

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
for the fiscal year ended December 31, 2022

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
for the transition period from _____ to _____
Commission file number: 1-13888



GRAFTECH INTERNATIONAL LTD.

(Exact name of registrant as specified in its charter)

Delaware 27-2496053

(State or other jurisdiction of (I.R.S. Employer
incorporation or organization) Identification Number)

982 Keynote Circle 44131

Brooklyn Heights, Ohio (Zip Code)

(Address of principal executive offices)

Registrant's telephone number, including area code: (216) 676-2000

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, \$0.01 par value per share	EAF	New York Stock Exchange

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

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ No ☐

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

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

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, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐

Smaller reporting company ☐ Emerging growth company ☐

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

Indicate by check mark whether the registrant 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. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of June 30, 2022 was \$1,360.3 million, based on the closing price of the registrant's common stock as reported on the New York Stock Exchange as of the last business day of the registrant's most recently completed second quarter.

On February 10, 2023, 256,613,554 shares of our common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement (the "Proxy Statement") to be filed with the Securities and Exchange Commission relative to the registrant's 2023 Annual Meeting of Stockholders are incorporated by reference into Part III of this Report.

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PART I

References herein to the "Company", "GrafTech", "we", "our", or "us" refer collectively to GrafTech International Ltd. and its subsidiaries.

Presentation of Financial, Market and Industry Data

We present our financial information on a consolidated basis. Unless otherwise noted, when we refer to dollars, we mean U.S. dollars.

Certain market and industry data included in this Annual Report on Form 10-K for the year ended December 31, 2022 (the "Annual Report" or "Report") has been obtained from third-party sources that we believe to be reliable. Market estimates are calculated by using independent industry publications, government publications and third-party forecasts in conjunction with our assumptions about our markets. We cannot guarantee the accuracy or completeness of this market and market share data and have not independently verified it. None of the sources has consented to the disclosure or use of data in this Annual Report. While we are not aware of any misstatements regarding any market, industry or similar data presented herein, such data involves risks and uncertainties and is subject to change based on various factors, including those discussed under the headings "Cautionary Note Regarding Forward-Looking Statements" and "Risk Factors" in this Annual Report.

Cautionary Note Regarding Forward-Looking Statements

This Report may contain forward-looking statements within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements reflect our current views with respect to, among other things, financial projections, plans and objectives of management for future operations, and future economic performance. Examples of forward-looking statements include, among others, statements we make regarding future estimated revenues and volume derived from our take-or-pay agreements with initial terms of three-to-five years ("LTA"), future pricing of short-term agreements and spot sales ("Non-LTA"), anticipated levels of capital expenditures, and guidance relating to earnings per share and adjusted EBITDA. You can identify these forward-looking statements by the use of forward-looking words such as "will," "may," "plan," "estimate," "project," "believe," "anticipate," "expect," "foresee," "intend," "should," "would," "could," "target," "goal," "continue to," "positioned to," "are confident," or the negative versions of those words or other comparable words. Any forward-looking statements contained in this Report are based upon our historical performance and on our current plans, estimates and expectations considering information currently available to us. The inclusion of this forward-looking information should not be regarded as a representation by us that the future plans, estimates, or expectations contemplated by us will be achieved. Our expectations and targets are not predictions of actual performance and historically our performance has deviated, often significantly, from our expectations and targets. These forward-looking statements are subject to various risks and uncertainties and assumptions relating to our operations, financial results, financial condition, business, prospects, growth strategy and liquidity. Accordingly, there are or will be important factors that could cause our actual results to differ materially from those indicated in these statements. We believe that these factors include, but are not limited to:

