption in demand that has and is expected to negatively impact the Company's sales globally in the aerospace industry. During the second and third quarters of 2020, there were no indicators of impairment identified for the Engineered Structures reporting unit.

During the 2020 annual review of goodwill in the fourth quarter, management proceeded directly to the quantitative impairment test for all four of its reporting units. The estimated fair values for each of the four reporting units exceeded their respective carrying values by more than 50%, thus, there was no goodwill impairment. Under the quantitative impairment test, the evaluation of impairment involves comparing the current fair value of each reporting unit to its carrying value, including goodwill. Howmet uses a DCF model to estimate the current fair value of its reporting units when testing for impairment, as management believes forecasted cash flows are the best indicator of such fair value. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including sales growth, production costs, capital spending, and discount rate. Most of these assumptions vary significantly among the reporting units. Cash flow forecasts are generally based on approved business unit operating plans for the early years and historical relationships in later years. The WACC rate for the individual reporting units is estimated with the assistance of valuation experts. The annual goodwill impairment tests in the fourth quarter of 2020, 2019 and 2018 indicated that goodwill was not impaired for any of the Company's reporting units. If actual results or external market factors decline significantly from management's estimates, future goodwill impairment charges (or the amount by which the carrying amount exceeds the reporting unit's fair value without exceeding the total amount of goodwill allocated to that reporting unit) may be necessary and could be material.

In the first quarter of 2020, management transferred its Savannah, Georgia business from the Engine Products reporting unit to the Engineered Structures reporting unit. As a result of the reorganization, these reporting units were evaluated for impairment during the first quarter of 2020. The estimated fair value of each of these reporting units substantially exceeded their carrying value; thus, there was no goodwill impairment. In the second quarter of 2019, the Company transferred its castings operations from Engineered Structures to Engine Products. As a result, these reporting units were evaluated for impairment during the second quarter of 2019. The estimated fair value of each of these reporting units substantially exceeded their carrying value; thus, there was no impairment.

In the second quarter of 2019, as a result of the decline in the forecasted financial performance and related impairment of long-lived assets of the Disks asset group which composed business currently in the Engine Products and Engineered Structures segments (see Note [Q](#)), the Company also performed an interim impairment evaluation of goodwill for Engine Products. The estimated fair value of the Engine Products reporting unit was substantially in excess of its carrying value; thus, there was no impairment of goodwill.

In connection with the interim impairment evaluation of long-lived assets for the Disks asset group in the second quarter of 2018, which resulted from a decline in forecasted financial performance for the business in connection with its updated three-year strategic plan, the Company also performed an interim impairment evaluation of goodwill for Engine Products. The estimated fair value of the reporting unit was substantially in excess of the carrying value; thus, there was no impairment of goodwill.

Other Intangible Assets. Intangible assets with indefinite useful lives are not amortized while intangible assets with finite useful lives are amortized generally on a straight-line basis over the periods benefited.

The following table details the weighted-average useful lives of software and other intangible assets by reporting segment (numbers in years):

	Software	Other intangible assets
Engine Products	7	33
Fastening Systems	6	23
Engineered Structures	4	10
Forged Wheels	4	23

Leases. The Company determines whether a contract contains a lease at inception. The Company leases land and buildings, plant equipment, vehicles, and computer equipment which have been classified as operating leases. Certain real estate leases include one or more options to renew; the exercise of lease renewal options is at the Company's discretion. The Company includes renewal option periods in the lease term when it is determined that the options are reasonably certain to be exercised. Certain of Howmet's real estate lease agreements include rental payments that either have fixed contractual increases over time or adjust periodically for inflation. Certain of the Company's lease agreements include variable lease payments. The variable portion of payments is not included in the initial measurement of the right-of-use asset or lease liability due to the uncertainty of the payment amount and is recorded as lease cost in the period incurred. The Company also rents or subleases certain real estate to third parties, which is not material to the consolidated financial statements.

Operating lease right-of-use assets and lease liabilities with an initial term greater than 12 months are recorded on the balance sheet at the present value of the future minimum lease payments over the lease term at the lease commencement date and are recognized as lease expense on a straight-line basis over the lease term. The Company uses an incremental collateralized borrowing rate based on the information available at the lease commencement date in determining the present value of future payments, as most of its leases do not provide an implicit rate. The operating lease right-of-use assets also include any lease prepayments made and were reduced by lease incentives and accrued exit costs.

Environmental Matters. Expenditures for current operations are expensed or capitalized, as appropriate. Expenditures relating to existing conditions caused by past operations, which will not contribute to future sales, are expensed. Liabilities are recorded when remediation costs are probable and can be reasonably estimated. The liability may include costs such as site investigations, consultant fees, feasibility studies, outside contractors, and monitoring expenses. Estimates are generally not discounted or reduced by potential claims for recovery. Claims for recovery are recognized when probable and as agreements are reached with third parties. The estimates also include costs related to other potentially responsible parties to the extent that Howmet has reason to believe such parties will not fully pay their proportionate share. The liability is continuously reviewed and adjusted to reflect current remediation progress, prospective estimates of required activity, and other factors that may be relevant, including changes in technology or regulations.

Litigation Matters. For asserted claims and assessments, liabilities are recorded when an unfavorable outcome of a matter is deemed to be probable and the loss is reasonably estimable. Management determines the likelihood of an unfavorable outcome based on many factors such as the nature of the matter, available defenses and case strategy, progress of the matter, views and opinions of legal counsel and other advisors, applicability and success of appeals processes, and the outcome of similar historical matters, among others. Once an unfavorable outcome is deemed probable, management weighs the probability of estimated losses, and the most reasonable loss estimate is recorded. If an unfavorable outcome of a matter is deemed to be reasonably possible, then the matter is disclosed and no liability is recorded. With respect to unasserted claims or assessments, management must first determine that the probability that an assertion will be made is likely, then, a determination as to the likelihood of an unfavorable outcome and the ability to reasonably estimate the potential loss is made. Legal matters are reviewed on a continuous basis to determine if there has been a change in management's judgment regarding the likelihood of an unfavorable outcome or the estimate of a potential loss.

Revenue Recognition. The Company's contracts with customers are comprised of acknowledged purchase orders incorporating the Company's standard terms and conditions, or for larger customers, may also generally include terms under negotiated multi-year agreements. These contracts with customers typically consist of the manufacture of products which represent single performance obligations that are satisfied upon transfer of control of the product to the customer. The Company produces fastening systems; seamless rolled rings; investment castings, including airfoils; extruded, machined and formed aircraft parts; and forged aluminum commercial vehicle wheels. Transfer of control is assessed based on alternative use of the products we produce and our enforceable right to payment for performance to date under the contract terms. Transfer of control and revenue recognition generally occur upon shipment or delivery of the product, which is when title, ownership and risk of loss pass to the customer and is based on the applicable shipping terms. The shipping terms vary across all businesses and depend on the

product, the country of origin, and the type of transportation (truck, train, or vessel). An invoice for payment is issued at time of shipment. Our segments set commercial terms on which Howmet sells products to its customers. These terms are influenced by industry custom, market conditions, product line (specialty versus commodity products), and other considerations.

In certain circumstances, Howmet receives advanced payments from its customers for product to be delivered in future periods. These advanced payments are recorded as deferred revenue until the product is delivered and title and risk of loss have passed to the customer in accordance with the terms of the contract. Deferred revenue is included in Other current liabilities and Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet. Advanced payments were \$97 and \$85 at December 31, 2020 and December 31, 2019, respectively.

Income Taxes. The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision for income taxes represents income taxes paid or payable (or received or receivable) for the current year plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid, and result from differences between the financial and tax bases of Howmet's assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted.

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Howmet's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance. Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also remeasured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

In 2018, the Company made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset Global Intangible Low-Taxed Income ("GILTI") inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that support the realizability of deferred tax assets.

Tax benefits related to uncertain tax positions taken or expected to be taken on a tax return are recorded when such benefits meet a more likely than not threshold. Otherwise, these tax benefits are recorded when a tax position has been effectively settled, which means that the statute of limitations has expired or the appropriate taxing authority has completed their examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related tax benefits are recognized.

Stock-Based Compensation. Howmet recognizes compensation expense for employee equity grants using the non-substantive vesting period approach, in which the expense is recognized ratably over the requisite service period based on the grant date fair value. Forfeitures are accounted for as they occur. The fair value of new stock options is estimated on the date of grant using a lattice-pricing model. The fair value of performance awards containing a market condition is valued using a Monte Carlo valuation model. Determining the fair value at the grant date requires judgment, including estimates for the average risk-free interest rate, dividend yield, volatility, and exercise behavior. These assumptions may differ significantly between grant dates because of changes in the actual results of these inputs that occur over time.

Foreign Currency. The local currency is the functional currency for Howmet's significant operations outside the United States ("U.S."), except for certain operations in Canada, United Kingdom and France, where the U.S. dollar is used as the functional currency. The determination of the functional currency for Howmet's operations is made based on the appropriate economic and management indicators.

Acquisitions. Howmet's business acquisitions are accounted for using the acquisition method. The purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values. Any excess purchase price over the fair value of the net assets acquired is recorded as goodwill. For all acquisitions, operating results are included in the Statement of Consolidated Operations from the date of the acquisition.

Discontinued Operations and Assets Held for Sale. For those businesses where management has committed to a plan to divest, each business is valued at the lower of its carrying amount or estimated fair value less cost to sell. If the carrying amount of the business exceeds its estimated fair value, an impairment loss is recognized. Fair value is estimated using accepted valuation techniques such as a DCF model, valuations performed by third parties, earnings multiples, or indicative bids, when available. A number of significant estimates and assumptions are involved in the application of these techniques, including the forecasting of markets and market share, sales volumes and prices, costs and expenses, and multiple other factors. Management considers historical experience and all available information at the time the estimates are made; however, the fair value that is ultimately realized upon the divestiture of a business may differ from the estimated fair value reflected in the Consolidated Financial Statements. Depreciation and amortization expense is not recorded on assets of a business to be divested once they are classified as held for sale. Businesses to be divested are generally classified in the Consolidated Financial Statements as either discontinued operations or held for sale.

For businesses classified as discontinued operations, the balance sheet amounts and results of operations should be reclassified from their historical presentation to assets and liabilities of discontinued operations on the Consolidated Balance Sheet and to discontinued operations on the Statement of Consolidated Operations, respectively, for all periods presented. The gains or losses associated with these divested businesses are recorded in discontinued operations on the Statement of Consolidated Operations. The Statement of Consolidated Cash Flows is not required to be reclassified for discontinued operations for any period. Segment information does not include the assets or operating results of businesses classified as discontinued operations for all periods presented. These businesses are expected to be disposed of within one year.

For businesses classified as held for sale that do not qualify for discontinued operations treatment, the balance sheet and cash flow amounts should be reclassified from their historical presentation to assets and liabilities of operations held for sale for all periods presented. The results of operations continue to be reported in continuing operations. The gains or losses associated with these divested businesses are recorded in Restructuring and other charges on the Statement of Consolidated Operations. The segment information includes the assets and operating results of businesses classified as held for sale for all periods presented.

B. Recently Adopted and Recently Issued Accounting Guidance

Recently Adopted Accounting Guidance.

On January 1, 2020, the Company adopted changes issued by the Financial Accounting Standards Board ("FASB") related to the impairment model for expected credit losses. The new impairment model (known as the current expected credit loss ("CECL") model) is based on expected losses rather than incurred losses. The Company recognizes as an allowance its estimate of expected credit losses. The CECL model applies to most debt instruments, trade receivables, lease receivables, financial guarantee contracts, and other loan commitments and requires the measurement of expected credit losses on assets including those that have a low risk of loss. The adoption of this new guidance did not have a material impact on the Consolidated Financial Statements.

In August 2018, the FASB issued guidance that impacts disclosures for defined benefit pension plans and other postretirement benefit plans. These changes became effective for Howmet's annual report for the year ended December 31, 2020 which did not have a material impact on its Consolidated Financial Statements.

In February 2016, the FASB issued changes to the accounting and presentation of leases. These changes required lessees to recognize a right-of-use asset and lease liability on the balance sheet, initially measured at the present value of lease payments for all operating leases with a term greater than 12 months. These changes became effective for the Company on January 1, 2019 and have been applied using the modified retrospective approach as of the date of adoption, under which leases existing at, or entered into after, January 1, 2019 were required to be recognized and measured. Prior period amounts have not been adjusted and continue to be reflected in accordance with the Company's historical accounting. The Company elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed the Company to carry forward the historical lease classification. The Company also elected to separate lease components from non-lease components for all classes of assets.

The adoption of this new lease standard resulted in the Company recording operating lease right-of-use assets and lease liabilities of approximately \$320 on the Consolidated Balance Sheet as of January 1, 2019. The adoption of the new lease standard had no impact on the Statement of Consolidated Operations or Statement of Consolidated Cash Flows. The Company entered into a sale leaseback arrangement in October 2018 for a cast house that is now part of Arconic Corporation, and due to continuing involvement, the gain on sale was deferred. In connection with the adoption of the new lease accounting standard on January 1, 2019, the arrangement no longer required that the gain be deferred. As such, the associated \$73 deferred gain, net of tax was recognized as a cumulative effect of an accounting change within Accumulated deficit in its Consolidated Balance Sheet and Statement of Changes in Consolidated Equity.

In August 2017, the FASB issued guidance that made more financial and nonfinancial hedging strategies eligible for hedge accounting. It also amended the presentation and disclosure requirements and changed how companies assess effectiveness. It is

intended to more closely align hedge accounting with companies' risk management strategies, simplify the application of hedge accounting, and increase transparency as to the scope and results of hedging programs. These changes became effective for the Company on January 1, 2019. For cash flow hedges, Howmet recorded a cumulative effect adjustment of \$2 related to eliminating the separate measurement of ineffectiveness by decreasing Accumulated other comprehensive loss and increasing Retained earnings on its Consolidated Balance Sheet and Statement of Changes in Consolidated Equity. The amendments to presentation and disclosure are required prospectively. Howmet has determined that under the new accounting guidance it is able to more broadly use cash flow hedge accounting for its variable priced inventory purchases and customer sales.

In February 2018, the FASB issued guidance that allows an optional reclassification from Accumulated other comprehensive loss to Accumulated deficit for stranded tax effects resulting from the Tax Cuts and Jobs Act enacted on December 22, 2017. Stranded tax effects were created when deferred taxes, originally established in Other comprehensive income at 35%, were revalued to 21% as a component of income tax expense from continuing operations. The Company elected to early adopt this provision in the fourth quarter of 2018 and reclassified \$367 of beneficial stranded tax effects in Accumulated other comprehensive loss to Retained earnings in its Consolidated Balance Sheet and Statement of Changes in Consolidated Equity.

Recently Issued Accounting Guidance.

In December 2019, the FASB issued guidance that is intended to simplify various aspects related to the accounting for income taxes. These changes became effective for Howmet on January 1, 2021. The adoption of this new guidance will not have a material impact on its Consolidated Financial Statements.

In March 2020, the FASB issued amendments that provide optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions affected by reference rate reform, if certain criteria are met. The amendments apply only to contracts and hedging relationships that reference London Inter-bank Offered Rate ("LIBOR") or another reference rate expected to be discontinued due to reference rate reform. These amendments are effective immediately and may be applied prospectively to contract modifications made and hedging relationships entered into or evaluated on or before December 31, 2022. Management is currently evaluating the potential impact of these changes on the Consolidated Financial Statements.

C. Arconic Inc. Separation Transaction and Discontinued Operations

On April 1, 2020, the Company completed the previously announced separation of its business into two independent, publicly-traded companies. Following the Arconic Inc. Separation Transaction, Arconic Corporation held the Global Rolled Products businesses (global rolled products, aluminum extrusions, and building and construction systems) previously held by the Company. The Company retained the Engineered Products and Forgings businesses (engine products, fastening systems, engineered structures, and forged wheels).

The Company's Board of Directors approved the completion of the separation on February 5, 2020, which was effected by the distribution (the "Distribution") by the Company of all of the outstanding common stock of Arconic Corporation on April 1, 2020 to the Company's stockholders who held shares as of the close of business on March 19, 2020 (the "Record Date"). In the Distribution, each Company stockholder of record as of the Record Date received one share of Arconic Corporation common stock for every four shares of the Company's common stock held as of the Record Date. The Company did not issue fractional shares of Arconic Corporation common stock in the Distribution. Instead, each stockholder otherwise entitled to a fractional share of Arconic Corporation common stock received cash in lieu of fractional shares.

In connection with the Arconic Inc. Separation Transaction, the Company entered into several agreements with Arconic Corporation that govern the relationship between the Company and Arconic Corporation following the Distribution, including the following: a Separation and Distribution Agreement, Tax Matters Agreement, Employee Matters Agreement, certain Patent, Know-How, Trade Secret License and Trademark License Agreements, and Raw Material Supply Agreements.

On February 7, 2020, Arconic Corporation completed an offering of \$600 aggregate principal amount of 6.125% senior secured second-lien notes due 2028. On March 25, 2020, Arconic Corporation entered into a credit agreement which provided for a \$600 aggregate principal amount seven-year senior secured first-lien loan B facility and a revolving credit facility which is guaranteed by certain of Arconic Corporation's wholly-owned domestic subsidiaries and secured on a first-priority basis by liens on substantially all assets of Arconic Corporation and subsidiary guarantors. Arconic Corporation used the proceeds to make payment to the Company to fund the transfer of certain assets to Arconic Corporation relating to the Arconic Inc. Separation Transaction and for general corporate purposes. The Company incurred debt issuance costs of \$45 associated with these issuances for the first quarter of 2020 and year ended December 31, 2020.

On February 1, 2020, the Company completed the sale of its rolling mill in Itapissuma, Brazil for \$50 in cash which resulted in a loss of \$59, of which \$53 was recognized in discontinued operations in the second half of 2019 and \$6 in the first quarter of 2020 and year ended December 31, 2020. On March 1, 2020, the Company sold its hard alloy extrusions plant in South Korea

for \$62 in cash, which resulted in a gain that was recognized in discontinued operations in the first quarter of 2020 and year ended December 31, 2020.

On October 31, 2018, the Company sold its Texarkana, Texas rolling mill and cast house, which had a combined net book value of \$63, to Ta Chen International, Inc. for \$302 in cash, including the settlement of post-closing adjustments, plus additional contingent consideration of up to \$50. The contingent consideration related to the achievement of various milestones within 36 months of the transaction closing date associated with operationalizing the rolling mill equipment. As part of the agreement, the Company produced aluminum slab at the facility for a period of 18 months through a lease back of the cast house building and equipment. The sale of the rolling mill and cast house had been accounted for separately. The gain on the sale of the rolling mill of \$154, including the fair value of contingent consideration of \$5, was recorded in 2018. In 2019, the Company received additional contingent consideration of \$20 and recorded a gain. These amounts were recorded in discontinued operations in the Statement of Consolidated Operations. The Company had continuing involvement related to the lease back of the cast house. As a result, in 2018, the Company continued to treat the cast house building and equipment that it sold to Ta Chen as owned. In conjunction with the adoption of the new lease accounting standard on January 1, 2019 (see Note B), the Company's continuing involvement no longer required deferral of the recognition of the cast house sale. As such, the cash proceeds, properties, plant and equipment and deferred tax assets related to the cast house were reclassified to Retained earnings as a cumulative effect of an accounting change of \$73 in 2018.

Discontinued Operations

The results of operations of Arconic Corporation are presented as discontinued operations in the Statement of Consolidated Operations as summarized below:

	Year ended December 31,		
	2020	2019	2018
Sales	\$ 1,576	\$ 7,094	\$ 7,236
Cost of goods sold	1,292	6,013	6,283
Selling, general administrative, research and development and other expenses	106	346	295
Provision for depreciation and amortization	59	241	262
Restructuring and other charges (credits)	(18)	38	(154)
Interest expense	7	—	1
Other expense, net	42	91	109
Income from discontinued operations	88	365	440
Provision for income taxes	38	21	107
Income from discontinued operations after income taxes	\$ 50	\$ 344	\$ 333

The following table presents purchases of properties, plant and equipment (capital expenditures), proceeds from the sale of businesses and provision for depreciation and amortization of discontinued operations related to Arconic Corporation:

	Year ended December 31,		
	2020	2019	2018
Capital expenditures	\$ 72	\$ 210	\$ 308
Proceeds from the sales of businesses	\$ 112	\$ 20	\$ 309
Provision for depreciation and amortization	\$ 59	\$ 241	\$ 262

On April 1, 2020, management evaluated the net assets of Arconic Corporation for potential impairment and determined that no impairment charge was required.

The cash flows and equity related to Arconic Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows or Statement of Comprehensive Income for all periods presented prior to the Arconic Inc. Separation Transaction.

The carrying amount of the major classes of assets and liabilities related to Arconic Corporation classified as assets and liabilities of discontinued operations in the Consolidated Balance Sheet consisted of the following:

	December 31, 2019
Total Assets of Discontinued Operations	
Cash and cash equivalents	\$ 71
Receivables from customers	385
Other receivables	135
Inventories	822
Prepaid expenses and other current assets	29
Current assets of discontinued operations	1,442
Properties, plants, and equipment, net	2,834
Goodwill	426
Intangibles, net	60
Deferred income taxes	383
Other noncurrent assets	196
Noncurrent assets of discontinued operations	3,899
Total assets of discontinued operations	\$ 5,341
Total Liabilities of Discontinued Operations:	
Accounts payable, trade	\$ 1,067
Accrued compensation and retirement costs	147
Taxes, including income taxes	22
Other current liabilities	188
Current liabilities of discontinued operations	1,424
Accrued pension benefits	1,429
Accrued other postretirement benefits	514
Other noncurrent liabilities and deferred credits	315
Noncurrent liabilities of discontinued operations	2,258
Total liabilities of discontinued operations	\$ 3,682

D. Segment and Geographic Area Information

Howmet is a global leader in lightweight metals engineering and manufacturing. Howmet's innovative, multi-material products, which include nickel, titanium, aluminum, and cobalt, are used worldwide in the aerospace (commercial and defense), commercial transportation, and industrial and other end markets. Segment performance under Howmet's management reporting system is evaluated based on a number of factors; however, the primary measure of performance is Segment operating profit. Howmet's definition of Segment operating profit is Operating income excluding Special items. Special items include Restructuring and Other charges and Impairment of Goodwill. Segment operating profit may not be comparable to similarly titled measures of other companies. Differences between segment totals and consolidated Howmet are in Corporate.

Following the Arconic Inc. Separation Transaction, Howmet's operations consist of four worldwide reportable segments as follows:

Engine Products

Engine Products produces investment castings, including airfoils, and seamless rolled rings primarily for aircraft engines and industrial gas turbines. Engine Products produces rotating parts as well as structural parts.

Fastening Systems

Fastening Systems produces aerospace fastening systems, as well as commercial transportation fasteners. The business's high-tech, multi-material fastening systems are found nose to tail on aircraft and aero engines. The business's products are also critical components of automobiles, commercial transportation vehicles, and construction and industrial equipment.

Engineered Structures

Engineered Structures produces titanium ingots and mill products for aerospace and defense applications and is vertically integrated to produce titanium forgings, extrusions forming and machining services for airframe, wing, aero-engine, and landing gear components. Engineered Structures also produces aluminum forgings, nickel forgings, and aluminum machined components and assemblies for aerospace and defense applications.

Forged Wheels

Forged Wheels provides forged aluminum wheels and related products for heavy-duty trucks and the commercial transportation markets.

Goodwill

The Company had \$4,102 of Goodwill at December 31, 2020, and the Company reviews it for impairment annually in the fourth quarter, or more frequently, if indicators exist or if a decision is made to sell or realign a business.

On January 1, 2020, management transferred the Savannah business from the Engine Products segment to the Engineered Structures segment, based on synergies with forgings technologies and manufacturing capabilities. As a result of the reorganization, goodwill of \$17 was reallocated from Engine Products to Engineered Structures, and these reporting units were evaluated for impairment during the first quarter of 2020. The estimated fair value of each of these reporting units substantially exceeded their carrying value; thus, there was no goodwill impairment at the date the business was transferred.

During the first quarter of 2020, Howmet's market capitalization declined significantly compared to the fourth quarter of 2019. Over the same period, the equity value of our peer group companies, and the overall U.S. stock market also declined significantly amid market volatility. In addition, as a result of the COVID-19 pandemic and measures designed to contain the spread, global sales to customers in the aerospace and commercial transportation industries impacted by COVID-19 have been and are expected to be negatively impacted as a result of disruption in demand. As a result of these macroeconomic factors, we performed a qualitative impairment test to evaluate whether it is more likely than not that the fair value of any of our reporting units is less than its carrying value. As a result of this assessment, the Company performed a quantitative impairment test in the first quarter for the Engineered Structures reporting unit and concluded that though the margin between the fair value of the reporting unit and carrying value had declined from approximately 60% to approximately 15%, it was not impaired. Consistent with prior practice, a discounted cash flow model was used to estimate the current fair value of the reporting unit. The significant assumptions and estimates utilized to determine fair value were developed utilizing current market and forecast information reflecting the disruption in demand that has and is expected to negatively impact the Company's sales globally in the aerospace industry. If our actual results or external market factors decline significantly from management's estimates, future goodwill impairment charges may be necessary and could be material. During the second and third quarters of 2020, there were no indicators of impairment identified for the Engineered Structures reporting unit.

The accounting policies of the segments are the same as those described in the Summary of Significant Accounting Policies (see Note [A](#)). Transactions among segments are established based on negotiation among the parties. Differences between segment totals and Howmet's consolidated totals for line items not reconciled are in Corporate.

The operating results and assets of the Company's reportable segments were as follows:

Year ended	Engine Products	Fastening Systems	Engineered Structures	Forged Wheels	Total Segment
2020					
Sales:					
Third-party sales	\$ 2,406	\$ 1,245	\$ 927	\$ 679	\$ 5,257
Inter-segment sales	5	—	7	—	12
Total sales	\$ 2,411	\$ 1,245	\$ 934	\$ 679	\$ 5,269
Profit and loss:					
Segment operating profit	\$ 417	\$ 247	\$ 73	\$ 153	\$ 890
Restructuring and other charges	36	39	28	3	106
Provision for depreciation and amortization	123	48	52	39	262
Other:					
Capital expenditures	\$ 77	\$ 39	\$ 19	\$ 23	\$ 158
Total Assets	\$ 4,756	\$ 2,707	\$ 1,444	\$ 628	\$ 9,535
2019					
Sales:					
Third-party sales	\$ 3,320	\$ 1,561	\$ 1,255	\$ 969	\$ 7,105
Inter-segment sales	11	—	13	—	24
Total sales	\$ 3,331	\$ 1,561	\$ 1,268	\$ 969	\$ 7,129
Profit and loss:					
Segment operating profit	\$ 621	\$ 396	\$ 120	\$ 253	\$ 1,390
Restructuring and other charges	297	6	199	4	506
Provision for depreciation and amortization	131	48	58	32	269
Other:					
Capital expenditures	\$ 211	\$ 36	\$ 27	\$ 70	\$ 344
Total Assets	\$ 5,445	\$ 2,810	\$ 1,151	\$ 629	\$ 10,035
2018					
Sales:					
Third-party sales	\$ 3,092	\$ 1,531	\$ 1,209	\$ 966	\$ 6,798
Inter-segment sales	16	—	19	—	35
Total sales	\$ 3,108	\$ 1,531	\$ 1,228	\$ 966	\$ 6,833
Profit and loss:					
Segment operating profit	\$ 464	\$ 357	\$ 64	\$ 220	\$ 1,105
Restructuring and other charges	47	17	(5)	—	59
Provision for depreciation and amortization	141	48	69	31	289
Other:					
Capital expenditures	\$ 217	\$ 47	\$ 53	\$ 90	\$ 407

The following table reconciles Total segment capital expenditures, which are presented on an accrual basis, with Capital expenditures as presented on the statement of cash flows. Differences between segment and consolidated totals are in Corporate and discontinued operations, including the impact of changes in accrued capital expenditures during the period.

For the year ended December 31,	2020	2019	2018
Total segment capital expenditures	\$ 158	\$ 344	\$ 407
Corporate and discontinued operations	109	297	361
Capital expenditures	<u>\$ 267</u>	<u>\$ 641</u>	<u>\$ 768</u>

The following tables reconcile certain segment information to consolidated totals:

For the year ended December 31,	2020	2019	2018
Sales:			
Total segment sales	\$ 5,269	\$ 7,129	\$ 6,833
Elimination of inter-segment sales	(12)	(24)	(35)
Corporate	2	(7)	(20)
Consolidated sales	<u>\$ 5,259</u>	<u>\$ 7,098</u>	<u>\$ 6,778</u>

For the year ended December 31,	2020	2019	2018
Total segment operating profit	\$ 890	\$ 1,390	\$ 1,105
Unallocated amounts:			
Restructuring and other charges	(182)	(582)	(163)
Corporate expense	(82)	(229)	(167)
Consolidated operating income	\$ 626	\$ 579	\$ 775
Interest expense	(381)	(338)	(377)
Other (expense) income, net	(74)	(31)	30
Income from continuing operations before income taxes	<u>\$ 171</u>	<u>\$ 210</u>	<u>\$ 428</u>

December 31,	2020	2019
Assets:		
Total segment assets	\$ 9,535	\$ 10,035
Unallocated amounts:		
Cash and cash equivalents	1,610	1,577
Deferred income taxes	272	209
Corporate fixed assets, net	140	135
Fair value of derivative contracts	5	6
Discontinued operations	—	5,341
Accounts receivable securitization	(241)	(61)
Other	122	320
Consolidated assets	<u>\$ 11,443</u>	<u>\$ 17,562</u>

Segment assets include third party receivables while the accounts receivable securitization item includes the impact of sold receivables under the Company's Accounts Receivable securitization programs. (See Note [M](#))

Geographic information for sales was as follows (based upon the destination of the sale):

For the year ended December 31,	2020	2019	2018
Sales:			
United States	\$ 2,782	\$ 3,534	\$ 3,265
Japan	388	480	462
France	327	546	523
Germany	309	385	385
United Kingdom	231	420	438
Mexico	185	277	252
Italy	181	195	196
Canada	119	179	155
Poland	76	131	112
China	75	168	165
Other	586	783	825
	<u>\$ 5,259</u>	<u>\$ 7,098</u>	<u>\$ 6,778</u>

Geographic information for long-lived tangible assets was as follows (based upon the physical location of the assets):

December 31,	2020	2019
Long-lived assets:		
United States	\$ 1,967	\$ 2,025
Hungary	213	202
France	150	141
United Kingdom	109	101
Germany	78	82
Mexico	62	57
China	59	61
Canada	44	43
Japan	25	25
Other	16	17
	<u>\$ 2,723</u>	<u>\$ 2,754</u>

The following table disaggregates segment revenue by major end market served. Differences between total segment and consolidated totals are in Corporate.

	Engine Products	Fastening Systems	Engineered Structures	Forged Wheels	Total Segment
Year ended December 31, 2020					
Aerospace - Commercial	\$ 1,247	\$ 808	\$ 542	\$ —	\$ 2,597
Aerospace - Defense	557	156	303	—	1,016
Commercial Transportation	—	155	—	679	834
Industrial and Other	602	126	82	—	810
Total end-market revenue	\$ 2,406	\$ 1,245	\$ 927	\$ 679	\$ 5,257
Year ended December 31, 2019					
Aerospace - Commercial	\$ 2,229	\$ 1,060	\$ 897	\$ —	\$ 4,186
Aerospace - Defense	475	158	256	—	889
Commercial Transportation	20	227	—	970	1,217
Industrial and Other	596	116	102	(1)	813
Total end-market revenue	\$ 3,320	\$ 1,561	\$ 1,255	\$ 969	\$ 7,105
Year ended December 31, 2018					
Aerospace - Commercial	\$ 2,056	\$ 1,069	\$ 871	\$ —	\$ 3,996
Aerospace - Defense	373	120	233	—	726
Commercial Transportation	48	229	—	969	1,246
Industrial and Other	615	113	105	(3)	830
Total end-market revenue	\$ 3,092	\$ 1,531	\$ 1,209	\$ 966	\$ 6,798

The Company derived 69%, 71% and 70% of its revenue for the year ended December 31, 2020, 2019 and 2018, respectively, from aerospace end markets.

General Electric Company represented approximately 11% of the Company's third-party sales for the year ended December 31, 2020, primarily from the Engine Products Segment.

E. Restructuring and Other Charges

Restructuring and other charges were comprised of the following:

For the year ended December 31,	2020	2019	2018
Layoff costs	\$ 113	\$ 69	\$ 18
Reversals of and adjustments to previously recorded layoff reserves	(21)	(6)	(8)
Pension, Other post-retirement benefits (costs) and deferred compensation - net settlement and curtailments	69	(7)	91
Non-cash asset impairments (O)	5	442	9
Net loss on divestitures of assets and businesses (U)	8	63	43
Other	8	21	10
Restructuring and other charges	\$ 182	\$ 582	\$ 163

Layoff costs were recorded based on approved detailed action plans submitted by the operating locations that specified positions to be eliminated, benefits to be paid under existing severance plans, union contracts or statutory requirements and the expected timetable for completion of the plans.

2020 Actions. In 2020, Howmet recorded Restructuring and other charges of \$182, which included a \$113 charge for layoff costs, including the separation of 4,301 employees (1,706 in Engine Products, 1,675 in Fastening Systems, 805 in Engineered Structures, 92 in Forged Wheels and 23 in Corporate); a \$69 net charge for Pension, Other postretirement benefits and deferred compensation - net settlement and curtailments composed of a \$74 charge for U.K. and U.S. pension plans' settlement accounting offset by a \$3 benefit from the termination of a deferred compensation plan and a \$2 curtailment benefit related to a

postretirement plan; a \$5 post-closing adjustment related to the sale of the Company's U.K. forgings business (which was formerly part of the Engine Products segment); a \$5 charge for impairment of assets associated with an agreement to sell an aerospace components business in the U.K. (within the Engineered Structures segment) that did not occur and the business was returned to held for use; \$5 charge related to the impairment of a cost method investment; a \$2 charge for accelerated depreciation; a \$1 charge for impairment of assets due to a facility sale and a \$6 charge for various other exit costs. These charges were partially offset by a benefit of \$21 related to the reversal of a number of prior period programs and a gain of \$3 on the sale of assets.

As of December 31, 2020, 3,519 of the 4,301 employees were separated. The remaining separations for the 2020 restructuring programs are expected to be completed in 2021.

2019 Actions. In 2019, Howmet recorded Restructuring and other charges of \$582 which included a \$428 charge for impairment of the Disks long-lived asset group; a \$69 charge for layoff costs, including the separation of 917 employees (103 in Engine Products, 128 in Engineered Structures, 132 in Fastening Systems, 60 in Forged Wheels and 494 in Corporate); a \$46 charge for impairment of assets associated with an agreement to sell the UK forging business; a \$14 charge for impairment of properties, plants, and equipment related to the Company's primary research and development facility; a \$13 loss on sale of assets primarily related to a small additive business; a \$12 charge for other exit costs from lease terminations primarily related to the exit of the corporate aircraft; a \$9 settlement accounting charge for U.S. pension plans; a \$5 charge for impairment of a cost method investment; a \$2 net charge for executive severance net of the benefit of forfeited executive stock compensation and a \$7 charge for other exit costs; partially offset by a benefit of \$16 related to the elimination of the life insurance benefit for the U.S. salaried and non-bargaining hourly retirees of the Company and its subsidiaries; a benefit of \$6 for the reversal of a number of layoff reserves related to prior periods and a net gain of \$1 on the sales of assets.

In 2019 the Company recorded an impairment charge of \$428 related to the Disks long-lived asset group, of which \$247 and \$181 was related to the Engine Products and Engineered Structures segments, respectively, as the carrying value exceeded the forecasted undiscounted cash flows composed of a write-down of properties, plants and equipment, intangible assets and certain other noncurrent assets. See Note [Q](#) for additional details.

As of December 31, 2020, the separations associated with the 2019 restructuring programs were essentially complete.

2018 Actions. In 2018, Howmet recorded Restructuring and other charges of \$163, which included a \$96 charge for pension plan settlement accounting; a \$23 charge for pension curtailment; a postretirement curtailment benefit of \$28; a \$43 loss on sale of the Hungary forgings business; a \$18 charge for layoff costs, including the separation of approximately 125 employees (34 in Engine Products, 55 in Fastening Systems and 36 in Corporate); a \$12 charge for contract termination costs and asset impairments associated with the shutdown of a facility in Acuna, Mexico; a \$6 charge for contract termination costs related to the New York office; a \$4 charge for other miscellaneous items including accelerated depreciation and asset impairments; a \$3 benefit for other exit costs and a \$8 benefit for the reversal of a number of layoff reserves related to prior periods.

As of December 31, 2020, the separations associated with the 2018 restructuring programs were complete.

Activity and reserve balances for restructuring charges were as follows:

	Layoff costs	Other exit costs	Total
Reserve balances at December 31, 2017	\$ 33	\$ —	\$ 33
2018 Activity			
Cash payments	(30)	—	(30)
Restructuring and other charges	101	62	163
Other ⁽¹⁾	(91)	(53)	(144)
Reserve balances at December 31, 2018	<u>\$ 13</u>	<u>\$ 9</u>	<u>\$ 22</u>
2019 Activity			
Cash payments	\$ (63)	\$ —	\$ (63)
Restructuring and other charges	58	524	582
Other ⁽²⁾	5	(533)	(528)
Reserve balances at December 31, 2019	<u>\$ 13</u>	<u>\$ —</u>	<u>\$ 13</u>
2020 Activity			
Cash payments	\$ (51)	\$ —	\$ (51)
Restructuring and other charges	161	21	182
Other ⁽³⁾	(69)	(21)	(90)
Reserve balances at December 31, 2020	<u>\$ 54</u>	<u>\$ —</u>	<u>\$ 54</u>

⁽¹⁾ In 2018, Other for layoff costs included reclassifications of \$119 in settlement and curtailment pension costs and a \$28 benefit in postretirement benefits, as the impacts were reflected in the Company's separate liabilities for Accrued pension benefits and Accrued postretirement benefits. In 2018, Other exit costs included a \$43 loss on sale of the Hungary forgings business; a \$9 charge for contract termination costs associated with the shutdown of a facility in Acuna, Mexico and the New York office; a \$4 charge for other miscellaneous items including accelerated depreciation and asset impairments; a \$3 benefit for other exit costs.

⁽²⁾ In 2019, Other for layoff costs included reclassifications of a \$16 credit for elimination of life insurance benefits for U.S. salaried and non-bargaining hourly retirees, a charge of \$9 for pension plan settlement accounting, as the impacts were reflected in the Company's separate liabilities for Accrued pension benefits and Accrued postretirement benefits; a charge of \$2 net charge for executive severance net of the benefit of forfeited executive stock compensation. In 2019, Other exit costs included a charge of \$428 for impairment of the Disks long-lived asset group; a charge of \$59 for impairment of assets associated with agreement to sell the U.K. forgings business, and a small additive business; a charge of \$14 for impairment of properties, plants, and equipment related to the Company's primary research and development facility; a charge of \$12 for lease terminations; \$5 charge for impairment of a cost method investment, a charge of \$7 related to other miscellaneous items and \$9 reclassification of lease exit costs to reduce right of use assets in Other Noncurrent assets in accordance with the adoption of the new lease accounting standard; partially offset by a gain of \$1 on the sales of assets.

⁽³⁾ In 2020, Other for layoff costs included \$74 in settlement accounting charges related to U.K. and U.S. pension plans, offset by a \$3 benefit from the termination of a deferred compensation plan and a \$2 curtailment benefit related to a postretirement plan; while Other exit costs included a charge of \$5 for impairment of assets; a \$5 post-closing adjustment related to the sale of a business; a \$5 charge related to the impairment of a cost method investment; a \$2 charge for accelerated depreciation; a \$1 charge for impairment of assets due to a facility closure and a \$6 charge for various other exit costs, which were offset by a gain of \$3 on the sale of assets.

The remaining reserves at December 31, 2020 are expected to be paid in cash during 2021.

F. Interest Cost Components

For the year ended December 31,	2020	2019	2018
Amount charged to expense	\$ 381	\$ 338	\$ 377
Amount capitalized	11	33	23
	<u>\$ 392</u>	<u>\$ 371</u>	<u>\$ 400</u>

G. Other Expense (Income), Net

For the year ended December 31,	2020	2019	2018
Non-service related net periodic benefit cost	\$ 26	\$ 17	\$ 19
Interest income	(5)	(24)	(22)
Foreign currency (gains) losses, net	(11)	5	9
Net loss from asset sales	8	10	10
Deferred Compensation	10	24	(8)
Other, net	46	(1)	(38)
Total	<u>\$ 74</u>	<u>\$ 31</u>	<u>\$ (30)</u>

In 2020, Other, net included a charge from the write-off of a tax indemnification receivable of \$53 reflecting the aggregate of Alcoa Corporation's 49% share and Arconic Corporation's 33.66% share of a Spanish tax reserve (see Note V). In 2018, Non-service related net periodic benefit cost included lower net actuarial losses as a result of pension actions taken during 2018 (see Note H) and Other, net included a benefit from establishing a tax indemnification receivable of \$29 reflecting Alcoa Corporation's 49% share of a Spanish tax reserve (see Note V).