- our dependence on the global steel industry generally and the electric arc furnace steel industry in particular;
- the cyclical nature of our business and the selling prices of our products, which may decline in the future, may lead to periods of reduced profitability and net losses in the future;
- the sensitivity of our business and operating results to economic conditions, including any recession, and the possibility others may not be able to fulfill their obligations to us in a timely fashion or at all;
- the possibility that we may be unable to implement our business strategies in an effective manner;
- the possibility that global graphite electrode overcapacity may adversely affect graphite electrode prices;
- the competitiveness of the graphite electrode industry;
- our dependence on the supply of raw materials, including decant oil and petroleum needle coke, and disruptions in supply chains for these materials;
- our reliance on one facility in Monterrey, Mexico for the manufacturing of connecting pins;
- the availability and cost of electric power and natural gas, particularly in Europe;
- our manufacturing operations are subject to hazards;
- the legal, compliance, economic, social and political risks associated with our substantial operations in multiple countries;

- the possibility that fluctuation of foreign currency exchange rates could materially harm our financial results;
- the possibility that our results of operations could deteriorate if our manufacturing operations were substantially disrupted for an extended period, including as a result of equipment failure, climate change, regulatory issues, natural disasters, public health crises, such as the COVID-19 pandemic, political crises or other catastrophic events;
- the risks and uncertainties associated with litigation, arbitration, and like disputes, including disputes related to contractual commitments;
- our dependence on third parties for certain construction, maintenance, engineering, transportation, warehousing and logistics services;
- the possibility that we are subject to information technology systems failures, cybersecurity attacks, network disruptions and breaches of data security;
- the possibility that we are unable to recruit or retain key management and plant operating personnel or successfully negotiate with the representatives of our employees, including labor unions;
- the sensitivity of goodwill on our balance sheet to changes in the market;
- our dependence on protecting our intellectual property and the possibility that third parties may claim that our products or processes infringe their intellectual property rights;
- the impact of inflation and our ability to mitigate the effect on our costs;
- the impact of macroeconomic and geopolitical events, including developments arising from the COVID-19 pandemic and the conflict between Russia and Ukraine, on our business, results of operations, financial condition and cash flows, and the disruptions and inefficiencies in our supply chain that may occur as a result of such events;
- the possibility that our indebtedness could limit our financial and operating activities or that our cash flows may not be sufficient to service our indebtedness;
- recent increases in benchmark interest rates and the fact that borrowings under certain of our existing financing agreements subject us to interest rate risk;
- the possibility that disruptions in the capital and credit markets could adversely affect our results of operations, cash flows and financial condition, or those of our customers and suppliers;
- the possibility that restrictive covenants in our financing agreements could restrict or limit our operations;
- changes in, or more stringent enforcement of, health, safety and environmental regulations applicable to our manufacturing operations and facilities;
- the possibility that the market price of our common stock could be negatively affected by sales of substantial amounts of our common stock in the public markets, including by Brookfield Asset Management Inc. and its affiliates (together, "Brookfield");
- the fact that our stockholders have the right to engage or invest in the same or similar businesses as us; and
- the possibility that we may not pay cash dividends on our common stock in the future.

These factors should not be construed as exhaustive and should be read in conjunction with the risk factors and other cautionary statements that are included in this Report. The forward-looking statements made in this Report relate only to events as of the date on which the statements are made. Except as required by law, we do not undertake any obligation to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise.

If one or more of these or other risks or uncertainties materialize, or if our underlying assumptions prove to be incorrect, our actual results may vary materially from what we may have expressed or implied by these forward-looking statements. We caution that you should not place undue reliance on any of our forward-looking statements. You should specifically consider the factors identified in this Report that could cause actual results to differ before making an investment decision to purchase our common stock. Furthermore, new risks and uncertainties arise from time to time, and it is impossible for us to predict those events or how they may affect us.

For a more complete discussion of these and other factors, see "Risk Factors" in Part I of this Report and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Part II of this Report.