H. Pension and Other Postretirement Benefits

Howmet maintains pension plans covering most U.S. employees and certain employees in foreign locations. Pension benefits generally depend on length of service and job grade. Substantially all benefits are paid through pension trusts that are sufficiently funded to ensure that all plans can pay benefits to retirees as they become due. Most salaried and non-bargaining hourly U.S. employees hired after March 1, 2006, participate in a defined contribution plan instead of a defined benefit plan.

Howmet also maintains health care and life insurance postretirement benefit plans covering eligible U.S. retired employees and certain retirees from foreign locations. Generally, the medical plans are unfunded and pay a percentage of medical expenses, reduced by deductibles and other coverage. Life benefits are generally provided by insurance contracts. Howmet retains the right, subject to existing agreements, to change or eliminate these benefits. All salaried and certain non-bargaining hourly U.S. employees hired after January 1, 2002 and certain bargaining hourly U.S. employees hired after July 1, 2010, are not eligible for postretirement health care benefits. All salaried and certain hourly U.S. employees that retire on or after April 1, 2008 are not eligible for postretirement life insurance benefits. Effective May 1, 2019, salaried employees and retirees are not eligible for postretirement life insurance benefits.

Effective January 1, 2015, Howmet no longer offers postretirement health care benefits to Medicare-eligible, primarily non-bargaining, U.S. retirees through Company-sponsored plans. Qualifying retirees (hired prior to January 1, 2002), both current and future, may access these benefits in the marketplace by purchasing coverage directly from insurance carriers.

On April 1, 2018, benefit accruals for future service and compensation under all of the Company's qualified and non-qualified defined benefit pension plans for U.S. salaried and non-bargaining hourly employees ceased. As a result of this change, in 2018, the Company recorded a decrease to the Accrued pension benefit liability of \$136 related to the reduction of future benefits (\$141 offset in Accumulated other comprehensive loss) and curtailment charges of \$5 in Restructuring and other charges.

On April 13, 2018, the United Auto Workers ratified a new five-year labor agreement, covering approximately 1,300 U.S. employees, which expires on March 31, 2023. A provision within the agreement includes a retirement benefit increase for future retirees that participate in a defined benefit pension plan, which impacts approximately 300 of those employees. In addition, effective January 1, 2019, benefit accruals for future service of this group ceased. As result of these changes, in 2018, a curtailment charge of \$9 was recorded in Restructuring and other charges.

In 2018, the Company announced that effective December 31, 2018, it would end all pre-Medicare medical, prescription drug and vision coverage for current and future salaried and non-bargained hourly employees and retirees of the Company and its subsidiaries. As a result of this change, in 2018, the Company recorded a decrease to the Accrued other postretirement benefits

liability of \$32 related to the reduction of future benefits, \$4 offset in Accumulated other comprehensive loss, and a curtailment benefit of \$28 in Restructuring and other charges.

In 2018, the company communicated to plan participants that effective in the first quarter of 2019, benefit accruals for future service and compensation for employees in the United Kingdom defined benefit pension plans will cease. The plan curtailment resulted in a \$13 decrease in the Accrued pension benefits liability which was offset in Accumulated other comprehensive loss. Additionally, on October 29, 2018, the United Kingdom High Court ruled that defined benefit pension plans offering Guaranteed Minimum Pensions must review benefits accrued between May 1990 to April 1997 to ensure gender pay equality. The review resulted in an increase to the Accrued pension benefits liability of \$9 and a corresponding curtailment charge that was recorded in Restructuring and other charges.

In 2019, the Company communicated to plan participants that for its U.S. salaried and non-bargained hourly retirees of the Company and its subsidiaries, it would eliminate the life insurance benefit effective May 1, 2019, and certain health care subsidies effective December 31, 2019. As a result of these changes, in 2019, the Company recorded a decrease to the Accrued other postretirement benefits liability of \$75, which was offset by a curtailment benefit of \$58 (of which \$16 was recorded in Restructuring and other charges and \$42 related to Arconic Corporation in Discontinued Operations) and \$17 in Accumulated other comprehensive loss.

In June 2019, the Company and the United Steelworkers ("USW") reached a tentative three-year labor agreement that was ratified on July 11, 2019 covering approximately 3,400 employees at four U.S. locations of Arconic Corporation; the previous labor agreement expired on May 15, 2019. In 2019, the Company recognized \$9 in Discontinued operations on the accompanying Statement of Consolidated Operations primarily for a one-time signing bonus for employees. Additionally, on July 25, 2019, the USW ratified a new four-year labor agreement covering approximately 560 employees at the Company's Niles, Ohio facility. The prior labor agreement expired on June 30, 2018.

In 2020 and 2019, the Company applied settlement accounting to U.S. pension plans due to lump sum payments to participants which resulted in settlement charges of \$8 and \$9, respectively, that were recorded in Restructuring and other charges.

In 2020 the Company undertook a number of actions to reduce pension obligations in the U.K. by offering lump sum payments to certain plan participants and entering into group annuity contracts with a third-party carrier to pay and administer future annuity payments which resulted in settlement charges of \$66 that were recorded in Restructuring and other charges in the Statement of Consolidated Operations. These actions reduced the number of pension plan participants in the U.K. by approximately half.

In 2020, the Company communicated to plan participants that for its U.S. salaried and non-bargained hourly retirees of the Company and its subsidiaries, it would eliminate certain health care subsidies effective December 31, 2021, and that for certain bargained retirees of the Company, it would eliminate certain health care subsidies effective December 31, 2021 and the life insurance benefit effective August 1, 2020. As a result of these amendments, the Company recorded a decrease to the Accrued other postretirement benefits liability of \$6 in 2020, which was offset in Accumulated other comprehensive loss.

The funded status of all of Howmet's pension and other postretirement benefit plans are measured as of December 31 each calendar year.

Obligations and Funded Status

December 31,	Pension benefits		Other postretirement benefits	
	2020	2019	2020	2019
Change in benefit obligation				
Benefit obligation at beginning of year	\$ 7,249	\$ 6,476	\$ 786	\$ 806
Transfer to Arconic Corporation	(4,355)	—	(569)	—
Service cost	6	25	2	7
Interest cost	71	235	7	28
Amendments	6	—	(11)	(78)
Actuarial losses ⁽¹⁾	313	974	14	100
Settlements	(398)	(23)	—	—
Benefits paid	(153)	(477)	(17)	(82)
Medicare Part D subsidy receipts	—	—	3	5
Foreign currency translation impact	(26)	39	—	—
Benefit obligation at end of year ⁽²⁾	\$ 2,713	\$ 7,249	\$ 215	\$ 786
Change in plan assets⁽²⁾				
Fair value of plan assets at beginning of year	\$ 4,868	\$ 4,334	\$ —	\$ —
Transfer to Arconic Corporation	(2,982)	—	—	—
Actual return on plan assets	203	731	—	—
Employer contributions	227	268	—	—
Benefits paid	(136)	(453)	—	—
Administrative expenses	(12)	(34)	—	—
Settlement payments	(413)	(22)	—	—
Foreign currency translation impact	(31)	44	—	—
Fair value of plan assets at end of year ⁽²⁾	\$ 1,724	\$ 4,868	\$ —	\$ —
Funded status	\$ (989)	\$ (2,381)	\$ (215)	\$ (786)
Amounts recognized in the Consolidated Balance Sheet consist of:				
Noncurrent assets	\$ 12	\$ 41	\$ —	\$ —
Noncurrent assets of discontinued operations	—	63	—	—
Current liabilities	(16)	(19)	(17)	(17)
Current liabilities of discontinued operations	—	(7)	—	(55)
Noncurrent liabilities	(985)	(1,030)	(198)	(200)
Noncurrent liabilities of discontinued operations	—	(1,429)	—	(514)
Net amount recognized	\$ (989)	\$ (2,381)	\$ (215)	\$ (786)
Amounts recognized in Accumulated Other Comprehensive Loss consist of:				
Net actuarial loss	\$ 1,274	\$ 3,375	\$ 22	\$ 179
Prior service cost (benefit)	6	1	(28)	(37)
Net amount recognized, before tax effect	\$ 1,280	\$ 3,376	\$ (6)	\$ 142
Other changes in plan assets and benefit obligations recognized in Other Comprehensive Loss consist of:				
Net actuarial loss	\$ 166	\$ 566	\$ 14	\$ 100
Amortization of accumulated net actuarial (loss) gain	(123)	(148)	1	(8)
Loss transferred to Arconic Corporation	(2,144)	—	(170)	—

Prior service cost (benefit)	5	—	(11)	(78)
Amortization of prior service (cost) benefit	—	(2)	5	68
Prior service credit transferred to Arconic Corporation	—	—	13	—
Net amount recognized, before tax effect	<u>\$ (2,096)</u>	<u>\$ 416</u>	<u>\$ (148)</u>	<u>\$ 82</u>

- (1) At December 31, 2020, the actuarial losses impacting the benefit obligation were due to changes in discount rate, alternative interest cost method and other changes including census data, partially offset by actual asset returns in excess of expected returns.
- (2) At December 31, 2020, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were \$2,327, \$1,361, and \$(966), respectively. At December 31, 2019, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were \$5,884, \$3,513, and \$(2,371) respectively.

Pension Plan Benefit Obligations

	Pension benefits	
	2020	2019
The projected benefit obligation and accumulated benefit obligation for all defined benefit pension plans were as follows:		
Projected benefit obligation	\$ 2,713	\$ 7,249
Accumulated benefit obligation	2,707	7,219
The aggregate projected benefit obligation and fair value of plan assets for pension plans with projected benefit obligations in excess of plan assets was as follows:		
Projected benefit obligation	2,364	6,064
Fair value of plan assets	1,364	3,579
The aggregate accumulated benefit obligation and fair value of plan assets for pension plans with accumulated benefit obligations in excess of plan assets was as follows:		
Accumulated benefit obligation	2,359	6,045
Fair value of plan assets	1,364	3,579

Components of Net Periodic Benefit Cost

For the year ended December 31,	Pension benefits ⁽¹⁾			Other postretirement benefits ⁽²⁾		
	2020	2019	2018	2020	2019	2018
Service cost	\$ 12	\$ 25	\$ 46	\$ 3	\$ 7	\$ 7
Interest cost	97	235	219	10	28	28
Expected return on plan assets	(136)	(286)	(306)	—	—	—
Recognized net actuarial loss	78	139	168	3	4	7
Amortization of prior service cost (benefit)	—	2	3	(6)	(6)	(7)
Settlements ⁽³⁾	76	9	96	—	—	—
Curtailments ⁽⁴⁾	—	—	23	(2)	(58)	(28)
Net periodic benefit cost ⁽⁵⁾	\$ 127	\$ 124	\$ 249	\$ 8	\$ (25)	\$ 7
Discontinued operations	20	95	100	6	(15)	12
Net amount recognized in Statement of Consolidated Operations	<u>\$ 107</u>	<u>\$ 29</u>	<u>\$ 149</u>	<u>\$ 2</u>	<u>\$ (10)</u>	<u>\$ (5)</u>

- (1) In 2020, 2019 and 2018, net periodic benefit cost for U.S. pension plans was \$58, \$127, and \$239, respectively.
- (2) In 2020, 2019 and 2018, net periodic benefit cost for other postretirement benefits reflects a reduction of \$1, \$11, and \$10, respectively, related to the recognition of the federal subsidy awarded under Medicare Part D.
- (3) In 2020, settlements were related to U.K. actions including lump sum benefits and the purchase of group annuity contracts as well as U.S. lump sum benefit payments. In 2019 and 2018, settlements were due to workforce reductions and the payment of lump sum benefits. (See Note E)

- (4) In 2020, the curtailment was due to workforce reductions. In 2019 and 2018, curtailments were due to a reduction of future benefits, resulting in the recognition of favorable and unfavorable plan amendments.
- (5) Service cost was included within Cost of goods sold, Selling, general administrative, and other expenses, and Research and development expenses; curtailments and settlements were included in Restructuring and other charges; and all other cost components were recorded in Other expense (income), net in the Statement of Consolidated Operations.

Assumptions

Weighted average assumptions used to determine benefit obligations for pension and other postretirement benefit plans were as follows:

December 31,	2020	2019
Discount rate	2.40 %	3.00 %
Cash balance plan interest crediting rate	3.00 %	3.00 %

The U.S. discount rate is determined using a Company-specific yield curve model (above-median) developed with the assistance of an external actuary while both the U.K. and Canada utilize models developed internally by their respective actuary. The cash flows of the plans' projected benefit obligations are discounted using a single equivalent rate derived from yields on high quality corporate bonds, which represent a broad diversification of issuers in various sectors, including finance and banking, industrials, transportation, and utilities, among others. The yield curve model parallels the plans' projected cash flows, which have a global average duration of 12 years. The underlying cash flows of the bonds included in the model exceed the cash flows needed to satisfy the Company's plans' obligations multiple times.

Benefit accruals for future compensation under the Company's major salaried and non-bargained hourly defined benefit pension plans have ceased. The rate of compensation increase no longer impacts the determination of the benefit obligation.

Weighted average assumptions used to determine net periodic benefit cost for pension and other postretirement benefit plans were as follows:

	2020	2019	2018
Discount rate to calculate service cost ⁽¹⁾	3.30 %	4.30 %	3.60 %
Discount rate to calculate interest cost ⁽¹⁾	2.70 %	3.90 %	3.30 %
Expected long-term rate of return on plan assets	6.00 %	5.60 %	5.90 %
Rate of compensation increase ⁽²⁾	— %	3.50 %	3.50 %
Cash balance plan interest crediting rate	3.00 %	3.00 %	3.00 %

(1) In all periods presented, the respective global discount rates were used to determine net periodic benefit cost for most pension plans for the full annual period. However, the discount rates for a limited number of plans were updated during 2020, 2019, and 2018 to reflect the remeasurement of these plans due to new union labor agreements, settlements, and/or curtailments. The updated discount rates used were not significantly different from the discount rates presented.

(2) Benefit accruals for future compensation under the Company's major salaried and non-bargained hourly defined benefit pension plans have ceased. The rate of compensation increase no longer impacts the determination of the benefit obligation.

The expected long-term rate of return on plan assets ("EROA") is generally applied to a five-year market-related value of plan assets (a fair value at the plan measurement date is used for certain non-U.S. plans). The process used by management to develop this assumption is one that relies on a combination of historical asset return information and forward-looking returns by asset class. As it relates to historical asset return information, management focuses on various historical moving averages when developing this assumption. While consideration is given to recent performance and historical returns, the assumption represents a long-term, prospective return. Management also incorporates expected future returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment.

For 2020, 2019, and 2018, the U.S. expected long-term rate of return used by management was based on the prevailing and planned strategic asset allocations, as well as estimates of future returns by asset class. These rates fell within the respective range of the 20-year moving average of actual performance and the expected future return developed by asset class. In 2018, management reduced the expected long-term rate of return by 75 basis points to 7.00% for the U.S. Pension plans due to a decrease in the expected return by asset class and the 20-year moving average. For 2021, management anticipates that 7.00% will continue to be the expected long-term rate of return for the U.S. Pension plans. EROA assumptions are developed by country. Annual changes in the weighted average EROA are impacted by the relative size of the assets by country.

Assumed health care cost trend rates for U.S. other postretirement benefit plans were as follows:

	2020	2019	2018
Health care cost trend rate assumed for next year	5.50 %	5.50 %	5.50 %
Rate to which the cost trend rate gradually declines	4.50	4.50	4.50
Year that the rate reaches the rate at which it is assumed to remain	2023	2023	2022

The assumed health care cost trend rate is used to measure the expected cost of gross eligible charges covered by Howmet's other postretirement benefit plans. For 2021, a 5.5% trend rate will be used, reflecting management's best estimate of the change in future health care costs covered by the plans. The plans' actual annual health care cost trend experience over the past three years has ranged from (3.8)% to 4.0%. Management does not believe this three-year range is indicative of expected increases for future health care costs over the long-term.

Plan Assets

Howmet's pension plans' investment policy at December 31, 2020 by asset class, were as follows:

Asset class	Policy range ⁽¹⁾
Equities	20–55%
Fixed income	25–55%
Other investments	15–35%
Total	

⁽¹⁾ Policy range is for U.S. plan assets only, as both the U.K. and Canadian asset investment allocations are controlled by a third-party trustee with input from Howmet.

The principal objectives underlying the investment of the pension plans' assets are to ensure that Howmet can properly fund benefit obligations as they become due under a broad range of potential economic and financial scenarios, maximize the long-term investment return with an acceptable level of risk based on such obligations, and broadly diversify investments across and within various asset classes to protect asset values against adverse movements. Specific objectives for long-term investment strategy include reducing the volatility of pension assets relative to pension liabilities and achieving diversification across the balance of the asset portfolio. The use of derivative instruments is permitted where appropriate and necessary for achieving overall investment policy objectives. The investment strategy uses long duration cash bonds and derivative instruments to offset a portion of the interest rate sensitivity of U.S. pension liabilities. Exposure to broad equity risk is decreased and diversified through investments in discretionary and systematic macro hedge funds, long/short equity hedge funds, high yield bonds, emerging market debt and global and emerging market equities. Investments are further diversified by strategy, asset class, geography, and sector to enhance returns and mitigate downside risk. A large number of external investment managers are used to gain broad exposure to the financial markets and to mitigate manager-concentration risk.

Investment practices comply with the requirements of the Employee Retirement Income Security Act of 1974 ("ERISA") and other applicable laws and regulations.

The following section describes the valuation methodologies used to measure the fair value of pension plan assets, including an indication of the level in the fair value hierarchy in which each type of asset is generally classified (see Note S for the definition of fair value and a description of the fair value hierarchy).

Equities. These securities consist of: (i) direct investments in the stock of publicly traded U.S. and non-U.S. companies, and equity derivatives, that are valued based on the closing price reported in an active market on which the individual securities are traded (generally classified in Level 1); (ii) the plans' share of commingled funds that are invested in the stock of publicly traded companies and are valued at the net asset value of shares held at December 31 (included in Level 1 and Level 2); and (iii) direct investments in long/short equity hedge funds and private equity (limited partnerships and venture capital partnerships) that are valued at net asset value.

Fixed income. These securities consist of: (i) U.S. government debt that are generally valued using quoted prices (included in Level 1); (ii) cash and cash equivalents invested in publicly-traded funds and are valued based on the closing price reported in an active market on which the individual securities are traded (generally classified in Level 1); (iii) publicly traded U.S. and non-U.S. fixed interest obligations (principally corporate bonds and debentures) and are valued through consultation and evaluation with brokers in the institutional market using quoted prices and other observable market data (included in Level 2); (iv) fixed income derivatives that are generally valued using industry standard models with market-based observable inputs (included in Level 2); and (v) cash and cash equivalents invested in institutional funds and are valued at net asset value.

Other investments. These investments include, among others: (i) exchange traded funds, such as gold, and real estate investment trusts and are valued based on the closing price reported in an active market on which the investments are traded (included in Level 1) and (ii) direct investments of discretionary and systematic macro hedge funds and private real estate (includes limited partnerships) and are valued at net asset value.

The fair value methods described above may not be indicative of net realizable value or reflective of future fair values. Additionally, while Howmet believes the valuation methods used by the plans' trustees are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The following table presents the fair value of pension plan assets classified under the appropriate level of the fair value hierarchy or net asset value:

December 31, 2020	Level 1	Level 2	Net Asset Value	Total
Equities:				
Equity securities	\$ 274	\$ 89	\$ 68	\$ 431
Long/short equity hedge funds	—	—	77	77
Private equity	—	—	87	87
	<u>\$ 274</u>	<u>\$ 89</u>	<u>\$ 232</u>	<u>\$ 595</u>
Fixed income:				
Intermediate and long duration government/credit	\$ 78	\$ 579	\$ 31	\$ 688
Other	63	254	—	317
	<u>\$ 141</u>	<u>\$ 833</u>	<u>\$ 31</u>	<u>\$ 1,005</u>
Other investments:				
Real estate	\$ 31	\$ —	\$ 52	\$ 83
Discretionary and systematic macro hedge funds	—	—	94	94
Other	—	—	23	23
	<u>\$ 31</u>	<u>\$ —</u>	<u>\$ 169</u>	<u>\$ 200</u>
Net plan assets⁽¹⁾	<u>\$ 446</u>	<u>\$ 922</u>	<u>\$ 432</u>	<u>\$ 1,800</u>

December 31, 2019	Level 1	Level 2	Net Asset Value	Total
Equities				
Equity securities	\$ 590	\$ —	\$ 508	\$ 1,098
Long/short equity hedge funds	—	—	260	260
Private equity	—	—	155	155
	<u>\$ 590</u>	<u>\$ —</u>	<u>\$ 923</u>	<u>\$ 1,513</u>
Fixed income:				
Intermediate and long duration government/credit	\$ 121	\$ 1,047	\$ 1,003	\$ 2,171
Other	126	7	144	277
	<u>\$ 247</u>	<u>\$ 1,054</u>	<u>\$ 1,147</u>	<u>\$ 2,448</u>
Other investments:				
Real estate	\$ 104	\$ —	\$ 165	\$ 269
Discretionary and systematic macro hedge funds	—	—	405	405
Other	—	—	240	240
	<u>\$ 104</u>	<u>\$ —</u>	<u>\$ 810</u>	<u>\$ 914</u>
Net plan assets⁽²⁾	<u>\$ 941</u>	<u>\$ 1,054</u>	<u>\$ 2,880</u>	<u>\$ 4,875</u>

(1) As of December 31, 2020, the total fair value of pension plans' assets excludes a net payable of \$76, which represents securities purchased and sold but not yet settled plus interest and dividends earned on various investments.

(2) As of December 31, 2019, the total fair value of pension plans' assets excludes a net receivable of \$7, which represents securities purchased and sold but not yet settled plus interest and dividends earned on various investments.

Funding and Cash Flows

It is Howmet's policy to fund amounts for pension plans sufficient to meet the minimum requirements set forth in applicable country benefits laws and tax laws. Periodically, Howmet contributes additional amounts as deemed appropriate. In 2020 and 2019, cash contributions to Howmet's pension plans were \$227 and \$268, respectively, which includes \$25 and \$53, respectively, contributed to the Company's U.S. plans that was in excess of the minimum required under ERISA.

The contributions to the Company's pension plans in 2021 are estimated to be \$140 (of which \$130 is for U.S. plans), all of which are minimum required contributions.

During the third quarter of 2016, the Pension Benefit Guaranty Corporation approved management's plan to separate the Alcoa Inc. pension plans between the Company and Alcoa Corporation. The plan stipulated that the Company make cash contributions of \$150 over a period of 30 months (from November 1, 2016) to its two largest pension plans. The Company satisfied the requirements of the plan by making payments of \$34, \$66, and \$50 in April 2019, March 2018, and April 2017, respectively.

Benefit payments expected to be paid to pension and other postretirement benefit plans' participants and expected Medicare Part D subsidy receipts are as follows utilizing the current assumptions outlined above:

For the year ended December 31,	Pension benefits paid	Gross Other post-retirement benefits	Less Medicare Part D subsidy receipts	Net Other post-retirement benefits
2021	\$ 168	\$ 17	\$ 1	\$ 16
2022	169	16	1	15
2023	164	16	1	15
2024	160	15	1	14
2025	158	15	1	14
2026 - 2030	728	67	6	61
	<u>\$ 1,547</u>	<u>\$ 146</u>	<u>\$ 11</u>	<u>\$ 135</u>

Defined Contribution Plans

Howmet sponsors savings and investment plans in various countries, primarily in the U.S. Howmet's contributions and expenses related to these plans were \$73, \$87, and \$85 in 2020, 2019, and 2018, respectively. U.S. employees may contribute a portion of their compensation to the plans, and Howmet matches a portion of these contributions in equivalent form of the investments elected by the employee.

I. Income Taxes

The components of income from continuing operations before income taxes were as follows:

For the year ended December 31,	2020	2019	2018
United States	\$ 84	\$ 128	\$ 166
Foreign	87	82	262
	<u>\$ 171</u>	<u>\$ 210</u>	<u>\$ 428</u>

The provision for income taxes consisted of the following:

For the year ended December 31,	2020	2019	2018
Current:			
Federal ⁽¹⁾	\$ (2)	\$ —	\$ —
Foreign	2	86	68
State and local	(2)	—	—
	<u>(2)</u>	<u>86</u>	<u>68</u>
Deferred:			
Federal	(67)	33	100
Foreign	11	(41)	(53)
State and local	18	6	4
	<u>(38)</u>	<u>(2)</u>	<u>51</u>
Total	<u>\$ (40)</u>	<u>\$ 84</u>	<u>\$ 119</u>

⁽¹⁾ Includes U.S. taxes related to foreign income

A reconciliation of the U.S. federal statutory rate to Howmet's effective tax rate was as follows (the effective tax rate for 2020 was a benefit on income and for 2019 and 2018 was a provision on income):

For the year ended December 31,	2020	2019	2018
U.S. federal statutory rate	21.0 %	21.0 %	21.0 %
Foreign tax rate differential	(1.4)	10.6	3.2
U.S. and residual tax on foreign earnings	5.6	15.3	5.5
U.S. State and local taxes	2.2	0.8	(0.4)
Federal (cost) benefit of state tax	(2.0)	1.2	0.4
Permanent differences related to asset disposals and items included in restructuring and other charges ⁽¹⁾	6.8	(1.3)	(34.3)
Non-deductible officer compensation	3.5	4.9	0.3
Statutory tax rate and law changes ⁽²⁾	(15.9)	(0.6)	13.2
Tax holidays	(0.4)	(8.2)	(3.0)
Changes in valuation allowances ⁽³⁾	74.8	(52.2)	(1.3)
Changes in uncertain tax positions ⁽⁴⁾	(116.9)	0.3	26.2
Prior year tax adjustments ⁽⁵⁾	(1.7)	44.3	(4.2)
Other	1.0	3.9	1.2
Effective tax rate	<u>(23.4)%</u>	<u>40.0 %</u>	<u>27.8 %</u>

⁽¹⁾ In 2018, a \$74 benefit was recorded related to the reversal of a foreign recapture obligation.

⁽²⁾ In 2020, final regulations were issued that provided an election to exclude from GILTI any foreign earnings subject to a local country tax rate of at least 90% of the U.S. tax rate. The Company recorded a \$30 benefit related to this tax law change. In 2018, the Company finalized its accounting for the Tax Cuts and Jobs Act of 2017 ("the 2017 Act") and recorded an additional \$59 charge.

⁽³⁾ In 2020, a \$104 valuation allowance was recorded related to deferred tax assets that were previously subject to a reserve that was otherwise released in 2020 as a result of a favorable Spanish tax case decision. In 2019, the Company released a \$112 valuation allowance related to 2015 and 2016 foreign tax credits, subsequent to filing U.S. amended tax returns to deduct, rather than credit, foreign taxes.

⁽⁴⁾ In 2020, the Company released a \$64 reserve liability and a \$104 reserve recorded as a contra balance against deferred tax assets as a result of a favorable Spanish tax case decision. A \$30 benefit related to a previously uncertain U.S. tax position was also recognized in 2020. In 2018, the tax charge to establish the reserves related to the Spanish tax matter was partially offset by a \$38 benefit related to a foreign reserve that was effectively settled.

⁽⁵⁾ In 2019, the Company filed U.S. amended tax returns to deduct, rather than credit, 2015 and 2016 foreign taxes resulting in a \$112 tax cost associated with the write-off of the deferred tax asset for the credit, partially offset by a \$24 tax benefit for the deduction.

On December 22, 2017, the 2017 Act was signed into law, making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a corporate tax rate decrease from 35% to 21% effective for tax years beginning after December 31, 2017, the transition of U.S. international taxation from a worldwide tax system to a territorial system, and a one-time transition tax on the non-previously taxed post-1986 foreign earnings and profits of certain U.S.-owned foreign corporations as of December 31, 2017. Also on December 22, 2017, Staff Accounting Bulletin No. 118 ("SAB 118"), Income Tax Accounting Implications of the Tax Cuts and Jobs Act, was issued by the SEC to address the application of U.S. GAAP for financial reporting. SAB 118 permitted the use of provisional amounts based on reasonable estimates in the financial statements. SAB 118 also provided that the tax impact may be considered incomplete 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 2017 Act.

The Company calculated a reasonable estimate of the impact of the 2017 Act's tax rate reduction and one-time transition tax in its 2017 year end income tax provision in accordance with its understanding of the 2017 Act and guidance available and, as a result, recorded a \$272 tax charge in the fourth quarter of 2017, the period in which the legislation was enacted.

In 2018, the Company included a \$59 tax charge in income from continuing operations as a result of finalizing its accounting for the 2017 Tax Act in accordance with SAB 118. This charge primarily related to a \$16 charge for the one-time transition tax and a \$43 charge to update deferred tax balances.

The components of net deferred tax assets and liabilities were as follows:

December 31,	2020		2019	
	Deferred tax assets	Deferred tax liabilities	Deferred tax assets	Deferred tax liabilities
Depreciation	\$ 21	\$ 506	\$ 10	\$ 480
Employee benefits	364	—	368	6
Loss provisions	24	1	36	—
Deferred income/expense	41	1,033	48	939
Interest	3	—	56	—
Tax loss carryforwards	3,267	—	2,819	—
Tax credit carryforwards	378	—	379	—
Other	7	13	23	—
	\$ 4,105	\$ 1,553	\$ 3,739	\$ 1,425
Valuation allowance	(2,307)	—	(2,121)	—
	\$ 1,798	\$ 1,553	\$ 1,618	\$ 1,425

The following table details the expiration periods of the deferred tax assets presented above:

December 31, 2020	Expires within 10 years	Expires within 11-20 years	No Expiration ⁽¹⁾	Other ⁽²⁾	Total
Tax loss carryforwards	\$ 378	\$ 262	\$ 2,627	\$ —	\$ 3,267
Tax credit carryforwards	299	66	13	—	378
Other ⁽³⁾	—	—	389	71	460
Valuation allowance	(644)	(161)	(1,479)	(23)	(2,307)
	\$ 33	\$ 167	\$ 1,550	\$ 48	\$ 1,798

⁽¹⁾ Deferred tax assets with no expiration may still have annual limitations on utilization.

⁽²⁾ Other represents deferred tax assets whose expiration is dependent upon the reversal of the underlying temporary difference.

⁽³⁾ A substantial amount of Other deferred tax assets relates to employee benefits that will become deductible for tax purposes in jurisdictions with unlimited expiration over an extended period of time as contributions are made to employee benefit plans and payments are made to retirees.

The total deferred tax asset (net of valuation allowance) is supported by projections of future taxable income exclusive of reversing temporary differences (15%) and taxable temporary differences that reverse within the carryforward period (85%).

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not (greater than 50%) that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Howmet's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance. Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also remeasured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

In 2018, the Company made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset GILTI income inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that support the realizability of deferred tax assets.

Howmet's foreign tax credits in the United States have a 10-year carryforward period with expirations ranging from 2021 to 2029 (as of December 31, 2020). Valuation allowances were initially established in prior years on a portion of the foreign tax credit carryforwards, primarily due to insufficient foreign source income to allow for full utilization of the credits within the expiration period. After consideration of all available evidence including potential tax planning strategies, an incremental valuation allowance of \$46 was recognized in 2018. No additional valuation allowance was recorded in 2020 and 2019 as the Company intends to deduct, rather than credit, foreign taxes. Foreign tax credits of \$88 and \$8 expired at the end of 2019 and 2018, respectively, resulting in a corresponding decrease to the valuation allowance. The valuation allowance was also reduced by \$113 in 2019 as a result of the Company filing amended tax returns to deduct foreign taxes that were previously claimed as a U.S. foreign tax credit. At December 31, 2020, the cumulative amount of the valuation allowance was \$216. The need for this valuation allowance will be reassessed on a continuous basis in future periods and, as a result, the allowance may increase or decrease based on changes in facts and circumstances.

In 2020, the Company reversed \$1 of valuation allowance recorded in 2019 related to capital losses utilized in the 2019 tax return. The Company also recorded a valuation allowance of \$9 related to capital investments in 2019. Capital losses can only offset capital gain income. Howmet does not anticipate sufficient future sources of capital gain income to support the utilization future capital losses on these investments. The need for valuation allowances against capital investments will be reassessed on a continuing basis.

The Company recorded a \$20 increase and \$11 decrease to U.S. state valuation allowances in 2020 and 2019, respectively. After weighing all available positive and negative evidence, the Company determined the adjustments based on the underlying net deferred tax assets that were more likely than not realizable based on projected taxable income. Changes in fully reserved U.S. state tax losses, credits and other deferred tax assets resulting from expirations, audit adjustments, tax rate, and tax law changes also resulted in a corresponding \$58 decrease and \$5 increase in the valuation allowance in 2020 and 2019, respectively. Valuation allowances of \$609 remain against state deferred tax assets expected to expire before utilization. The need for valuation allowances against state deferred tax assets will be reassessed on a continuous basis in future periods and, as a result, the allowance may increase or decrease based on changes in facts and circumstances.

In 2020, the Company increased a valuation allowance by \$104 as a result of releasing a tax reserve following a favorable Spanish tax case decision. In 2018, the Company had reduced a valuation allowance by \$92 as a result of increasing a tax reserve for unrecognized tax benefits related to the same Spanish tax case. The valuation allowance reduction was partially offset by a \$20 charge with respect to losses no longer supported by reversing temporary differences. The Company also recorded an additional valuation allowance of \$61 in 2018, which offset a deferred tax asset recorded for additional losses reported on the Spanish tax return related to the Alcoa Inc. Separation Transaction that are not more likely than not to be realized.

The following table details the changes in the valuation allowance:

December 31,	2020	2019	2018
Balance at beginning of year	\$ 2,121	\$ 2,357	\$ 2,459
Increase to allowance	136	19	119
Release of allowance	(50)	(211)	(144)
Acquisitions and divestitures	—	(2)	—
Tax apportionment, tax rate and tax law changes	(23)	(13)	(14)
Foreign currency translation	123	(29)	(63)
Balance at end of year	<u>\$ 2,307</u>	<u>\$ 2,121</u>	<u>\$ 2,357</u>

As a result of the 2017 Act, the non-previously taxed post-1986 foreign earnings and profits (calculated based on U.S. tax principles) of certain U.S.-owned foreign corporations has been subject to U.S. tax under the one-time transition tax provisions. The 2017 Act also created a new requirement that certain income earned by foreign subsidiaries, GILTI, must be included in the gross income of the U.S. shareholder. The 2017 Act also established the Base Erosion and Anti-Abuse Tax ("BEAT"). In the first quarter of 2018, the Company made a final accounting policy election to treat taxes due from future inclusions in U.S. taxable income related to GILTI as a current period expense when incurred. Howmet has estimated a GILTI inclusion for 2020, 2019, and 2018 and recorded tax expense accordingly. Howmet does not anticipate being subject to BEAT for these years.

Foreign U.S. GAAP earnings that have not otherwise been subject to U.S. tax, will generally be exempt from future U.S. tax under the 2017 Act when distributed. Such distributions, as well as distributions of previously taxed foreign earnings, could potentially be subject to U.S. state tax in certain states, and foreign withholding taxes. Foreign currency gains/losses related to the translation of previously taxed earnings from functional currency to U.S. dollars could also be subject to U.S. tax when distributed. At this time, Howmet has no plans to distribute such earnings in the foreseeable future. If such earnings were to be distributed, Howmet would expect the potential U.S. state tax and withholding tax impacts to be immaterial and the potential deferred tax liability associated with future foreign currency gains to be impracticable to determine.

Howmet and its subsidiaries file income tax returns in the U.S. federal jurisdiction and various states and foreign jurisdictions. With a few minor exceptions, Howmet is no longer subject to income tax examinations by tax authorities for years prior to 2011. All U.S. tax years prior to 2020 have been audited by the Internal Revenue Service. Various state and foreign jurisdiction tax authorities are in the process of examining the Company's income tax returns for various tax years through 2019.

A reconciliation of the beginning and ending amount of unrecognized tax benefits (excluding interest and penalties) was as follows:

December 31,	2020	2019	2018
Balance at beginning of year	\$ 176	\$ 148	\$ 50
Additions for tax positions of the current year	—	34	—
Additions for tax positions of prior years	—	—	143
Reductions for tax positions of prior years	(182)	(1)	(38)
Settlements with tax authorities	(1)	—	—
Expiration of the statute of limitations	—	(2)	(6)
Foreign currency translation	9	(3)	(1)
Balance at end of year	<u>\$ 2</u>	<u>\$ 176</u>	<u>\$ 148</u>

For all periods presented, a portion of the balance pertains to state tax liabilities, which are presented before any offset for federal tax benefits. The effect of unrecognized tax benefits, if recorded, that would impact the annual effective tax rate for 2020, 2019, and 2018 would be approximately 1%, 36%, and 11%, respectively, of pre-tax book income. Howmet does not anticipate that changes in its unrecognized tax benefits will have a material impact on the Statement of Consolidated Operations during 2021.

It is Howmet's policy to recognize interest and penalties related to income taxes as a component of the Provision for income taxes on the accompanying Statement of Consolidated Operations. Howmet recognized interest of \$2, \$6, and \$22 in 2020, 2019, and 2018, respectively. Due to the expiration of the statute of limitations, settlements with tax authorities, reductions in prior accruals and refunded overpayments, Howmet recognized interest income of \$25, \$0, and \$1 in 2020, 2019, and 2018, respectively. As of December 31, 2020, 2019, and 2018, the amount accrued for the payment of interest and penalties was \$2, \$23, and \$21, respectively.

J. Preferred and Common Stock

Preferred Stock. Howmet has two classes of preferred stock: \$3.75 Cumulative Preferred Stock ("Class A Preferred Stock") and Class B Serial Preferred Stock. Class A Preferred Stock has 660,000 shares authorized at a par value of \$100 per share with an annual \$3.75 cumulative dividend preference per share. There were 546,024 shares of Class A Preferred Stock outstanding at December 31, 2020 and 2019. Class B Serial Preferred Stock has 10,000,000 shares authorized as a par value of \$1 per share. There were no shares of Class B Serial Preferred Stock outstanding at December 31, 2020 and 2019.

Common Stock. At December 31, 2020, there were 600,000,000 shares authorized and 432,906,377 shares issued and outstanding. Dividends paid were \$0.02 per share in 2020 (all in the first quarter of 2020) and \$0.12 per share in 2019 (\$0.06 dividend in the first quarter of 2019 and \$0.02 per quarter for the remainder of the year) and \$0.24 per share in 2018, or \$0.06 per quarter in 2018.

As of December 31, 2020, 47 million shares of common stock were reserved for issuance under Howmet's stock-based compensation plans. As of December 31, 2020, 33 million shares remain available for issuance. Howmet issues new shares to satisfy the exercise of stock options and the conversion of stock awards.

In July 2015, through the acquisition of RTI International Metals Inc. ("RTI"), the Company assumed the obligation to repay two tranches of convertible debt; one tranche was due and settled in cash on December 1, 2015 (principal amount of \$115) and the other tranche was due and settled in cash on October 15, 2019 (principal amount of \$403). No shares of the Company's common stock were issued in connection with the maturity or final conversion of this convertible debt.

Common Stock Outstanding and Share Activity (number of shares)

Balance at December 31, 2017	481,416,537
Issued for stock-based compensation plans	1,854,180
Balance at December 31, 2018	<u>483,270,717</u>
Issued for stock-based compensation plans	4,436,830
Repurchase and retirement of common stock	<u>(54,852,364)</u>
Balance at December 31, 2019	<u>432,855,183</u>
Issued for stock-based compensation plans	3,896,119
Repurchase and retirement of common stock	<u>(3,844,925)</u>
Balance at December 31, 2020	<u><u>432,906,377</u></u>

On February 19, 2019, the Company entered into an accelerated share repurchase ("ASR") agreement with JPMorgan Chase Bank to repurchase \$700 of its common stock (the "February 2019 ASR"), pursuant to the share repurchase programs previously authorized by its Board of Directors (the "Board"). On May 2, 2019, the Company entered into an ASR agreement with JPMorgan Chase Bank to repurchase \$200 of its common stock (the "May 2019 ASR"), pursuant to the share repurchase programs previously authorized by its Board.

On May 14, 2019, the Board authorized the repurchase of an additional \$500 of its outstanding common stock. Pursuant to the share repurchase programs previously authorized by the Board, the Company entered into an ASR agreement on August 6, 2019 with Goldman Sachs & Co. LLC to repurchase \$200 of its common stock (the "August 2019 ASR"). In November 2019, the Company repurchased \$50 of its common stock on the open market.

In August/September 2020 and in November 2020, the Company repurchased \$51 and \$22, respectively, of its common stock on the open market.

Shares repurchased during 2020 and 2019 were \$73 and \$1,150, respectively. All of the shares repurchased during 2020 and 2019 were immediately retired. After giving effect to the share repurchases made through December 31, 2020, approximately \$277 remains available under the prior authorizations by the Board for share repurchases. The amount of share repurchases by the Company may be limited under the terms of the Five-Year Revolving Credit Agreement. (See Note [R](#))

The following table provides details for the share repurchases during 2020 and 2019.

	Number of shares	Average price	Total
August/September 2020 open market repurchase	2,907,094	\$17.36	\$51
November 2020 open market repurchase	937,831	\$23.99	\$22
2020 Share repurchase total	3,844,925	\$18.98	\$73
February 2019 ASR total	36,434,423	\$19.21	\$700
May 2019 ASR total	9,016,981	\$22.18	\$200
August 2019 ASR total	7,774,279	\$25.73	\$200
November 2019 open market repurchase	1,626,681	\$30.74	\$50
2019 Share repurchase total	54,852,364	\$20.97	\$1,150

Stock-Based Compensation

Howmet has a stock-based compensation plan under which stock options and/or restricted stock unit awards are granted in the first half of each year to eligible employees. Stock options are granted at the closing market price of Howmet's common stock on the date of grant and typically vest over a three-year service period (1/3 each year) with a ten-year contractual term. Restricted stock unit awards typically vest over a three-year service period from the date of grant. As part of Howmet's stock-based compensation plan design, individuals who are retirement-eligible have a six-month requisite service period in the year of grant. Certain of the restricted stock unit awards include performance and market conditions and are granted to certain eligible employees. In 2020 and 2019, performance stock awards were granted to a senior executive that vest either based on achievement of the Arconic Inc. Separation Transaction (see Note C for further details) or the achievement of certain stock price thresholds. For performance stock awards granted to other employees in 2020, the final number of shares earned will be based on Howmet's achievement of profitability targets over the respective performance periods and will be earned at the end of the third year. Performance stock awards granted in the first quarter of 2019 were converted to restricted stock unit awards (at target), in order to address the pending Arconic Inc. Separation Transaction. For performance stock awards granted in 2018, in order to address the pending Arconic Inc. Separation Transaction, the final number of shares earned will be based on Howmet's achievement of sales and profitability targets over performance periods in 2018 and 2019. Additionally, the 2020 and 2018 performance stock awards will be scaled by a total shareholder return ("TSR") multiplier, which depends upon relative performance against the TSRs of a group of peer companies.

In conjunction with their employment agreements, certain current and former executives were granted cash bonus awards based on the achievement of certain stock price thresholds. These awards are liability classified and were marked-to-market each quarter using a Monte Carlo simulation. The stock price thresholds have been fully reached. The cash payment of \$23 will occur in 2021 in accordance with the terms of the agreements.

In 2020, 2019, and 2018, Howmet recognized stock-based compensation expense of \$46 (\$42 after-tax), \$69 (\$63 after-tax), and \$40 (\$31 after-tax), respectively. Senior executive performance awards granted in April 2020 were modified in June 2020, resulting in incremental compensation expense of \$12, which will be amortized over the remaining service period ending April 1, 2023. Additionally, the effect of the Arconic Inc. Separation Transaction was a modification of the original stock options and restricted stock award units. The modifications were designed with the intention that the intrinsic value of the stock option or stock award were the same both previous to and after the adjustments. An immaterial charge was recorded to Restructuring and other charges related to the modification.

Over 95% of compensation expense recorded in 2020 relates to restricted stock unit awards. Cash bonus awards of \$2 and \$21 were recorded in 2020 and 2019, respectively. Of the remaining stock-based compensation expense in 2019, more than 95% relates to restricted stock unit awards. The expense related to restricted stock unit awards in 2018 was approximately 80%. No stock-based compensation expense was capitalized in any of those years. Stock-based compensation expense was reduced by \$3 in 2019 for certain executive pre-vest cancellations which were recorded in Restructuring and other charges within the Statement of Consolidated Operations. At December 31, 2020, there was \$51 (pre-tax) of unrecognized compensation expense related to non-vested stock option grants and non-vested restricted stock unit award grants. This expense is expected to be recognized over a weighted average period of 1.8 years.

Stock-based compensation expense is based on the grant date fair value of the applicable equity grant. For restricted stock unit awards, the fair value was equivalent to the closing market price of Howmet's common stock on the date of grant. The weighted average grant date fair value of the 2020 performance stock awards with a market condition scaled by a TSR multiplier was \$21.33, and the weighted average grant date fair value of the April 2020 senior executive performance stock awards with a market condition (achievement of certain stock price thresholds) was \$2.57. The weighted average grant date fair value of the 2019 performance stock awards with a market condition (achievement of certain stock price thresholds) was \$11.93. The grant date fair value of the 2018 performance stock awards containing a market condition (scaled by TSR multiplier) was \$20.25. The 2020, 2019 and 2018 performance awards were valued using a Monte Carlo model. A Monte Carlo simulation uses assumptions of stock price behavior to estimate the probability of satisfying market conditions and the resulting fair value of the award. The risk-free interest rate (0.3% in 2020, 1.6% in 2019 and in 2.7% 2018) was based on a yield curve of interest rates at the time of the grant based on the remaining performance period. In 2020 volatility was estimated using a blended rate of Howmet's historical volatility and a peer-based volatility (48.3%) due to the Arconic Inc. Separation Transaction and the related changes in the nature of the business. In 2019 volatility was estimated using implied and historical volatility (33.4%). Because of limited historical information due to the Alcoa Inc. Separation Transaction, 2018 volatility (32.0%) was estimated using implied volatility, and the representative price return approach, which uses price returns of comparable companies, was used to develop a correlation assumption. For stock options, the fair value was estimated on the date of grant using a lattice-pricing model, which generated a result of \$9.79 per option in 2018. There were no stock options issued in 2020 or 2019. The lattice-pricing model uses a number of assumptions to estimate the fair value of a stock option, including a risk-free interest rate, dividend yield, volatility, exercise behavior, and contractual life. The following paragraph describes in detail the assumptions used to estimate the fair value of stock options granted in 2018.

The risk-free interest rate (2.5%) was based on a yield curve of interest rates at the time of the grant based on the contractual life of the option. The dividend yield (0.9%) was based on a one-year average. Volatility (34.0%) was based on comparable companies and implied volatilities over the term of the option. Howmet utilized historical option forfeiture data to estimate annual post-vesting forfeitures (6%). Exercise behavior (61%) was based on a weighted average exercise ratio (exercise patterns for grants issued over the number of years in the contractual option term) of an option's intrinsic value resulting from historical employee exercise behavior. Based upon the other assumptions used in the determination of the fair value, the life of an option (6.0) was an output of the lattice-pricing mod. The activity for stock options and stock awards during 2020 was as follows (options and awards in millions):

	Stock options		Stock awards	
	Number of options	Weighted average exercise price	Number of awards	Weighted average FMV per award
Outstanding, December 31, 2019	7	\$ 25.75	7	\$ 22.05
Granted	—	—	6	10.89
Exercised	(2)	21.65	—	—
Converted	—	—	(4)	19.54
Expired or forfeited	(1)	30.12	—	19.57
Canceled due to Arconic Inc. Separation Transaction ⁽¹⁾	(1)	27.85	(1)	23.84
Adjustment due to Arconic Inc. Separation Transaction ⁽²⁾	—	24.35	1	19.10
Performance share adjustment	—	—	—	21.20
Outstanding, December 31, 2020	3	\$ 24.47	9	\$ 13.68

⁽¹⁾ As a result of the Arconic Inc. Separation Transaction, all stock options and stock awards relating to Arconic Corporation employees were cancelled.

⁽²⁾ As a result of the Arconic Inc. Separation Transaction, all stock options and stock awards relating to Howmet employees were adjusted to reflect the Arconic Inc. Separation Transaction.

As of December 31, 2020, the number of stock options outstanding had a weighted average remaining contractual life of 2.9 years and a total intrinsic value of \$18. Additionally, 3.1 million of the stock options outstanding were fully vested and exercisable and had a weighted average remaining contractual life of 2.8 years, a weighted average exercise price of \$24.32, and a total intrinsic value of \$18 as of December 31, 2020. In 2020, 2019, and 2018, the cash received from stock option exercises was \$33, \$56, and \$16 and the total tax benefit realized from these exercises was \$3, \$4, and \$2, respectively. The total intrinsic value of stock options exercised during 2020, 2019, and 2018 was \$14, \$17, and \$7, respectively.

K. Earnings Per Share

Basic earnings per share ("EPS") amounts are computed by dividing earnings (loss), after the deduction of preferred stock dividends declared, by the average number of common shares outstanding. Diluted EPS amounts assume the issuance of common stock for all potentially dilutive share equivalents outstanding.

The information used to compute basic and diluted EPS attributable to Howmet common shareholders was as follows (shares in millions):

For the year ended December 31,	2020	2019	2018
Net income from continuing operations attributable to common shareholders	\$ 211	126	309
Less: preferred stock dividends declared	2	2	2
Net income from continuing operations attributable to common shareholders:	209	124	307
Income from discontinued operations	50	344	333
Net income available to Howmet Aerospace common shareholders - basic	259	468	640
Add: interest expense related to convertible notes	—	9	11
Net income available to Howmet common shareholders - diluted	\$ 259	\$ 477	\$ 651
Average shares outstanding - basic	435	446	483
Effect of dilutive securities:			
Stock options	—	1	1
Stock and performance awards	4	5	5
Convertible notes ⁽¹⁾	—	11	14
Average shares outstanding - diluted	439	463	503

⁽¹⁾ The convertible notes matured on October 15, 2019 (see Note [R](#)). No shares of the Company's common stock were issued in connection with the maturity or the final conversion of the convertible notes. As of October 15, 2019, the calculation of average diluted shares outstanding ceased to include the approximately 15 million shares of common stock and the corresponding interest expense previously attributable to the convertible notes.

Common stock outstanding was 433 million shares at both at December 31, 2020 and 2019.

The following shares were excluded from the calculation of average shares outstanding – diluted as their effect was anti-dilutive (shares in millions).

For the year ended December 31,	2020	2019	2018
Convertible notes	—	—	—
Stock options	1	1	9
Stock awards	—	—	—

L. Accumulated Other Comprehensive Loss

The following table details the activity of the four components that comprise Accumulated other comprehensive loss for Howmet's shareholders:

	2020	2019	2018
Pension and other postretirement benefits (H)			
Balance at beginning of period	\$ (2,732)	\$ (2,344)	\$ (2,230)
Adoption of accounting standard ⁽¹⁾	—	—	(369)
Other comprehensive (loss) income:			
Unrecognized net actuarial (loss) gain and prior service cost/benefit	(211)	(587)	70
Tax benefit (expense)	48	129	(19)
Total Other comprehensive (loss) income before reclassifications, net of tax	(163)	(458)	51
Amortization of net actuarial loss and prior service cost ⁽²⁾	149	90	262
Tax expense ⁽³⁾	(32)	(20)	(58)
Total amount reclassified from Accumulated other comprehensive loss, net of tax ⁽⁴⁾	117	70	204
Total Other comprehensive (loss) income	(46)	(388)	255
Transfer to Arconic Corporation	1,798	—	—
Balance at end of period	<u>\$ (980)</u>	<u>\$ (2,732)</u>	<u>\$ (2,344)</u>
Foreign currency translation			
Balance at beginning of period	\$ (596)	\$ (583)	\$ (437)
Other comprehensive (loss) ⁽⁵⁾	58	(13)	(146)
Transfer to Arconic Corporation	(428)	—	—
Balance at end of period	<u>\$ (966)</u>	<u>\$ (596)</u>	<u>\$ (583)</u>
Debt securities			
Balance at beginning of period	\$ —	\$ (3)	\$ (2)
Other comprehensive income (loss) ⁽⁶⁾	—	3	(1)
Balance at end of period	<u>\$ —</u>	<u>\$ —</u>	<u>\$ (3)</u>
Cash flow hedges			
Balance at beginning of period	\$ (1)	\$ 4	\$ 25
Adoption of accounting standard ⁽⁷⁾	—	(2)	2
Other comprehensive (loss):			
Net change from periodic revaluations	—	(9)	(15)
Tax benefit	—	3	3
Total Other comprehensive (loss) income before reclassifications, net of tax	—	(6)	(12)
Net amount reclassified to earnings	6	4	(14)
Tax (expense) benefit ⁽³⁾	(2)	(1)	3
Total amount reclassified from Accumulated other comprehensive loss, net of tax ⁽⁴⁾	4	3	(11)
Total Other comprehensive (loss)	4	(3)	(23)
Balance at end of period	<u>\$ 3</u>	<u>\$ (1)</u>	<u>\$ 4</u>
Accumulated other comprehensive loss balance at end of period	<u><u>\$ (1,943)</u></u>	<u><u>\$ (3,329)</u></u>	<u><u>\$ (2,926)</u></u>

⁽¹⁾ Adjustment related to eliminating stranded tax effects resulting from a change in income tax rates resulting from the enactment of the Tax Cuts and Jobs Act

⁽²⁾ These amounts were recorded in Other expense (income), net (see Note G).

⁽³⁾ These amounts were included in Provision for income taxes on the accompanying Statement of Consolidated Operations.

⁽⁴⁾ A positive amount indicates a corresponding charge to earnings and a negative amount indicates a corresponding benefit to earnings.

- (5) In all periods presented, no amounts were reclassified to earnings.
- (6) Realized gains and losses were included in Other expense (income), net, on the accompanying Statement of Consolidated Operations.
- (7) Adjustment was related to eliminating the separate measurement of hedge ineffectiveness as part of the adoption of new hedge accounting guidance.

M. Receivables

Sale of Receivables Program

The Company has two accounts receivables securitization arrangements.

The first is an arrangement with financial institutions to sell certain customer receivables without recourse on a revolving basis ("Receivables Sale Program"). The sale of such receivables is completed using a bankruptcy remote special purpose entity, which is a consolidated subsidiary of the Company. This arrangement historically provided up to a maximum funding of \$400 for receivables sold. The Company maintains a beneficial interest, or a right to collect cash, on the sold receivables that have not been funded (deferred purchase program receivable). In the first quarter of 2020, the Company entered into an amendment to remove subsidiaries of the GRP business from the sale of receivables program in preparation for the Arconic Inc. Separation Transaction and repurchased the remaining \$282 unpaid receivables of GRP customers in a non-cash transaction by reducing the amount of the deferred purchase program receivable. This amendment also reduced the maximum funding for receivables sold to \$300. Effective September 30, 2020, the concentration limit of one customer may be reduced at the discretion of the financial institutions or automatically upon the downgrade of its debt rating as defined in the Receivables Sale Program agreement. A reduction in the customer's concentration limit would reduce the eligible receivable funding base thereby reducing the amount of future draws available and may also require repayment of a portion of existing draws.

The Company had net cash repayments totaling \$146 (\$207 in draws and \$353 in repayments) in 2020 and net cash repayments totaling \$0 (\$600 in draws and \$600 in repayments) in 2019.

As of December 31, 2020, and 2019, the deferred purchase program receivable was \$12 and \$246, respectively, which was included in Other receivables on the accompanying Consolidated Balance Sheet. The deferred purchase program receivable is reduced as collections of the underlying receivables occur; however, as this is a revolving program, the sale of new receivables will result in an increase in the deferred purchase program receivable. The Company services the customer receivables for the financial institutions at market rates; therefore, no servicing asset or liability was recorded.

On April 14, 2020, the Company's credit rating was downgraded by Moody's Investors Service, Inc., which resulted in a termination event under the provisions of the Receivables Sale Program agreement for which a waiver was obtained. This termination event under the Receivables Sale Program is not an event of default under the Company's other financing and commercial agreements, including the Credit Agreement. On May 5, 2020, an amendment to the Receivables Sale Program was executed that cured the termination event.

Cash receipts from customer payments on sold receivables (which are cash receipts on the underlying trade receivables that have been previously sold in this program) as well as cash receipts and cash disbursements from draws and repayments under the program are presented as cash receipts from sold receivables within investing activities in the Statement of Consolidated Cash Flows.

The second arrangement is one in which the Company, through a wholly-owned special purpose entity ("SPE"), entered into an receivables purchase agreement (the "Receivables Purchase Agreement") on June 30, 2020 such that the SPE may sell certain receivables to financial institutions until the earlier of June 30, 2021 or a termination event. The Receivables Purchase Agreement also contains customary representations and warranties, as well as affirmative and negative covenants. Pursuant to the Receivables Purchase Agreement, the Company does not maintain effective control over the transferred receivables, and therefore accounts for these transfers as sales of receivables.

The SPE sold \$165 of its receivables without recourse and received cash funding under this program in 2020, resulting in derecognition of the receivables from the Company's consolidated balance sheets (of which \$46 remained outstanding from the customer at December 31, 2020 and \$0 was in the program at December 31, 2019). Cash received from collections of sold receivables is used by the SPE to fund additional purchases of receivables on a revolving basis, not to exceed \$125, which is the aggregate maximum limit. As collateral against the sold receivables, the SPE maintains a certain level of unsold receivables, which was \$33 at December 31, 2020. Costs associated with the sales of receivables are reflected in the Company's Consolidated statements of operations for the periods in which the sales occur. Cash receipts from sold receivables under the Receivables Purchase Agreement are presented within operating activities in the Statement of Consolidated Cash Flows.

The Company had accounts receivable securitization arrangements totaling \$425 at December 31, 2020, of which \$250 was drawn. The Company had accounts receivable securitization arrangements totaling \$400 at December 31, 2019, of which \$350 was drawn. The \$100 reduction in the amount drawn resulted in a corresponding reduction in Cash and cash equivalents.

Other Customer Receivable Sales

In 2020, the Company sold \$32 of a certain customer's receivables in exchange for cash (of which \$0 remained outstanding from the customer at December 31, 2020), the proceeds from which are presented in changes in receivables within operating activities in the Statement of Consolidated Cash Flows. The sale of these customer receivables partially offset the maximum funding reduction resulting from the Arconic Inc. Separation Transaction as well as customer concentration limits within the first accounts receivable securitization arrangement.

In 2020, the Company sold another customer's receivables of \$149 in exchange for cash (of which \$50 remained outstanding from the customer at December 31, 2020), the proceeds from which are presented in changes in receivables within operating activities in the Statement of Consolidated Cash Flows. The sale of these customer receivables was undertaken to offset a change in the customer's payment patterns (customer had been taking a discount for paying early).

Allowance for Doubtful Accounts

The following table details the changes in the allowance for doubtful accounts related to customer receivables and other receivables:

	Customer receivables			Other receivables		
	2020	2019	2018	2020	2019	2018
Balance at beginning of year	\$ 1	\$ 1	\$ 3	\$ 15	\$ 15	\$ 15
Provision for doubtful accounts	1	2	—	3	7	2
Write off of uncollectible accounts	—	(1)	(2)	(1)	(2)	(1)
Recoveries of prior write-offs	—	—	—	(1)	(3)	(3)
Other	(1)	(1)	—	3	(2)	2
Balance at end of year	<u>\$ 1</u>	<u>\$ 1</u>	<u>\$ 1</u>	<u>\$ 19</u>	<u>\$ 15</u>	<u>\$ 15</u>

N. Inventories

December 31,	2020	2019
Finished goods	\$ 528	\$ 524
Work-in-process	629	741
Purchased raw materials	292	299
Operating supplies	39	43
Total inventories	<u>\$ 1,488</u>	<u>\$ 1,607</u>

At December 31, 2020 and 2019, the portion of inventories valued on a LIFO basis was \$458 and \$503, respectively. If valued on an average-cost basis, total inventories would have been \$131 and \$133 higher at December 31, 2020 and 2019, respectively.

O. Properties, Plants, and Equipment, Net

	December 31, 2020	December 31, 2019
Land and land rights	\$ 98	\$ 99
Structures	1,033	938
Machinery and equipment	3,879	3,626
	5,010	4,663
Less: accumulated depreciation and amortization	2,626	2,449
	2,384	2,214
Construction work-in-progress	208	415
Properties, plants, and equipment, net	<u>\$ 2,592</u>	<u>\$ 2,629</u>

During the second quarter of 2019, the Company updated its five-year strategic plan and determined that there was a decline in the forecasted financial performance for the Disks asset group within the Engineered Products and Forgings segment at that time. As such, the Company evaluated the recoverability of the Disks asset group long-lived assets by comparing the carrying value to the undiscounted cash flows of the Disks asset group. The carrying value exceeded the undiscounted cash flows and therefore the Disks asset group long-lived assets were deemed to be impaired. The impairment charge was measured as the amount of carrying value in excess of fair value of the long-lived assets, with fair value determined using a DCF model and a combination of sales comparison and cost approach valuation methods including an estimate for economic obsolescence. The impairment charge of \$428, of which \$247 and \$181 related to the Engine Products and Engineered Structures segments, respectively, recorded in the second quarter of 2019 impacted properties, plants, and equipment; intangible assets; and certain other noncurrent assets by \$198, \$197, and \$33, respectively. The impairment charge was recorded in Restructuring and other charges in the Statement of Consolidated Operations in 2019.

Depreciation expense related to Properties, plants and equipment recorded in Provision for depreciation and amortization in the accompanying Statement of Consolidated Operations was \$236, \$234, and \$253 for the years ended December 31, 2020, 2019 and 2018, respectively.

P. Goodwill and Other Intangible Assets

The following table details the changes in the carrying amount of goodwill:

	Engine Products	Fastening Systems	Engineered Structures	Forged Wheels	Total
Balances at December 31, 2018					
Goodwill	\$ 2,785	\$ 1,607	\$ 506	\$ 7	\$ 4,905
Accumulated impairment losses	(719)	—	—	—	(719)
Goodwill, net	2,066	1,607	506	7	4,186
Acquisitions and Divestitures (See Note U)					
	(13)	—	—	—	(13)
Translation and other					
	6	—	(2)	—	4
Transfer from Engineered Structures to Discontinued Operations (Arconic Corporation)					
	—	—	(110)	—	(110)
Transfer from Engineered Structures to Engine Products					
	105	—	(105)	—	—
Balances at December 31, 2019					
Goodwill	2,883	1,607	289	7	4,786
Accumulated impairment losses	(719)	—	—	—	(719)
Goodwill, net	2,164	1,607	289	7	4,067
Impairment (See Note U)					
	—	—	(2)	—	(2)
Translation and other					
	24	13	—	—	37
Transfer from Engine Products to Engineered Structures					
	(17)	—	17	—	—
Balances at December 31, 2020					
Goodwill	2,890	1,620	306	7	4,823
Accumulated impairment losses	(719)	—	(2)	—	(721)
Goodwill, net	\$ 2,171	\$ 1,620	\$ 304	\$ 7	\$ 4,102

In the first quarter of 2020, the Savannah operations was transferred from the Engine Products segment to the Engineered Structures segment, and as a result goodwill of \$17 was reallocated.

In the second quarter of 2019, the Company's casting operations were transferred from the Engineered Structures segment to the Engine Products segment, and as a result goodwill of \$105 was reallocated. In the second quarter of 2018, the aluminum extrusion operations was also transferred from the Engineered Structures segment to Discontinued operations, and as a result goodwill of \$110 was reallocated.

Other intangible assets were as follows:

December 31, 2020	Gross carrying amount	Accumulated amortization	Intangibles, net
Computer software	\$ 194	\$ (169)	\$ 25
Patents and licenses	67	(65)	2
Other intangibles	700	(188)	512
Total amortizable intangible assets	961	(422)	539
Indefinite-lived trade names and trademarks	32	—	32
Total intangible assets, net	\$ 993	\$ (422)	\$ 571

December 31, 2019	Gross carrying amount	Accumulated amortization	Intangibles, net
Computer software	\$ 199	\$ (165)	\$ 34
Patents and licenses	67	(65)	2
Other intangibles	693	(162)	531
Total amortizable intangible assets	959	(392)	567
Indefinite-lived trade names and trademarks	32	—	32
Total intangible assets, net	<u>\$ 991</u>	<u>\$ (392)</u>	<u>\$ 599</u>

During the second quarter of 2019, the Company recorded a charge of \$197 for intangible asset impairments associated with the Disks long-lived asset group which was recorded in Restructuring and other charges in the accompanying Statement of Consolidated Operations. See Note [O](#) for additional details.

Computer software consists primarily of software costs associated with enterprise business solutions across Howmet's businesses.

Amortization expense related to the intangible assets recorded in Provision for depreciation and amortization in the accompanying Statement of Consolidated Operations was \$40, \$58, and \$58 for the years ended December 31, 2020, 2019, and 2018 respectively, and is expected to be in the range of approximately \$37 to \$43 annually from 2021 to 2025.

Q. Leases

Operating lease cost, which included short-term leases and variable lease payments and approximated cash paid, was \$67, \$84, and \$87 in 2020, 2019, and 2018, respectively.

Operating lease right-of-use assets and lease liabilities in the Consolidated Balance Sheet were as follows:

December 31,	2020	2019
Right-of-use assets classified in Other noncurrent assets	\$ 131	\$ 125
Current portion of lease liabilities classified in Other current liabilities	38	38
Long-term portion of lease liabilities classified in Other noncurrent liabilities and deferred credits	100	98
Total lease liabilities	<u>\$ 138</u>	<u>\$ 136</u>

Future minimum contractual operating lease obligations were as follows at December 31, 2020:

2021	\$ 44
2022	34
2023	25
2024	17
2025	11
Thereafter	32
Total lease payments	<u>\$ 163</u>
Less: Imputed interest	(25)
Present value of lease liabilities	<u>\$ 138</u>

December 31,	2020	2019
Right-of-use assets obtained in exchange for operating lease obligations	\$ 35	\$ 26
Weighted-average remaining lease term in years	6	6
Weighted-average discount rate	5.6 %	5.9 %

R. Debt**Debt.**

December 31,	2020	2019
6.150% Notes, due 2020	\$ —	\$ 1,000
5.400% Notes, due 2021 ⁽¹⁾	361	1,250
5.870% Notes, due 2022	476	627
5.125% Notes, due 2024	1,250	1,250
6.875% Notes, due 2025	1,200	—
5.900% Notes, due 2027	625	625
6.750% Bonds, due 2028	300	300
5.950% Notes, due 2037	625	625
4.750% Iowa Finance Authority Loan, due 2042	250	250
Other ⁽²⁾	(12)	13
	<u>5,075</u>	<u>5,940</u>
Less: amount due within one year	376	1,034
Total long-term debt	\$ 4,699	\$ 4,906

⁽¹⁾ Redeemed on January 15, 2021.

⁽²⁾ Includes various financing arrangements related to subsidiaries, unamortized debt discounts and unamortized debt issuance costs related to outstanding notes and bonds listed in the table above.

The principal amount of long-term debt maturing in each of the next five years is \$361 in 2021, \$476 in 2022, \$0 in 2023, \$1,250 in 2024, and \$1,200 in 2025.

Public Debt. On January 15, 2021 the Company completed the early redemption of all the remaining \$361 of its 5.400% Notes due in April 2021 (the "5.400% Notes") at par and paid \$5 in accrued interest. On an annual basis, the redemption of these Notes will decrease Interest expense, net by approximately \$19.

On May 21, 2020, the Company completed a cash tender offer and redeemed \$589 and \$151 of principal amount of the 5.400% Notes and its 5.870% Notes due 2022, respectively. The amount of early tender premium and accrued interest and associated with the notes accepted for early settlement were \$24 and \$4, respectively, which was recorded in Interest expense, net during the second quarter ended June 30, 2020 and nine months ended September 30, 2020 in the Statement of Consolidated Operations.

On April 24, 2020, the Company completed an offering of \$1,200 aggregate principal amount of 6.875% Notes due 2025, the proceeds of which have been used to fund the cash tender offers noted above and to pay related transaction fees, including applicable premiums and expenses, with the remaining amount to be used for general corporate purposes. The Company incurred deferred financing costs of \$14 associated with the issuance in the second quarter of 2020.

On April 16, 2020, the Company filed a shelf registration statement on Form S-3 with the Securities and Exchange Commission, which became effective automatically (the "Shelf Registration Statement"). The Shelf Registration Statement allows for offerings of debt securities from time to time.

On April 6, 2020, the Company completed the early redemption of all \$1,000 of its 6.150% Notes due 2020 (the "6.150% Notes") and the early partial redemption of \$300 of its 5.400% Notes. Holders of the 6.150% Notes were paid an aggregate of \$1,020 and holders of the 5.400% Notes were paid an aggregate of \$315, plus accrued and unpaid interest up to, but not including, the redemption date. The Company incurred early termination premium and accrued interest of \$35 and \$17, respectively, which has been recorded in Interest expense, net during the second quarter ended June 30, 2020 and nine months ended September 30, 2020 in the Statement of Consolidated Operations.

On October 15, 2019, the 1.63% Convertible Notes matured in accordance with their terms and the Company repaid in cash the aggregate outstanding principal amount of \$403 together with accrued and unpaid interest.

During the first quarter of 2018, the Company completed the early redemption of its remaining outstanding 5.72% Notes due in 2019, with aggregate principal amount of \$500, for \$518 in cash including accrued and unpaid interest. As a result, the Company recorded a charge of \$19 in Interest expense in the accompanying Statement of Consolidated Operations for 2018 primarily for the premium paid on the early redemption of these notes in excess of their carrying value.

The Company has the option to redeem certain of its Notes and Bonds in whole or part, at any time at a redemption price equal to the greater of principal amount or the sum of the present values of the remaining scheduled payments, discounted using a defined treasury rate plus a spread, plus in either case accrued and unpaid interest to the redemption date.

Credit Facilities. On July 25, 2014, Howmet entered into a Five-Year Revolving Credit Agreement with a syndicate of lenders and issuers named therein, which provides for a senior unsecured revolving credit facility (the “Credit Facility”). By an Extension Request and Amendment Letter dated as of June 5, 2015, the maturity date of the Credit Facility was extended to July 25, 2020. On September 16, 2016, Howmet entered into Amendment No. 1 to the Five-Year Revolving Credit Agreement to permit the Alcoa Inc. Separation Transaction and to amend certain terms of the Credit Agreement, including the replacement of the existing financial covenant with a leverage ratio and reduction of total commitments available from \$4,000 to \$3,000. On June 29, 2018, the Company entered into Amendment No. 2 (“Amendment No. 2”) to amend and restate the Five-Year Revolving Credit Agreement. The Five-Year Revolving Credit Agreement, as so amended and restated, is herein referred to as the “Credit Agreement.”

On March 4, 2020, the Company entered into Amendment No. 3 to the Credit Agreement. The amendment was entered into to permit the Arconic Inc. Separation Transaction and to amend certain terms of the Credit Agreement, including a change to the existing financial covenant and reduction of total commitments available from \$3,000 to \$1,500, effective April 1, 2020 and extended the maturity date from June 29, 2023 to April 1, 2025. The Company was required to maintain a ratio of Consolidated Net Debt (as defined in the Credit Agreement) to Consolidated EBITDA (as defined in the Credit Agreement) to be no greater than 3.50 to 1.00.

On June 26, 2020, the Company entered into Amendment No. 4 to the Credit Agreement to provide relief from its existing financial covenant through December 31, 2021 and reduce total commitment available from \$1,500 to \$1,000. The Company is required to maintain a ratio of Consolidated Net Debt to Consolidated EBITDA (as defined in the Credit Agreement) as of the end of each fiscal quarter for the period of the four fiscal quarters of the Company most recently ended, to be no greater than (i) 5.00 to 1.00 for any quarter ending on or prior to December 31, 2020, (ii) 5.25 to 1.00 for the quarter ending March 31, 2021, (iii) 5.00 to 1.00 for the quarter ending June 30, 2021, (iv) 4.50 to 1.00 for the quarter ending September 30, 2021, and (v) 4.00 to 1.00 for the quarter ending December 31, 2021. The ratio returns to 3.50 to 1.00 for all periods thereafter.

Under Amendment No. 4 to the Credit Agreement, during the covenant relief period from June 30, 2020 through December 31, 2021 (unless the Company ends the covenant relief period earlier in accordance with the amendment), common stock dividends and share repurchases are permitted only if no borrowings under the Credit Agreement are outstanding at the time and are limited to an aggregate amount of \$100 through June 30, 2021, with such limit increasing by \$150 to an aggregate amount of \$250 after June 30, 2021 if the Consolidated Net Debt to Consolidated EBITDA ratio is no greater than 3.75 to 1.00. At December 31, 2020, the Company was in compliance with all covenants under the Credit Agreement. Availability under the Credit Agreement could be reduced in future periods if the Company fails to maintain the required ratios referenced above.

The Credit Agreement includes additional covenants, including, among others, (a) limitations on Howmet’s ability to incur liens securing indebtedness for borrowed money, (b) limitations on Howmet’s ability to consummate a merger, consolidation or sale of all or substantially all of its assets, and (c) limitations on Howmet’s ability to change the nature of its business.

The Credit Facility matures on April 1, 2025, unless extended or earlier terminated in accordance with the provisions of the Credit Agreement. Howmet may make two one-year extension requests during the term of the Credit Facility, subject to the lender consent requirements set forth in the Credit Agreement. Under the provisions of the Credit Agreement, Howmet will pay a fee of 0.30% per annum (based on Howmet’s current long-term debt ratings) of the total commitment to maintain the Credit Facility.

The Credit Facility is unsecured and amounts payable under it will rank pari passu with all other unsecured, unsubordinated indebtedness of Howmet. Borrowings under the Credit Facility may be denominated in U.S. dollars or euros. Loans will bear interest at a base rate or a rate equal to LIBOR, plus, in each case, an applicable margin based on the credit ratings of Howmet’s outstanding senior unsecured long-term debt. The applicable margin during the covenant relief period on base rate loans and LIBOR loans will be 1.20% and 2.20% per annum, respectively, through June 30, 2021; and 0.95% and 1.95% per annum, respectively, for the period from June 30, 2021 through December 31, 2021, based on Howmet’s current long-term debt ratings. The applicable margin in 2022 and thereafter on base rate loans and LIBOR loans will be 0.70% and 1.70% per annum, respectively, based on Howmet’s current long-term debt ratings. The applicable margin during and after the covenant relief period is subject to change based on the Company’s long-term debt ratings. Loans may be prepaid without premium or penalty, subject to customary breakage costs.

The obligation of Howmet to pay amounts outstanding under the Credit Facility may be accelerated upon the occurrence of an “Event of Default” as defined in the Credit Agreement. Such Events of Default include, among others, (a) non-payment of obligations; (b) breach of any representation or warranty in any material respect; (c) non-performance of covenants and obligations; (d) with respect to other indebtedness in a principal amount in excess of \$100, a default thereunder that causes such

indebtedness to become due prior to its stated maturity or a default in the payment at maturity of any principal of such indebtedness; (e) the bankruptcy or insolvency of Howmet; and (f) a change in control of Howmet.

There were no amounts outstanding at December 31, 2020 and 2019, and no amounts were borrowed during 2020, 2019, or 2018 under the Credit Agreement.

In addition to the Credit Agreement, the Company had several other credit agreements that provided a borrowing capacity of \$640 as of December 31, 2019, and all of which expired in 2020. The purpose of any borrowings under these credit arrangements was to provide for working capital requirements and for other general corporate purposes. The covenants contained in these arrangements were the same as the Credit Agreement. In 2020, nothing was borrowed or repaid under these arrangements. In 2019 and 2018, Howmet borrowed and repaid \$400 and \$600, respectively, under the respective credit arrangements. The weighted-average interest rate and weighted-average days outstanding of the respective borrowings during 2019 and 2018 were 3.7%, and 3.3%, respectively, and 49 days and 46 days, respectively.

Short-Term Debt. At December 31, 2020 and 2019, short-term debt was \$14 and \$31, respectively, substantially all of which related to accounts payable settlement arrangements with certain vendors and third-party intermediaries. These arrangements provide that, at the vendor's request, the third-party intermediary advances the amount of the scheduled payment to the vendor, less an appropriate discount, before the scheduled payment date, and Howmet makes payment to the third-party intermediary on the date stipulated in accordance with the commercial terms negotiated with its vendors. Howmet records imputed interest related to these arrangements in Interest expense on the accompanying Statement of Consolidated Operations.

Commercial Paper. Howmet had no outstanding commercial paper at December 31, 2020 and 2019. In 2020 and 2019, Howmet did not issue commercial paper. In 2018, the average outstanding commercial paper was \$49. Commercial paper matured at various times in 2018 and had an annual weighted average interest rate of 2.5% during 2018.

S. Other Financial Instruments

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 at the measurement date. The fair value hierarchy distinguishes between (i) market participant assumptions developed based on market data obtained from independent sources (observable inputs) and (ii) an entity's own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs). The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy are described below:

- Level 1 - Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities.
- Level 2 - Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly, including quoted prices for similar assets or liabilities in active markets; quoted prices for identical or similar assets or liabilities in markets that are not active; inputs other than quoted prices that are observable for the asset or liability (e.g., interest rates); and inputs that are derived principally from or corroborated by observable market data by correlation or other means.
- Level 3 - Inputs that are both significant to the fair value measurement and unobservable.

The carrying values of Cash and cash equivalents, Restricted cash, Derivatives, Noncurrent receivables, and Short-term debt included in the Consolidated Balance Sheet approximate their fair value. The Company holds exchange-traded fixed income securities which are considered available-for-sale securities that are carried at fair value which is based on quoted market prices which are classified in Level 1 of the fair value hierarchy. The fair value of Long-term debt, less amounts due within one year was based on quoted market prices for public debt and on interest rates that are currently available to Howmet for issuance of debt with similar terms and maturities for non-public debt. The fair value amounts for all Long-term debt were classified in Level 2 of the fair value hierarchy.

December 31,	2020		2019	
	Carrying value	Fair value	Carrying value	Fair value
Long-term debt, less amounts due within one year	\$ 4,699	\$ 5,426	\$ 4,906	\$ 5,337

Restricted cash was \$1, \$55 (see Note U), and \$6 in 2020, 2019, and 2018, respectively, and was recorded in Prepaid expenses and other current assets on the Consolidated Balance Sheet.

T. Cash Flow Information

Cash paid for interest and income taxes for both continuing and discontinued operations was as follows:

	2020		2019		2018
Interest, net of amounts capitalized	\$ 401	\$	340	\$	391
Income taxes, net of amounts refunded	\$ (33)	\$	122	\$	74

The Company incurred capital expenditures which remain unpaid at December 31, 2020, 2019 and 2018 of \$50, \$133 and \$188 respectively, which result in cash outflows for investing activities in subsequent periods.

U. Acquisitions and Divestitures**2020 Divestitures**

On January 31, 2020, the Company reached an agreement to sell a small manufacturing plant within the Engineered Structures segment for \$12 in cash and therefore was classified as held for sale. However, as the sale did not close, the Company changed the classification of the assets from held for sale to held for use and recorded these assets at their lower of carrying value (assuming no initial reclassification for held for sale was made) or fair value. The result was a \$5 non-cash impairment in 2020 which was recorded in Restructuring and other charges in the Statement of Consolidated Operations.

2019 Divestitures

On May 31, 2019, the Company sold a small additive manufacturing facility within the Engineered Structures segment for \$1 in cash, which resulted in a loss of \$13 recorded in Restructuring and other charges in the Statement of Consolidated Operations in 2019.

On August 15, 2019, the Company sold inventories and properties, plants, and equipment related to a small energy business within the Engineered Structures segment for \$13 in cash. The Company recognized a charge of \$10 related to inventory impairment and recorded the charge in Cost of goods sold in the Statement of Consolidated Operations in 2019.

On December 1, 2019, the Company completed the sale of its forgings business in the United Kingdom (U.K.) for \$64 in cash, which resulted in a loss on sale of \$46 which was recorded in Restructuring and other charges in the Statement of Consolidated Operations in 2019. The Company settled certain post-closing adjustments which resulted in a \$5 reduction in the purchase price and an additional loss of sale which was recorded in Restructuring and other charges in the Statement of Consolidated Operations in 2020. The sale remains subject to certain tax post-closing adjustments. Of the cash proceeds received, \$53 was recorded as Restricted cash within Prepaid expenses and other current assets on the Consolidated Balance Sheet at December 31, 2019 as its use is subject to restriction by the U.K. pension authority until certain U.K. pension plan changes have been made and approved. The restriction on these proceeds was removed in the second quarter of 2020. The forgings business primarily produces steel, titanium, and nickel based forged components for aerospace, mining, and off-highway markets and its operating results and assets and liabilities were included in the Engine Products segment. This business generated third party sales of \$116, and \$126 in 2019 and 2018, and had 540 employees at the time of divestiture.

2018 Divestitures

On December 31, 2018, as part of the Company's then ongoing strategy and portfolio review, Howmet completed the sale of its forgings business in Hungary to Angstrom Automotive Group LLC for \$2, which resulted in a loss of \$43 recorded in Restructuring and other charges in the Statement of Consolidated Operations in 2018. While owned by Howmet, the operating results and assets and liabilities of the business were included in the Engine Products segment. This business generated sales of \$32 in 2018 and had 180 employees at the time of the divestiture.

V. Contingencies and Commitments**Contingencies**

Environmental Matters. Howmet participates in environmental assessments and cleanups at more than 30 locations. These include owned or operating facilities and adjoining properties, previously owned or operating facilities and adjoining properties, and waste sites, including Superfund (Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA")) sites.