Item 1. Business

Introduction

GrafTech International Ltd., founded in 1886 and incorporated in Delaware, is a leading manufacturer of high-quality graphite electrode products essential to the production of electric arc furnace ("EAF") steel and other ferrous and non-ferrous metals. We believe that we have the most competitive portfolio of low-cost ultra-high power ("UHP") graphite electrode manufacturing facilities in the industry, including three of the highest capacity facilities in the world. We have graphite electrode manufacturing facilities in Calais, France, Pamplona, Spain, Monterrey, Mexico and St. Marys, Pennsylvania. We are the only large scale graphite electrode producer that is substantially vertically integrated into petroleum needle coke, our key raw material for graphite electrode manufacturing. This unique position provides us with competitive advantages in product quality and cost.

Our only reportable segment, Industrial Materials, is comprised of two major product categories: graphite electrodes and petroleum needle coke products. Our vision is to provide highly engineered graphite electrode products, services and solutions to EAF operators. Based on the high-quality of our graphite electrodes, reliability of our petroleum needle coke supply and our excellent customer service, we believe that we are viewed as a preferred supplier to the global EAF steel producer market.

Our production capacity is approximately 200 thousand metric tons ("MT")¹ through our primary manufacturing facilities in Calais, Pamplona and Monterrey.

Our principal executive offices are located at 982 Keynote Circle, Brooklyn Heights, Ohio 44131 and our telephone number is (216) 676-2000. Our website address is www.graftech.com. Information on, or accessible through, our website is not part of this Annual Report. We have included our website address only as an inactive textual reference and do not intend it to be an active link to our website.

Products and Raw Materials

Graphite Electrodes

Graphite electrodes are an industrial consumable product used primarily in EAF steel production, one of the two primary methods of steel production and the steelmaking technology used by all "mini-mills." Electrodes act as conductors of electricity in the furnace, generating sufficient heat to melt scrap metal, iron ore or other raw materials used to produce steel or other metals. We estimate that, on average, the cost of graphite electrodes represents less than 5% of the total production cost of steel in a typical EAF, but they are essential to EAF steel production. Graphite electrodes are currently the only known commercially available products that have the high levels of electrical conductivity and the capability to sustain the high levels of heat generated in EAF steel production. As a result, EAF steel manufacturers require a reliable supply of high-quality graphite electrodes. Graphite electrodes are also used in steel refining in ladle furnaces and in other processes, such as the production of titanium dioxide, stainless steel, silicon metals and other ferrous and non-ferrous metals.

With the growth of EAF steel production, graphite electrode production has become focused on the manufacturing of UHP electrodes, which have low electrical resistivity and strong durability to maximize efficient use of electricity in the EAF and minimize electrode consumption. The production of UHP electrodes requires an extensive proprietary manufacturing process and material science knowledge, including the use of higher quality needle coke blends. We manufacture graphite electrodes ranging in size up to 30 inches (750 millimeters) in diameter, over 11 feet (3,400 millimeters) in length, and weighing as much as 5,900 pounds (2.6 MT). We also manufacture corresponding sizes of graphite connecting pins, which are used by customers to connect and fasten graphite electrodes together in a column for use in an EAF. For the past several years, all of our connecting pin production was performed at our Monterrey, Mexico facility. However, we are pursuing alternatives with respect to the production and sourcing of connecting pins to reduce our reliance on one production location for this critical component. The total manufacturing time of a UHP graphite electrode and its associated connecting pin is, on average and except for special requests, approximately six months.

The size of the electrodes used in EAF steel production varies depending on the size of the furnace, the size of the furnace's electric transformer and the planned productivity of the furnace. In a typical furnace using alternating electric current and operating at a typical number of production cycles per day, three UHP graphite electrodes are fully consumed (requiring the

¹ Production capacity reflects expected maximum production volume during the period depending on product mix and expected maintenance outage. Actual production may vary.

addition of new electrodes), on average, every eight to ten operating hours. UHP graphite electrodes are consumed at a rate of approximately 1.7 kilograms per MT of steel production in EAF facilities.

The actual rate of consumption and addition of electrodes for a particular furnace depends primarily on the efficiency and productivity of the furnace. Therefore, demand for graphite electrodes is directly related to the amount and efficiency of EAF steel production. EAF steel production requires significant heat (as high as 5,000° F) to melt the raw materials, primarily scrap metal, in the furnace. Heat is generated as electricity (as much as 150,000 amps) passes through the electrodes and creates an electric arc between the electrodes and the raw materials.

Graphite Electrode Industry - Supply and Demand Trends

Supply trends

We estimate that as of the end of 2022, the graphite electrode industry globally (excluding China) had capacity to produce approximately 800 thousand MT of graphite electrodes. The industry is fairly consolidated, with the five largest global (excluding China) producers in the industry, GrafTech, Resonac Holdings Corporation (previously known as Showa Denko K.K.), Graphite India Limited, Tokai Carbon Co., Ltd. and HEG Limited, collectively, representing approximately 80% of global (excluding China) graphite electrode production capacity. Our graphite electrode production facilities, with production capacity of approximately 200 thousand MT (excluding St. Marys), represents one-quarter of the global (excluding China) graphite electrode production capacity.

We believe that no new graphite electrode production facilities have been built outside of China for approximately ten years. In recent years, additional production capacity has been generated by optimization and debottlenecking of existing assets and limited brownfield expansion.

Although graphite electrode production capacity within China exceeds that of the rest of the world combined, the production landscape in China is fragmented, and the quality of Chinese graphite electrodes varies greatly. We believe that a significant portion of the electrodes produced in China do not meet the quality standards needed to be utilized in the most demanding EAF applications. In addition, the imposition of customs duties and other tariffs in key EAF steelmaking regions, including the United States and the European Union ("EU"), have further limited the quantities of graphite electrodes exported from China.

We primarily compete in the UHP segment of the graphite electrode market. We estimate that, as of the end of 2022, global (excluding China) UHP graphite electrode capacity was approximately 680 thousand MT, or approximately 84% of the global (excluding China) graphite electrode capacity. After factoring in practical utilization rates (e.g., accounting for product mix and expected maintenance outage), this capacity is insufficient to meet the global (excluding China) demand for UHP graphite electrodes (see "Demand Trends" section below). As a result, exports from Chinese electrode producers that meet the technical performance standards required by EAF steel manufacturers typically provide the balance of UHP graphite electrode needs.

Demand trends

We estimate that global (excluding China) UHP graphite electrode demand was approximately 680 thousand MT in 2022. UHP graphite electrodes are primarily used in the EAF steelmaking process, and long-term global growth of EAF steel production has driven increased demand for graphite electrodes. EAF steelmaking has historically been the fastest-growing segment of the global steel market. According to the World Steel Association ("WSA"), global (excluding China) EAF steel production grew at a 4% compound annual growth rate from 2015 to 2021, the most recent year for which WSA has published such figures. This compares to a 2% compound annual growth rate for overall global (excluding China) steel production during this same period. As a result, the EAF method of steelmaking accounted for 49% of the global (excluding China) steel production in 2021, compared to 44% in 2015, with share growth in nearly every region.

EAF steelmaking is more energy efficient and is advantaged in terms of its environmental footprint, compared to steel produced through the blast oxygen furnace ("BOF") steelmaking model. According to the Steel Manufacturers Association ("SMA"), EAF steelmaking produces 75% fewer carbon dioxide emissions compared to BOF steelmaking. Further, SMA notes that the EAF process is a sustainable model for recycling scrap-based raw materials into new steel, which is 100% (and infinitely) recyclable at the end of its useful life. In addition to these advantages, EAF steel producers benefit from their flexibility in sourcing iron units, being able to make steel from either scrap or alternative sources of iron, such as direct reduced iron and hot briquetted iron, both made directly from iron ore.