A liability is recorded for environmental remediation when a cleanup program becomes probable and the costs can be reasonably estimated. As assessments and cleanups proceed, the liability is adjusted based on progress made in determining the extent of remedial actions and related costs. The liability can change substantially due to factors such as the nature and extent of contamination, changes in remedial requirements, and technological changes, among others.

The Company's remediation reserve balance was \$10 at December 31, 2020 and \$8 at December 31, 2019 recorded in Other noncurrent liabilities and deferred credits in the Consolidated Balance Sheet (of which \$5 and \$3, respectively, were classified as a current liability), and reflects the most probable costs to remediate identified environmental conditions for which costs can be reasonably estimated. Payments related to remediation expenses applied against the reserve were \$2 in 2020 and \$3 in 2019 and included expenditures currently mandated, as well as those not required by any regulatory authority or third party.

Included in annual operating expenses are the recurring costs of managing hazardous substances and environmental programs. These costs are estimated to be less than 1% of Cost of goods sold.

The Company previously reported on a remediation project related to the Grasse River, which is adjacent to the Massena West, New York plant site that is now part of Arconic Corporation. Pursuant to the Separation and Distribution Agreement between the Company and Arconic Corporation, dated as of March 31, 2020, Arconic Corporation agreed to assume and indemnify the Company against potential liabilities associated with the Grasse River remediation project. Therefore, the Company will no longer report on the Grasse River matter unless and until some event in the future causes it to become material and reportable.

Tax. As previously reported, in July 2013, following a Spanish corporate income tax audit covering the 2006 through 2009 tax years, an assessment was received mainly disallowing certain interest deductions claimed by a Spanish consolidated tax group owned by the Company. The Company appealed this assessment to Spain's Central Tax Administrative Court, and subsequently to Spain's National Court, each of which was denied.

The Company then appealed the decision to the Supreme Court of Spain. In November 2020, the Supreme Court of Spain rendered a decision in favor of the taxpayer, removing the assessment in its entirety. The decision is final and cannot be further appealed.

As a result of the favorable decision, in the fourth quarter of 2020, the Company released an income tax reserve, including interest, of \$64 (€54), which was recorded in Provision (benefit) for income taxes in the Consolidated Statement of Operations, that was previously established in the third quarter of 2018. In addition, the Company reversed a combined indemnification receivable of \$53 (€45) for Alcoa Corporation's 49% share and Arconic Corporation's 33.66% share of the total reserve, which was recorded in Other expense (income), net in the Consolidated Statement of Operations, that were previously established pursuant to the October 31, 2016 and March 31, 2020 Tax Matters Agreements, respectively. As of the end of 2020, the Company no longer has a balance recorded for this matter.

Reynobond PE. Prior to the Arconic Inc. Separation Transaction on April 1, 2020, the Company was known as Arconic Inc. References to "Arconic Inc." in this "Reynobond PE" section refer to Arconic Inc. only and do not include its subsidiaries, except as otherwise stated.

On June 13, 2017, the Grenfell Tower in London, U.K. caught fire resulting in fatalities, injuries and damage. A French subsidiary of Arconic Inc., Arconic Architectural Products SAS ("AAP SAS") (now a subsidiary of Arconic Corporation as a result of the Arconic Inc. Separation Transaction), supplied a product, Reynobond PE, to its customer, a cladding system fabricator, which used the product as one component of the overall cladding system on Grenfell Tower. The fabricator supplied its portion of the cladding system to the façade installer, who then completed and installed the system under the direction of the general contractor. Neither Arconic Inc. nor AAP SAS was involved in the design or installation of the system used at the Grenfell Tower, nor did it have a role in any other aspect of the building's refurbishment or original design. Regulatory investigations into the overall Grenfell Tower matter are being conducted, including a criminal investigation by the London Metropolitan Police Service (the "Police"), a Public Inquiry by the British government and a consumer protection inquiry by a French public authority. The Public Inquiry was announced by the U.K. Prime Minister on June 15, 2017 and subsequently was authorized to examine the circumstances leading up to and surrounding the Grenfell Tower fire in order to make findings of fact and recommendations to the U.K. Government on matters such as the design, construction and modification of the building, the role of relevant public authorities and contractors, the implications of the fire for the adequacy and enforcement of relevant regulations, arrangements in place for handling emergencies and the handling of concerns from residents, among other things. Hearings for Phase 1 of the Public Inquiry began on May 21, 2018 and concluded on December 12, 2018. Phase 2 hearings of the Public Inquiry began in early 2020, following which a final report will be written and subsequently published. AAP SAS is participating as a Core Participant in the Public Inquiry and is also cooperating with the ongoing parallel investigation by the Police. Arconic Corporation does not sell and Arconic Inc. previously stopped selling the PE product for architectural use on buildings. Given the preliminary nature of these investigations and the uncertainty of potential future litigation, the Company cannot reasonably estimate at this time the likelihood of an unfavorable outcome or the possible loss or range of losses in the event of an unfavorable outcome.

Pursuant to the Separation and Distribution Agreement, dated as of March 31, 2020, Arconic Corporation agreed to indemnify the Company for certain liabilities and the Company agreed to indemnify Arconic Corporation for certain liabilities. As a result of the Arconic Inc. Separation Transaction, Arconic Corporation holds the building and construction systems businesses previously held by the Company and AAP SAS is a subsidiary of Arconic Corporation; accordingly, Arconic Corporation has

agreed to assume and indemnify the Company against potential liabilities associated with the June 13, 2017 fire at the Grenfell Tower in London, U.K., including the following legal proceedings in which Arconic Inc. and/or its then directors were named as parties:

United Kingdom Litigation. On December 23, 2020, claimant groups comprised of survivors and estates of decedents of the Grenfell Tower fire filed claims in the U.K. arising from that fire, against 23 defendants, including Howmet Aerospace Inc., AAP SAS, Arconic Corporation, the Royal Borough of Kensington and Chelsea, the Royal Borough of Kensington and Chelsea Tenant Management Organisation Ltd, the London Fire Commissioner, the UK Home Office, The Ministry of Housing, Communities and Local Government, Rydon Maintenance Ltd, Celotex Ltd, Saint-Gobain Construction Products UK Limited, Kingspan Insulation Limited, Kingspan Group PLC, Studio E Architects Ltd (in liquidation), Harley Facades Ltd, Harley Curtain Wall Limited (in liquidation), CEP Architectural Facades Ltd, Exova (U.K.) Ltd, CS Stokes & Associates Ltd, Artelia Projects UK Limited, Whirlpool UK Appliances Limited, Whirlpool Company Polska Sp.z.o.o. and Whirlpool Corporation. The Company has not yet been served with the claims and, therefore, currently does not have information regarding claimants' substantive allegations or the relief that claimants seek.

Behrens et al. v. Arconic Inc. et al. On June 6, 2019, 247 plaintiffs comprised of survivors and estates of decedents of the Grenfell Tower fire filed a complaint against "Arconic Inc., Alcoa Inc. and Arconic Architectural Products, LLC" (collectively, for purposes of the description of such proceeding, the "Arconic Defendants"), as well as Saint-Gobain Corporation, d/b/a Celotex, and Whirlpool Corporation alleging claims under Pennsylvania state law for products liability and wrongful death related to the fire. In particular, the plaintiffs allege that the Arconic Defendants knowingly supplied a dangerous product ("Reynobond PE") for installation on the Grenfell Tower despite knowing that Reynobond PE was unfit for use above a certain height. Plaintiffs seek monetary damages exceeding \$75,000 for each plaintiff. The case was removed to the United States District Court for the Eastern District of Pennsylvania. Defendants moved to dismiss the case on numerous grounds, including forum non conveniens. Defendant Saint-Gobain Corporation was subsequently voluntarily dismissed from the case. On September 16, 2020, the court issued an order granting the remaining defendants' motion to dismiss on forum non conveniens grounds, subject to certain conditions, determining that the United Kingdom, and not the United States, is the appropriate place for plaintiffs to bring their case. Plaintiffs subsequently filed a motion for reconsideration, which the court denied on November 23, 2020. Plaintiffs are appealing the judgment; the Arconic Defendants are cross-appealing one of the conditions.

Howard v. Arconic Inc. et al. A purported class action complaint related to the Grenfell Tower fire was filed on August 11, 2017 in the United States District Court for the Western District of Pennsylvania against Arconic Inc. and Klaus Kleinfeld. A related purported class action complaint was filed in the United States District Court for the Western District of Pennsylvania on September 15, 2017, under the caption *Sullivan v. Arconic Inc. et al.*, against Arconic Inc., three former Arconic Inc. executives, several current and former directors, and certain banks. *Howard* and *Sullivan* were subsequently consolidated and the lead plaintiffs in the consolidated purported class action filed a consolidated amended complaint alleging violations of the federal securities laws and seeking, among other things, unspecified compensatory damages and an award of attorney and expert fees and expenses. After the court granted the defendants' motion to dismiss in full, the lead plaintiffs filed a second amended complaint, and all defendants have moved to dismiss the second amended complaint.

Raul v. Albaugh, et al. On June 22, 2018, a derivative complaint was filed nominally on behalf of Arconic Inc. by a purported Arconic Inc. stockholder against the then members of Arconic Inc.'s Board of Directors and Klaus Kleinfeld and Ken Giacobbe, naming Arconic Inc. as a nominal defendant, in the United States District Court for the District of Delaware. The complaint raises similar allegations as the consolidated amended complaint and second amended complaint in *Howard*, as well as allegations that the defendants improperly authorized the sale of Reynobond PE for unsafe uses, and asserts claims under federal securities laws and Delaware state law. The case has been stayed until the final resolution of the *Howard* case, the Grenfell Tower Public Inquiry in London, and the investigation by the Police.

While there can be no assurances regarding the ultimate resolution of these matters, Arconic Corporation has agreed to assume and indemnify the Company against potential liabilities associated with them.

Stockholder Demands. Prior to the Arconic Inc. Separation Transaction, the Board of Directors also received letters, purportedly sent on behalf of stockholders, reciting allegations similar to those made in the federal court lawsuits and demanding that the Board authorize the Company to initiate litigation against members of management, the Board and others. The Board of Directors appointed a Special Litigation Committee of the Board to review, investigate, and make recommendations to the Board regarding the appropriate course of action with respect to these stockholder demand letters. On May 22, 2019, the Special Litigation Committee, following completion of its investigation into the claims demanded in the demand letters, recommended to the Board that it reject the demands to authorize commencement of litigation. On May 28, 2019, the Board adopted the Special Litigation Committee's findings and recommendations and rejected the demands that it authorize commencement of actions to assert the claims set forth in the demand letters.

Lehman Brothers International (Europe) ("LBIE") Claim. On June 26, 2020, LBIE filed formal proceedings against two Firth Rixson entities ("Firth") in the High Court of Justice, Business and Property Courts of England and Wales. The proceedings relate to interest rate swap transactions that Firth entered into with LBIE in 2007 to 2008. In 2008, LBIE commenced insolvency proceedings, an event of default under the agreements, rendering LBIE unable to meet its obligations under the swaps and suspending Firth's payment obligations. In the Court proceedings, LBIE seeks a declaration that Firth has a contractual obligation to pay the amounts owing to LBIE under the agreements. The parties filed position papers on July 24, 2020 and October 19, 2020 (LBIE) and September 21, 2020 (Firth). A virtual hearing in this matter occurred on January 13 and 14, 2021 in London. A decision is expected in three to six months. The resolution of this matter is not probable as of December 31, 2020.

Other. In addition to the matters discussed above, various other lawsuits, claims, and proceedings have been or may be instituted or asserted against the Company, including those pertaining to environmental, product liability, safety and health, employment, tax and antitrust matters. While the amounts claimed in these other matters may be substantial, the ultimate liability cannot currently be determined because of the considerable uncertainties that exist. Therefore, it is possible that the Company's liquidity or results of operations in a period could be materially affected by one or more of these other matters. However, based on facts currently available, management believes that the disposition of these other matters that are pending or asserted will not have a material adverse effect, individually or in the aggregate, on the results of operations, financial position or cash flows of the Company.

Commitments

Purchase Obligations. Howmet has entered into purchase commitments for raw materials, energy and other goods and services, which total \$210 in 2021, \$31 in 2022, \$10 in 2023, \$8 in 2024, \$0 in 2025, and \$0 thereafter.

Operating Leases. See Note Q for the operating lease future minimum contractual obligations.

Guarantees. At December 31, 2020, Howmet had outstanding bank guarantees related to tax matters, outstanding debt, workers' compensation, environmental obligations, energy contracts, and customs duties, among others. The total amount committed under these guarantees, which expire at various dates between 2021 and 2040 was \$44 at December 31, 2020.

Pursuant to the Separation and Distribution Agreement between Howmet and Alcoa Corporation, Howmet was required to provide certain guarantees for Alcoa Corporation, which had a fair value of \$12 and \$9 at December 31, 2020 and 2019, respectively, and were included in Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet. The Company was required to provide a guarantee up to an estimated present value amount of approximately \$1,398 and \$1,353 at December 31, 2020 and December 31, 2019, respectively. For this guarantee, subject to its provisions, the Company is secondarily liable in the event of a payment default by Alcoa Corporation. The Company currently views the risk of an Alcoa Corporation payment default on its obligations under the contract to be remote.

Letters of Credit. The Company has outstanding letters of credit, primarily related to workers' compensation, environmental obligations and leasing obligations. The total amount committed under these letters of credit, which automatically renew or expire at various dates, mostly in 2021, was \$105 at December 31, 2020.

Pursuant to the Separation and Distribution Agreements between the Company and Arconic Corporation and between the Company and Alcoa Corporation, the Company is required to retain letters of credit of \$53 that had previously been provided related to the Company, Arconic Corporation, and Alcoa Corporation workers' compensation claims which occurred prior to the respective separation transactions of April 1, 2020 and November 1, 2016. Arconic Corporation and Alcoa Corporation workers' compensation and letters of credit fees paid by the Company are being proportionally billed to and are being reimbursed by Arconic Corporation and Alcoa Corporation, respectively. Also, the Company was required to provide letters of credit for certain Arconic Corporation environmental obligations and, as a result, the Company has \$29 of outstanding letters of credit relating to liabilities (which are included in the \$105 in the above paragraph). \$13 of these outstanding letters of credit are pending cancellation and will be deemed cancelled once returned by the beneficiary. Arconic Corporation has issued surety bonds to cover these environmental obligations. Arconic Corporation is being billed for these letter of credit fees paid by the Company and will reimburse the Company for any payments made under these letters of credit.

Surety Bonds. The Company has outstanding surety bonds primarily related to tax matters, contract performance, workers' compensation, environmental-related matters, and customs duties. The total amount committed under these surety bonds, which expire and automatically renew at various dates, primarily in 2021, was \$43 at December 31, 2020.

Pursuant to the Separation and Distribution Agreements between the Company and Arconic Corporation and between the Company and Alcoa Corporation, the Company is required to provide surety bonds of \$26 (which are included in the \$43 in the above paragraph) that had previously been provided related to the Company, Arconic Corporation, and Alcoa Corporation workers' compensation claims which occurred prior to the respective separation transactions of April 1, 2020 and November 1,

2016. Arconic Corporation and Alcoa Corporation workers' compensation claims paid and surety bond fees paid by the Company are being proportionately billed to and are being reimbursed by Arconic Corporation and Alcoa Corporation.

W. Subsequent Events

Management evaluated all activity of Howmet and concluded that no subsequent events have occurred that would require recognition in the Consolidated Financial Statements or disclosure in the Notes to the Consolidated Financial Statements, except as noted below:

See Note [R](#) for the early redemption of debt.

Supplemental Financial Information (unaudited)

Quarterly Data
(in millions, except per-share amounts)

	First	Second ⁽²⁾	Third	Fourth	Year
2020					
Sales	\$ 1,634	\$ 1,253	\$ 1,134	\$ 1,238	\$ 5,259
Income (loss) from continuing operations after income taxes	\$ 153	\$ (84)	\$ 36	\$ 106	\$ 211
Net income (loss) per share from continuing operations attributable to Howmet common shareholders ⁽¹⁾ :					
Net income (loss) from continuing operations - basic	\$ 0.35	\$ (0.19)	\$ 0.08	\$ 0.24	\$ 0.48
Net income (loss) from continuing operations - diluted	\$ 0.34	\$ (0.19)	\$ 0.08	\$ 0.24	\$ 0.48
2019					
Sales	\$ 1,752	\$ 1,818	\$ 1,794	\$ 1,734	\$ 7,098
Income (loss) from continuing operations after income taxes	\$ 86	\$ (136)	\$ 58	\$ 118	\$ 126
Earnings (loss) per share attributable to Howmet common shareholders ⁽¹⁾ :					
Net income (loss) from continuing operations - basic	\$ 0.18	\$ (0.31)	\$ 0.13	\$ 0.27	\$ 0.28
Net income (loss) from continuing operations - diluted	\$ 0.18	\$ (0.31)	\$ 0.13	\$ 0.27	\$ 0.27

⁽¹⁾ Per share amounts are calculated independently for each period presented; therefore, the sum of the quarterly per share amounts may not equal the per share amounts for the year.

⁽²⁾ In the second quarter of 2020, the Company recorded settlement accounting charges of \$62 associated with its U.K. pension plan related to the Arconic Inc. Separation Transaction and premium paid on early redemption of debt of \$59. In the second quarter of 2019, the Company recorded an impairment charge of \$428 related to its Disks business (see Note [O](#)).

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

None.

Item 9A. Controls and Procedures.

(a) Evaluation of Disclosure Controls and Procedures

Howmet's co-Chief Executive Officers and Chief Financial Officer have evaluated the Company's disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as of the end of the period covered by this report, and they have concluded that these controls and procedures are effective.

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

Management's Report on Internal Control over Financial Reporting is included in Part II, Item 8 of this Form 10-K beginning on page [46](#).

(c) Attestation Report of the Registered Public Accounting Firm

The effectiveness of Howmet's internal control over financial reporting as of December 31, 2020 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included in Part II, Item 8 of this Form 10-K on page [47](#).

(d) Changes in Internal Control over Financial Reporting

There have been no changes in internal control over financial reporting during the fourth quarter of 2020, that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by Item 401 of Regulation S-K regarding directors is contained under the caption "Item 1 Election of Directors" of the Proxy Statement and is incorporated 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 of the Registrant."

The information required by Item 405 of Regulation S-K is contained under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" of the Proxy Statement and is incorporated by reference.

The Company's Code of Ethics for the CEO, CFO and Other Financial Professionals is publicly available on the Company's Internet website at www.howmet.com under the section "Investors—Corporate Governance—Governance and Policies." The remaining information required by Item 406 of Regulation S-K is contained under the captions "Corporate Governance" and "Corporate Governance—Business Conduct Policies and Code of Ethics" of the Proxy Statement and is incorporated by reference.

The information required by Items 407(c)(3), (d)(4) and (d)(5) of Regulation S-K is included under the captions "Item 1 Election of Directors—Nominating Board Candidates—Procedures and Director Qualifications" and "Corporate Governance—Committees of the Board—Audit Committee" of the Proxy Statement and is incorporated by reference.

Item 11. Executive Compensation.

The information required by Item 402 of Regulation S-K is contained under the captions "Director Compensation", "Executive Compensation" and "Corporate Governance—Recovery of Incentive Compensation" of the Proxy Statement. Such information is incorporated by reference.

The information required by Items 407(e)(4) and (e)(5) of Regulation S-K is contained under the captions "Corporate Governance—Compensation Committee Interlocks and Insider Participation" and "Item 3 Advisory Approval of Executive Compensation—Compensation Committee Report" of the Proxy Statement. Such information (other than the Compensation Committee Report, which shall not be deemed to be "filed") is incorporated by reference.

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

The following table gives information about Howmet’s common stock that could be issued under the Company’s equity compensation plans as of December 31, 2020.

Equity Compensation Plan Information

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders ⁽¹⁾	11,706,858 ⁽¹⁾	\$24.47	26,517,097 ⁽²⁾
Equity compensation plans not approved by security holders	—	—	—
Total	11,706,858	\$24.47	26,517,097⁽²⁾

⁽¹⁾ Includes the 2013 Howmet Aerospace Stock Incentive Plan, as Amended and Restated (approved by shareholders in May 2019, May 2018, May 2016 and May 2013) (the “2013 Plan”) and 2009 Alcoa Stock Incentive Plan (approved by shareholders in May 2009). Also includes 5,273 stock options resulting from the merger conversion of RTI Metals employee equity. Table amounts are comprised of the following:

- 3,191,692 stock options
- 5,173,704 restricted share units
- 3,341,462 performance share awards (2,887,515 granted in 2020 at target)

⁽²⁾ The 2013 Plan authorizes, in addition to stock options, other types of stock-based awards in the form of stock appreciation rights, restricted shares, restricted share units, performance awards and other awards. The shares that remain available for issuance under the 2013 Plan may be issued in connection with any one of these awards. Up to 66,666,667 shares may be issued under the plan. Any award other than an option or a stock appreciation right shall count as 2.33 shares. Options and stock appreciation rights shall be counted as one share for each option or stock appreciation right. In addition, the 2013 Plan provides the following are available to grant under the 2013 Plan: (i) shares that are issued under the 2013 Plan, which are subsequently forfeited, cancelled or expire in accordance with the terms of the award and (ii) shares that had previously been issued under prior plans that are outstanding as of the date of the 2013 Plan which are subsequently forfeited, cancelled or expire in accordance with the terms of the award.

The information required by Item 403 of Regulation S-K is contained under the captions “Howmet Aerospace Stock Ownership—Stock Ownership of Certain Beneficial Owners” and “Howmet Aerospace Stock Ownership—Stock Ownership of Directors and Executive Officers” 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 of Regulation S-K is contained under the captions “Executive Compensation” (excluding the information under the caption “Compensation Committee Report”) and “Corporate Governance— Related Person Transactions” of the Proxy Statement and is incorporated by reference.

The information required by Item 407(a) of Regulation S-K regarding director independence is contained under the captions “Item 1 Election of Directors” and “Corporate Governance” of the Proxy Statement and is incorporated by reference.

Item 14. Principal Accounting Fees and Services.

The information required by Item 9(e) of Schedule 14A is contained under the captions “Item 2 Ratification of Appointment of Independent Registered Public Accounting Firm—Report of the Audit Committee” and “Item 2 Ratification of Appointment of Independent Registered Public Accounting Firm — Audit and Non-Audit Fees” of the Proxy Statement and in its Attachment A (Pre-Approval Policies and Procedures for Audit and Non-Audit Services) thereto and is incorporated by reference.

PART IV**Item 15. Exhibits, Financial Statement Schedules.**

(a) The consolidated financial statements and exhibits listed below are filed as part of this report.

(1) The Company's consolidated financial statements, the notes thereto and the report of the Independent Registered Public Accounting Firm are on pages 47 through 100 of this report.

(2) Financial statement schedules have been omitted because they are not applicable, not required, or the required information is included in the consolidated financial statements or notes thereto.

(3) Exhibits.

Exhibit Number	Description*
2(a)	Separation and Distribution Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(b)	Tax Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.3 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(c)	Employee Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(c)(1)	Amendment No. 1, dated December 13, 2016, to Employee Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2(e)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
2(d)	Alcoa Corporation to Arconic Inc. Patent, Know-How, and Trade Secret License Agreement, dated as of October 31, 2016, by and between Alcoa USA Corp. and Arconic Inc., incorporated by reference to exhibit 2.5 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(e)	Arconic Inc. to Alcoa Corporation Patent, Know-How, and Trade Secret License Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa USA Corp., incorporated by reference to exhibit 2.6 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(f)	Amended and Restated Alcoa Corporation to Arconic Inc. Trademark License Agreement, dated as of June 25, 2017, by and between Alcoa USA Corp. and Arconic Inc., incorporated by reference to exhibit 2 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2017.
2(g)	Reserved.
2(h)	Massena Lease and Operations Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.10 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(i)	Agreement and Plan of Merger, dated October 12, 2017, by and between Arconic Inc., a Pennsylvania corporation, and Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 2.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
2(j)	Separation and Distribution Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.1 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(k)	Tax Matters Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.2 to the Company's Current Report on Form 8-K filed on April 6, 2020.

2(l)	Employee Matters Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.3 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(l)(1)	First Amendment to Employee Matters Agreement, dated as of April 10, 2020, by and between Howmet Aerospace Inc. and Arconic Corporation, incorporated by reference to Exhibit 2.1 to the Company's Current Report on Form 8-K filed on April 13, 2020.
2(m)	Patent, Know-How, and Trade Secret License Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.4 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(n)	Patent, Know-How, and Trade Secret License Agreement, dated as of March 31, 2020, by and between Arconic Rolled Products Corporation and Arconic Inc. , incorporated by reference to Exhibit 2.5 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(o)	Trademark License Agreement, dated as of March 31, 2020, by and between Arconic Rolled Products Corporation and Arconic Inc. , incorporated by reference to Exhibit 2.6 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(p)	Trademark License Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.7 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(q)	Master Agreement for Product Supply, dated as of March 31, 2020, by and between Arconic Massena LLC, Arconic Lafayette LLC, Arconic Davenport LLC and Arconic Inc., incorporated by reference to Exhibit 2.8 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(r)	Second Supplemental Tax and Project Certificate and Agreement, dated as of March 31, 2020, by and among Arconic Inc., Arconic Davenport LLC and Arconic Rolled Products Corporation, incorporated by reference to Exhibit 2.9 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(s)	Lease and Property Management Agreement, dated as of March 31, 2020, by and between Arconic Inc. and Arconic Massena LLC, incorporated by reference to Exhibit 2.10 to the Company's Current Report on Form 8-K filed on April 6, 2020.
2(t)	Metal Supply & Tolling Agreement by and between Arconic-Köfém Mill Products Hungary Kft and Arconic-Köfém Kft, dated January 1, 2020.
3(a)	Certificate of Incorporation of Howmet Aerospace Inc., a Delaware corporation.
3(b)	Bylaws of Howmet Aerospace Inc., a Delaware corporation.
4(a)	Form of Certificate for Shares of Common Stock of Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 4.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(b)	Bylaws. See exhibit 3(b) above.
4(c)	Form of Indenture, dated as of September 30, 1993, between Alcoa Inc. and The Bank of New York Trust Company, N.A., as successor to J. P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association), as successor Trustee to PNC Bank, National Association, as Trustee (undated form of Indenture incorporated by reference to exhibit 4(a) to Registration Statement No. 33-49997 on Form S-3).
4(c)(1)	First Supplemental Indenture, dated as of January 25, 2007, between Alcoa Inc. and The Bank of New York Trust Company, N.A., as successor to J.P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association), as successor Trustee to PNC Bank, National Association, as Trustee, incorporated by reference to exhibit 99.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 25, 2007.

4(c)(2)	Second Supplemental Indenture, dated as of July 15, 2008, between Alcoa Inc. and The Bank of New York Mellon Trust Company, N.A., as successor in interest to J. P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association, as successor to PNC Bank, National Association), as Trustee, incorporated by reference to exhibit 4(c) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 15, 2008.
4(c)(3)	Fourth Supplemental Indenture, dated as of December 31, 2017, between Arconic Inc., a Pennsylvania corporation, Arconic Inc., a Delaware corporation, and The Bank of New York Mellon Trust Company, N.A., as trustee, incorporated by reference to exhibit 4.3 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(c)(4)	Fifth Supplemental Indenture, dated as of April 16, 2020, between Howmet Aerospace Inc., a Delaware corporation, and The Bank of New York Mellon Trust Company, N.A., as trustee, incorporated by reference to exhibit 4(e) to the Company's Registration Statement on Form S-3 (Registration Statement No. 333-237705) dated April 16, 2020.
4(c)(5)	Sixth Supplemental Indenture, dated as of May 6, 2020 between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee, incorporated by reference to exhibit 4.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 6, 2020.
4(d)	Form of 6.75% Bonds Due 2028, incorporated by reference to exhibit 4(d) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
4(e)	Form of 5.90% Notes Due 2027, incorporated by reference to exhibit 4(e) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2008.
4(f)	Form of 5.95% Notes Due 2037, incorporated by reference to exhibit 4(f) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2008.
4(g)	Form of 5.87% Notes Due 2022, incorporated by reference to exhibit 4.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 21, 2007.
4(h)	Form of 5.40% Notes Due 2021, incorporated by reference to exhibit 4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated April 21, 2011.
4(i)	Form of 5.125% Notes Due 2024, incorporated by reference to exhibit 4.5 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 22, 2014.
4(j)	Form of 6.875% Notes due 2025, incorporated by reference to exhibit 4.6 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated April 24, 2020.
4(k)	Howmet Aerospace Hourly Retirement Savings Plan (formerly known as the Arconic Bargaining Retirement Savings Plan and, prior to that, the Alcoa Retirement Savings Plan for Bargaining Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(p) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(l)	Howmet Aerospace Salaried Retirement Savings Plan (formerly known as the Arconic Salaried Retirement Savings Plan and, prior to that, the Alcoa Retirement Savings Plan for Salaried Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(s) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(m)	Howmet Aerospace Niles Bargaining Retirement Savings Plan (formerly known as the Arconic Retirement Savings Plan for ATEP Bargaining Employees), effective January 1, 2017, incorporated by reference to exhibit 4 to Post-Effective Amendment, dated December 30, 2016, to Registration Statement No. 333-32516 on Form S-8.
4(p)	Description of Arconic Inc.'s Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934, incorporated by reference to exhibit 4(p) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2019.
10(a)	Five-Year Revolving Credit Agreement, dated as of July 25, 2014, among Alcoa Inc., the Lenders and Issuers named therein, Citibank, N.A., as Administrative Agent for the Lenders and Issuers, and JPMorgan Chase Bank, N.A., as Syndication Agent, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 31, 2014.

10(a)(1)	Extension Request and Amendment Letter, dated as of June 5, 2015, among Alcoa Inc., each lender and issuer party thereto, and Citibank, N.A., as Administrative Agent, effective July 7, 2015, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 13, 2015.
10(a)(2)	Amendment No. 1, dated September 16, 2016, to the Five-Year Revolving Credit Agreement dated as of July 25, 2014, among Arconic Inc., the lenders and issuers named therein, Citibank, N.A., as administrative agent, and JPMorgan Chase Bank, N.A. as syndication agent, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 19, 2016.
10(a)(3)	Assumption Agreement, dated as of December 31, 2017, by Arconic Inc., a Delaware corporation, in favor of and for the benefit of the Lenders and Citibank, N.A., as administrative agent, incorporated by reference to exhibit 4.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
10(a)(4)	Amendment No. 2, dated as of June 29, 2018, to the Company's Five-Year Revolving Credit Agreement dated as of July 25, 2014, by and among the Company, a syndicate of lenders and issuers named therein, Citibank, N.A., as administrative agent for the lenders and issuers, and JPMorgan Chase Bank, N.A., as syndication agent, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated July 2, 2018.
10(a)(5)	Amendment No. 3, dated as of March 4, 2020, to the Company's Five-Year Revolving Credit Agreement dated as of July 25, 2014, among the Company, the lenders and issuers named therein, Citibank, N.A., as administrative agent, JPMorgan Chase Bank, N.A., as syndication agent, and Goldman Sachs Bank USA, as documentation agent, incorporated by reference to Exhibit 10.1 to Amendment No. 1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated March 5, 2020.
10(a)(6)	Amendment No. 4, dated as of June 26, 2020, to the Company's Five-Year Revolving Credit Agreement dated as of July 25, 2014, among the Company, the lenders and issuers named therein, Citibank, N.A., as administrative agent, and JPMorgan Chase Bank, N.A., as syndication agent.
10(b)	Plea Agreement dated January 8, 2014, between the United States of America and Alcoa World Alumina LLC, incorporated by reference to exhibit 10(l) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2013.
10(c)	Agreement, dated February 1, 2016, by and between Elliott Associates, L.P., Elliott International, L.P., Elliott International Capital Advisors Inc. and Alcoa Inc., incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 1, 2016.
10(d)	Settlement Agreement, dated as of May 22, 2017, by and among Elliott Associates, L.P., Elliott International, L.P., Elliott International Capital Advisors Inc. and Arconic Inc., incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 22, 2017 (reporting an event on May 21, 2017).
10(e)	Letter Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of December 19, 2017, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 19, 2017.
10(f)	Registration Rights Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of December 19, 2017, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 19, 2017.
10(f)(1)	Amendment to Registration Rights Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of February 2, 2018, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 6, 2018.
10(g)	Howmet Aerospace Inc. 2020 Annual Cash Incentive Plan (formerly known as the Arconic Inc. 2020 Annual Cash Incentive Plan), incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 10, 2019.
10(h)	Howmet Aerospace Excess Benefits Plan C (formerly known as the Arconic Employees' Excess Benefits Plan C), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(j) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.

10(h)(1)	First Amendment to Howmet Aerospace Excess Benefits Plan C (formerly known as the Arconic Employees' Excess Benefits Plan C), effective January 1, 2018, incorporated by reference to exhibit 10(l)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(h)(2)	Second Amendment to Howmet Aerospace Excess Benefits Plan C (formerly known as the Arconic Employees' Excess Benefits Plan C), effective January 1, 2018, incorporated by reference to exhibit 10(l)(2) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(h)(3)	Third Amendment to Howmet Aerospace Excess Benefits Plan C (formerly known as the Arconic Employees' Excess Benefits Plan C), effective March 31, 2018, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 8, 2018.
10(i)	Deferred Fee Plan for Directors, as amended effective July 9, 1999, incorporated by reference to exhibit 10(g)(1) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 1999.
10(j)	Amended and Restated Deferred Fee Plan for Directors, effective April 1, 2020, incorporated by reference to exhibit 10.4 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2020.
10(k)	Non-Employee Director Compensation Policy, effective April 1, 2020, incorporated by reference to exhibit 10.3 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2020.
10(l)	Fee Continuation Plan for Non-Employee Directors, incorporated by reference to exhibit 10(k) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1989.
10(l)(1)	Amendment to Fee Continuation Plan for Non-Employee Directors, effective November 10, 1995, incorporated by reference to exhibit 10(i)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1995.
10(l)(2)	Second Amendment to the Fee Continuation Plan for Non-Employee Directors, effective September 15, 2006, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 20, 2006.
10(m)	Howmet Aerospace Deferred Compensation Plan (formerly known as the Arconic Deferred Compensation Plan), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(p) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(m)(1)	First Amendment to the Howmet Aerospace Deferred Compensation Plan (formerly known as the Arconic Deferred Compensation Plan), effective January 1, 2018, incorporated by reference to exhibit 10(r)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(n)	Summary of the Executive Split Dollar Life Insurance Plan, dated November 1990, incorporated by reference to exhibit 10(m) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1990.
10(o)	Amended and Restated Dividend Equivalent Compensation Plan, effective January 1, 1997, incorporated by reference to exhibit 10(h) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2004.
10(p)	Form of Indemnity Agreement between the Company and individual directors or officers, incorporated by reference to exhibit 10(j) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1987.)
10(q)	Form of Indemnification Agreement between the Company and individual directors or officers, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 25, 2018.

10(r)	Amended and Restated 2009 Alcoa Stock Incentive Plan, dated February 15, 2011, incorporated by reference to exhibit 10(z)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2010.
10(s)	Howmet Aerospace Supplemental Pension Plan for Senior Executives (formerly known as the Arconic Supplemental Pension Plan for Senior Executives), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(v) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(s)(1)	First Amendment to Howmet Aerospace Supplemental Pension Plan for Senior Executives (formerly known as the Arconic Supplemental Pension Plan for Senior Executives), effective January 1, 2018, incorporated by reference to exhibit 10(x)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(s)(2)	Second Amendment to Howmet Aerospace Supplemental Pension Plan for Senior Executives (formerly known as the Arconic Supplemental Pension Plan for Senior Executives), effective January 1, 2018, incorporated by reference to exhibit 10(x)(2) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(t)	Deferred Fee Estate Enhancement Plan for Directors, effective July 10, 1998, incorporated by reference to exhibit 10(r) to the Company's Annual Report on Form 10-K (Commission file number 1- 3610) for the year ended December 31, 1998.
10(u)	Howmet Aerospace Inc. Change in Control Severance Plan, as Amended and Restated, effective September 30, 2020, incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
10(v)	Howmet Aerospace Inc. Executive Severance Plan, as Amended and Restated, effective September 30, 2020 incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
10(w)	Letter Agreement, by and between Alcoa Inc. and Katherine H. Ramundo, dated as of July 28, 2016, incorporated by reference to exhibit 10(ff) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(x)	Letter Agreement, from Arconic Inc. to Ken Giacobbe, dated as of February 14, 2019, incorporated by reference to exhibit 10(hh) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2018.
10(y)	Letter Agreement, by and between Arconic Inc. and John C. Plant, dated as of February 6, 2019, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2019.
10(z)	Letter Agreement, by and between Arconic Inc. and John C. Plant, dated as of August 1, 2019, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated August 2, 2019.
10(aa)	Letter Agreement, by and between Arconic Inc. and John C. Plant, dated as of February 24, 2020, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated February 25, 2020.
10(bb)	Letter Agreement between Howmet Aerospace Inc. and John C. Plant, dated as of June 9, 2020, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on June 12, 2020.
10(cc)	Letter Agreement, by and between Arconic Inc. and Elmer L. Doty, dated as of February 6, 2019, incorporated by reference to exhibit 10(b) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2019.
10(dd)	Letter Agreement, by and between Arconic Inc. and Neil E. Marchuk, dated as of February 13, 2019, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2019.
10(ee)	Letter Agreement between Arconic Inc. and Tolga Oal, dated as of February 24, 2020, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 25, 2020.

10(ff)	Howmet Aerospace Global Pension Plan (formerly known as the Arconic Global Pension Plan), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(bb) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(gg)	Global Expatriate Employee Policy (pre-January 1, 2003), incorporated by reference to exhibit 10(uu) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2005.
10(hh)	Howmet Aerospace Inc. Legal Fee Reimbursement Plan (formerly known as the Arconic Inc. Legal Fee Reimbursement Plan), effective as of April 30, 2018, incorporated by reference to exhibit 10(b) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2018.
10(ii)	2013 Howmet Aerospace Stock Incentive Plan, as Amended and Restated, effective September 30, 2020, incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
10(jj)	Terms and Conditions (Australian Addendum) to the 2013 Howmet Aerospace Stock Incentive Plan, effective May 3, 2013, incorporated by reference to exhibit 10(d) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 8, 2013.
10(kk)	RTI International Metals, Inc. 2004 Stock Plan, incorporated by reference to exhibit 4(b) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 23, 2015.
10(ll)	RTI International Metals, Inc. 2014 Stock and Incentive Plan, incorporated by reference to exhibit 4(a) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 23, 2015.
10(ll)(1)	First Amendment to the RTI International Metals, Inc. 2014 Stock and Incentive Plan, as amended and assumed by Arconic Inc., dated January 19, 2018, incorporated by reference to exhibit 10(oo)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(mm)	Terms and Conditions for Stock Options, effective January 1, 2011, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2011.
10(nn)	Terms and Conditions for Stock Option Awards, effective May 3, 2013, incorporated by reference to exhibit 10(b) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 8, 2013.
10(oo)	Terms and Conditions for Stock Option Awards under the 2013 Howmet Aerospace Stock Incentive Plan, effective July 22, 2016, incorporated by reference to Exhibit 10(d) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.
10(pp)	Global Stock Option Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(uu) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(qq)	Form of Stock Option Award Agreement, incorporated by reference to exhibit 10(f) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(rr)	Terms and Conditions for Restricted Share Units, effective May 3, 2013, incorporated by reference to exhibit 10(c) to the Company's Current Report on Form 8-K (Commission file number 1- 3610) dated May 8, 2013.
10(ss)	Terms and Conditions for Restricted Share Units under the under the 2013 Howmet Aerospace Stock Incentive Plan, effective July 22, 2016, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.
10(tt)	Terms and Conditions for Restricted Share Units for Annual Director Awards under the 2013 Howmet Aerospace Stock Incentive Plan, effective November 30, 2016, incorporated by reference to exhibit 10(vv) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.

10(uu)	Terms and Conditions for Restricted Share Units for Annual Director Awards under the 2013 Howmet Aerospace Stock Incentive Plan, as Amended and Restated, effective December 5, 2017, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2018.
10(vv)	Terms and Conditions for Deferred Fee Restricted Share Units for Director Awards under the 2013 Howmet Aerospace Stock Incentive Plan, effective November 30, 2016, incorporated by reference to exhibit 10(ww) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(ww)	Terms and Conditions for Restricted Share Units issued on or after January 13, 2017, under the 2013 Howmet Aerospace Stock Incentive Plan, effective January 13, 2017, incorporated by reference to exhibit 10(xx) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(xx)	Global Restricted Share Unit Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(eee) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(yy)	Terms and Conditions for Restricted Share Units issued on or after January 19, 2018, under the 2013 Howmet Aerospace Stock Incentive Plan, effective January 19, 2018, incorporated by reference to exhibit 10(fff) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(zz)	Form of Restricted Share Unit Award Agreement, incorporated by reference to exhibit 10(g) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(aaa)	Restricted Share Unit Award Agreement - Executive Vice President, Human Resources (Neil E. Marchuk) Annual Equity Award, effective March 15, 2019, incorporated by reference to exhibit 10(f) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2019.
10(bbb)	Restricted Share Unit Award Agreement - Executive Vice President, Human Resources (Neil E. Marchuk) Sign-on Equity Award, effective March 15, 2019, incorporated by reference to exhibit 10(g) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2019.
10(ccc)	Terms and Conditions for Special Retention Awards under the 2013 Howmet Aerospace Stock Incentive Plan, effective January 1, 2015, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2015.
10(ddd)	Terms and Conditions for Special Retention Awards under the 2013 Howmet Aerospace Stock Incentive Plan, effective July 22, 2016, incorporated by reference to exhibit 10(e) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.
10(eee)	Global Special Retention Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(kkk) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(fff)	Special Retention Award Agreement - Paul Myron, effective May 16, 2018, incorporated by reference to exhibit 10(e) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(ggg)	Global Restricted Share Unit Award Agreement, effective September 30, 2020, incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
10(hhh)	Global Stock Option Award Agreement, effective September 30, 2020, incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.

10(iii)	Global Special Retention Award Agreement, effective September 30, 2020, incorporated by reference to Exhibit 10.6 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
10(jjj)	Terms and Conditions for Restricted Share Units, effective September 30, 2020, , incorporated by reference to Exhibit 10.7 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2020.
21	Subsidiaries of the Registrant.
23	Consent of Independent Registered Public Accounting Firm.
24	Power of Attorney for directors.
31	Certifications pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32	Certification pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101. INS	Inline XBRL Instance Document.
101. SCH	Inline XBRL Taxonomy Extension Schema Document.
101. CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101. DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101. LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101. PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104	The cover page of this Annual Report on Form 10-K for the year ended December 31, 2020 (formatted in Inline XBRL and contained in Exhibit 101).

* Exhibit Nos. 10(g) through 10(jjj) are management contracts or compensatory plans required to be filed as Exhibits to this Form 10-K.

Amendments and modifications to other Exhibits previously filed have been omitted when in the opinion of the registrant such Exhibits as amended or modified are no longer material or, in certain instances, are no longer required to be filed as Exhibits.

No other instruments defining the rights of holders of long-term debt of the registrant or its subsidiaries have been filed as Exhibits because no such instruments met the threshold materiality requirements under Regulation S-K. The registrant agrees, however, to furnish a copy of any such instruments to the Commission upon request.

Item 16. Form 10-K Summary.

None.

Metal Supply & Tolling Agreement

This **Metal Supply & Tolling Agreement** (“Agreement”) is made by and between Arconic-Köfém Mill Products Hungary Kft, a Hungarian corporation (“**Seller**”) and Arconic-Köfém Kft, a Hungarian corporation (“**Buyer**”). Seller and Buyer can be referred to as a “**Party**” individually or “**Parties**” collectively.

WHEREAS, the Parties desire for Seller to consign and sell homogenized aluminum forging stock billet, cut to specification, to Buyer;

WHEREAS, the Parties desire for Seller to provide tolling and logistical services to make homogenized aluminum forging stock billet, cut to specification, from revert made available to Seller by Buyer; and

WHEREAS, the Parties desire for Seller to provide services to Buyer in the form of cutting aluminum forging stock billet provided by Buyer.

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein, and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Buyer and Seller, intending to be legally bound, agree as follows:

1. **Term.** This Agreement is effective January 1, 2020 and expires on December 31, 2024, unless sooner terminated as agreed to by the Parties in writing or as provided in this Agreement.
2. **Products and Services.** In accordance with this Agreement, Seller agrees to consign and sell the Products described in **Exhibit A** and to sell the Services described in **Exhibit B** as Buyer may order from time to time.
3. **Pricing and Payment.** The prices for the Products and Services are identified in **Exhibit C**.

Fém szállítási és Nyersanyag Feldolgozási Megállapodás

A jelen **Fém szállítási és bér munka-megállapodás** („Megállapodás”) az Arconic-Köfém Mill Products Hungary Kft. magyar társaság („**Eladó**”) és az Arconic-Köfém Kft. magyar társaság („**Vevő**”) között jött létre. A Megállapodásban az Eladó és a Vevő külön-külön „**Fél**”, együttesen „**Felek**” megjelöléssel is szerepel.

MIVEL a Felek szándéka, hogy az Eladó specifikáció szerint darabolt, homogenizált alumíniumból készült kovácsolt nyersdarabokat szállítson és értékesítsen a Vevő részére;

MIVEL a Felek szándéka, hogy az Eladó a Vevő számára nyersanyag-feldolgozási és logisztikai szolgáltatásokat nyújtson, amelynek során a Vevő által biztosított visszatérő anyagból specifikáció szerint darabolt, homogenizált alumíniumból készült kovácsolt nyersdarabokat készít; és

MIVEL a Felek szándéka, hogy az Eladó a Vevő által biztosított alumínium kovácsolt nyersdarabok darabolására irányuló szolgáltatást nyújtson a Vevőnek,

ENNEK MEGFELELŐEN – az alábbi kölcsönös kötelezettségvállalások és megállapodások, valamint egyéb valós ellenérték figyelembevételével, amelyek átvételét és kielégítő voltát a Felek elismerik – a Vevő és az Eladó jogi kötőerő keletkeztetésének szándékával az alábbiakról állapodik meg:

1. **Időbeli Hatály.** A jelen Megállapodás 2020. január 1. napján lép hatályba és 2024. december 31. napján jár le, hacsak a Felek írásban ennél korábbi megszüntetésről nem állapodnak meg, illetve a jelen Megállapodás eltérően nem rendelkezik.
2. **Termékek és Szolgáltatások.** Az Eladó a jelen Megállapodás rendelkezéseinek megfelelően vállalja azon **A. mellékletben** felsorolt Termékek leszállítását és eladását, valamint azon **B. mellékletben** leírt Szolgáltatások teljesítését, amelyeket a Vevő időről időre megrendel.
3. **Árak és fizetés.** A Termékek és Szolgáltatások árát a **C. melléklet** rögzíti.

4. **Terms and Conditions & Definitions.** The terms and conditions governing the consignment, purchase and sale of Products and Services pursuant to this Agreement are set forth in **Exhibits A, B, and D.** Definitions for terms used in this Agreement are set forth in **Exhibit E.**

5. **Termination.**

- a. This Agreement may be terminated, in whole or in part, as follows:
- i. by mutual agreement in writing;
 - ii. by written notice of the non-breaching Party if the other Party is in material breach of this Agreement and such Party fails to cure the breach within ninety (90) days of receipt of a written notice from the non-breaching Party specifying the nature of the breach, provided that the cure period for a failure to timely pay is thirty (30) days, not 90 days; or
 - iii. by written notice to a Party if the other Party is adjudicated as bankrupt, or if a receiver or trustee is appointed for it or for a substantial portion of its assets used in performing this Agreement, or if it makes an assignment of substantially all such assets for the benefit of its creditors, or if it commences a voluntary petition in bankruptcy, or if it otherwise becomes insolvent in either law or equity.

4. **Szerződési Feltételek és Fogalommeghatározások.** A Termékek és a Szolgáltatások jelen Megállapodás szerinti konszignációs, vételi és eladási feltételeit az **A., B és D. melléklet,** a jelen Megállapodásban használt kifejezések fogalommeghatározását pedig az **E. melléklet** rögzíti.

5. **A Megállapodás megszűnése.**

- a. A jelen Megállapodás részben vagy egészben az alábbiak szerint szüntethető meg:
- i. közös megállapodással írásban;
 - ii. a vétlen Fél általi írásos felmondással, amennyiben a másik Fél súlyosan megszegi a jelen Megállapodást, és a vétlen Fél – a szerződésszegés jellegét is rögzítő – írásos felszólítása átvételétől számított 90 (kilencven) napon belül a szerződésszegést nem orvosolja, azzal, hogy a fizetési késedelem orvoslására nyitva álló idő nem 90, hanem 30 (harminc) nap; vagy
 - iii. a Félnek küldött írásos felmondással, amennyiben a Fél fizetéseképtelenségét a bíróság kimondja, a társaság egésze vagy vagyonának a jelen Megállapodás során használt, jelentős része tekintetében felszámolót vagy vagyonfelügyelőt neveznek ki, vagy a társaság lényegében a teljes ilyen vagyont a hitelezőire ruházza, saját maga ellen csődeljárást indít, vagy a jogszabályok vagy a méltányosságon alapuló szokásjog értelmében egyéb módon fizetéseképtelenné válik.

- b. Upon the expiration or termination of this Agreement for any reason, (i) the Parties will conduct a final physical inventory and reconciliation of Revert, Scrap, WIP, Deliverables and Products within thirty (30) business days of the final day of this Agreement and (ii) Seller shall deliver all Deliverables and (iii) the non-breaching party shall determine whether the Parties shall complete the production of Product (or Deliverables, as the case may be) out of WIP and deliver such items to Buyer. In such circumstances, Seller may invoice upon delivery and the payment terms for such items are set forth in Exhibit D, Section 5(C). Seller will either return Scrap and Revert to Buyer or utilize such items for the completion of orders per subsections (i) and (ii) below.
- i. Upon termination of this Agreement by Seller: Seller shall determine whether (a) to make Products in consignment available to Buyer for sale or whether to pick up Products in consignment at Buyer's expense, (b) to complete the sale and purchase of Firm Fixed Orders for Products and Services.
- ii. Upon termination of this Agreement by Buyer: Buyer shall determine whether (a) to purchase Products in consignment or whether to have Seller pick up Products in consignment at Seller's expense, (b) to complete the sale and purchase of Firm Fixed Orders for Products and Services.
6. **Incorporation by Reference.** Exhibits A - E are attached hereto, made part hereof, and incorporated by reference herein.
7. **Precedence of Documents.** In the event of any conflict between the documents comprising this Agreement, the order of precedence will be as follows:
- A. The first 5 pages of this Agreement and Exhibit E
- b. Amennyiben a jelen Megállapodás lejár vagy bármely okból megszűnik, i. a Felek a jelen Megállapodás utolsó napjától számított 30 (harminc) munkanapon belül elvégzik a Visszatérő Anyagok, a Hulladék, a Folyamatban Léévő Munkák, a Leszállítandók és a Termékek végső fizikai leltározását és egyeztetését; és ii. az Eladó átadja a Leszállítandókat; továbbá iii. a vétlen Fél meghatározza, hogy a Felek befejezik-e a Folyamatban Léévő Munkákon kívül eső Termék (vagy az adott esetnek megfelelően a Leszállítandók) előállítását, és azokat leszállítják-e a Vevőnek. Ilyen esetben az Eladó a leszállításkor állíthatja ki a számláját, azzal, hogy az ilyen tételekre irányadó fizetési feltételeket a D. melléklet 5.C. pontja rögzíti. A Hulladékot és a Visszatérő Anyagot az Eladó visszaszolgáltatja a Vevőnek vagy felhasználja a megrendelések teljesítésére az alábbi i. és ii. alpont szerint.
- i. A jelen Megállapodás Eladó általi felmondása esetén: az Eladó meghatározza, hogy a) a konszignációban lévő Termékek értékesíthetők-e a Vevő számára, vagy a konszignációban lévő Termékek a Vevő költségére elhozandók-e, b) a Termékekre és Szolgáltatásokra leadott Határozott Rögzített Megrendelések adásvétele teljesítendő-e.
- ii. A jelen Megállapodás Vevő általi felmondása esetén: A Vevő meghatározza, hogy a) a konszignációban lévő Termékeket megvásárolja-e, vagy a konszignációban lévő Termékeket az Eladó saját költségére elvigye-e, b) a Termékekre és Szolgáltatásokra leadott Határozott Rögzített Megrendelések adásvétele teljesítendő-e.
6. **Hivatkozás a melléletekre.** A jelen Megállapodáshoz csatolt és hivatkozott A-E. **melléletek** a Megállapodás részét képezik.
7. **A dokumentumok rangsora.** Amennyiben a jelen Megállapodást alkotó dokumentumok között ellentmondás merül fel, a rendelkezések az alábbi sorrendben irányadók:
- A. A jelen Megállapodás első 5 oldala és az E. melléklet

B. Exhibit A (Products) and Exhibit B (Services)

C. Exhibit C (Pricing)

D. Exhibit D (Terms and Conditions)

8. **Notices.** All notices required or permitted to be given pursuant to this Agreement or any of the exhibits hereto shall be in writing and shall be valid and sufficient if dispatched by a) registered or certified mail, postage prepaid; b) hand delivery; or c) overnight courier.

If to BUYER:

Arconic-Kofem Kft.

1-15 Verseci utca, Szekesfehervar

8000 Hungary

Attn: Istvan Katus

If to SELLER:

Arconic-Kofem Mill Products Hungary Kft.

1-15 Verseci utca, Szekesfehervar

8000 Hungary

Attn: Balazs Gabor

Each Party may change its address or other notice information in any respect, by giving written notice to the other Party.

B. Az A. melléklet (Termékek) és a B. melléklet (Szolgáltatások)

C. A C. melléklet (Árszabás)

D. A D. melléklet (Általános szerződési feltételek)

8. **Értesítések.** A jelen Megállapodás vagy annak bármely melléklete alapján küldendő vagy küldhető értesítéseket írásban kell továbbítani, és azok akkor minősülnek érvényesnek és megfelelőnek, ha a) bérmentesítve, ajánlott vagy tértivevényes levélként adják fel, b) személyes átadással vagy c) expressz futárszolgálattal kézbesítik.

A VEVŐ részére:

Arconic-Kofem Kft.

1-15 Verseci utca, Szekesfehervar

8000 Hungary

Címzett: Istvan Katus

Az ELADÓ részére:

Arconic-Kofem Mill Products Hungary Kft.

1-15 Verseci utca, Szekesfehervar

8000 Hungary

Címzett: Balazs Gabor

A címét vagy egyéb kapcsolattartási adatait bármely Fél módosíthatja a másik Félnek küldött írásos értesítéssel.

9. **Entire Agreement.** This Agreement, together with the exhibits hereto and purchase orders issued by Buyer and accepted by Seller, set forth the entire agreement between Buyer and Seller with respect to the subject matter hereof and supersedes and overrides all prior negotiations, commitments and writings, including but not limited to boilerplate terms and conditions contained in purchase orders, sales order acknowledgement forms or other documents exchanged between the Parties in connection with their obligations hereunder. Seller and Buyer acknowledge that purchase orders, sales acknowledgment forms and other standard documents may be utilized by the Parties for purposes of convenience in the administration of this Agreement, however any standard terms and conditions contained therein are for informational purposes only and shall not vary the terms of this Agreement.

10. **Counterparts.** This Agreement may be executed in any number of counterparts, which together shall constitute one and the same document.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the dates written below.

Arconic-Kőfém Mill Products Hungary Kft.

By: /s/ Balazs Gabor

Name: Balazs Gabor

Title: managing director

Date: 9th January, 2020

Arconic-Kőfém Kft.

By: /s/ Istvan Gabor Katus

Name: Istvan Gabor Katus

Title: managing director

Date: 9th January, 2020

9. **A Megállapodás teljessége.** Annak tárgya vonatkozásában a jelen Megállapodás képezi a Vevő és az Eladó teljes megállapodását annak mellékleteivel, valamint a Vevő által feladott és az Eladó által elfogadott megrendelésekkel együtt, és felülír és hatályon kívül helyez minden korábbi tárgyalást, vállalást és írásos kommunikációt, ideértve többek között a Felek által az e Megállapodás szerinti kötelezettségeikkel kapcsolatban egymásnak küldött megrendelésekben, értékesítési visszaigazoló nyomtatványokban vagy egyéb dokumentumokban szereplő standard feltételeket is. Az Eladó és a Vevő tudomásul veszi, hogy a Felek a jelen Megállapodás ügyintézésé során, annak egyszerűsítése érdekében megrendelőlapokat, értékesítési visszaigazoló nyomtatványokat és egyéb formanyomtatványokat használhatnak, azonban az ezekben szereplő esetleges általános szerződési feltételek kizárólag tájékoztatásul szolgálnak, és nem módosítják a jelen Megállapodás feltételeit.

10. **Példányok.** A jelen Megállapodás bármennyi ellenpéldányban aláírható, amelyek együttesen alkotják ugyanazt az egy okiratot.

A FENTIEK HITELÉÜL a Felek megfelelő felhatalmazással rendelkező képviselői az alulírott napon ezennel aláírják a jelen Megállapodást.

Arconic-Kőfém Mill Products Hungary Kft.

Aláíró: /s/ Balazs Gabor

Név: Balazs Gabor

Beosztás: ügyvezető

Kelt: 2020. január 9.

Arconic-Kőfém Kft.

Aláíró: /s/ Istvan Gabor Katus

Név: Istvan Gabor Katus

Beosztás: ügyvezető

Kelt: 2020. január 9.

CERTIFICATE OF INCORPORATION
OF
HOWMET AEROSPACE INC.

ARTICLE I.

NAME OF CORPORATION

The name of the corporation is: Howmet Aerospace Inc. (the "Corporation").

ARTICLE II.

REGISTERED OFFICE; REGISTERED AGENT

The address of the registered office of the Corporation in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, 19801. The name of the registered agent of the Corporation at such address is The Corporation Trust Company. The Corporation may have such other offices, either within or without the State of Delaware, as the Board of Directors of the Corporation (the "Board of Directors") may designate or as the business of the Corporation may from time to time require.

ARTICLE III.

PURPOSE

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware, as amended ("DGCL").

ARTICLE IV.

STOCK

Section i. Authorized Stock. The total number of authorized capital stock of the Corporation shall be 610,660,000 shares which shall be divided into three classes as follows: (i) 660,000 shares of Serial Preferred Stock of the par value of \$100 per share (the "Serial Preferred Stock"), (ii) 10,000,000 shares of Class B Serial Preferred Stock of the par value of \$1.00 per share (the "Class B Serial Preferred Stock" and together with the Serial Preferred Stock, the "Preferred Stock") and (iii) 600,000,000 shares of Common Stock of the par value of \$1.00 per share (the "Common Stock").

Section ii. Common Stock. Except as otherwise provided by law, by this Certificate of Incorporation, or by the resolution or resolutions adopted by the Board of Directors designating the rights, powers and preferences of any series of Preferred Stock, the holders of outstanding shares of Common Stock shall have the right to vote on all matters, including the election of directors, to the exclusion of all other stockholders, and holders of Preferred Stock shall not be entitled to receive notice of any meeting of stockholders at which they are not entitled to vote. Each holder of record of Common Stock shall be entitled to one vote for each share of Common Stock standing in the name of the stockholder on the books of the Corporation.

Section iii. Preferred Stock. Shares of Preferred Stock may be authorized and issued in one or more series, and the number of shares to be included in each such series may be established, and the designations, powers,

rights and preferences of the shares of each such series, and the qualifications, limitations and restrictions thereof may be fixed, in this Certificate of Incorporation. In addition, the Board of Directors (or any committee to which it may duly delegate the authority granted in this Article IV) is hereby empowered, by resolution or resolutions, to authorize the issuance from time to time of shares of Preferred Stock in one or more series, for such consideration and for such corporate purposes as the Board of Directors (or such committee thereof) may from time to time determine, and by filing a certificate pursuant to applicable law of the State of Delaware as it presently exists or may hereafter be amended to establish from time to time for each such series the number of shares to be included in each such series and to fix the designations, powers, rights and preferences of the shares of each such series, and the qualifications, limitations and restrictions thereof to the fullest extent now or hereafter permitted by this Certificate of Incorporation and the laws of the State of Delaware, including, without limitation, voting rights (if any), dividend rights, dissolution rights, conversion rights, exchange rights and redemption rights thereof, as shall be stated and expressed in a resolution or resolutions adopted by the Board of Directors (or such committee thereof) providing for the issuance of such series of Preferred Stock, and in accordance with the following provisions:

(a) Establishment of Series of Preferred Stock. Preferred Stock shall be issued in one or more series. Each series shall be designated herein or by the Board of Directors so as to distinguish the shares thereof from the shares of all other series and classes. The Board of Directors may, by resolution, from time to time divide shares of Preferred Stock into series and fix and determine the number of shares and, subject to the provisions of this Article IV, the relative rights and preferences of any series so established, provided that all shares of Preferred Stock shall be identical except as to the following relative rights and preferences, in respect of any or all of which there may be variations between different series, namely: the rate of dividend (including the date from which dividends shall be cumulative and, with respect to Class B Serial Preferred Stock, whether such dividend rate shall be fixed or variable and the methods, procedures and formulas for the recalculation or periodic resetting of any variable dividend rate); the price at, and the terms and conditions on, which shares may be redeemed; the amounts payable on shares in the event of voluntary or involuntary liquidation; sinking fund provisions for the redemption or purchase of shares in the event shares of any series are issued with sinking fund provisions; and the terms and conditions on which the shares of any series may be converted in the event the shares of any series are issued with the privilege of conversion. Each share of any series of Preferred Stock shall be identical with all other shares of such series, except as to date from which dividends shall be cumulative.

(b) Dividends.

i. The holders of Serial Preferred Stock of any series shall be entitled to receive, when and as declared by the Board of Directors, out of surplus or net profits legally available therefor, cumulative dividends at the rate of dividend fixed by the Board of Directors for such series as hereinbefore provided, and no more, payable quarter yearly on the first days of January, April, July and October in each year. The dividends on any shares of Serial Preferred Stock shall be cumulative from such date as shall be fixed for that purpose by the Board of Directors prior to the issue of such shares or, if no such date shall be so fixed by the Board of Directors, from the quarter yearly dividend payment date next preceding the date of issue of such shares.

ii. The holders of Class B Serial Preferred Stock of any series shall be entitled to receive, when and as declared by the Board of Directors or any authorized committee thereof, out of funds legally available therefor, cumulative dividends at the rate of dividend fixed by the Board of Directors for such series including any such rate which may be reset or recalculated from time to time pursuant to procedures or formulas established therefor by the Board of Directors, and no more; provided, however, that no dividend shall be declared or paid on the Class B Serial Preferred Stock so long as any of the Serial Preferred Stock remains outstanding, unless all quarter yearly dividends accrued on the Serial Preferred Stock and the dividend thereon for the current quarter yearly dividend period shall have been paid or declared and a sum sufficient for the payment thereof set apart. The dividends on any shares of Class B Serial Preferred Stock shall be cumulative from such date as shall be fixed for that purpose by the Board of Directors prior to the issue of such shares or, if no such date shall be so fixed by the Board of Directors, from the dividend payment date for such series next preceding the date of issue of such shares. If full cumulative dividends on shares of a series of Class B Serial Preferred Stock have not been paid or declared and a sum sufficient

for the payment thereof set apart, dividends thereon shall be declared and paid pro rata to the holders of such series entitled thereto. Accrued dividends shall not bear interest.

iii. The holders of Common Stock shall be entitled to receive dividends, when and as declared by the Board of Directors, provided, however, that no dividend shall be declared or paid on the Common Stock so long as any of the Preferred Stock remains outstanding, unless all dividends accrued on all classes of Preferred Stock and the dividend on Serial Preferred Stock for the current quarter yearly dividend period shall have been paid or declared and a sum sufficient for the payment thereof set apart.

(c) Liquidation. In the event of any liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary, then before any payment or distribution shall be made to the holders of Common Stock or Class B Serial Preferred Stock the holders of Serial Preferred Stock shall be entitled to be paid such amount as shall have been fixed by the Board of Directors as hereinbefore provided, plus all dividends which have accrued on the Serial Preferred Stock and have not been paid or declared and a sum sufficient for the payment thereof set apart. Thereafter, the holders of Class B Serial Preferred Stock of each series shall be entitled to be paid such amount as shall have been fixed by the Board of Directors as hereinbefore provided, plus all dividends which have accrued on the Class B Serial Preferred Stock and have not been paid or declared and a sum sufficient for the payment thereof set apart. Thereafter, the remaining assets shall belong to and be divided among the holders of the Common Stock. The consolidation or merger of the Corporation with or into any other corporation or corporations or share exchange or division involving the Corporation in pursuance of applicable statutes providing for the consolidation, merger, share exchange or division shall not be deemed a liquidation, dissolution or winding up of the Corporation within the meaning of any of the provisions of this Section 3(c).

(d) Voting Rights. The holders of Preferred Stock shall have no voting rights except as otherwise required by law or provided in this Certificate of Incorporation (including in any certificate of designation):

i. If at any time the amount of any dividends on Preferred Stock which have accrued and which have not been paid or declared and a sum sufficient for the payment thereof set apart shall be at least equal to the amount of four quarter yearly dividends, the holders of Preferred Stock shall have one vote per share, provided, however, that such voting rights of the holders of Preferred Stock shall continue only until all quarter yearly dividends accrued on the Preferred Stock have been paid or declared and a sum sufficient for the payment thereof set apart.

ii. Without the consent of the holders of at least a majority of the shares of Preferred Stock at the time outstanding, given in person or by proxy, either in writing or by vote at a meeting called for that purpose at which the holders of Preferred Stock shall vote as a class:

1. no additional class of stock ranking on a parity with the Preferred Stock as to dividends or assets shall be authorized;
2. the authorized number of shares of Preferred Stock or of any class of stock ranking on a parity with the Preferred Stock as to dividends or assets shall not be increased; and
3. the Corporation shall not merge or consolidate with or into any other corporation if the corporation surviving or resulting from such merger or consolidation would have after such merger or consolidation any authorized class of stock ranking senior to or on a parity with the Preferred Stock except the same number of shares of stock with the same rights and preferences as the authorized stock of the Corporation immediately preceding such merger or consolidation.

iii. Except in pursuance of the provisions of Section 3(d)(i)(C), without the consent of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the number of shares of Preferred Stock at the time

outstanding, given in person or by proxy, either in writing or by a vote at a meeting called for that purpose at which the holders of Preferred Stock shall vote as a class:

1. no change shall be made in the rights and preferences of the Preferred Stock as set forth in this Certificate of Incorporation or as fixed by the Board of Directors so as to affect such stock adversely; provided, however, that if any such change would affect any series of Preferred Stock adversely as compared with the effect thereof upon any other series of Preferred Stock, no such change shall be made without the additional consent given as aforesaid of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the number of shares at the time outstanding of the Preferred Stock of the series which would be so adversely affected;
2. no additional class of stock ranking senior to the Preferred Stock as to dividends or assets shall be authorized;
3. the authorized number of shares of any class of stock ranking senior to the Preferred Stock as to dividends or assets shall not be increased; and
4. the Corporation shall not (I) sell, lease, convey or part with control of all or substantially all of its property or business or (II) voluntarily liquidate, dissolve or wind up its affairs.

Notwithstanding the foregoing:

- (x) except as otherwise required by law, the voting rights of any series of Class B Serial Preferred Stock may be limited or eliminated by the Board of Directors prior to the issuance thereof; and
- (y) provided no shares of Serial Preferred Stock are then outstanding, any series of Class B Serial Preferred Stock may be issued with such additional voting rights in the event of dividend arrearages as the Board of Directors may determine to be required to qualify such series for listing on one or more securities exchanges of recognized standing.

(e) Redemption.

i. The Corporation, at the option of the Board of Directors, may redeem the whole or any part of the Serial Preferred Stock, or the whole or any part of any series thereof, at any time or from time to time, at such redemption price therefor as shall have been fixed by the Board of Directors as hereinbefore provided, plus all dividends which on the redemption date have accrued on the shares to be redeemed and have not been paid or declared and a sum sufficient for the payment thereof set apart. Notice of every such redemption shall be published not less than thirty (30) days nor more than sixty (60) days prior to the date fixed for redemption in a daily newspaper printed in the English language and published and of general circulation in the Borough of Manhattan, City and State of New York, and in a daily newspaper printed in the English language and published and of general circulation in the City of Pittsburgh, Pennsylvania. Notice of every such redemption shall also be mailed not less than thirty (30) days nor more than sixty (60) days prior to the date fixed for redemption to the holders of record of the shares of Serial Preferred Stock to be redeemed at their respective addresses as the same appear upon the books of the Corporation; but no failure to mail such notice or any defect therein or in the mailing thereof shall affect the validity of the proceedings for the redemption of any shares of Serial Preferred Stock. In case of a redemption of a part only of any series of the Serial Preferred Stock at the time outstanding, the Corporation shall select shares so to be redeemed in such manner, whether pro rata or by lot, as the Board of Directors may determine. Subject to the provisions herein contained, the Board of Directors shall have full power and authority to prescribe the manner in which and the terms and conditions on which the Serial Preferred Stock shall be redeemed from time to time. If notice of redemption shall have been published as hereinbefore provided and if before the redemption date specified in such notice all funds necessary for

such redemption shall have been set apart so as to be available therefor, then on and after the date fixed for redemption the shares of Serial Preferred Stock so called for redemption, notwithstanding that any certificate therefor shall not have been surrendered for cancellation, shall no longer be deemed outstanding and all rights with respect to such shares shall forthwith cease and terminate except only the right of the holders thereof to receive upon surrender of certificates therefor the amount payable upon redemption thereof, but without interest; provided, however, that if the Corporation shall, after the publication of notice of any such redemption and prior to the redemption date, deposit in trust for the account of the holders of the Serial Preferred Stock to be redeemed with a bank or trust company in good standing, designated in such notice, organized under the laws of the United States of America or of the State of New York or of the Commonwealth of Pennsylvania, doing business in the Borough of Manhattan, The City of New York, or in the City of Pittsburgh, Pennsylvania, and having a capital, undivided profits and surplus aggregating at least five million dollars (\$5,000,000), all funds necessary for such redemption, then from and after the time of such deposit the shares of Serial Preferred Stock so called for redemption, notwithstanding that any certificate therefor shall not have been surrendered for cancellation, shall no longer be deemed outstanding and all rights with respect to such shares shall forthwith cease and terminate except only the right of the holders of such shares to receive from such bank or trust company upon surrender of certificates therefor the amount payable upon redemption thereof, but without interest. All shares of Serial Preferred Stock so redeemed shall be cancelled and shall not be reissued.

ii. The terms and conditions under which the whole or any part of any series of the Class B Serial Preferred Stock may be redeemed shall be established by the Board of Directors prior to the issuance thereof. Unless otherwise determined by the Board of Directors, all shares of Class B Serial Preferred Stock so redeemed or otherwise acquired by the Corporation shall be returned to the status of authorized but unissued shares.

(f) Preemptive Rights. Neither the holders of the Preferred Stock nor the holders of the Common Stock shall be entitled to participate in any right of subscription to any increased or additional capital stock of the Corporation of any kind whatsoever.

(g) Serial Preferred Stock. There is hereby established a series of the Serial Preferred Stock of the Corporation consisting initially of 660,000 shares as follows:

i. The shares of such series shall be designated as \$3.75 Cumulative Preferred Stock.

ii. The rate of dividend payable upon the shares of \$3.75 Cumulative Preferred Stock shall be \$3.75 per share per annum and the dividends upon shares thereof issued in respect of such shares of the Corporation's predecessor issued prior to April 1, 1947 shall be cumulative.

iii. The redemption price applicable to the shares of \$3.75 Cumulative Preferred Stock shall be \$100 per share, plus dividends which have accrued and have not been paid or declared and a sum sufficient for the payment thereof set apart.

iv. The amounts payable to the holders of \$3.75 Cumulative Preferred Stock in the event of any voluntary liquidation, dissolution or winding-up of the Corporation, as provided in this Article IV, before any distribution shall be made to the holders of Common Stock, shall be \$100 per share, plus dividends which have accrued and have not been paid or declared and a sum sufficient for the payment thereof set apart. In the event of any involuntary liquidation, dissolution or winding-up of the Corporation, as provided in this Article IV, the amount payable to the holders of \$3.75 Cumulative Preferred Stock, before any payment or distribution shall be made to the holders of Common Stock, shall be \$100 per share, plus dividends which have accrued and have not been paid or declared and a sum sufficient for the payment thereof set apart.

ARTICLE V.

TERM

The term of existence of the Corporation shall be perpetual.

ARTICLE VI.

BOARD OF DIRECTORS

Section 1. Number of Directors. Subject to any rights of the holders of any class or series of Preferred Stock to elect additional directors under specified circumstances, the number of directors which shall constitute the Board of Directors shall be fixed from time to time exclusively pursuant to a resolution adopted by the affirmative vote of a majority of the total number of directors that the Corporation would have if there were no vacancies (the "Whole Board").

Section 2. Election of Directors. At each annual meeting of stockholders, directors of the Corporation shall be elected to hold office for a term expiring at the next annual meeting of stockholders, and until their respective successors shall have been duly elected and qualified or until their earlier death, resignation or removal as hereinafter provided; except that if any such election shall be not so held, such election shall take place at a stockholders' meeting called and held in accordance with the DGCL. For the avoidance of doubt, the term of all directors of the Corporation serving on the Board of Directors as of December 31, 2017 shall expire at the next annual meeting of stockholders as provided in the preceding sentence. Unless and except to the extent that the Bylaws of the Corporation (as amended, the "Bylaws") shall so require, the election of directors of the Corporation need not be by written ballot. Advance notice of stockholder nominations for the election of directors shall be given in the manner and to the extent provided in the Bylaws.

Section 3. Newly Created Directorships and Vacancies. Subject to applicable law and the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, and unless the Board of Directors otherwise determines, vacancies resulting from death, resignation, retirement, disqualification, removal from office or other cause, and newly created directorships resulting from any increase in the authorized number of directors, may be filled only by the affirmative vote of a majority of the remaining directors, though less than a quorum of the Board of Directors, or by a sole remaining director, and directors so chosen shall hold office for a term expiring at the next annual meeting of stockholders and until such director's successor shall have been duly elected and qualified. No decrease in the number of authorized directors constituting the Whole Board shall shorten the term of any incumbent director.

Section 4. Removal of Directors. Subject to the rights of the holders of any series of Preferred Stock then outstanding, any director may be removed from office at any time with or without cause, at a meeting called for that purpose, by the affirmative vote of the holders of at least a majority of the voting power of all outstanding shares of Common Stock entitled to vote generally in the election of directors, voting together as a single class.

Section 5. Rights of Holders of Preferred Stock. Notwithstanding the provisions of this Article VI, whenever the holders of one or more series of Preferred Stock issued by the Corporation shall have the right, voting separately or together by series, to elect directors at an annual or special meeting of stockholders, the election, term of office, filling of vacancies and other features of such directorship shall be governed by the rights of such Preferred Stock as set forth in this Certificate of Incorporation or the certificate of designations governing such series.

Section 6. No Cumulative Voting. Except as may otherwise be set forth in the resolution or resolutions of the Board of Directors providing the issuance of a series of Preferred Stock, and then only with respect to such series of Preferred Stock, cumulative voting in the election of directors is specifically denied.

ARTICLE VII.

STOCKHOLDER ACTION

Section 1. Stockholder Action by Written Consent. Subject to the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, any action required or permitted to be taken by the stockholders of the Corporation at an annual or special meeting of stockholders of the Corporation, may be taken without a meeting, without prior notice, and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed by the holders of stock of the Corporation having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares of stock of the Corporation entitled to vote thereon were present and voted.

Section 2. Special Meetings of Stockholders. Subject to the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, special meetings of stockholders may only be called by or at the direction of (1) the Chairman of the Board of Directors or the Chief Executive Officer, (2) the Board of Directors pursuant to a resolution adopted by a majority of the Whole Board or (3) the Secretary of the Corporation at the written request of a stockholder of record in accordance with the requirements and procedures provided in the Bylaws. At any special meeting of stockholders, only such business shall be conducted or considered as shall have been properly brought before the meeting pursuant to the Corporation's notice of meeting.

ARTICLE VIII.

DIRECTOR LIABILITY

To the fullest extent permitted by the DGCL, as the same exists or may hereafter be amended, a director of the Corporation shall not be personally liable either to the Corporation or to any of its stockholders for monetary damages for breach of fiduciary duty as a director. Any amendment, modification or repeal of the foregoing sentence shall not adversely affect any right or protection of a director of the Corporation hereunder in respect of any act or omission occurring prior to the time of such amendment, modification or repeal. If the DGCL hereafter is amended to further eliminate or limit the liability of a director, then a director of the Corporation, in addition to the circumstances in which a director is not personally liable as set forth in the preceding sentence, shall not be liable to the fullest extent permitted by the amended DCGL.

ARTICLE IX.

AMENDMENTS TO BYLAWS

In furtherance and not in limitation of the powers conferred by law, the Board of Directors is expressly authorized and empowered to adopt, amend, alter, change or repeal the Bylaws.

ARTICLE X.

FORUM AND VENUE

Unless the Board of Directors otherwise determines, the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim for or based on a breach of a fiduciary duty owed by any current or former director or officer or other employee of the Corporation to the Corporation or to the Corporation's stockholders, including any claim alleging aiding and abetting of such a breach of fiduciary duty, (iii) any action asserting a claim against the Corporation or any current or former director or officer or other employee of the Corporation arising pursuant to any provision of the DGCL or this Certificate of Incorporation or the Bylaws (as either may be amended from time to time), (iv) any action asserting a claim related to or involving the Corporation that is governed by the internal affairs doctrine, or (v) any action asserting an "internal corporate claim" as that term is defined in Section 115 of the DGCL, shall be a state court located within

the State of Delaware (or, if no state court located within the State of Delaware has jurisdiction, the federal court for the District of Delaware).

ARTICLE XI.

AMENDMENTS

The Corporation reserves the right to amend, alter, change or repeal any provision contained in this Certificate of Incorporation, in the manner now or hereafter prescribed by the laws of the State of Delaware, and all rights herein are granted subject to this reservation.

**BYLAWS
OF
HOWMET AEROSPACE INC.
Incorporated under the Laws of the State of Delaware**

These Bylaws (the "Bylaws") of Howmet Aerospace Inc., a Delaware corporation, are effective as of December 31, 2017.

Article I.

OFFICES AND RECORDS

SECTION 1.1. Delaware Office. The registered office of Howmet Aerospace Inc. (the "Corporation") in the State of Delaware shall be as stated from time to time in the Certificate of Incorporation of the Corporation (as amended, the "Certificate of Incorporation").

SECTION 1.2. Other Offices. The Corporation may have such other offices, either inside or outside the State of Delaware, as the Board of Directors of the Corporation (the "Board of Directors") may from time to time designate or as the business of the Corporation may require.

SECTION 1.3. Books and Records. The books and records of the Corporation may be kept inside or outside the State of Delaware at such place or places as may from time to time be designated by the Board of Directors.

Article II.

STOCKHOLDERS

SECTION 2.1. Annual Meeting. The annual meeting of the stockholders of the Corporation shall be held at such date and time and in such manner as may be fixed by resolution of the Board of Directors.

SECTION 2.2. Special Meeting.

(A) Subject to the rights of the holders of any series of Preferred Stock (as used herein, such term shall have the meaning given in the Certificate of Incorporation) with respect to such series of Preferred Stock, special meetings of the stockholders may be called only by or at the direction of the Chairman of the Board of Directors or the Chief Executive Officer, the Board of Directors pursuant to a resolution adopted by a majority of the total number of directors which the Corporation would have if there were no vacancies (the "Whole Board"), or the Secretary of the Corporation at the written request of a stockholder of record who owns and has owned, or is acting on behalf of one or more beneficial owners who own and have owned, continuously for at least one year as of the record date fixed in accordance with these Bylaws to determine who may deliver a written request to call such special meeting, capital stock representing at least twenty-five percent (25%) of the outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors (the "Special Meeting Request Required Shares"), and who continue to own the Special Meeting Request Required Shares at all times between such record date and the date of the applicable meeting of stockholders. For purposes of this Section 2.2, a record or beneficial owner shall be deemed to "own" shares of capital stock of the Corporation that such record or beneficial owner would be deemed to own in accordance with clause (3) of the first paragraph of Section 9.1 (without giving effect to any reference to Constituent Holder or any stockholder fund comprising a Qualifying Fund contained therein).

(B) Any record stockholder (whether acting for him, her or itself, or at the direction of a beneficial owner) may, by written notice to the Secretary, demand that the Board of Directors fix a record date to determine the record stockholders who are entitled to deliver a written request to call a special meeting (such record date, the “Ownership Record Date”). A written demand to fix an Ownership Record Date shall include all of the information that must be included in a written request to call a special meeting, as set forth in paragraph (D) of this Section 2.2. The Board of Directors may fix the Ownership Record Date within ten (10) days of the Secretary’s receipt of a valid demand to fix the Ownership Record Date. The Ownership Record Date shall not precede, and shall not be more than ten (10) days after, the date upon which the resolution fixing the Ownership Record Date is adopted by the Board of Directors. If an Ownership Record Date is not fixed by the Board of Directors within the period set forth above, the Ownership Record Date shall be the date that the first written request to call a special meeting in accordance with the requirements of this Section 2.2 is received by the Secretary with respect to the proposed business to be submitted for stockholder approval at a special meeting.

(C) A beneficial owner who wishes to deliver a written request to call a special meeting must cause the nominee or other person who serves as the record stockholder of such beneficial owner’s stock to sign the written request to call a special meeting. If a record stockholder is the nominee for more than one beneficial owner of stock, the record stockholder may deliver a written request to call a special meeting solely with respect to the capital stock of the Corporation beneficially owned by the beneficial owner who is directing the record stockholder to sign such written request to call a special meeting.