Reflecting these and other competitive advantages, we believe EAF steel production will continue to grow at a faster rate than BOF steel production. Based on industry announcements of planned incremental EAF capacity additions, we estimate this could result in global (excluding China) EAF production capacity increasing at approximately 3% compound annual growth rate from 2022 to 2030. We expect this to result in a similar increase in demand for UHP graphite electrodes over this same period to support EAF capacity expansion, before factoring in further potential UHP graphite electrode demand from production increases at existing EAF steel plants to support overall expected growth in steel demand. Combined, we believe these factors could result in global (excluding China) UHP graphite electrode demand growing at approximately 3% to 4% compound annual growth rate through 2030.

Petroleum Needle Coke

Petroleum needle coke, a crystalline form of carbon derived from decant oil, is the key raw material we use in the production of graphite electrodes. It is also a primary raw material utilized in the production of synthetic graphite used in anodes for lithium-ion batteries that power electric vehicles ("EV").

Petroleum needle coke is produced through a manufacturing process very similar to a refinery. The production process converts decant oil, a byproduct of the gasoline refining process, into petroleum needle coke. Pitch needle coke, used principally by Chinese graphite electrode manufacturers, is made from coal tar pitch, a byproduct of coking metallurgical coal used in BOF steelmaking. For the production of our graphite electrodes, we prefer petroleum needle coke because of the meaningfully shorter bake and graphitizing time required, compared to graphite electrodes produced using pitch needle coke.

We are substantially vertically integrated into petroleum needle coke through our Seadrift facility ("Seadrift"), located in Port Lavaca, Texas, which provides the majority of our petroleum needle coke requirements used to produce our graphite electrodes and insulates us from rapid changes in the petroleum needle coke market. In addition, we believe the quality of Seadrift's petroleum needle coke is superior for graphite electrode production compared to most of the petroleum needle coke available to our peers on the open market, allowing us to produce high-quality electrodes in a cost-efficient manner. Seadrift sources all its decant oil requirements from reputable U.S.-based suppliers. Seadrift has developed a well-diversified pool of suppliers, which we believe is sufficient to meet our needs.

Graphite electrode producers combine petroleum needle coke and/or pitch needle coke with binders and other ingredients to form graphite electrodes. Petroleum needle coke and pitch needle coke, relative to other varieties of coke, are distinguished by their needle-like structure and their quality, which is measured by the presence of impurities, principally sulfur, nitrogen and ash. Petroleum needle coke and pitch needle coke are typically low in these impurities. Additionally, the needle-like structure of petroleum and pitch needle coke creates expansion along the length of the electrode, rather than the width, which reduces the likelihood of fractures.

Petroleum Needle Coke Industry - Supply and Demand Trends

Supply Trends

We estimate that, as of the end of 2022, the petroleum needle coke industry globally (excluding China) had capacity to produce approximately 750 thousand MT of petroleum needle coke. The global (excluding China) industry is highly concentrated as it is comprised of four producers, Phillips 66, GrafTech (via Seadrift), Petrocokes Japan Ltd. (a subsidiary of Sumitomo Corporation) and ENEOS Holdings, Inc. Our Seadrift facility, with production capacity of approximately 140 thousand MT, represents nearly one-fifth of the global (excluding China) petroleum needle coke production capacity.

Petroleum needle coke production capacity outside of China has remained relatively flat for many years due to the capital intensity, technical know-how and long permitting lead times required to build greenfield needle coke production facilities. Furthermore, we believe that brownfield expansion opportunities are generally limited as petroleum needle coke manufacturing is a continuous process with significant costs associated with shutting down and restarting facilities for maintenance or capital investment.

Chinese petroleum needle coke production capacity is expected to grow significantly in the coming years, with a primary focus on serving the EV market, as China is currently the largest producer of EV batteries. Although this may provide sufficient capacity to meet global petroleum needle coke needs for the next several years, as demand from emerging non-Chinese EV battery producers continues to increase, we believe that regional supply-demand imbalances will occur, particularly in North America and Europe.