(D) Each written request to call a special meeting shall include the following and shall be delivered to the Secretary of the Corporation: (i) the signature of the record stockholder submitting such request and the date such request was signed, (ii) the text of each business proposal desired to be submitted for stockholder approval at the special meeting, and (iii) as to the beneficial owner, if any, directing such record stockholder to sign the written request to call a special meeting and as to such record stockholder (unless such record stockholder is acting solely as a nominee for a beneficial owner) (each such beneficial owner and each record stockholder who is not acting solely as a nominee, a “Disclosing Party”):

(1) all of the information required to be disclosed pursuant to Section 2.9(C)(1) of these Bylaws (which information shall be supplemented by delivery to the Secretary) by each Disclosing Party, (i) not later than ten (10) days after the record date for determining the record stockholders entitled to notice of the special meeting (such record date, the “Meeting Record Date”), to disclose the foregoing information as of the Meeting Record Date and (ii) not later than the 5th day before the special meeting, to disclose the foregoing information as of the date that is ten (10) days prior to the special meeting or any adjournment or postponement thereof;

(2) with respect to each business proposal to be submitted for stockholder approval at the special meeting, a statement whether or not any Disclosing Party will deliver a proxy statement and form of proxy to holders of at least the percentage of voting power of all of the outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors (“Voting Stock”) required under applicable law to carry such proposal (such statement, a “Solicitation Statement”); and

(3) any additional information reasonably requested by the Board of Directors to verify the Voting Stock ownership position of such Disclosing Party.

Each time the Disclosing Party’s Voting Stock ownership position decreases following the delivery of the foregoing information to the Secretary, such Disclosing Party shall notify the Corporation of his, her or its decreased Voting Stock ownership position, together with any information reasonably requested by the Board of Directors to verify such position, within ten (10) days of such decrease or as of the 5th day before the special meeting, whichever is earlier.

(E) The Secretary shall not accept, and shall consider ineffective, a written request to call a special meeting pursuant to clause (A)(3) of this Section 2.2:

(1) that does not comply with the provisions of this Section 2.2;

(2) that relates to an item of business that is not a proper subject for stockholder action under applicable law;

(3) if such written request to call a special meeting is delivered between the time beginning on the 61st day after the earliest date of signature on a written request to call a special meeting, that has been delivered to the Secretary, relating to an identical or substantially similar item (as determined by the Board of Directors, a "Similar Item"), other than the election or removal of directors, and ending on the one (1)-year anniversary of such earliest date;

(4) if a Similar Item will be submitted for stockholder approval at any stockholder meeting to be held on or before the 120th day after the Secretary receives such written request to call a special meeting (and, for purposes of this clause (4), the election of directors shall be deemed to be a Similar Item with respect to all items of business involving the election or removal of directors, changing the size of the Board of Directors and the filling of vacancies or newly created directorships resulting from any increase in the authorized number of directors);

(5) if a Similar Item has been presented at any meeting of stockholders held within 180 days prior to receipt by the Secretary of such written request to call a special meeting (and, for purposes of this clause (5), the election of directors shall be deemed to be a Similar Item with respect to all items of business involving the election or removal of directors, changing the size of the Board of Directors and the filling of vacancies or newly created directorships resulting from any increase in the authorized number of directors); or

(6) if such written request to call a special meeting is delivered between the time beginning on the 90th day prior to the date of the next annual meeting and ending on the date of the next annual meeting.

(F) Revocations:

(1) A record stockholder may revoke a request to call a special meeting at any time before the special meeting by sending written notice of such revocation to the Secretary of the Corporation.

(2) All written requests for a special meeting shall be deemed revoked:

(a) upon the first date that, after giving effect to revocation(s) and notices of ownership position decreases (pursuant to Section 2.2(D)(3) and the last sentence of Section 2.2(D), respectively), the aggregate Voting Stock ownership position of all the Disclosing Parties who are listed on the unrevoked written requests to call a special meeting with respect to a Similar Item decreases to a number of shares of Voting Stock less than the Special Meeting Request Required Shares;

(b) if any Disclosing Party who has provided a Solicitation Statement with respect to any business proposal to be submitted for stockholder approval at such special meeting does not act in accordance with the representations set forth therein; or

(c) if any Disclosing Party does not provide the supplemental information required by Section 2.2(D)(3) or by the final sentence of Section 2.2(D), in accordance with such provisions.

(3) If a deemed revocation of all written requests to call a special meeting has occurred after the special meeting has been called by the Secretary, the Board of Directors shall have the discretion to determine whether or not to proceed with the special meeting.

(G) The Board of Directors may submit its own proposal or proposals for consideration at a special meeting called at the request of one or more stockholders. The Meeting Record Date for, and the place, date and time of, any special meeting shall be fixed by the Board of Directors; provided, that the date of any such special meeting shall not be more than 120 days after the date on which valid special meeting request(s) from holders of the Special Meeting Request Required Shares are delivered to the Secretary of the Corporation.

SECTION 2.3. Place of Meeting. The Board of Directors or the Chairman of the Board of Directors, as the case may be, may designate the place of meeting for any annual or special meeting of the stockholders or may designate that the meeting be held by means of remote communication. If no designation is so made, the place of meeting shall be the principal office of the Corporation.

SECTION 2.4. Notice of Meeting. Written or printed notice, stating the place, if any, date and hour of the meeting, the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such meeting, and in the case of a special meeting, the purpose or purposes for which the meeting is called, shall be delivered by the Corporation not less than ten (10) days nor more than sixty (60) days before the date of the meeting, either personally, by electronic transmission in the manner provided in Section 232 of the General Corporation Law of the State of Delaware (as amended, the “DGCL”) (except to the extent prohibited by Section 232(e) of the DGCL) or by mail, to each stockholder of record entitled to vote at such meeting. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail with postage thereon prepaid, addressed to the stockholder at such stockholder’s address as it appears on the records of the Corporation. If notice is given by electronic transmission, such notice shall be deemed to be given at the times provided in the DGCL. Such further notice shall be given as may be required by applicable law. Meetings may be held without notice if all stockholders entitled to vote are present and participate at the meeting without objecting to the holding of the meeting, or if notice is waived by those not present in accordance with Section 7.4 of these Bylaws. Any previously scheduled meeting of the stockholders may be postponed, and unless the Certificate of Incorporation otherwise provides, any special meeting of the stockholders may be cancelled, by resolution of the Board of Directors upon public notice given prior to the date previously scheduled for such meeting of stockholders.

SECTION 2.5. Quorum and Adjournment. Except as otherwise provided by law or by the Certificate of Incorporation, the holders of a majority of the Voting Stock, represented in person or by proxy, shall constitute a quorum at a meeting of stockholders, except that when specified business is to be voted on by a class or series of stock voting as a class, the holders of a majority of the shares of such class or series shall constitute a quorum of such class or series for the transaction of such business. The Chairman of the Board of Directors or the Chief Executive Officer may adjourn the meeting from time to time, whether or not there is a quorum. No notice of the time, date and place, if any, of adjourned meetings need be given except as required by applicable law. The stockholders present at a duly called meeting at which a quorum is present may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum.

SECTION 2.6. Organization. Meetings of stockholders shall be presided over by such person as the Board of Directors may designate as chairman of the meeting, or in the absence of such a person, the Chairman of the Board of Directors, or if none or in the Chairman of the Board of Directors’ absence or inability to act, the Chief Executive Officer, or if none or in the Chief Executive Officer’s absence or inability to act, the President, or if none or in the President’s absence or inability to act, an officer of the Corporation elected by the Board of Directors, or, if none of the foregoing is present or able to act, by a chairman to be chosen by the holders of a majority of the shares entitled to vote who are present in person or by proxy at the meeting. The Secretary, or in the Secretary’s absence, an Assistant Secretary, shall act as secretary of every meeting, but if neither the Secretary nor an Assistant Secretary is present, the presiding officer of the meeting shall appoint any person present to act as secretary of the meeting. The Board of Directors shall be entitled to make such rules or regulations for the conduct of meetings of stockholders as it shall deem necessary, appropriate or convenient. Subject to such rules and regulations of the Board of Directors, if any, the chairman of the meeting shall have the right and authority to prescribe such rules, regulations and

procedures and to do all such acts as, in the judgment of such chairman, are necessary, appropriate or convenient for the proper conduct of the meeting, including, without limitation, establishing an agenda or order of business for the meeting, rules and procedures for maintaining order at the meeting and the safety of those present, limitations on participation in the meeting to stockholders of record of the Corporation, their duly authorized and constituted proxies and such other persons as the chairman shall permit, restrictions on entry to the meeting after the time fixed for the commencement thereof, limitations on the time allotted to questions or comments by participants and regulation of the opening and closing of the polls for balloting and matters which are to be voted on by ballot.

SECTION 2.7. Proxies. At all meetings of stockholders, a stockholder may vote by proxy executed in writing (or in such manner prescribed by the DGCL) by the stockholder, or by such stockholder's duly authorized attorney in fact.

SECTION 2.8. Order of Business.

(A) Annual Meetings of Stockholders. At any annual meeting of the stockholders, only such nominations of individuals for election to the Board of Directors shall be made, and only such other business shall be conducted or considered, as shall have been properly brought before the meeting. For nominations to be properly made at an annual meeting, and proposals of other business to be properly brought before an annual meeting, nominations and proposals of other business must be: (a) specified in the Corporation's notice of meeting (or any supplement thereto) given by or at the direction of the Board of Directors, (b) otherwise properly made at the annual meeting, by or at the direction of the Board of Directors or (c) otherwise properly requested to be brought before the annual meeting by a stockholder of the Corporation in accordance with these Bylaws. For nominations of individuals for election to the Board of Directors or proposals of other business to be properly requested by a stockholder to be made at an annual meeting, a stockholder must (i) be a stockholder of record at the time of giving of notice of such annual meeting by or at the direction of the Board of Directors and at the time of the annual meeting, (ii) be entitled to vote at such annual meeting and (iii) comply with the procedures set forth in these Bylaws as to such business or nomination. Subject to Article IX of these Bylaws, the immediately preceding sentence shall be the exclusive means for a stockholder to make nominations or other business proposals (other than matters properly brought under Rule 14a-8 under the Securities Exchange Act of 1934, as amended (the "Exchange Act") and included in the Corporation's notice of meeting) before an annual meeting of stockholders.

(B) Special Meetings of Stockholders. At any special meeting of the stockholders, only such business shall be conducted or considered as shall have been properly brought before the meeting pursuant to the Corporation's notice of meeting. To be properly brought before a special meeting, proposals of business must be (i) specified in the Corporation's notice of meeting (or any supplement thereto) given by or at the direction of the Board of Directors, (ii) otherwise properly brought before the special meeting, by or at the direction of the Board of Directors or (iii) specified in the Corporation's notice of meeting (or any supplement thereto) given by the Corporation pursuant to a valid stockholder request in accordance with Section 2.2 of these Bylaws, it being understood that business transacted at such a special meeting shall be limited to the matters stated in such valid stockholder request; provided, however, that nothing herein shall prohibit the Board of Directors from submitting additional matters to stockholders at any such special meeting.

Nominations of individuals for election to the Board of Directors may be made at a special meeting of stockholders at which directors are to be elected pursuant to the Corporation's notice of meeting (a) by or at the direction of the Board of Directors or (b) provided that the Board of Directors has determined that directors shall be elected at such meeting, by any stockholder of the Corporation who (1) is a stockholder of record at the time of giving of notice of such special meeting and at the time of the special meeting, (2) is entitled to vote at the meeting, and (3) complies with the procedures set forth in these Bylaws as to such nomination. Subject to Article IX of these Bylaws, this Section 2.8(B) shall be the exclusive means for a stockholder to make nominations or other business proposals (other than matters properly brought under Rule 14a-8 under the Exchange Act and included in the Corporation's notice of meeting) before a special meeting of stockholders.

(C) General. Except as otherwise provided by law, the Certificate of Incorporation or these Bylaws, the chairman of any annual or special meeting shall have the power to determine whether a nomination or any other

business proposed to be brought before the meeting was made or proposed, as the case may be, in accordance with these Bylaws and, if any proposed nomination or other business is not in compliance with these Bylaws, to declare that no action shall be taken on such nomination or other proposal and such nomination or other proposal shall be disregarded.

SECTION 2.9. Advance Notice of Stockholder Business and Nominations.

(A) Annual Meeting of Stockholders. Without qualification or limitation, subject to Section 2.9(C)(4) of these Bylaws, for any nominations or any other business to be properly brought before an annual meeting by a stockholder pursuant to Section 2.8(A) of these Bylaws, the stockholder must have given timely notice thereof (including, in the case of nominations, the completed and signed questionnaire, representation and agreement required by Section 2.10 of these Bylaws), and timely updates and supplements thereof, in each case in proper form, in writing to the Secretary, and such other business must otherwise be a proper matter for stockholder action.

To be timely, a stockholder's notice shall be delivered to the Secretary at the principal executive offices of the Corporation not earlier than the close of business on the 120th day and not later than the close of business on the 90th day prior to the first anniversary of the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is more than thirty (30) days before or more than sixty (60) days after such anniversary date, notice by the stockholder must be so delivered not earlier than the close of business on the 120th day prior to the date of such annual meeting and not later than the close of business on the later of the 90th day prior to the date of such annual meeting or, if the first public announcement of the date of such annual meeting is less than one hundred (100) days prior to the date of such annual meeting, the 10th day following the day on which public announcement of the date of such meeting is first made by the Corporation. In no event shall any adjournment or postponement of an annual meeting, or the public announcement thereof, commence a new time period for the giving of a stockholder's notice as described above.

Notwithstanding anything in the immediately preceding paragraph to the contrary, in the event that the number of directors to be elected to the Board of Directors is increased by the Board of Directors, and there is no public announcement by the Corporation naming all of the nominees for director or specifying the size of the increased Board of Directors at least one hundred (100) days prior to the first anniversary of the preceding year's annual meeting, a stockholder's notice required by this Section 2.9(A), shall also be considered timely, but only with respect to nominees for any new positions created by such increase, if it shall be delivered to the Secretary at the principal executive offices of the Corporation not later than the close of business on the 10th day following the day on which such public announcement is first made by the Corporation.

In addition, to be considered timely, a stockholder's notice shall further be updated and supplemented, if necessary, so that the information provided or required to be provided in such notice shall be true and correct as of the record date for the meeting and as of the date that is ten (10) business days prior to the meeting or any adjournment or postponement thereof, and such update and supplement shall be delivered to the Secretary at the principal executive offices of the Corporation not later than five (5) business days after the record date for the meeting in the case of the update and supplement required to be made as of the record date, and not later than eight (8) business days prior to the date for the meeting or any adjournment or postponement thereof in the case of the update and supplement required to be made as of ten (10) business days prior to the meeting or any adjournment or postponement thereof. For the avoidance of doubt, the obligation to update and supplement as set forth in this paragraph or any other Section of these Bylaws shall not limit the Corporation's rights with respect to any deficiencies in any notice provided by a stockholder, extend any applicable deadlines hereunder or under any other provision of the Bylaws or enable or be deemed to permit a stockholder who has previously submitted notice hereunder or under any other provision of the Bylaws to amend or update any proposal or to submit any new proposal, including by changing or adding nominees, matters, business and or resolutions proposed to be brought before a meeting of the stockholders.

(B) Special Meetings of Stockholders. Only such business shall be conducted at a special meeting of stockholders as shall have been brought before the meeting pursuant to the Corporation's notice of meeting, subject to the provisions of Section 2.8(B) of these Bylaws.

Subject to Section 2.9(C)(4) of these Bylaws, in the event the Corporation calls a special meeting of stockholders for the purpose of electing one or more directors to the Board of Directors, any stockholder may nominate an individual or individuals (as the case may be) for election to such position(s) as specified in the Corporation's notice of meeting, provided that the stockholder gives timely notice thereof (including the completed and signed questionnaire, representation and agreement required by Section 2.10 of these Bylaws), and timely updates and supplements thereof in each case in proper form, in writing, to the Secretary. To be timely, a stockholder's notice pursuant to the preceding sentence shall be delivered to the Secretary at the principal executive offices of the Corporation not earlier than the close of business on the 120th day prior to the date of such special meeting and not later than the close of business on the later of the 90th day prior to the date of such special meeting or, if the first public announcement of the date of such special meeting is less than one hundred (100) days prior to the date of such special meeting, the 10th day following the day on which public announcement is first made of the date of the special meeting and of the nominees proposed by the Board of Directors to be elected at such meeting. In no event shall any adjournment or postponement of a special meeting of stockholders, or the public announcement thereof, commence a new time period for the giving of a stockholder's notice as described above. In addition, to be considered timely, a stockholder's notice pursuant to the first sentence of this paragraph shall further be updated and supplemented, if necessary, so that the information provided or required to be provided in such notice shall be true and correct as of the record date for the meeting and as of the date that is ten (10) business days prior to the meeting or any adjournment or postponement thereof, and such update and supplement shall be delivered to the Secretary at the principal executive offices of the Corporation not later than five (5) business days after the record date for the meeting in the case of the update and supplement required to be made as of the record date, and not later than eight (8) business days prior to the date for the meeting, any adjournment or postponement thereof in the case of the update and supplement required to be made as of ten (10) business days prior to the meeting or any adjournment or postponement thereof.

(C) Disclosure Requirements.

(1) To be in proper form, a stockholder's notice (whether given pursuant to Section 2.2, 2.8, this Section 2.9 or Section 2.10) to the Secretary must include the following, as applicable:

(a) As to the stockholder giving the notice and the beneficial owner, if any, on whose behalf the nomination or proposal, as applicable, is made, a stockholder's notice must set forth: (i) the name and address of such stockholder, as they appear on the Corporation's books, of such beneficial owner, if any, and of their respective affiliates or associates or others acting in concert therewith, (ii) (A) the class or series and number of shares of the Corporation which are, directly or indirectly, owned beneficially and of record by such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith, (B) any option, warrant, convertible security, stock appreciation right, or similar right with an exercise or conversion privilege or a settlement payment or mechanism at a price related to any class or series of shares of the Corporation or with a value derived in whole or in part from the value of any class or series of shares of the Corporation, or any derivative or synthetic arrangement having the characteristics of a long position in any class or series of shares of the Corporation, or any contract, derivative, swap or other transaction or series of transactions designed to produce economic benefits and risks that correspond substantially to the ownership of any class or series of shares of the Corporation, including due to the fact that the value of such contract, derivative, swap or other transaction or series of transactions is determined by reference to the price, value or volatility of any class or series of shares of the Corporation, whether or not such instrument, contract or right shall be subject to settlement in the underlying class or series of shares of the Corporation, through the delivery of cash or other property, or otherwise, and without regard to whether the stockholder of record, the beneficial owner, if any, or any affiliates or associates or others acting in concert therewith, may have entered into transactions that hedge or mitigate the economic effect of such instrument, contract or right, or any other direct or indirect opportunity to profit or share in any profit derived from any increase or decrease in the value of shares of the Corporation (any of the foregoing, a "Derivative Instrument") directly or indirectly owned beneficially by such stockholder, the beneficial owner, if any, or any affiliates or

associates or others acting in concert therewith, (C) any proxy, contract, arrangement, understanding, or relationship pursuant to which such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith have any right to vote any class or series of shares of the Corporation, (D) any agreement, arrangement, understanding, relationship or otherwise, including any repurchase or similar so-called “stock borrowing” agreement or arrangement, involving such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith, directly or indirectly, the purpose or effect of which is to mitigate loss to, reduce the economic risk (of ownership or otherwise) of any class or series of the shares of the Corporation by, manage the risk of share price changes for, or increase or decrease the voting power of, such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith with respect to any class or series of the shares of the Corporation, or which provides, directly or indirectly, the opportunity to profit or share in any profit derived from any decrease in the price or value of any class or series of the shares of the Corporation (any of the foregoing, a “Short Interest”), (E) any rights to dividends on the shares of the Corporation owned beneficially by such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith that are separated or separable from the underlying shares of the Corporation, (F) any proportionate interest in shares of the Corporation or Derivative Instruments held, directly or indirectly, by a general or limited partnership in which such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith is a general partner or, directly or indirectly, beneficially owns an interest in a general partner of such general or limited partnership, (G) any performance-related fees (other than an asset-based fee) that such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith are entitled to based on any increase or decrease in the value of shares of the Corporation or Derivative Instruments, if any, including without limitation any such interests held by members of the immediate family sharing the same household of such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith, (H) any significant equity interests or any Derivative Instruments or Short Interests in any principal competitor of the Corporation held by such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith and (I) any direct or indirect interest of such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith in any contract with the Corporation, any affiliate of the Corporation or any principal competitor of the Corporation (including, in any such case, any employment agreement, collective bargaining agreement or consulting agreement), (iii) all information that would be required to be set forth in a Schedule 13D filed pursuant to Rule 13d-1(a) or an amendment pursuant to Rule 13d-2(a) if such a statement were required to be filed under the Exchange Act and the rules and regulations promulgated thereunder by such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith, if any, and (iv) any other information relating to such stockholder, such beneficial owner and their respective affiliates or associates or others acting in concert therewith, if any, that would be required to be disclosed in a proxy statement and form of proxy or other filings required to be made in connection with solicitations of proxies for, as applicable, the proposal and/or for the election of directors in a contested election pursuant to Section 14 of the Exchange Act and the rules and regulations promulgated thereunder;

(b) If the notice relates to any business other than a nomination of a director or directors that the stockholder proposes to bring before the meeting, a stockholder’s notice must, in addition to the matters set forth in paragraph (a) above, also set forth: (i) a brief description of the business desired to be brought before the meeting, the reasons for conducting such business at the meeting and any material interest of such stockholder, such beneficial owner and each of their respective affiliates or associates or others acting in concert therewith, if any, in such business, (ii) the text of the proposal or business (including the text of any resolutions proposed for consideration and, in the event that such proposal or business includes a proposal to amend the Bylaws of the Corporation, the text of the proposed amendment), and (iii) a description of all agreements, arrangements and understandings between such stockholder, such beneficial owner and any of their respective affiliates or associates or others acting in concert therewith, if any, and any other person or persons (including their names) in connection with the proposal of such business by such stockholder;

(c) As to each individual, if any, whom the stockholder proposes to nominate for election or reelection to the Board of Directors, a stockholder’s notice must, in addition to the matters set forth in paragraph (a) above, also set forth: (i) all information relating to such individual that would be required to be disclosed in a proxy statement or other filings required to be made in connection with solicitations of proxies

for election of directors in a contested election pursuant to Section 14 of the Exchange Act and the rules and regulations promulgated thereunder (including such individual's written consent to being named in the Corporation's proxy statement as a nominee and to serving as a director if elected) and (ii) a description of all direct and indirect compensation and other material monetary agreements, arrangements and understandings during the past three (3) years, and any other material relationships, between or among such stockholder and beneficial owner, if any, and their respective affiliates and associates, or others acting in concert therewith, on the one hand, and each proposed nominee, and his or her respective affiliates and associates, or others acting in concert therewith, on the other hand, including, without limitation all information that would be required to be disclosed pursuant to Rule 404 or any successor provision promulgated under Regulation S-K if the stockholder making the nomination and any beneficial owner on whose behalf the nomination is made, if any, or any affiliate or associate thereof or person acting in concert therewith, were the "registrant" for purposes of such rule and the nominee were a director or executive officer of such registrant; and

(d) With respect to each individual, if any, whom the stockholder proposes to nominate for election or reelection to the Board of Directors, a stockholder's notice must, in addition to the matters set forth in paragraphs (a) and (c) above, also include a completed and signed questionnaire, representation and agreement required by Section 2.10 of these Bylaws. The Corporation may require any proposed nominee to furnish such other information as may reasonably be required by the Corporation to determine the eligibility of such proposed nominee to serve as an independent director of the Corporation or that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of such nominee. Notwithstanding anything to the contrary, only persons who are nominated in accordance with the procedures set forth in these Bylaws, including without limitation Sections 2.8, 2.9 and 2.10 hereof, shall be eligible for election as directors.

(2) For purposes of these Bylaws, "public announcement" shall mean disclosure in a press release reported by a national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act and the rules and regulations promulgated thereunder.

(3) Notwithstanding the provisions of these Bylaws, a stockholder shall also comply with all applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to the matters set forth in this Bylaw; provided, however, that any references in these Bylaws to the Exchange Act or the rules promulgated thereunder are not intended to and shall not limit the separate and additional requirements set forth in these Bylaws with respect to nominations or proposals as to any other business to be considered.

(4) Nothing in this Section 2.9 shall be deemed to affect any rights (i) of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a8 under the Exchange Act or (ii) of the holders of any series of Preferred Stock if and to the extent provided for under law, the Certificate of Incorporation or these Bylaws. Subject to Rule 14a-8 under the Exchange Act, nothing in this Section 2.9 shall be construed to permit any stockholder, or give any stockholder the right, to include or have disseminated or described in the Corporation's proxy statement any nomination of director or directors or any other business proposal.

SECTION 2.10. Submission of Questionnaire, Representation and Agreement. To be eligible to be a nominee for election or reelection as a director of the Corporation, a person nominated by a stockholder for election or reelection to the Board of Directors must deliver (in accordance with the time periods prescribed for delivery of notice under Section 2.9 of these Bylaws) to the Secretary at the principal executive offices of the Corporation a written questionnaire with respect to the background and qualification of such individual and the background of any other person or entity on whose behalf, directly or indirectly, the nomination is being made (which questionnaire shall be provided by the Secretary upon written request), and a written representation and agreement (in the form provided by the Secretary upon written request) that such individual (A) is not and will not become a party to (1) any agreement, arrangement or understanding with, and has not given any commitment or assurance to, any person or entity as to how such person, if elected as a director of the Corporation, will act or vote on any issue or question (a "Voting Commitment") that has not been disclosed to the Corporation, or (2) any Voting Commitment that could limit or interfere with such individual's ability to comply, if elected as a director of the Corporation, with

such individual's fiduciary duties under applicable law, (B) is not and will not become a party to any agreement, arrangement or understanding with any person or entity other than the Corporation with respect to any direct or indirect compensation, reimbursement or indemnification in connection with service or action as a director that has not been disclosed therein, (C) will comply with the Corporation's corporate governance guidelines and other policies applicable to its directors, and has disclosed therein whether all or any portion of securities of the Corporation were purchased with any financial assistance provided by any other person and whether any other person has any interest in such securities, (D) in such individual's personal capacity and on behalf of any person or entity on whose behalf, directly or indirectly, the nomination is being made, would be in compliance, if elected as a director of the Corporation, and will comply, with all applicable corporate governance, conflict of interest, confidentiality and stock ownership and trading policies and guidelines of the Corporation publicly disclosed from time to time, (E) consents to being named as a nominee in the Corporation's proxy statement pursuant to Rule 14a-4(d) under the Exchange Act and any associated proxy card of the Corporation and agrees to serve if elected as a director, and (F) will abide by the requirements of Section 2.11 of these Bylaws.

SECTION 2.11. Procedure for Election of Directors; Required Vote.

(A) Except as set forth below, election of directors at all meetings of the stockholders at which directors are to be elected shall be by ballot, and, subject to the rights of the holders of any series of Preferred Stock to elect directors, a majority of the votes cast at any meeting for the election of directors at which a quorum is present shall elect directors. For purposes of this Bylaw, a majority of votes cast shall mean that the number of shares voted "for" a director's election exceeds fifty percent (50%) of the number of votes cast with respect to that director's election. Votes cast shall include votes against in each case and exclude abstentions and broker nonvotes with respect to that director's election. Notwithstanding the foregoing, in the event of a "contested election" of directors, directors shall be elected by the vote of a plurality of the votes cast at any meeting for the election of directors at which a quorum is present. For purposes of this Bylaw, a "contested election" shall mean any election of directors in which the number of candidates for election as directors exceeds the number of directors to be elected, with the determination thereof being made by the Secretary as of the later of (i) the close of the applicable notice of nomination period set forth in Section 2.9 of these Bylaws or under applicable law and (ii) the last day on which a Proxy Access Notice may be delivered in accordance with the procedures set forth in Section 9.1, based on whether one or more notice(s) of nomination or Proxy Access Notice(s) were timely filed in accordance with said Section 2.9 and/or Section 9.1, as applicable; provided, however, that the determination that an election is a "contested election" shall be determinative only as to the timeliness of a notice of nomination and not otherwise as to its validity. If, prior to the time the Corporation mails its initial proxy statement in connection with such election of directors, one or more notices of nomination are withdrawn such that the number of candidates for election as director no longer exceeds the number of directors to be elected, the election shall not be considered a contested election, but in all other cases, once an election is determined to be a contested election, directors shall be elected by the vote of a plurality of the votes cast.

(B) If a nominee for director who is an incumbent director is not elected and no successor has been elected at such meeting, the director shall promptly tender his or her resignation to the Board of Directors in accordance with the agreement contemplated by Section 2.10 of these Bylaws. The Governance and Nominating Committee shall make a recommendation to the Board of Directors as to whether to accept or reject the tendered resignation, or whether other action should be taken. The Board of Directors shall act on the tendered resignation, taking into account the Governance and Nominating Committee's recommendation, and publicly disclose (by a press release, a filing with the Securities and Exchange Commission or other broadly disseminated means of communication) its decision regarding the tendered resignation and the rationale behind the decision within ninety (90) days from the date of the certification of the election results. The Governance and Nominating Committee in making its recommendation, and the Board of Directors in making its decision, may each consider any factors or other information that it considers appropriate and relevant. The director who tenders his or her resignation shall not participate in the recommendation of the Governance and Nominating Committee or the decision of the Board of Directors with respect to his or her resignation. If such incumbent director's resignation is not accepted by the Board of Directors, such director shall continue to serve until the next annual meeting and until his or her successor is duly elected, or his or her earlier resignation or removal. If a director's resignation is accepted by the Board of Directors pursuant to this Bylaw, or if a nominee for director is not elected and the

nominee is not an incumbent director, then the Board of Directors, in its sole discretion, may fill any resulting vacancy pursuant to the provisions of Section 3.10 of these Bylaws or may decrease the size of the Board of Directors pursuant to the provisions of Section 3.2 of these Bylaws.

(C) Except as otherwise provided by law, the Certificate of Incorporation, or these Bylaws, in all matters other than the election of directors, the affirmative vote of a majority of the shares present in person or represented by proxy at the meeting and entitled to vote on the matter shall be the act of the stockholders.

(D) Any individual who is nominated for election to the Board of Directors and included in the Corporation's proxy materials for an annual meeting, including pursuant to Section 9.1, shall tender an irrevocable resignation, effective immediately, upon a determination by the Board of Directors or any committee thereof that (1) the information provided to the Corporation by such individual or, if applicable, by the Eligible Stockholder (or any stockholder, fund comprising a Qualifying Fund and/or beneficial owner whose stock ownership is counted for the purposes of qualifying as an Eligible Stockholder) who nominated such individual, was untrue in any material respect or omitted to state a material fact necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading or (2) such individual or, if applicable, the Eligible Stockholder (including each stockholder, fund comprising a Qualifying Fund and/or beneficial owner whose stock ownership is counted for the purposes of qualifying as an Eligible Stockholder) who nominated such individual, shall have breached any representations or obligations owed to the Corporation under these Bylaws.

SECTION 2.12. Inspectors of Elections; Opening and Closing the Polls. The Board of Directors by resolution shall appoint one or more inspectors, which inspector or inspectors may, but does not need to, include individuals who serve the Corporation in other capacities, including, without limitation, as officers, employees, agents or representatives, to act at the meetings of stockholders and make a written report thereof. One or more persons may be designated as alternate inspectors to replace any inspector who fails to act. If no inspector or alternate has been appointed to act or is able to act at a meeting of stockholders, the chairman of the meeting shall appoint one or more inspectors to act at the meeting. Each inspector, before discharging his or her duties, shall take and sign an oath faithfully to execute the duties of inspector with strict impartiality and according to the best of his or her ability. The inspectors shall have the duties prescribed by law.

The chairman of the meeting shall fix and announce at the meeting the date and time of the opening and the closing of the polls for the matters upon which the stockholders will vote at a meeting.

SECTION 2.13. Stockholder Action by Written Consent. Subject to the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, any action required or permitted to be taken by the stockholders of the Corporation at an annual or special meeting of stockholders of the Corporation may be taken without a meeting, without prior notice, and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed by the holders of stock of the Corporation having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares of stock of the Corporation entitled to vote thereon were present and voted. No written consent shall be effective to take the action referred to therein unless written consents signed by the holders of stock of the Corporation having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares of stock of the Corporation entitled to vote thereon were present and voted are delivered to and received by the Corporation within sixty (60) days of the first date on which a written consent was delivered to the Corporation. Every written consent shall be signed by one or more persons who as of the record date are stockholders of record on such record date, shall bear the date of signature of each such stockholder, and shall set forth the name and address, as they appear in the Corporation's books, of each stockholder signing such consent and the class or series and number of shares of the Corporation which are owned of record and beneficially by each such stockholder and shall be delivered to and received by the Secretary of the Corporation at the Corporation's principal office by hand or by certified or registered mail, return receipt requested.

SECTION 2.14. Record Date for Action by Written Consent. In order that the Corporation may determine the stockholders entitled to consent to corporate action in writing without a meeting, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the

record date is adopted by the Board of Directors, and which date shall not be more than ten (10) days after the date upon which the resolution fixing the record date is adopted by the Board of Directors. Any stockholder of record seeking to have the stockholders authorize or take corporate action by written consent shall request the Board of Directors to fix a record date, which request shall be in proper form and delivered to the Secretary at the principal executive offices of the Corporation. To be in proper form, such request must be in writing and shall state the purpose or purposes of the action or actions proposed to be taken by written consent.

The Board of Directors shall promptly, but in all events within ten (10) days after the date on which such a request is received, adopt a resolution fixing the record date. If no record date has been fixed by the Board of Directors within ten (10) days of the date on which such a request is received, the record date for determining stockholders entitled to consent to corporate action in writing without a meeting, when no prior action by the Board of Directors is required by applicable law, shall be the first date on which a signed written consent setting forth the action taken or proposed to be taken is delivered to the Corporation by delivery to its registered office in Delaware, its principal place of business or to any officer or agent of the Corporation having custody of the book in which proceedings of meetings of stockholders are recorded. Delivery made to the Corporation's registered office shall be by hand or by certified or registered mail, return receipt requested. If no record date has been fixed by the Board of Directors and prior action by the Board of Directors is required by applicable law, the record date for determining stockholders entitled to consent to corporate action in writing without a meeting shall be at the close of business on the date on which the Board of Directors adopts the resolution taking such prior action.

SECTION 2.15. Inspectors of Written Consent. In the event of the delivery, in the manner provided by Section 2.13 of these Bylaws, to the Corporation of the requisite written consents to take corporate action and/or any related revocation or revocations, the Corporation shall engage nationally recognized independent inspectors of elections for the purpose of promptly performing a ministerial review of the validity of the consents and revocations. For the purpose of permitting the inspectors to perform such review, no action by written consent without a meeting shall be effective until such date as the independent inspectors certify to the Corporation that the consents delivered to the Corporation in accordance with Section 2.13 of these Bylaws represent shares entitled to the minimum number of votes that would be necessary to authorize or take the action that is the subject of the consent at a meeting at which all shares of stock of the Corporation entitled to vote thereon were present and voted. Nothing contained in this paragraph shall in any way be construed to suggest or imply that the Corporation or any stockholder shall not be entitled to contest the validity of any consent or revocation thereof, whether before or after such certification by the independent inspectors, or to take any other action (including, without limitation, the commencement, prosecution or defense of any litigation with respect thereto, and the seeking of injunctive relief in such litigation).

Article III.

BOARD OF DIRECTORS

SECTION 3.1. General Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors. In addition to the powers and authorities by these Bylaws expressly conferred upon them, the Board of Directors may exercise all such powers of the Corporation and do all such lawful acts and things as are not by statute or by the Certificate of Incorporation or by these Bylaws required to be exercised or done by the stockholders.

SECTION 3.2. Number and Tenure. Subject to the rights of the holders of any series of Preferred Stock to elect directors, the number of directors shall be fixed from time to time exclusively pursuant to a resolution adopted by a majority of the Whole Board. No decrease in the number of authorized directors constituting the Whole Board shall shorten the term of any incumbent director.

SECTION 3.3. Election of Directors. The directors shall be elected at the annual meetings of stockholders as specified in the Certificate of Incorporation except as otherwise provided in the Certificate of Incorporation and in these Bylaws, and each director of the Corporation shall hold office until such director's successor is elected and qualified or until such director's earlier death, resignation or removal.

SECTION 3.4. Regular Meetings. A regular meeting of the Board of Directors shall be held without other notice than this Bylaw immediately after, and at the same place as, the annual meeting of stockholders, or such other date, time and place as the Board of Directors may determine. The Board of Directors may, by resolution, provide the date, time and place, if any, for the holding of additional regular meetings without other notice than such resolution.

SECTION 3.5. Special Meetings. Special meetings of the Board of Directors shall be called at the request of the Chairman of the Board of Directors, the Chief Executive Officer or a majority of the Board of Directors then in office. The person or persons authorized to call special meetings of the Board of Directors may fix the place, if any, date and time of the meetings.

SECTION 3.6. Notice of Meeting. Notice of any special meeting of directors shall be given to each director at such person's business or residence in writing by hand delivery, first-class or overnight mail or courier service, email or facsimile transmission, or orally by telephone. If mailed by first-class mail, such notice shall be deemed adequately delivered when deposited in the United States mails so addressed, with postage thereon prepaid, at least five (5) days before such meeting. If by overnight mail or courier service, such notice shall be deemed adequately delivered when the notice is delivered to the overnight mail or courier service company at least twenty-four (24) hours before such meeting. If by email, facsimile transmission, telephone or by hand, such notice shall be deemed adequately delivered when the notice is transmitted at least twelve (12) hours before such meeting. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the Board of Directors need be specified in the notice of such meeting. A meeting may be held at any time without notice if all the directors are present or if those not present waive notice of the meeting in accordance with Section 7.4 of these Bylaws.

SECTION 3.7. Action by Consent of Board of Directors. Any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting if all members of the Board of Directors or committee, as the case may be, consent thereto in writing, or by electronic transmission and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceedings of the Board of Directors, or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

SECTION 3.8. Conference Telephone Meetings. Members of the Board of Directors, or any committee thereof, may participate in a meeting of the Board of Directors or such committee by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and such participation in a meeting shall constitute presence in person at such meeting.

SECTION 3.9. Quorum. Subject to Section 3.10 of these Bylaws, a whole number of directors equal to at least a majority of the Whole Board shall constitute a quorum for the transaction of business, but if at any meeting of the Board of Directors there shall be less than a quorum present, a majority of the directors present may adjourn the meeting from time to time without further notice. The act of the majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors. The directors present at a duly organized meeting may continue to transact business until adjournment, notwithstanding the withdrawal of enough directors to leave less than a quorum.

SECTION 3.10. Vacancies. Subject to applicable law and the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, and unless the Board of Directors otherwise determines, vacancies resulting from death, resignation, retirement, disqualification, removal from office or other cause, and newly created directorships resulting from any increase in the authorized number of directors, may be filled only by the affirmative vote of a majority of the remaining directors, though less than a quorum of the Board of Directors, or by a sole remaining director, and directors so chosen shall hold office for a term expiring at the next annual meeting of stockholders and until such director's successor shall have been duly elected and qualified. No decrease in the number of authorized directors constituting the Whole Board shall shorten the term of any incumbent director.

SECTION 3.11. Chairman of the Board of Directors. The Chairman of the Board of Directors shall be chosen from among the directors and may be the Chief Executive Officer. The Chairman of the Board of Directors shall preside over all meetings of the Board of Directors. In the absence of the Chairman of the Board of Directors, a Vice Chairman of the Board of Directors, the Chief Executive Officer, the President, or another director, in the order designated by the Chairman of the Board of Directors, shall preside at meetings of the Board of Directors.

SECTION 3.12. Committees. The Board of Directors may designate any such committee as the Board of Directors considers appropriate, which shall consist of one or more directors of the Corporation. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. Any such committee may to the extent permitted by law exercise such powers and shall have such responsibilities as shall be specified in the designating resolution. Each committee shall keep written minutes of its proceedings and shall report such proceedings to the Board of Directors as appropriate.

A majority of any committee may determine its action and fix the time and place of its meetings, unless the Board of Directors shall otherwise provide. Notice of such meetings shall be given to each member of the committee in the manner provided for in Section 3.6 of these Bylaws. The Board of Directors shall have power at any time to fill vacancies in, to change the membership of, or to dissolve, any such committee. Nothing herein shall be deemed to prevent the Board of Directors from appointing one or more committees consisting in whole or in part of persons who are not directors of the Corporation; provided, however, that no such committee shall have or may exercise any authority of the Board of Directors.

SECTION 3.13. Removal. Subject to the rights of the holders of any series of Preferred Stock with respect to such series of Preferred Stock, any director, or the entire Board of Directors, may be removed from office at any time by the stockholders, with or without cause, by the affirmative vote of the holders of a majority of the then-outstanding shares of Voting Stock, voting together as a single class.

Article IV.

OFFICERS

SECTION 4.1. Elected Officers. The elected officers of the Corporation shall be a Chief Executive Officer, a Chief Financial Officer, a Chief Legal Officer, a Secretary, a Treasurer, a Controller and such other officers, including a President, or assistant officers as the Board of Directors from time to time may deem proper. Any number of offices may be held by the same person. All officers and assistant officers elected by the Board of Directors shall each have such powers and duties as generally pertain to their respective offices, subject to the specific provisions of this Article IV. Such officers and assistant officers shall also have such powers and duties as from time to time may be conferred by the Board of Directors or by any committee thereof. The Board of Directors or any committee thereof may from time to time elect such other officers and assistant officers (including one or more Assistant Vice Presidents, Assistant Secretaries, and Assistant Treasurers and Assistant Controllers) and such agents, as may be necessary or desirable for the conduct of the business of the Corporation. Assistant officers and agents also may be appointed by the Chief Executive Officer. Such other officers, assistant officers and agents shall have such duties and shall hold their offices for such terms as shall be provided in these Bylaws or as may be prescribed by the Board of Directors or such committee or by the Chief Executive Officer, as the case may be.

SECTION 4.2. Election and Term of Office. The elected officers of the Corporation shall be elected by the Board of Directors. Each officer shall hold office until such officer's successor shall have been duly elected and shall have qualified or until such officer's earlier death, resignation or removal.

SECTION 4.3. Chief Executive Officer. The Chief Executive Officer shall be responsible for the general management of the affairs of the Corporation and shall perform all duties incident to the office which may be required by applicable law and all such other duties as are properly required of the Chief Executive Officer by the

Board of Directors. The Chief Executive Officer of the Corporation may also serve as President, if so elected by the Board of Directors.

SECTION 4.4. President. If the Board of Directors elects a President who is not the Chief Executive Officer, the President shall act in a general executive capacity and shall assist the Chief Executive Officer in the administration and operation of the Corporation's business and general supervision of its policies and affairs.

SECTION 4.5. Vice Presidents. Each Vice President, including any Vice President designated as Executive, Senior, or otherwise, shall have such powers and shall perform such duties as shall be assigned to such Vice President by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.6. Chief Financial Officer. The Chief Financial Officer shall act in an executive financial capacity. The Chief Financial Officer shall assist the Chief Executive Officer and the President in the general supervision of the Corporation's financial policies and affairs. The Chief Financial Officer shall, in general, perform all the duties incident to the office of Chief Financial Officer and shall have such further powers and duties as shall be prescribed from time to time by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.7. Chief Legal Officer. The Chief Legal Officer shall advise the Corporation on legal matters affecting the Corporation and its activities and shall supervise and direct the handling of all such legal matters. The Chief Legal Officer shall, in general, perform all duties incident to such office, and shall have such further powers and duties as shall be prescribed from time to time by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.8. Treasurer. The Treasurer shall exercise general supervision over the receipt, custody and disbursement of corporate funds. The Treasurer shall, in general, perform all the duties incident to the office of Treasurer and shall have such further powers and duties as shall be prescribed from time to time by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.9. Secretary. The Secretary shall keep or cause to be kept, in one or more books provided for that purpose, the minutes of all meetings of the Board of Directors, the committees of the Board of Directors and the stockholders. The Secretary shall see that all notices are duly given in accordance with the provisions of these Bylaws and as required by applicable law. The Secretary shall see that the books, reports, statements, certificates and other documents and records required by applicable law to be kept and filed are properly kept and filed. The Secretary shall, in general, perform all the duties incident to the office of Secretary and such other duties as from time to time may be assigned to such Secretary by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.10. Controller. The Controller shall be responsible for the implementation of accounting policies and procedures and the installation and supervision of all accounting records. The Controller shall also be responsible for the maintenance of adequate records of authorized appropriations and the approval for payment of all checks and vouchers. The Controller shall, in general, perform all duties incident to the office of Controller, and shall have such further powers and duties as shall be prescribed from time to time by the Board of Directors, the Chief Executive Officer or the President.

SECTION 4.11. Compensation of Assistant Officers and Agents. Unless otherwise determined by the Board of Directors, the Chief Executive Officer shall have the authority to fix and determine, and change from time to time, the compensation of all assistant officers and agents of the Corporation elected or appointed by the Board of Directors or by the Chief Executive Officer, including, but not restricted to, monthly or other periodic compensation and incentive or other additional compensation.

SECTION 4.12. Removal. The Chief Executive Officer, the President and the Chief Financial Officer may be removed from office with or without cause by the affirmative vote of a majority of the Whole Board. Any other officer or assistant officer elected, or agent appointed, by the Board of Directors may be removed from office with or without cause by the affirmative vote of a majority of the Board of Directors then in office. Any assistant

officer or agent appointed by the Chief Executive Officer may be removed by the Chief Executive Officer with or without cause. No elected officer or assistant officer shall have any contractual rights against the Corporation for compensation by virtue of such election beyond the date of the election of his or her successor, his or her death, or his or her resignation or removal, whichever event shall first occur, except as otherwise provided in an employment contract or under an employee deferred compensation plan.

SECTION 4.13. Vacancies. A newly created elected office and a vacancy in any elected office because of death, resignation, or removal may be filled by the Board of Directors. Any vacancy in an office appointed by the Chief Executive Officer or the President because of death, resignation, or removal may be filled by the Chief Executive Officer or the President.

Article V.

STOCK CERTIFICATES AND TRANSFERS

SECTION 5.1. Certificated and Uncertificated Stock; Transfers. The interest of each stockholder of the Corporation may be evidenced by certificates for shares of stock in such form as the appropriate officers of the Corporation may from time to time prescribe or may be uncertificated.

The shares of the stock of the Corporation shall be transferred on the books of the Corporation, in the case of certificated shares of stock, by the holder thereof in person or by such person's attorney duly authorized in writing, upon surrender for cancellation of certificates for at least the same number of shares, with an assignment and power of transfer endorsed thereon or attached thereto, duly executed, with such proof of the authenticity of the signature as the Corporation or its agents may reasonably require; and, in the case of uncertificated shares of stock, upon receipt of proper transfer instructions from the registered holder of the shares or by such person's attorney duly authorized in writing, and upon compliance with appropriate procedures for transferring shares in uncertificated form. No transfer of stock shall be valid as against the Corporation for any purpose until it shall have been entered in the stock records of the Corporation by an entry showing from and to whom transferred.

The certificates of stock shall be signed, countersigned and registered in such manner as the Board of Directors may by resolution prescribe, which resolution may permit all or any of the signatures on such certificates to be in facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate has ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if such person were such officer, transfer agent or registrar at the date of issue.

Notwithstanding anything to the contrary in these Bylaws, at all times that the Corporation's stock is listed on a stock exchange, the shares of the stock of the Corporation shall comply with all direct registration system eligibility requirements established by such exchange, including any requirement that shares of the Corporation's stock be eligible for issue in book-entry form. All issuances and transfers of shares of the Corporation's stock shall be entered on the books of the Corporation with all information necessary to comply with such direct registration system eligibility requirements, including the name and address of the person to whom the shares of stock are issued, the number of shares of stock issued and the date of issue. The Board of Directors shall have the power and authority to make such rules and regulations as it may deem necessary or proper concerning the issue, transfer and registration of shares of stock of the Corporation in both the certificated and uncertificated form.

SECTION 5.2. Lost, Stolen or Destroyed Certificates. No certificate for shares of stock in the Corporation shall be issued in place of any certificate alleged to have been lost, destroyed or stolen, except on production of such evidence of such loss, destruction or theft and on delivery to the Corporation of a bond of indemnity in such amount, upon such terms and secured by such surety, as the Board of Directors or any financial officer may in its or such person's discretion require.

SECTION 5.3. Record Owners. The Corporation shall be entitled to recognize the exclusive right of a person registered on its books as the owner of shares to receive dividends, and to vote as such owner, and to hold liable for calls and assessments a person registered on its books as the owner of shares, and shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of any other person, whether or not it shall have express or other notice thereof, except as otherwise required by applicable law.

SECTION 5.4. Transfer and Registry Agents. The Corporation may from time to time maintain one or more transfer offices or agencies and registry offices or agencies at such place or places as may be determined from time to time by the Board of Directors or by the Chief Executive Officer or the President.

Article VI.

INDEMNIFICATION

SECTION 6.1. Indemnification. Each person who was or is a party to, or is otherwise threatened to be made a party to, any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (a "Proceeding"), by reason of the fact that he or she (or a person of whom he or she is the legal representative), is or was, at any time during which this Bylaw is in effect (whether or not such person continues to serve in such capacity at the time any indemnification or advancement of expenses pursuant hereto is sought or at the time any Proceeding relating thereto exists or is brought), a director or officer of the Corporation or, while serving as a director or officer of the Corporation, is or was serving at the request of the Corporation as a director, officer, trustee, employee or agent of another corporation, or of a partnership, joint venture, trust or other enterprise, including service with respect to employee benefit plans maintained or sponsored by the Corporation (each such director or officer, a "Covered Person"), shall be (and shall be deemed to have a contractual right to be) indemnified and held harmless by the Corporation (and any successor of the Corporation by merger or otherwise) to the fullest extent permitted by the DGCL as the same exists or may hereafter be amended or modified from time to time (but, in the case of any such amendment or modification, only to the extent that such amendment or modification permits the Corporation to provide greater indemnification rights than the DGCL permitted the Corporation to provide prior to such amendment or modification), against all expenses, liability and loss (including attorneys' fees, judgments, fines, ERISA excise taxes and penalties and amounts paid or to be paid in settlement) reasonably incurred or suffered by such person in connection therewith; provided, however, that the Corporation shall indemnify any such Covered Person seeking indemnification in connection with a Proceeding (or part thereof) initiated by such Covered Person only if such Proceeding (or part thereof) was authorized by the Board of Directors of the Corporation.

SECTION 6.2. Advance of Expenses. To the fullest extent permitted by the DGCL as the same exists or may hereafter be amended or modified from time to time (but, in the case of any such amendment or modification, only to the extent that such amendment or modification permits the Corporation to provide greater rights to advancement of expenses than said law permitted the Corporation to provide prior to such amendment or modification), each Covered Person shall have (and shall be deemed to have a contractual right to have) the right, without the need for any action by the Board of Directors, to be paid by the Corporation (and any successor of the Corporation by merger or otherwise) the expenses (including reasonable attorneys' fees) incurred in connection with any Proceeding in advance of its final disposition, such advances to be paid by the Corporation within twenty (20) days after the receipt by the Corporation of a statement or statements from the claimant requesting such advance or advances from time to time; provided, that if the DGCL requires, the payment of such expenses incurred by a director or officer in his or her capacity as a director or officer (and not, except to the extent specifically required by applicable law, in any other capacity in which service was or is rendered by such person while a director or officer, including, without limitation, service to an employee benefit plan) shall be made only upon delivery to the Corporation of an undertaking (hereinafter, the "Undertaking") by or on behalf of such director or officer, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision from which there is no further right of appeal (a "final disposition") that such director or officer is not entitled to be indemnified for such expenses under this Bylaw or otherwise.

SECTION 6.3. Non-Exclusivity of Rights. The rights conferred on any person in this Article VI, shall not be exclusive of any other right that such person may have or hereafter acquire under any statute, provision of the Certificate of Incorporation, Bylaws, agreement, vote or consent of stockholders or directors. Additionally, nothing in this Article VI shall limit the ability of the Corporation, in its discretion, to indemnify or advance expenses to persons whom the Corporation is not obligated to indemnify or advance expenses pursuant to this Article VI. The Board of Directors shall have the power to delegate to such officer or other person as the Board of Directors shall specify the determination of whether indemnification shall be given to any person pursuant to this Section 6.3.

SECTION 6.4. Indemnification Contracts. The Board of Directors is authorized to cause the Corporation to enter into indemnification contracts with any director, officer, employee or agent of the Corporation, or any person serving at the request of the Corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, including employee benefit plans, providing indemnification rights to such person. Such rights may be greater than those provided in this Article VI.

SECTION 6.5. Continuation of Indemnification. The rights to indemnification and to advancement of expenses provided by, or granted pursuant to, this Article VI shall continue notwithstanding that the person has ceased to be a Covered Person and shall inure to the benefit of his or her estate, heirs, executors, administrators, legatees and distributees; provided, however, that the Corporation shall indemnify any such person seeking indemnity in connection with a Proceeding (or part thereof) initiated by such person only if such Proceeding (or part thereof) was authorized by the Board of Directors.

SECTION 6.6. Effect of Amendment or Repeal. The provisions of this Article VI shall constitute a contract between the Corporation, on the one hand, and, on the other hand, each individual who serves or has served as a Covered Person (whether before or after the adoption of these Bylaws), in consideration of such person's performance of such services, and pursuant to this Article VI, the Corporation intends to be legally bound to each such current or former Covered Person. With respect to current and former Covered Persons, the rights conferred under this Article VI are present contractual rights and such rights are fully vested, and shall be deemed to have vested fully, immediately upon adoption of these Bylaws. With respect to any Covered Persons who commence service following adoption of these Bylaws, the rights conferred under this Article VI shall be present contractual rights, and such rights shall fully vest, and be deemed to have vested fully, immediately upon such Covered Person's service in the capacity which is subject to the benefits of this Article VI.

SECTION 6.7. Notice. Any notice, request or other communication required or permitted to be given to the Corporation under this Article VI shall be in writing and either delivered in person or sent by telecopy, overnight mail or courier service, or certified or registered mail, postage prepaid, return receipt requested, to the Secretary of the Corporation and shall be effective only upon receipt by the Secretary.

SECTION 6.8. Severability. If any provision or provisions of this Bylaw shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (1) the validity, legality and enforceability of the remaining provisions of this Bylaw (including, without limitation, each portion of any paragraph of this Bylaw containing any such provision held to be invalid, illegal or unenforceable, that is not itself held to be invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby; and (2) to the fullest extent possible, the provisions of this Bylaw (including, without limitation, each such portion of any paragraph of this Bylaw containing any such provision held to be invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested by the provision held invalid, illegal or unenforceable.

Article VII.

MISCELLANEOUS PROVISIONS

SECTION 7.1. Fiscal Year. The fiscal year of the Corporation shall end on the 31st day of December; provided, that the Board of Directors shall have the power, from time to time, to fix a different fiscal year of the Corporation by a duly adopted resolution.

SECTION 7.2. Dividends. The Board of Directors may from time to time declare, and the Corporation may pay, dividends on its outstanding shares in the manner and upon the terms and conditions provided by law and the Certificate of Incorporation.

SECTION 7.3. Seal. The corporate seal, if the Corporation shall have a corporate seal, shall have inscribed thereon the words "Corporate Seal, Delaware," the name of the Corporation and the year of its organization. The seal may be used by causing it or a facsimile thereof to be impressed or affixed or in any other manner reproduced.

SECTION 7.4. Waiver of Notice. Whenever any notice is required to be given to any stockholder or director of the Corporation under the provisions of the DGCL, the Certificate of Incorporation or these Bylaws, a waiver thereof in writing, signed by the person or persons entitled to such notice, or a waiver by electronic transmission by the person entitled to notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice. Neither the business to be transacted at, nor the purpose of, any annual or special meeting of the stockholders or the Board of Directors or committee thereof need be specified in any waiver of notice of such meeting. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

SECTION 7.5. Resignations. Any director or any officer, whether elected or appointed, may resign at any time by giving written notice of such resignation to the Chairman of the Board of Directors, the Chief Executive Officer, or the Secretary, and such resignation shall be deemed to be effective as of the close of business on the date said notice is received by the Chairman of the Board of Directors, the Chief Executive Officer, or the Secretary, or at such later time as is specified therein. Except to the extent specified in such notice, no formal action shall be required of the Board of Directors or the stockholders to make any such resignation effective.

Article VIII.

CONTRACTS, PROXIES, ETC.

SECTION 8.1. Contracts. Except as otherwise required by applicable law, the Certificate of Incorporation or these Bylaws, any contracts or other instruments may be executed and delivered in the name and on behalf of the Corporation by such officer or officers of the Corporation as the Board of Directors may from time to time direct. Such authority may be general or confined to specific instances as the Board of Directors may determine. The Chairman of the Board of Directors, any Vice Chairman of the Board of Directors, the Chief Executive Officer, the President, any Vice President, the Secretary, the Treasurer, the Chief Legal Officer, the Controller and any other officer of the Corporation elected by the Board of Directors may sign, acknowledge, verify, make, execute and/or deliver on behalf of the Corporation any agreement, application, bond, certificate, consent, guarantee, mortgage, power of attorney, receipt, release, waiver, contract, deed, lease and any other instrument, or any assignment or endorsement thereof. Subject to any restrictions imposed by the Board of Directors or the Chairman of the Board of Directors, the Chief Executive Officer, the President, any Vice President, the Secretary, the Treasurer, the Chief Legal Officer, the Controller or any other officer of the Corporation elected by the Board of Directors may delegate contractual powers to others under his or her jurisdiction, it being understood, however, that any such delegation of power shall not relieve such officer of responsibility with respect to the exercise of such delegated power.

SECTION 8.2. Proxies. Unless otherwise provided by resolution adopted by the Board of Directors, the Chairman of the Board of Directors, the Chief Executive Officer, the President or any officer of the Corporation elected by the Board of Directors may from time to time appoint an attorney or attorneys or agent or agents of the

Corporation, in the name and on behalf of the Corporation, to cast the votes which the Corporation may be entitled to cast as the holder of stock or other securities in any other entity, any of whose stock or other securities may be held by the Corporation, at meetings of the holders of the stock or other securities of such other entity, or to consent in writing, in the name of the Corporation as such holder, to any action by such other entity, and may instruct the person or persons so appointed as to the manner of casting such votes or giving such consent, and may execute or cause to be executed in the name and on behalf of the Corporation and under its corporate seal or otherwise, all such written proxies or other instruments as he or she may deem necessary or proper in the premises.

Article IX.

PROXY ACCESS

SECTION 9.1. Inclusion of Stockholder Director Nominations in the Corporation's Proxy Materials. Subject to the terms and conditions set forth in these Bylaws, the Corporation shall include in its proxy statement for annual meetings of stockholders the name, together with the Required Information (as defined in paragraph (A) below), of an eligible person nominated for election (the "Stockholder Nominee") to the Board of Directors pursuant to this Section 9.1 by a stockholder or group of stockholders that satisfy the requirements of this Section 9.1, including qualifying as an Eligible Stockholder (as defined in paragraph (D) below) and that expressly elects at the time of providing the written notice required by this Section 9.1 (a "Proxy Access Notice") to have its nominee(s) included in the Corporation's proxy statement pursuant to this Section 9.1. For the purposes of this Section 9.1:

(1) "Constituent Holder" shall mean any stockholder, investment fund included within a Qualifying Fund (as defined in paragraph (D) below) or beneficial holder whose stock ownership is counted for the purposes of qualifying as holding the Proxy Access Request Required Shares (as defined in paragraph (D) below) or qualifying as an Eligible Stockholder (as defined in paragraph (D) below);

(2) "affiliate" and "associate" shall have the meanings ascribed thereto in Rule 405 under the Securities Act of 1933, as amended; provided, however, that the term "partner" as used in the definition of "associate" shall not include any limited partner that is not involved in the management of the relevant partnership; and

(3) a stockholder (including any Constituent Holder) shall be deemed to "own" only those outstanding shares of Voting Stock as to which the stockholder itself (or such Constituent Holder itself) possesses both (a) the full voting and investment rights pertaining to the shares and (b) the full economic interest in (including the opportunity for profit and risk of loss on) such shares. The number of shares calculated in accordance with the foregoing clauses (a) and (b) shall be deemed not to include (and to the extent any of the following arrangements have been entered into by affiliates of the stockholder (or of any Constituent Holder), shall be reduced by) any shares (x) sold by such stockholder or Constituent Holder (or any of either's affiliates) in any transaction that has not been settled or closed, including any short sale, (y) borrowed by such stockholder or Constituent Holder (or any of either's affiliates) for any purposes or purchased by such stockholder or Constituent Holder (or any of either's affiliates) pursuant to an agreement to resell, or (z) subject to any option, warrant, forward contract, swap, contract of sale, other derivative or similar agreement entered into by such stockholder or Constituent Holder (or any of either's affiliates), whether any such instrument or agreement is to be settled with shares or with cash based on the notional amount or value of Voting Stock, in any such case which instrument or agreement has, or is intended to have, or is exercised by either party thereto would have, the purpose or effect of (i) reducing in any manner, to any extent or at any time in the future, such stockholder's or Constituent Holder's (or either's affiliate's) full right to vote or direct the voting of any such shares, and/or (ii) hedging, offsetting or altering to any degree gain or loss arising from the full economic ownership of such shares by such stockholder or Constituent Holder (or either's affiliate), other than any such arrangements solely involving an exchange listed multi-industry market index fund in which Voting Stock represents at the time of entry into such arrangement less than ten percent (10%) of the proportionate value of such index. For purposes of this Section 9.1, a stockholder (including any Constituent Holder) will be deemed to "own" shares held in the

name of a nominee or other intermediary so long as the stockholder itself (or such Constituent Holder itself) retains the right to instruct how the shares are voted with respect to the election of directors and the right to direct the disposition thereof and possesses the full economic interest in the shares. For purposes of this Section 9.1, a stockholder's (including any Constituent Holder's) ownership of shares shall be deemed to (I) continue during any period in which such person has loaned such shares in the ordinary course of its business so long as such stockholder retains the unrestricted power to recall such shares on no greater than five (5) business days' notice or delegated any voting power over such shares by means of a proxy, power of attorney or other instrument or arrangement so long as such delegation is revocable at any time by the stockholder, and (II) include, for purposes of measuring ownership for any applicable time period, ownership of Voting Stock of the Corporation's immediate predecessor. The terms "owned," "owning" and other variations of the word "own" shall have correlative meanings.

(A) For purposes of this Section 9.1, the "Required Information" that the Corporation shall include in its proxy statement is (1) the information concerning the Stockholder Nominee and the Eligible Stockholder that the Corporation determines is required to be disclosed in the Corporation's proxy statement by the regulations promulgated under the Exchange Act; and (2) if the Eligible Stockholder so elects, a Statement (as defined in paragraph (F) below). The Corporation shall also include the name of the qualifying Stockholder Nominee in its proxy card. For the avoidance of doubt, and any other provision of these Bylaws notwithstanding, the Corporation may in its sole discretion solicit against, and include in the proxy statement its own statements or other information relating to, any Eligible Stockholder and/or Stockholder Nominee, including any information provided to the Corporation with respect to the foregoing.

(B) To be timely, a stockholder's Proxy Access Notice must be delivered to the principal executive offices of the Corporation no earlier than one hundred and fifty (150) days and no later than one hundred and twenty (120) days before the one (1)-year anniversary of the date that the Corporation commenced mailing of its definitive proxy statement (as stated in such proxy statement) for the immediately preceding annual meeting with the Securities and Exchange Commission. In no event shall any adjournment or postponement of an annual meeting, the date of which has been announced by the Corporation, commence a new time period for the giving of a Proxy Access Notice.

(C) The number of Stockholder Nominees (including Stockholder Nominees that were submitted by an Eligible Stockholder for inclusion in the Corporation's proxy materials pursuant to this Section 9.1 but either are subsequently withdrawn or that the Board of Directors decides to nominate as Board of Directors' nominees or otherwise appoint to the Board of Directors) appearing in the Corporation's proxy materials with respect to an annual meeting of stockholders may not exceed the greater of (x) two (2) and (y) the largest whole number that does not exceed twenty percent (20%) of the number of directors in office as of the last day on which a Proxy Access Notice may be delivered in accordance with the procedures set forth in this Section 9.1 (such greater number, the "Permitted Number"); provided, however, that the Permitted Number shall be reduced by the number of directors in office with respect to whom a Proxy Access Notice was previously provided to the Corporation pursuant to this Section 9.1, other than (a) any such director whose term of office will expire at such annual meeting and who is not nominated by the Corporation at such annual meeting for another term of office and who is not seeking or agreeing to be nominated at such meeting for another term of office, and (b) any such director who at the time of such annual meeting will have served as a director continuously for at least two years; provided, further, that in no circumstance shall the Permitted Number exceed the number of directors to be elected at the applicable annual meeting as noticed by the Corporation; and provided, further, that in the event the Board of Directors resolves to reduce the size of the Board of Directors effective on or prior to the date of the annual meeting, the Permitted Number shall be calculated based on the number of directors in office as so reduced. Any Eligible Stockholder submitting more than one Stockholder Nominee for inclusion in the Corporation's proxy statement pursuant to this Section 9.1 shall (i) rank such Stockholder Nominees based on the order that the Eligible Stockholder desires such Stockholder Nominees to be selected for inclusion in the Corporation's proxy statement in the event that the number of Stockholder Nominees submitted by Eligible Stockholders pursuant to this Section 9.1 exceeds the Permitted Number and (ii) explicitly specify and include the respective rankings referred to in the foregoing clause (i) in the Proxy Access Notice delivered to the Corporation with respect to all Stockholder Nominees submitted pursuant thereto. In the event that the number of Stockholder Nominees submitted by Eligible Stockholders pursuant to this

Section 9.1 exceeds the Permitted Number, each Eligible Stockholder will have its highest ranking Stockholder Nominee (as ranked pursuant to the preceding sentence) who meets the requirements of this Section 9.1 selected for inclusion in the Corporation's proxy materials until the Permitted Number is reached, going in order of the amount (largest to smallest) of shares of Voting Stock each Eligible Stockholder disclosed as owned in its Proxy Access Notice submitted to the Corporation (with the understanding that an Eligible Stockholder may not ultimately have any of its Stockholder Nominees included if the Permitted Number has previously been reached). If the Permitted Number is not reached after each Eligible Stockholder has had one (1) Stockholder Nominee selected, this selection process shall continue as many times as necessary, following the same order each time, until the Permitted Number is reached. After reaching the Permitted Number of Stockholder Nominees, if any Stockholder Nominee who satisfies the eligibility requirements in this Section 9.1 thereafter withdraws, has his or her nomination withdrawn or is thereafter not submitted for director election, no other nominee or nominees shall be required to be substituted for such Stockholder Nominee and included in the Corporation's proxy statement or otherwise submitted for director election pursuant to this Section 9.1.

(D) An "Eligible Stockholder" is one or more stockholders of record who own and have owned, or are acting on behalf of one or more beneficial owners who own and have owned (in each case as defined above), in each case continuously for at least three (3) years as of both the date that the Proxy Access Notice is received by the Corporation pursuant to this Section 9.1, and as of the record date for determining stockholders eligible to vote at the annual meeting, at least three percent (3%) of the aggregate voting power of the Voting Stock (the "Proxy Access Request Required Shares"), and who continue to own the Proxy Access Request Required Shares at all times between the date such Proxy Access Notice is received by the Corporation and the date of the applicable annual meeting, provided that the aggregate number of stockholders, and, if and to the extent that a stockholder is acting on behalf of one or more beneficial owners, of such beneficial owners, whose stock ownership is counted for the purpose of satisfying the foregoing ownership requirement may not exceed twenty (20). Two or more investment funds that are (I) under common management and investment control, (II) under common management and funded primarily by the same employers or (III) a "group of investment companies" as such term is defined in Section 12(d)(1)(G)(ii) of the Investment Company Act of 1940 (a "Qualifying Fund") will be treated as one stockholder for the purpose of determining the aggregate number of stockholders in this paragraph (D), provided that each fund included within a Qualifying Fund otherwise meets the requirements set forth in this Section 9.1. No shares may be attributed to more than one group constituting an Eligible Stockholder under this Section 9.1 (and, for the avoidance of doubt, no stockholder may be a member of more than one group constituting an Eligible Stockholder). A record holder acting on behalf of one or more beneficial owners will not be counted separately as a stockholder with respect to the shares owned by beneficial owners on whose behalf such record holder has been directed in writing to act, but each such beneficial owner will be counted separately, subject to the other provisions of this paragraph (D), for purposes of determining the number of stockholders whose holdings may be considered as part of an Eligible Stockholder's holdings. For the avoidance of doubt, Proxy Access Request Required Shares will qualify as such if and only if the beneficial owner of such shares as of the date of the Proxy Access Notice has itself individually beneficially owned such shares continuously for the three (3)-year period ending on that date and through the other applicable dates referred to above (in addition to the other applicable requirements being met).

(E) No later than the final date when a Proxy Access Notice pursuant to this Section 9.1 may be timely delivered to the Corporation, an Eligible Stockholder (including each Constituent Holder) must provide the following in writing to the Secretary of the Corporation:

(1) with respect to each Constituent Holder, the information, representations and agreements that would be required to be provided in a stockholder's notice of nomination pursuant to the requirements of Section 2.9(C) and 2.10 of these Bylaws;

(2) a description of all direct and indirect compensation and other material monetary agreements, arrangements and understandings during the past three (3) years, and any other material relationships, between or among the Eligible Stockholder (including any Constituent Holder) and its or their respective affiliates and associates, or others acting in concert therewith, on the one hand, and each of such Eligible Stockholder's Stockholder Nominee(s), and his or her respective affiliates and associates, or others acting in concert therewith, on the other hand, including without limitation all information that would be required to be disclosed

pursuant to Rule 404 promulgated under Regulation SK if the Eligible Stockholder (including any Constituent Holder), or any affiliate or associate thereof or person acting in concert therewith, were the “registrant” for purposes of such rule and the Stockholder Nominee were a director or executive officer of such registrant;

(3) one or more written statements from the record holder of the shares (and from each intermediary through which the shares are or have been held during the requisite three (3)-year holding period) verifying that, as of a date within seven (7) calendar days prior to the date the Proxy Access Notice is delivered to the Corporation, such person owns, and has owned continuously for the preceding three (3) years, the Proxy Access Request Required Shares, and such person’s agreement to provide:

(a) within ten (10) days after the record date for the annual meeting, written statements from the record holder and intermediaries verifying such person’s continuous ownership of the Proxy Access Request Required Shares through the record date, together with any additional information reasonably requested to verify such person’s ownership of the Proxy Access Request Required Shares; and

(b) immediate notice if the Eligible Stockholder ceases to own any of the Proxy Access Request Required Shares prior to the date of the applicable annual meeting of stockholders;

(4) a representation that such person:

(a) acquired the Proxy Access Request Required Shares in the ordinary course of business and not with the intent to change or influence control of the Corporation, and does not have such intent;

(b) has not nominated and will not nominate for election to the Board of Directors at the annual meeting any person other than the Stockholder Nominee(s) being nominated pursuant to this [Section 9.1](#);

(c) has not engaged and will not engage in, and has not and will not be a “participant” in another person’s, “solicitation” within the meaning of Rule 14a-1(l) under the Exchange Act in support of the election of any individual as a director at the annual meeting other than its Stockholder Nominee(s) or a nominee of the Board of Directors;

(d) will not distribute to any stockholder any form of proxy for the annual meeting other than the form distributed by the Corporation; and

(e) will provide facts, statements and other information in all communications with the Corporation and its stockholders that are and will be true and correct in all material respects and do not and will not omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading, and will otherwise comply with all applicable laws, rules and regulations in connection with any actions taken pursuant to this [Section 9.1](#);

(5) in the case of a nomination by a group of stockholders that together is such an Eligible Stockholder, the designation by all group members of one group member that is authorized to act on behalf of all members of the nominating stockholder group with respect to the nomination and matters related thereto, including withdrawal of the nomination; and

(6) an undertaking that such person agrees to:

(a) assume all liability stemming from, and indemnify and hold harmless the Corporation and its affiliates and each of its and their directors, officers, and employees individually against any liability, loss or damages in connection with any threatened or pending action, suit or proceeding, whether legal, administrative or investigative, against the Corporation or any of its affiliates, or any of its or their directors, officers or employees arising out of any legal or regulatory violation arising out of the Eligible

Stockholder's communications with the stockholders of the Corporation or out of the information that the Eligible Stockholder (including such person) provided to the Corporation in connection with the nomination of the Stockholder Nominee(s) or efforts to elect such Stockholder Nominee(s) or out of any failure of the Eligible Stockholder to comply with, or any breach of, its obligations, agreements or representations pursuant to these Bylaws;

(b) comply with all laws, rules, regulations and listing standards applicable to nominations or solicitations in connection with the annual meeting of stockholders, and promptly provide the Corporation with such other information as the Corporation may reasonably request; and

(c) file with the Securities and Exchange Commission any solicitation by the Eligible Stockholder of stockholders of the Corporation relating to the annual meeting at which the Stockholder Nominee will be nominated.

In addition, no later than the final date when a Proxy Access Notice pursuant to this Section 9.1 may be timely delivered to the Corporation, a Qualifying Fund whose stock ownership is counted for purposes of qualifying as an Eligible Stockholder must provide to the Secretary of the Corporation documentation reasonably satisfactory to the Board of Directors that demonstrates that the funds included within the Qualifying Fund satisfy the definition thereof. In order to be considered timely, any information required by this Section 9.1 to be provided to the Corporation must be supplemented (by delivery to the Secretary of the Corporation) (1) no later than ten (10) days following the record date for the applicable annual meeting, to disclose the foregoing information as of such record date, and (2) no later than the fifth day before the annual meeting, to disclose the foregoing information as of the date that is no earlier than ten (10) days prior to such annual meeting. For the avoidance of doubt, the requirement to update and supplement such information shall not permit any Eligible Stockholder or other person to change or add any proposed Stockholder Nominee or be deemed to cure any defects or limit the remedies (including without limitation under these Bylaws) available to the Corporation relating to any defect.

(F) The Eligible Stockholder may provide to the Secretary of the Corporation, at the time the information required by this Section 9.1 is originally provided, a written statement for inclusion in the Corporation's proxy statement for the annual meeting, not to exceed five hundred (500) words, in support of the candidacy of such Eligible Stockholder's Stockholder Nominee (the "Statement"). Notwithstanding anything to the contrary contained in this Section 9.1, the Corporation may omit from its proxy materials any information or Statement that it, in good faith, believes is materially false or misleading, omits to state any material fact, or would violate any applicable law or regulation.

(G) No later than the final date when a Proxy Access Notice pursuant to this Section 9.1 may be timely delivered to the Corporation, each Stockholder Nominee must:

(1) provide an executed agreement, in a form deemed satisfactory by the Board of Directors or its designee (which form shall be provided by the Corporation reasonably promptly upon written request of a stockholder), that such Stockholder Nominee consents to being named in the Corporation's proxy statement and form of proxy card (and will not agree to be named in any other person's proxy statement or form of proxy card with respect to the Corporation) as a nominee;

(2) complete, sign and submit all questionnaires, representations and agreements required by these Bylaws, including Section 2.9(C) and 2.10 of these Bylaws, or of the Corporation's directors generally; and

(3) provide such additional information as necessary to permit the Board of Directors to determine if such Stockholder Nominee:

(a) is independent under the listing standards of each principal U.S. exchange upon which the common stock of the Corporation is listed, any applicable rules of the Securities and

Exchange Commission and any publicly disclosed standards used by the Board of Directors in determining and disclosing the independence of the Corporation's directors;

(b) has any direct or indirect relationship with the Corporation other than those relationships that have been deemed categorically immaterial pursuant to the Corporation's Corporate Governance Guidelines;

(c) would, by serving on the Board of Directors, violate or cause the Corporation to be in violation of these Bylaws, the Certificate of Incorporation, the rules and listing standards of the principal U.S. exchange upon which the common stock of the Corporation is listed or any applicable law, rule or regulation; and

(d) is or has been subject to any event specified in Item 401(f) of Regulation S-K (or successor rule) of the Securities and Exchange Commission.

In the event that any information or communications provided by the Eligible Stockholder (or any Constituent Holder) or the Stockholder Nominee to the Corporation or its stockholders ceases to be true and correct in all material respects or omits a material fact necessary to make the statements made, in light of the circumstances under which they were made, not misleading, each Eligible Stockholder or Stockholder Nominee, as the case may be, shall promptly notify the Secretary of the Corporation of any defect in such previously provided information and of the information that is required to correct any such defect; it being understood for the avoidance of doubt that providing any such notification will not be deemed to cure any such defect or limit the remedies (including without limitation under these Bylaws) available to the Corporation relating to any such defect.

(H) Any Stockholder Nominee who is included in the Corporation's proxy materials for a particular annual meeting of stockholders but withdraws from or becomes ineligible or unavailable for election at that annual meeting (other than by reason of such Stockholder Nominee's disability or other health reason) shall be ineligible to be a Stockholder Nominee pursuant to this Section 9.1 for the next two annual meetings. Any Stockholder Nominee who is included in the Corporation's proxy statement for a particular annual meeting of stockholders, but subsequently is determined not to satisfy the eligibility requirements of this Section 9.1 or any other provision of these Bylaws, the Certificate of Incorporation or other applicable rules or regulation any time before the annual meeting of stockholders, shall not be eligible for election at the relevant annual meeting of stockholders.

(I) The Corporation will not be required to include, pursuant to this Section 9.1, any Stockholder Nominee in its proxy materials for any annual meeting of stockholders, and if the proxy statement already has been filed, any Stockholder Nominee will cease to be eligible for nomination as a Stockholder Nominee, notwithstanding that proxies in respect of such vote may have been received by the Corporation, if:

(1) such Stockholder Nominee is not independent under the listing standards of the principal U.S. exchange upon which the common stock of the Corporation is listed, any applicable rules of the Securities and Exchange Commission and any publicly disclosed standards used by the Board of Directors in determining and disclosing independence of the Corporation's directors, in each case as determined by the Board of Directors;

(2) such Stockholder Nominee's service as a member of the Board of Directors would violate or cause the Corporation to be in violation of these Bylaws, the Certificate of Incorporation, the rules and listing standards of the principal U.S. exchange upon which the common stock of the Corporation is traded, or any applicable law, rule or regulation;

(3) such Stockholder Nominee is or has been, within the past three (3) years, an officer or director of a competitor, as defined in Section 8 of the Clayton Antitrust Act of 1914, 15 U.S.C. §19;

(4) such Stockholder Nominee is a named subject of a pending criminal proceeding (excluding traffic violations and other minor offenses) or has been convicted in such a criminal proceeding within the past ten (10) years;

(5) such Stockholder Nominee is subject to any order of the type specified in Rule 506(d) of Regulation D promulgated under the Securities Act of 1933;

(6) the Eligible Stockholder (or any Constituent Holder) or applicable Stockholder Nominee otherwise breaches or fails to comply in any material respect with its obligations pursuant to this Section 9.1 or any agreement, representation or undertaking required by this Section;

(7) the Eligible Stockholder ceases to be an Eligible Stockholder for any reason, including but not limited to not owning the Proxy Access Request Required Shares through the date of the applicable annual meeting; or

(8) the Secretary of the Corporation receives a notice that any stockholder has nominated or intends to nominate a person for election to the Board of Directors at such annual meeting pursuant to Section 2.9 of these Bylaws.

For the purposes of this paragraph (1), clauses (1), (2), (3), (4) and (5) and, to the extent related to a breach or failure by the Stockholder Nominee, clause (6) will result in the exclusion from the proxy materials pursuant to this Section 9.1 of the specific Stockholder Nominee to whom the ineligibility applies, or, if the proxy statement already has been filed, the ineligibility of such Stockholder Nominee to be nominated pursuant to this Section 9.1; provided, however, that clause (7) and, to the extent related to a breach or failure by an Eligible Stockholder (or any Constituent Holder), clause (6) will result in the Voting Stock owned by such Eligible Stockholder (or Constituent Holder) being excluded from the Proxy Access Request Required Shares (and, if as a result the Proxy Access Notice will no longer have been filed by an Eligible Stockholder, the exclusion from the proxy materials pursuant to this Section 9.1 of all of the applicable stockholder's Stockholder Nominees from the applicable annual meeting of stockholders or, if the proxy statement has already been filed, the ineligibility of all of such stockholder's Stockholder Nominees to be nominated).

Notwithstanding anything to the contrary set forth herein, the Board of Directors or the person presiding at the annual meeting shall declare a nomination by an Eligible Stockholder to be invalid, and the nominated Stockholder Nominee shall cease to be eligible for nomination pursuant to this Section 9.1, notwithstanding that proxies in respect of such vote may have been received by the Corporation, if (i) the Eligible Stockholder (or a qualified representative thereof) does not appear at the annual meeting to present any nomination pursuant to this Section 9.1 or (ii) the Eligible Stockholder (or any Constituent Holder) becomes ineligible to nominate a director for inclusion in the Corporation's proxy materials pursuant to this Section 9.1 or withdraws its nomination or a Stockholder Nominee becomes unwilling, unavailable or ineligible to serve on the Board of Directors, whether before or after the Corporation's issuance of the definitive proxy statement.

Article X.

AMENDMENTS

SECTION 10.1. By the Stockholders. Subject to the provisions of the Certificate of Incorporation, these Bylaws may be altered, amended or repealed, or new Bylaws enacted, at any special meeting of the stockholders if duly called for that purpose (provided that in the notice of such special meeting, notice of such purpose shall be given), or at any annual meeting, by the affirmative vote of a majority of the Voting Stock.