Demand Trends

We estimate that global (excluding China) needle coke demand for use in UHP graphite electrode production was approximately 584 thousand MT in 2022, with the majority being petroleum needle coke. With demand for UHP graphite electrodes expected to increase at approximately 3% to 4% or more compound annual growth rate from 2022 to 2030 (see “Graphite Electrode” section above), we expect this to result in a similar increase in demand for needle coke used in graphite electrode production.

While the vast majority of petroleum needle coke produced globally (excluding China) is currently used in the production of graphite electrodes, its use in lithium-ion batteries for the EV market is expected to grow with the increased production of these vehicles. Most EVs rely on lithium-ion batteries as their key performance component, with graphite being the key material used for the carbon anode portion of the batteries. Although both natural and synthetic graphite are used in anodes for lithium-ion batteries, EV manufacturers prefer synthetic graphite, which is produced using needle coke, because of its advantages in terms of charging rate and capacity, providing batteries with longer driving ranges and longevity.

Based on the International Energy Agency’s estimates for growth in EV sales and battery pack sizes, we estimate this could result in global needle coke demand for use in EV applications increasing at a 20% or more compound annual growth rate from 2022 to 2030. While synthetic graphite can be produced from either petroleum needle coke or pitch needle coke, petroleum needle coke has superior characteristics for EV battery applications, as it does with graphite electrode applications. As a result, demand growth for petroleum needle coke for use in the EV market is expected to be higher than that of overall needle coke demand growth. As noted above, with North American and European EV manufacturers increasing focus on domestic sourcing of battery material needs, we believe that regional supply-demand imbalances will occur for petroleum needle coke in the coming years.

Contracts and Customers

Our customers include major steel producers and other ferrous and non-ferrous metal producers in Europe, the Middle East and Africa (collectively, “EMEA”), the Americas, and Asia-Pacific (“APAC”), which sell their products primarily into the automotive, construction, appliance, machinery, equipment and transportation industries.

We sell our products under short-term purchase agreements, LTAs and spot purchase orders.

Our short-term agreements are either annual, semi-annual or quarterly. Because of the long production time, the book building process is largely concentrated in the fourth quarter of each year for the annual short-term agreements as well as for the semi-annual agreements related to the first half of the upcoming year. Spot purchase orders are entered into with deliveries usually starting three or more months later. Pricing has historically been cyclical, reflecting the demand trends of the global EAF steelmaking industry and supply of graphite electrodes. The price of our short-term agreements is determined through contract negotiations with our customers and is influenced by the then-prevailing price on spot purchase orders as well as the anticipated supply-demand situation at the time of the planned deliveries. There is a lag between the time we negotiate prices for our short-term agreements and when our electrodes are delivered and recognized in revenue.

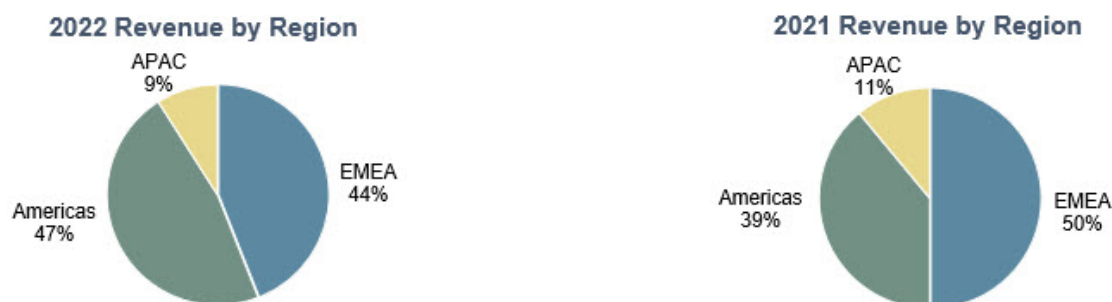
Our LTAs were entered into between the end of 2017 and early 2019. As graphite electrodes are an essential consumable in the EAF steel production process, the LTAs provided certainty of supply of reliable, high-quality graphite electrodes in an at-times volatile market. These LTAs have fixed prices. Within the contract, our customers are contractually bound to purchase the specified volume of product at the price under the contract. Sales from our LTAs represented 68%, 77% and 87% of our net sales in 2022, 2021 and 2020, respectively.

As our LTAs are nearing the end of their terms, our mix of business has begun to shift towards short-term purchase agreements and spot purchase orders. We will continue to offer multi-year agreements as an important part of our commercialization strategy and value proposition. Our substantial vertical integration into petroleum needle coke supports our ability to offer contracts with varying durations, providing our customers with flexibility and surety of supply. However, we do not anticipate that multi-year agreements will make up the majority of our portfolio moving forward.

2022 Revenue and production by region

Approximately 93% of our graphite electrodes were purchased by EAF steel producers in 2022. The remaining portion is primarily used in various other ferrous and non-ferrous melting applications, fused materials, chemical processing, and alloy metals. We sell our products in every major geographic region globally. Sales of our products to buyers outside the United States accounted for approximately 73% of net sales in 2022 compared to 79% in both 2021 and 2020. Overall, in 2022, we generated 91% of our net sales from EMEA and the Americas.

The charts below show our revenue by region for 2022 and 2021:



Sales and customer service

We differentiate and sell the value of our graphite electrodes primarily based on price, product quality and performance, delivery reliability and customer technical service.

We have a large customer technical service organization, with supporting application engineering and scientific groups and approximately 40 engineers and specialists around the world serving in this area. We believe that we are one of the industry leaders in providing value-added technical services to our customers.

Our direct sales force currently operates from 11 sales offices located around the world. We sell our graphite electrodes primarily through our direct sales force, independent sales representatives, and distributors, all of whom are trained and experienced with our products.

We have customer technical service personnel based around the world to assist customers to maximize their production and minimize their costs. A portion of our engineers and technicians provide technical service and advice to key steel and other metals customers. These services relate to furnace applications and operation, as well as furnace upgrades to reduce energy consumption, improve raw material costs and increase output.

We believe we have a competitive advantage in offering customers ArchiTech Furnace Productivity System ("ArchiTech"), which is an advanced support and technical service platform in the graphite electrode industry. ArchiTech, which has been installed in customer furnaces worldwide, enables our engineers to work with our customers seamlessly to maximize the performance of their furnaces and provide real-time diagnostics and troubleshooting. The arc furnace monitoring system team is continuously listening to our customers' needs and develops new functionalities for the ArchiTech environment.

Distribution

We deploy various demand management and inventory management techniques to seek to ensure that we can meet our customers' delivery requirements while still maximizing the utilization of our production capacity. We can experience significant variation in our customers' delivery requirements as their specific needs vary and change throughout the year. We generally seek to maintain appropriate inventory levels, taking into account these factors as well as the significant differences in manufacturing cycle times for graphite electrode products and our customers' products.

Finished products are usually stored at our manufacturing facilities. Limited quantities of some finished products are also stored at local warehouses around the world to meet customer needs.

Research and development

We have over 135 years of experience in the research and development ("R&D") of graphite- and carbon-based solutions. By focusing our management's attention and R&D spending on the graphite electrode business, we have been able to improve the quality of our graphite electrodes, maintain our position as an industry leader and improve our relationships with strategic customers. Our focus on improving the quality of petroleum needle coke through R&D has led to our petroleum needle coke production at Seadrift being best-in-class for use in the manufacturing of highly durable UHP electrodes. Simultaneously, the R&D team helps to evaluate technology in adjacent markets where GrafTech may have technological advantages. We believe that the above strengths and capabilities provide us with a competitive advantage.

Intellectual property

We believe that our intellectual property, consisting primarily of patents and proprietary know-how, provides us with competitive advantages and is important to our growth opportunities. Our intellectual property portfolio is extensive, with over 127 U.S. and foreign patents and pending patent applications.