SECTION 10.2. By the Board of Directors. Subject to the laws of the State of Delaware, the Certificate of Incorporation and these Bylaws, these Bylaws may also be altered, amended or repealed, or new Bylaws enacted, by the Board of Directors.

AMENDMENT NO. 4 TO CREDIT AGREEMENT

This Amendment No. 4 to Credit Agreement, dated as of June 26, 2020 (this "Amendment"), is entered into by and among Howmet Aerospace Inc., a Delaware corporation ("Howmet"), the Lenders (as defined below), Citibank, N.A. and JPMorgan Chase Bank, N.A. (each, an Issuer with respect to the L/C Commitments under the Existing Credit Agreement referenced below), Citibank, N.A., as administrative agent for the Lenders (in such capacity, the "Administrative Agent"), and JPMorgan Chase Bank, N.A., as syndication agent. Capitalized terms used but not otherwise defined herein have the meanings assigned to such terms in the Existing Credit Agreement referenced below.

WITNESSETH:

WHEREAS, reference is made to that certain Five-Year Revolving Credit Agreement, dated as of July 25, 2014 (as amended and extended by the letter agreement, dated June 5, 2015, and as further amended pursuant to Amendment No. 1 to Credit Agreement, dated as of September 16, 2016, and as further amended pursuant to Amendment No. 2 to Credit Agreement, dated as of June 29, 2018, and as further amended pursuant to Amendment No. 3, dated as of March 4, 2020, the "Existing Credit Agreement"; the Existing Credit Agreement, as amended by this Amendment, the "Credit Agreement"), among Howmet, the lenders and issuers from time to time party thereto, the Administrative Agent and JPMorgan Chase Bank, N.A., as Syndication Agent;

WHEREAS, Howmet has requested that the Existing Credit Agreement be amended on the terms and conditions set forth herein;

WHEREAS, Howmet has requested, and the Lenders and the Administrative Agent have agreed, on the terms and conditions set forth herein, to make certain amendments to the Existing Credit Agreement as provided herein;

NOW, THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt, adequacy and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

Section 1. Definitions. Unless otherwise specifically defined herein, each term used herein (including in the recitals above) that is defined in the Credit Agreement has the meaning assigned to such term in the Credit Agreement.

Section 2. Amendments to the Existing Credit Agreement upon the Amendment No. 4 Effective Date. Subject to the satisfaction of the conditions set forth in Section 4 below, the parties hereto agree that the Existing Credit Agreement shall be amended, with effect upon the Amendment No. 4 Effective Date (as defined in Section 4 below), as follows:

iii. Article I of the Existing Credit Agreement is hereby amended by amending Section 1.01 thereof to insert the following new defined terms in their correct alphabetical order:

"Amendment No. 4" shall mean Amendment No. 4 to this Agreement, dated as of June 26, 2020.

"Amendment No 4. Effective Date" shall have the meaning assigned to such term in Amendment No. 4.

“Covenant Relief Period” means the period commencing on June 30, 2020, and ending on (and including) the Covenant Relief Period Termination Date.

“Covenant Relief Period Termination Date” means the earlier of (a) December 31, 2021 and (b) the date on which the Administrative Agent receives an Covenant Relief Period Termination Notice from Howmet; provided that, with respect to clause (b) hereof, no Event of Default or Default shall have occurred and be continuing.

“Covenant Relief Period Termination Notice” means a certificate of a Responsible Officer of Howmet (a) stating that Howmet irrevocably elects to terminate the Covenant Relief Period effective as of the date set forth in such certificate (which date shall be no earlier than the date of the certificate) delivered to the Administrative Agent and (b) certifying that (x) the Consolidated Net Debt to Consolidated EBITDA as of the end of the fiscal quarter for the period of the four fiscal quarters of Howmet most recently ended did not exceed 3.50 to 1.00 and (y) at the time of and immediately after the Covenant Relief Period Termination Date no Event of Default or Default shall have occurred and be continuing.

“Existing Preferred Stock” means the \$3.75 Cumulative Preferred Stock, par value \$100 per share of Howmet issued as of the Amendment No. 4 Effective Date.

“Restricted Payment” means (a) any dividend, distribution or any other payment (whether direct or indirect) on account of any stock or equity interests of any Borrower or any of its Subsidiaries now or hereafter outstanding and (b) any redemption, retirement, sinking fund or similar payment, purchase, repurchase or other acquisition for value (direct or indirect) of any stock or equity interests of the Borrower or any of its Subsidiaries now or hereafter outstanding, in each case other than (v) with respect to Existing Preferred Stock, (w) by any Subsidiary to another Subsidiary or any Borrower, (x) Restricted Payments by Howmet payable solely in the common stock or other common equity interests of Howmet, (y) payments in lieu of the issuance of fractional shares in connection with the exercise of warrants, options or other securities convertible into or exchangeable for stock and (z) repurchase of equity interests upon the exercise of stock options if such equity interests represent a portion of the exercise price of such stock options.

iii. Article I of the Existing Credit Agreement is hereby amended by amending Section 1.01 thereof by amending and restating the following defined terms in their entirety as follows:

“Applicable Margin” shall mean:

(a) as of any date of determination, other than during the Covenant Relief Period, a per annum rate equal to the rate set forth below opposite the applicable Type of Loan and the Index Debt Ratings in effect on such date set forth below; provided, that in the event the Index Debt Ratings fall within different categories, the Applicable Margin shall be based on the category

corresponding to the higher of such Index Debt Ratings, unless such Index Debt Ratings differ by two or more categories, in which case the spreads shall be based upon the category one level below the category corresponding to the higher of such Index Debt Ratings;

	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
	Index Debt Ratings of at least BBB+ by S&P and/or Baa1 by Moody's	Index Debt Ratings less than Category 1, but at least BBB by S&P and/or Baa2 by Moody's	Index Debt Ratings less than Category 2, but at least BBB- by S&P and/or Baa3 by Moody's.	Index Debt Ratings less than Category 3, but at least BB+ by S&P and/or Ba1 by Moody's.	Index Debt Ratings less than Category 4, but at least BB by S&P and/or Ba2 by Moody's.	Index Debt Ratings equal to or lower than BB- by S&P and/or Ba3 by Moody's.
Applicable Margin for LIBOR Loans	1.015%	1.125%	1.325%	1.50%	1.70%	1.90%
Applicable Margin for Base Rate Loans	0.015%	0.125%	0.325%	0.50%	0.70%	0.90%

(b) as of any date of determination during the Covenant Relief Period, for the period through (and including) the fiscal quarter ending June 30, 2021, a per annum rate equal to the rate set forth below opposite the applicable Type of Loan and the Index Debt Ratings in effect on such date set forth below; provided, that in the event the Index Debt Ratings fall within different categories, the Applicable Margin shall be based on the category corresponding to the higher of such Index Debt Ratings, unless such Index Debt Ratings differ by two or more categories, in which case the spreads shall be based upon the category one level below the category corresponding to the higher of such Index Debt Ratings;

	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
	Index Debt Ratings of at least BBB+ by S&P and/or Baa1 by Moody's	Index Debt Ratings less than Category 1, but at least BBB by S&P and/or Baa2 by Moody's	Index Debt Ratings less than Category 2, but at least BBB- by S&P and/or Baa3 by Moody's.	Index Debt Ratings less than Category 3, but at least BB+ by S&P and/or Ba1 by Moody's.	Index Debt Ratings less than Category 4, but at least BB by S&P and/or Ba2 by Moody's.	Index Debt Ratings equal to or lower than BB- by S&P and/or Ba3 by Moody's.
Applicable Margin for LIBOR Loans	1.515%	1.625%	1.825%	2.00%	2.20%	2.40%
Applicable Margin for Base Rate Loans	0.515%	0.625%	0.825%	1.00%	1.20%	1.40%

(c) as of any date of determination during the Covenant Relief Period, for the period following the fiscal quarter ending June 30, 2021, a per annum rate equal to the rate set forth below opposite the applicable Type of Loan and the Index Debt Ratings in effect on such date set forth below; provided, that in the event the Index Debt Ratings fall within different categories, the Applicable Margin shall be based

on the category corresponding to the higher of such Index Debt Ratings, unless such Index Debt Ratings differ by two or more categories, in which case the spreads shall be based upon the category one level below the category corresponding to the higher of such Index Debt Ratings:

	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
	Index Debt Ratings of at least BBB+ by S&P and/or Baa1 by Moody's	Index Debt Ratings less than Category 1, but at least BBB by S&P and/or Baa2 by Moody's	Index Debt Ratings less than Category 2, but at least BBB- by S&P and/or Baa3 by Moody's.	Index Debt Ratings less than Category 3, but at least BB+ by S&P and/or Ba1 by Moody's.	Index Debt Ratings less than Category 4, but at least BB by S&P and/or Ba2 by Moody's.	Index Debt Ratings equal to or lower than BB- by S&P and/or Ba3 by Moody's.
Applicable Margin for LIBOR Loans	1.265%	1.375%	1.575%	1.75%	1.95%	2.15%
Applicable Margin for Base Rate Loans	0.265%	0.375%	0.575%	0.75%	0.95%	1.15%

“Commitment” shall mean, with respect to each Lender, the commitment of such Lender to make Loans and acquire interests in Letters of Credit as set forth in this Agreement in the aggregate principal amount not to exceed the amount set forth opposite such Lender’s name on Schedule 2.01(a) or in any Assignment and Assumption or Accession Agreement pursuant to which such Lender first becomes a Lender hereunder, as the same may be terminated or reduced from time to time pursuant to Section 2.10 or Section 10.04(h), increased from time to time pursuant to Section 2.20 or extended pursuant to Section 2.21. As of the Amendment No. 4 Effective Date, the aggregate amount of Commitments is \$1,000,000,000.

iv. Article VI of the Existing Credit Agreement is hereby amended by amending and restating Section 6.01(b) thereof in its entirety as follows:

(b) Notwithstanding paragraph (a) of this Section 6.01 and in addition to the Liens permitted thereunder, each Borrower and any Restricted Subsidiary may create or incur Liens which would otherwise be subject to the foregoing restrictions to secure Indebtedness for borrowed money in an aggregate outstanding amount which does not at the time exceed (x) during the Covenant Relief Period, \$400,000,000 (less any amounts incurred by any Subsidiary under Section 6.06) or (y) at any time other than during the Covenant Relief Period, 10% of the Consolidated Net Tangible Assets of Howmet and its consolidated Subsidiaries at such time.

v. Article VI of the Existing Credit Agreement is hereby amended by amending and restating Section 6.03 thereof in its entirety as follows:

Section 6.03. Consolidated Net Leverage Ratio. Howmet shall not permit the ratio of Consolidated Net Debt to Consolidated EBITDA as of the end of each fiscal quarter for the period of the four fiscal quarters of Howmet

most recently ended, to be greater than 3.50 to 1.00; provided, however, that notwithstanding the foregoing, during the Covenant Relief Period, Howmet shall not permit the ratio of Consolidated Net Debt to Consolidated EBITDA as of the end of each fiscal quarter for the period of the four fiscal quarters of Howmet set forth below, to exceed the applicable level set forth below opposite such period under the heading “Consolidated Net Debt to Consolidated EBITDA”:

Fiscal Quarter Ending	Consolidated Net Debt to Consolidated EBITDA
June 30, 2020	5.00 to 1.00
September 30, 2020	5.00 to 1.00
December 31, 2020	5.00 to 1.00
March 31, 2021	5.25 to 1.00
June 30, 2021	5.00 to 1.00
September 30, 2021	4.50 to 1.00
December 31, 2021	4.00 to 1.00

vi. Article VI of the Existing Credit Agreement is hereby amended by inserting, after Section 6.04 thereof, the following new Section 6.05:

Section 6.05. Restricted Payments. During the Covenant Relief Period, declare, order, pay, make, or permit any Subsidiary to declare, order, pay or make, any Restricted Payment except for so long as there are no Revolving Credit Outstandings immediately prior to or after giving effect to such Restricted Payment, in an aggregate amount not to exceed the sum of (x) \$100,000,000 and (y) after June 30, 2021, if the ratio of Consolidated Net Debt to Consolidated EBITDA after giving effect thereto on a pro forma basis is less than or equal to 3.75 to 1.00, \$150,000,000.

vii. Article VI of the Existing Credit Agreement is hereby amended by inserting, after Section 6.05 thereof, the following new Section 6.06:

Section 6.06. Subsidiary Indebtedness. During the Covenant Relief Period, permit any Subsidiary to directly or indirectly create, incur, assume or guaranty, or otherwise become or remain directly or indirectly liable with respect to any Indebtedness except in an aggregate outstanding amount which does not at the time exceed \$400,000,000 (less any amounts secured by any Borrower or Restricted Subsidiary under Section 6.01(b)).

viii. Article VI of the Existing Credit Agreement is hereby amended by inserting, after Section 6.06 thereof, the following new Section 6.07:

Section 6.07. Accounts Receivable and Securitization. During the Covenant Relief Period, enter, or permit any Subsidiary to enter, into any accounts receivable facility or similar financing facility or transaction (including any securitization or non-recourse accounts receivable financing but excluding, for the avoidance of doubt, any supply chain financing) providing for the

factoring, sale or pledge of receivables or similar assets; provided, however, that the foregoing shall not apply to facilities or transactions for which the aggregate outstanding amount of (x) any Indebtedness attributable thereto and (y) to the extent not included as a liability on the consolidated balance sheet of Howmet and its Subsidiaries in accordance with GAAP, the amount of the financing component for such facility or transaction that would appear on a balance sheet of such Person prepared on such date in accordance with GAAP if such financing component were accounted for as Indebtedness incurred by such person, does not at the time exceed \$500,000,000. For purposes of determining compliance with this Section 6.07, the amount of any Indebtedness or obligation denominated in any currency other than Dollars shall be calculated based on customary currency exchange rates in effect on the date on which such Indebtedness or obligation was incurred.

ix. Article X of the Existing Credit Agreement is hereby amended by amending and restating Section 10.13 thereof in its entirety as follows:

Section 10.13. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall constitute an original but all of which when taken together shall constitute but one contract, and shall become effective as provided in Section 10.03. The words “execution,” “execute,” “signature” and words of like import in this Agreement shall be deemed to include electronic signatures, which shall be of the same legal effect, validity or enforceability as a manually executed signature, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act or any other similar state laws based on the Uniform Electronic Transactions Act.

Section 3. Reduction and Deemed Assignment of Commitments

iii. Subject to the terms and conditions set forth herein, upon the Amendment No. 4 Effective Date, each lender party hereto hereby agrees to commit to provide its respective Commitment as set forth in Schedule 2.01(a) of Exhibit A hereto (which shall be deemed to supersede and replace Schedule 2.01(a) of the Existing Credit Agreement on the Amendment No. 4 Effective Date) (each lender listed on Schedule 2.01(a) of Exhibit A hereto, a “Lender”). Schedule 2.01(a) of Exhibit A hereto shall be deemed to supersede and replace Schedule 2.01(a) of the Existing Credit Agreement upon the Amendment No. 4 Effective Date; provided, that, in the event that, following the date hereof but prior to the occurrence of the Amendment No. 4 Effective Date, any Commitments are assigned or changed pursuant to the Credit Agreement (other than as set forth above), then upon the Amendment No. 4 Effective Date, the Administrative Agent shall make such changes to Schedule 2.01(a) of Exhibit A hereto solely to the extent necessary to give effect to any such assignment or change and to the other provisions of this Section 3(a).

iii. Each Issuer committed to providing L/C Commitments under the Existing Credit Agreement immediately prior to the effectiveness of this Amendment shall continue to act in such capacity immediately following the effectiveness hereof. Schedule 2.01(b) of Exhibit A hereto shall be deemed to supersede and replace Schedule 2.01(b) of the Existing Credit Agreement upon the Amendment No. 4 Effective Date; provided, that, in the event that, following the date hereof but prior to

the occurrence of the Amendment No. 4 Effective Date, any L/C Commitments are changed pursuant to the Credit Agreement (other than as set forth above), then upon the Amendment No. 4 Effective Date, the Administrative Agent shall make such changes to Schedule 2.01(b) of Exhibit A hereto solely to the extent necessary to give effect to any such change and to the other provisions of this Section 3(b).

Section 4. Conditions Precedent to Amendment No. 4 Effective Date.

The amendments set forth under Sections 2 and 3 herein shall be effective upon the date on which the following conditions precedent are satisfied (such date, the "Amendment No. 4 Effective Date"):

iii. Amendment. The Administrative Agent shall have received counterparts of this Amendment, duly executed by Howmet, the Lenders, each Issuer and the Administrative Agent.

iii. Fees and Expenses. The Administrative Agent shall have received all fees and other amounts due and payable on or prior to the Amendment No. 4 Effective Date (including, without limitation, (x) consent fees payable to the Lenders pursuant to Section 4(g) below and (y) fees and other amounts due and payable under Section 10.05 (*Expenses; Indemnity*) of the Existing Credit Agreement).

iv. Corporate Documents. The Administrative Agent shall have received (i) a copy, including all amendments thereto, of the charter of Howmet, certified as of a recent date by the Secretary of State or other appropriate official of its jurisdiction of incorporation and a certificate as to the good standing of Howmet as of a recent date, from such Secretary of State or other official; (ii) a certificate of the Secretary or Assistant Secretary of Howmet dated the Amendment No. 4 Effective Date and certifying (A) that attached thereto is a true and complete copy of the by-laws of Howmet as in effect on the Amendment No. 4 Effective Date showing all amendments thereto since the date of the resolutions described in clause (B) below, (B) that attached thereto is a true and complete copy of resolutions duly adopted by the Board of Directors of Howmet authorizing the execution, delivery and performance of this Amendment and the borrowings by Howmet hereunder, and that such resolutions have not been modified, rescinded or amended and are in full force and effect, (C) that the charter of Howmet has not been amended since the date of the last amendment thereto shown on the certificate of good standing furnished pursuant to clause (i) above and (D) as to the incumbency and specimen signature of each officer executing this Amendment or any other document delivered in connection herewith on behalf of Howmet; (iii) a certificate of another officer of Howmet as to the incumbency and specimen signature of the Secretary or Assistant Secretary executing the certificate pursuant to clause (ii) above; and (iv) such other documents as the Lenders or Weil, Gotshal & Manges LLP, counsel for the Administrative Agent may reasonably request; provided that the charter referenced in clause (i) above and the bylaws referenced in clause (ii) shall not be required to be delivered to the extent the Secretary or Assistant Secretary of Howmet certifies that such documents are unchanged since last delivered to the Administrative Agent.

v. Representations and Warranties. The representations and warranties set forth in Section 5 of this Amendment shall be true and correct in all material respects (or in all respects if such representation or warranty is qualified by Material Adverse Effect or other materiality qualifier) on and as of the Amendment No. 4 Effective Date with the same effect as though made on and as of such date, except to the extent such representations and warranties expressly relate to an earlier date.

vi. Conditions Precedent Certificates. The Administrative Agent shall have received certificates dated the Amendment No. 4 Effective Date and signed by a Financial Officer of Howmet confirming the satisfaction of the conditions precedent set forth in paragraph (d) of this Section 4 and that

as of the Amendment No. 4 Effective Date, no Event of Default or Default has occurred and is continuing.

vii.Responsible Officer Certificates. The Administrative Agent shall have received certificates of a Responsible Officer of Howmet, each dated the Amendment No. 4 Effective Date and stating that (i) except as previously disclosed, Howmet and each of its Subsidiaries have complied in all respects with all Federal, state, local and foreign statutes, ordinances, orders, judgments, rulings and regulations relating to environmental pollution or to environmental regulation or control except to the extent any such failure so to comply would not, alone or together with any other such failure, be reasonably likely to result in a Material Adverse Effect; (ii) neither Howmet nor any of its Subsidiaries has received notice of any failure so to comply which alone or together with any other such failure would be reasonably likely to result in a Material Adverse Effect; and (iii) the plants of Howmet and its Subsidiaries do not manage any hazardous wastes, toxic pollutants or substances similarly denominated in violation of any applicable law or regulations promulgated pursuant thereto including, for operations within the United States, the Resource Conservation and Recovery Act, the Comprehensive Environmental Response Compensation and Liability Act, the Hazardous Materials Transportation Act, the Toxic Substance Control Act, the Clean Air Act, the Clean Water Act or any other applicable law, where such violation would be reasonably likely to result, individually or together with any such other violations, in a Material Adverse Effect.

viii.Consent Fee. The Administrative Agent shall have received a consent fee, for the account of each applicable Lender (including Citibank, N.A.) consenting to this Amendment (each, a "Consenting Lender"), in an amount equal to 0.15% of such Consenting Lender's Commitment as set forth on Exhibit A to this Amendment ("Exhibit A"), payable on the Amendment No. 4 Effective Date.

Section 5. Representations and Warranties. To induce the Administrative Agent and the Lenders party hereto to enter into this Amendment, Howmet hereby represents and warrants to the Administrative Agent and the Lenders, that:

iii.Authorization. Howmet has the power and authority, corporate or otherwise, to execute, deliver and carry out the provisions of this Amendment, or to become a party to this Amendment in accordance with the terms hereof and to perform its obligations hereunder and under the Credit Agreement as modified hereby, and all such action has been duly and validly authorized by all necessary proceedings, corporate or otherwise, on its part.

iii.Enforceability. This Amendment has been duly executed and delivered by Howmet and this Amendment and the Credit Agreement as modified hereby constitute the legal, valid and binding obligations of Howmet, enforceable in accordance with their respective terms, except as limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

iv.Governmental Approvals. No authorization, consent, approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Governmental Authority (other than filings under the Securities Exchange Act of 1934, as amended, and the rules and regulations of the SEC promulgated thereunder) is necessary in connection with Howmet's execution and delivery of this Amendment, the consummation by Howmet of the transactions contemplated hereby or Howmet's performance of or compliance with the terms and conditions hereof or of the Credit Agreement as modified hereby.

v.No Conflict. None of the execution and delivery by Howmet of this Amendment, the consummation by Howmet of the transactions contemplated hereby or the performance by Howmet of or compliance by Howmet with the terms and conditions hereof or of the Credit Agreement as modified hereby will (a) violate any law, constitution, statute, treaty, regulation, rule, ordinance, order, injunction, writ, decree or award of any Governmental Authority to which it is subject, (b) conflict with or result in a breach or default under its charter or Memorandum and Articles of Association or by-laws (or equivalent organizational or governing documents), as applicable, (c) conflict with or result in a breach or default which is material in the context of this Amendment under any agreement or instrument to which Howmet is a party or by which it or any of its properties, whether now owned or hereafter acquired, may be subject or bound or (d) result in the creation or imposition of any Lien prohibited by Section 6.01 of the Credit Agreement upon any property or assets, whether now owned or hereafter acquired, of Howmet.

vi.No Default; Representations and Warranties. On and as of the Amendment No. 4 Effective Date, (i) no Default or Event of Default has occurred and is continuing and (ii) the representations and warranties of Howmet set forth in the Loan Documents are true and correct in all material respects (or in all respects if such representation or warranty is qualified by Material Adverse Effect or other materiality qualifier) with the same effect as though made on and as of the date hereof, except to the extent that any such representation or warranty specifically refers to an earlier date, in which case such representation or warranty is true and correct in all material respects (or in all respects if such representation or warranty is qualified by Material Adverse Effect or other materiality qualifier) as of such earlier date.

Section 6. Reference to and Effect on the Existing Credit Agreement.

iii.From the Amendment No. 4 Effective Date (i) this Amendment and the Existing Credit Agreement shall be construed as a single instrument and (ii) each reference in the Existing Credit Agreement to “the Credit Agreement”, “this Agreement”, “hereunder”, “hereof” or words of like import, and each reference in each of the other Loan Documents to “the Credit Agreement”, “thereunder”, “thereof” or words of like import, shall mean and be a reference to the Credit Agreement as amended hereby.

iii.Except as expressly set forth in this Amendment, all of the terms and provisions of the Existing Credit Agreement, each other Loan Document, and all other instruments and agreements executed in connection therewith are and shall remain in full force and effect and are hereby reaffirmed, ratified and confirmed, and the Borrowers shall continue to be bound by all of such terms and provisions.

iv.Except with respect to the subject matter hereof, the execution, delivery and effectiveness of this Amendment shall not operate as a waiver of any right, power or remedy of the Administrative Agent or the Lenders, nor constitute a waiver of any provision of the Credit Agreement or any other documents, instruments and agreements executed and/or delivered in connection therewith.

v.This Amendment is a Loan Document under (and as defined in) the Credit Agreement.

Section 7. Miscellaneous.

iii.Governing Law. **THIS AMENDMENT SHALL BE CONSTRUED IN ACCORDANCE WITH AND GOVERNED BY THE LAWS OF THE STATE OF NEW YORK WITHOUT REGARD TO ANY CONFLICT OF LAWS PRINCIPLES THEREOF THAT WOULD CALL FOR THE APPLICATION OF THE LAWS OF ANY OTHER JURISDICTION.**

SECTION 10.11 AND 10.15 OF THE CREDIT AGREEMENT ARE HEREBY INCORPORATED BY REFERENCE INTO THIS AMENDMENT AND SHALL APPLY HERETO.

iii.Headings. Section headings used herein are for convenience of reference only, are not part of this Amendment and are not to affect the construction of, or to be taken into consideration in interpreting, this Amendment.

iv.Counterparts. This Amendment may be executed in two or more counterparts, each of which shall constitute an original but all of which when taken together shall constitute but one contract, and shall become effective as provided in Section 10.03 of the Credit Agreement. Delivery of an executed counterpart of a signature page of this Amendment by facsimile, PDF or any other electronic means that reproduces an image of the actual executed signature page shall be effective as delivery of a manually executed counterpart of this Amendment. The words “execution,” “execute,” “signature” and words of like import in this Agreement shall be deemed to include electronic signatures, which shall be of the same legal effect, validity or enforceability as a manually executed signature, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act or any other similar state laws based on the Uniform Electronic Transactions Act.

[Signature Pages Follow]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed by their respective authorized officers as of the day and year first above written.

HOWMET AEROSPACE INC.

By: /s/ Peter Hong

Name: Peter Hong
Title: Vice President and Treasurer

[Signature Page to Amendment No. 4 to Credit Agreement]

CITIBANK, N.A.,

individually as a Lender, as an Issuer and as Administrative Agent

By: /s/ Michael Vondriska

Name: Michael Vondriska

Title: Vice President

[Signature Page to Amendment No. 4 to Credit Agreement]

JPMorgan Chase Bank, N.A., as a Lender and as an Issuer

By: /s/ James Shender

Name: James Shender

Title: Executive Director

[Signature Page to Amendment No. 4 to Credit Agreement]

ABN Amro capital usa llc, as a Lender
By: /s/ Jamie Matos

Name: Jamie Matos
Title: Director

ABN Amro capital usa llc, as a Lender

By: /s/ Amit Wynalda

Name: Amit Wynalda
Title: Executive Director

[Signature Page to Amendment No. 4 to Credit Agreement]

Bank of montreal, as a Lender

By: /s/ Joshua Hovermale

Name: Joshua Hovermale

Title: Director

BNP paribas, as a Lender

By: /s/ Nicolas Anberree

Name: Nicolas Anberree

Title: Director

BNP paribas, as a Lender

By: /s/ Claudia Zarate

Name: Claudia Zarate

Title: Managing Director

CREdit suisse ag, cayman islands branch, as a Lender

By: /s/ Judith Smith

Name: Judith Smith
Title: Authorized Signatory

By: /s/ Michael Dieffenbacher

Name: Michael Dieffenbacher
Title: Authorized Signatory

fifth third bank, national association, as a Lender

By: /s/ Michael S. Barnett

Name: Michael S. Barnett
Title: Senior Vice President

GOLDMAN SACHS BANK USA, as a Lender

By: /s/ Jamie Minieri

Name: Jamie Minieri

Title: Authorized Signatory

Intesa Sanpaolo S.p.A. - New York Branch, as a Lender

By: /s/ Alessandro Toigo

Name: Alessandro Toigo

Title: Head of Corporate Desk

By: /s/ William Denton

Name: William Denton

Title: Global Relationship Manager

Mizuho Bank, Ltd., as a Lender

By: /s/ Donna DeMagistris

Name: Donna DeMagistris

Title: Executive Director

Morgan Stanley Bank, N.A., as a Lender

By: /s/ Jacob Dowden

Name: Jacob Dowden

Title: Authorized Signatory

MUFG Bank, Ltd., as a Lender

By: /s/ Liwei Liu

Name: Liwei Liu

Title: Vice President

PNC Bank, National Association, as a Lender

By: /s/ Joseph McElhinny

Name: Joseph McElhinny

Title: Vice President

Sumitomo Mitsui Banking Corporation, as a Lender

By: /s/ Jun Ashley

Name: Jun Ashley

Title: Director

TD Bank, N.A., as a Lender

By: /s/ Maciej Niedzwiecki

Name: Maciej Niedzwiecki

Title: Senior Vice President

Truist Bank, as a Lender

By: /s/ Matthew J. Davis

Name: Matthew J. Davis

Title: Senior Vice President

U.S. Bank National Association, as a Lender

By: /s/ Patrick McGraw

Name: Patrick McGraw

Title: Senior Vice President

Citizens Bank, N.A., as a Lender

By: /s/ Eric J. Grasso

Name: Eric J. Grasso

Title: Vice President

ING Bank N.V., Dublin Branch, as a Lender

By: /s/ Sean Hassett

Name: Sean Hassett
Title: Director

By: /s/ Cormac Langford

Name: Cormac Langford
Title: Director

The Bank of Nova Scotia, as a Lender

By: /s/ Kevin McCarthy

Name: Kevin McCarthy

Title: Director

The Huntington National Bank, as a Lender

By: /s/ Marcel Fournier

Name: Marcel Fournier

Title: Vice President

Banco Bradesco S.A., New York Branch, as a Lender

By: /s/ Fabiana G. Paes de Barros

Name: Fabiana G. Paes de Barros

Title: Manager

By: /s/ Sonia Bettancourt

Name: Sonia Bettancourt

Title: Coordinator

M&T Bank, as a Lender

By: /s/ Shafiul Alam

Name: Shafiul Alam

Title: Vice President

Nomura Corporate Funding Americas, LLC, as a Lender

By: /s/ Andrew Keith

Name: Andrew Keith

Title: Executive Director

Riyad Bank, Houston Agency, as a Lender

By: /s/ Michael Meiss

Name: Michael Meiss
Title: General Manager

By: /s/ Roxanne Crawford

Name: Roxanne Crawford
Title: Vice President, Administrative Officer

Standard Chartered Bank, as a Lender

By: /s/ James Beck

Name: James Beck

Title: Associate Director

The Bank of New York Mellon, as a Lender

By: /s/ William M. Feathers

Name: William M. Feathers

Title: Director

Westpac Banking Corporation, as a Lender

By: /s/ Stuart Brown

Name: Stuart Brown

Title: Tier Two Attorney

EXHIBIT A

[Amendments to Schedules to Credit Agreement]

[AM_ACTIVE 402177115_9]

TO CREDIT AGREEMENT

LENDERS AND COMMITMENTS

Lender	Commitment
Citibank N.A.	\$56,666,666.68
JPMorgan Chase Bank, N.A.	\$56,666,666.68
ABN Amro Capital USA LLC	\$43,333,333.33
Bank of Montreal	\$43,333,333.33
BNP Paribas	\$43,333,333.33
Credit Suisse AG, Cayman Islands Branch	\$43,333,333.33
Fifth Third Bank, National Association	\$43,333,333.33
Goldman Sachs Bank USA	\$43,333,333.33
Intesa Sanpaolo S.p.A.- New York Branch	\$43,333,333.33
Mizuho Bank, Ltd.	\$43,333,333.33
Morgan Stanley Bank, N.A.	\$43,333,333.33
MUFG Bank, Ltd.	\$43,333,333.33
PNC Bank, National Association	\$43,333,333.33
Sumitomo Mitsui Banking Corporation	\$43,333,333.33
TD Bank, N.A.	\$43,333,333.33
Truist Bank	\$43,333,333.33
U.S. Bank National Association	\$43,333,333.33
Citizens Bank, N.A.	\$30,000,000.00
ING Bank N.V., Dublin Branch	\$30,000,000.00
The Bank of Nova Scotia	\$30,000,000.00
The Huntington National Bank	\$30,000,000.00
Banco Bradesco S.A., New York Branch	\$16,666,666.67
M&T Bank	\$16,666,666.67
Nomura Corporate Funding Americas, LLC	\$16,666,666.67
Riyad Bank, Houston Agency	\$16,666,666.67
Standard Chartered Bank	\$16,666,666.67
The Bank of New York Mellon	\$16,666,666.67
Westpac Banking Corporation	\$16,666,666.67
Total	\$1,000,000,000

TO CREDIT AGREEMENT

ISSUERS AND L/C COMMITMENTS

Issuing Bank	Commitment
Citibank, N.A.	\$200,000,000
JPMorgan Chase Bank, N.A.	\$200,000,000

[AM_ACTIVE 402177115_9]

SUBSIDIARIES OF THE REGISTRANT
(As of December 31, 2020)

Name	State or Country of Organization
Howmet Aerospace Inc.	Delaware
Howmet Domestic LLC	Delaware
Howmet Securities LLC	Delaware
Howmet International Inc.	Delaware
Howmet Holdings Corporation	Delaware
Howmet Japan LTD	Japan
Howmet Castings & Servings, Inc.	Delaware
Howmet Corporation	Delaware
Howmet International Holding Company LLC	Delaware
Howmet Luxembourg S.à r.l.	Luxembourg
Howmet Holdings Limited	United Kingdom
Howmet-Köfém Kft	Hungary
Howmet Global Treasury Services S.a.r.l.	Luxembourg
Howmet Europe Financial Services LP	United Kingdom
Howmet Wheel System Europe LLC	Hungary
FR Acquisitions Corporation Europe Limited	United Kingdom
Howmet Holding France SAS	France
Howmet Europe Commercial SAS	France
Howmet Mexico Holdings LLC	Delaware
Cordant Technologies Holding Company	Delaware
Huck International Inc.	Delaware
FR Acquisition Corporation (US), Inc.	Delaware
JFB Firth Rixson Inc.	Delaware
RTI Fabrication and Distribution, Inc.	Ohio
RTI Martinsville, Inc.	Ohio
RTI - Claro, Inc.	Canada
Howmet International LLC	Delaware
Howmet Canada Company	Canada

The names of particular subsidiaries have been omitted because, considered in the aggregate as a single subsidiary, they would not constitute, as of the end of the year covered by this report, a “significant subsidiary” as that term is defined in Regulation S-X under the Securities Exchange Act of 1934.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-237705) and Form S-8 (Nos. 333-32516, 333-106411, 333-128445, 333-146330, 333-153369, 333-155668, 333-159123, 333-168428, 333-170801, 333-182899, 333-189882, 333-203275, 333-209772, 333-212246, 333-229727, 333-229914 and 333-232219) of Howmet Aerospace Inc. of our report dated February 16, 2021 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 16, 2021

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that each of the undersigned Directors of Howmet Aerospace Inc. (the "Company") hereby constitutes and appoints RAMON J. CERON, KENNETH J. GIACOBBE, AND W. PAUL MYRON, or any of them, his or her true and lawful attorneys-in-fact and agents, with full power of substitution, to do any and all acts and things and to execute any and all instruments that said attorneys-in-fact and agents, or any of them, may deem necessary or advisable or may be required:

(1) To enable the Company to comply with the Securities Exchange Act of 1934, as amended (the "1934 Act"), and any rules, regulations or requirements of the Securities and Exchange Commission (the "Commission") in respect thereof, in connection with the filing under the 1934 Act of the Company's Annual Report on Form 10-K for the year ended December 31, 2020 (the "2020 Annual Report"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to the 2020 Annual Report to be filed with the Commission and to any instruments or documents filed as part of or in connection with the 2020 Annual Report, including any amendments or supplements thereto;

(2) To enable the Company to comply with the Securities Act of 1933, as amended (the "1933 Act"), and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act during 2021 of the offer and sale or delivery of shares of common stock of the Company to be issued under the 2013 Howmet Aerospace Stock Incentive Plan, as Amended and Restated, as such plan may be amended and/or restated from time to time (including any amendments thereto or restatements thereof, the "2013 Plan"), the RTI International Metals, Inc. 2014 Stock and Incentive Plan, as amended (the "RTI 2014 Plan") and the RTI International Metals, Inc. 2004 Stock Plan, as amended (the "RTI 2004 Plan"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to any registration statement on Form S-8, or on such other form as may be appropriate, to be filed with the Commission in respect of said shares and the 2013 Plan, the RTI 2014 Plan or the RTI 2004 Plan, or any of them, to any and all pre-effective amendments, post-effective amendments and supplements to any such registration statement, and to any instruments or documents filed as part of or in connection with any such registration statement or any such amendments or supplements thereto; and

(3) To enable the Company to comply with the 1933 Act, and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act during 2021 of the offer and sale or delivery of shares of common stock of the Company to be issued under the Company's employee retirement savings plans (together with interests in such plans), including, without limitation, the Howmet Aerospace Hourly Retirement Savings Plan, the Howmet Aerospace Salaried Retirement Savings Plan, the Howmet Aerospace Niles Bargaining Retirement Savings Plan, and employee retirement or other savings plans sponsored by the Company or its subsidiaries or entities acquired by the Company from time to time (the "Plans"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to any registration statement on Form S-8, or on such other form as may be appropriate, to be filed with the Commission in respect of said shares and the Plans (or interests in such Plans), or any of them, to any and all pre-effective amendments, post-effective amendments and supplements to any such registration statement, and to any instruments or documents filed as part of or in connection with any such registration statement or any such amendments or supplements thereto; and

(4) To enable the Company to comply with the 1933 Act, and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act on an unallocated basis of the Company's securities, including debt securities, preferred stock, common stock and hybrid securities (including convertible or exchangeable securities); warrants to purchase debt or equity securities of the Company; stock purchase contracts and stock purchase units; and trust preferred securities of a trust or similar vehicle and related guarantees thereof by the Company, including specifically, but without limiting the generality of the foregoing, power and authority (i) to sign the name of each of the undersigned in the capacity of Director of the Company to one or more registration statements on Form S-3 or such other form as such attorneys-in-fact, or any of them, may deem necessary or desirable (including any registration statement filed pursuant to Rule 462 under the 1933 Act), and to any and all amendments and post-effective amendments and supplements to any such registration statements, and to any and all instruments or documents filed as part of or in connection with any such registration statements or amendments or supplements thereto, and (ii) to file the same with all exhibits thereto with the Commission; and

granting unto each of said attorneys-in-fact and agents full power and authority to do and perform each and every act and thing requisite and necessary to be done, as fully to all intents and purposes as the undersigned might or could do in person, and each

of the undersigned hereby ratifies and confirms all that said attorneys-in-fact and agents, or any of them, shall do or cause to be done by virtue hereof.

This power of attorney will be governed by and construed in accordance with the laws of the State of Delaware. The execution of this power of attorney is not intended to, and does not, revoke any prior powers of attorney. This power of attorney may be signed in any number of counterparts, each of which shall constitute an original and all of which, taken together, shall constitute one power of attorney.

IN WITNESS WHEREOF, each of the undersigned has subscribed these presents this 15th day of February 2021.

/s/ James F. Albaugh

James F. Albaugh

/s/ Amy E. Alving

Amy E. Alving

/s/ Joseph S. Cantie

Joseph S. Cantie

/s/ Robert F. Leduc

Robert F. Leduc

/s/ David J. Miller

David J. Miller

/s/ Jody G. Miller

Jody G. Miller

/s/ Tolga I. Oal

Tolga I. Oal

/s/ John C. Plant

John C. Plant

/s/ Nicole W. Piasecki

Nicole W. Piasecki

/s/ Ulrich R. Schmidt

Ulrich R. Schmidt

Certifications

I, John C. Plant, certify that:

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

Date: February 16, 2021

/s/ John C. Plant

John C. Plant

Executive Chairman and Co-Chief Executive Officer

I, Tolga Oal, certify that:

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

Date: February 16, 2021

/s/ Tolga Oal
Tolga Oal
Co-Chief Executive Officer

I, Ken Giacobbe, certify that:

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

Date: February 16, 2021

/s/ Ken Giacobbe

Ken Giacobbe

Executive Vice President and Chief Financial Officer

Certification
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code), each of the undersigned officers of Howmet Aerospace Inc., a Delaware corporation (the "Company"), does hereby certify that:

The Annual Report on Form 10-K for the period ended December 31, 2020 (the "Form 10-K") of the Company fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated:	February 16, 2021	<u>/s/ John C. Plant</u>
		John C. Plant
		Executive Chairman and Co-Chief Executive Officer

Dated:	February 16, 2021	<u>/s/ Tolga Oal</u>
		Tolga Oal
		Co-Chief Executive Officer

Dated:	February 16, 2021	<u>/s/ Ken Giacobbe</u>
		Ken Giacobbe
		Executive Vice President and Chief Financial Officer

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

The foregoing certification is being furnished to the Securities and Exchange Commission as an exhibit to the Form 10-K and shall not be considered filed as part of the Form 10-K.