We own, have the right to use or have obtained licenses for various trade names and trademarks used in our businesses. For example, the UCAR trademark is owned by Union Carbide Corporation ("Union Carbide") (which was acquired by Dow Chemical Company) and is licensed to us on a worldwide, exclusive and royalty-free basis until January 2035. This particular license automatically renews for successive 10-year periods. It permits non-renewal by Union Carbide at the end of any renewal period upon five years' notice of non-renewal.

We rely on patent, trademark, copyright and trade secret laws, as well as appropriate agreements to protect our intellectual property. Among other things, we seek to protect our proprietary know-how and information by requiring employees, consultants, strategic partners and others who have access to such proprietary information and know-how to enter into confidentiality or restricted use agreements.

Insurance

We maintain insurance against civil liabilities relating to personal injuries to third parties, for loss of or damage to property, for business interruptions and for certain environmental matters, that provides coverage, subject to the applicable coverage limits, deductibles and retentions, and exclusions, that we believe is appropriate upon terms and conditions and for premiums that we consider fair and reasonable in the circumstances. There can be no assurance that we will not incur losses beyond the limits of or outside the coverage of our insurance.

Regulatory Matters

As a company with global operations, we are subject to the laws and regulations of the United States and the multiple foreign jurisdictions in which we operate or conduct business as well as the rules, reporting obligations and interpretations of all such requirements and obligations by various governing bodies, which may differ among jurisdictions. These include federal, state, local and foreign environmental laws and regulations, increasingly complex and changing laws and regulations enacted to protect business and personal data in the United States and other jurisdictions, including the EU's General Data Protection Regulation ("GDPR"), anti-corruption laws, import/export controls, anti-competition laws, U.S. securities laws and a variety of regulations including work-related and community safety laws. We believe we operate in compliance in all material respects with applicable laws and regulations, and maintaining compliance with them is not expected to materially affect our capital expenditures, earnings and competitive position. Estimates of future costs for compliance with U.S. and foreign environmental protection laws and regulations, and for environmental liabilities, are necessarily imprecise due to numerous uncertainties, including the impact of potential new laws and regulations, the availability and application of new and diverse technologies, the extent of insurance coverage, the potential discovery of contaminated properties, or the identification of new hazardous substance disposal sites at which we may be a potentially responsible party ("PRP") and, in the case of sites subject to the Comprehensive Environmental Response, Compensation and Liability Act and similar state and foreign laws, the final determination of remedial requirements and the ultimate allocation of costs among the PRPs. Subject to the inherent imprecision in estimating such future costs, but taking into consideration our experience to date regarding environmental matters of a similar nature and facts currently known, we estimate that our costs and capital expenditures (in each case, before adjustment for inflation) for environmental protection regulatory compliance programs and for remedial response actions will not be material over the next several years. Furthermore, we establish accruals for environmental liabilities when it is probable that a liability has been or will be incurred, and the amount of the liability can be reasonably estimated. We adjust the accrual as new remedial actions or other commitments are made, as well as when new information becomes available that changes the prior estimates previously made and we believe our existing accruals are reasonable.

Human Capital Resources

Employment

As of December 31, 2022, we had 1,347 employees (excluding contractors), 815 of which were hourly employees. A total of 519 employees were in Mexico, 455 were in Europe, 329 were in the United States, 37 were in Brazil, five were in the Asia Pacific region and two were in South Africa.

As of December 31, 2022, approximately 524 employees, or 39% of our worldwide employees, were covered by collective bargaining or similar agreements that expire, or are subject to renegotiation, at various times through December 31, 2023. We believe that, in general, our relationships with our employees' unions are good and that we will be able to renew or extend our collective bargaining or similar agreements on reasonable terms as they expire. We have not had any material work stoppages or strikes initiated by our employees during the past year.

Health and Safety

The health and safety of our global team is a top priority and is a core value of the Company. Our comprehensive programs strive to achieve zero injuries and no harm done. Our total recordable incident rate in 2022 was 0.94 per 200,000 work hours, compared to 0.49 per 200,000 work hours in 2021. Our global Health, Safety and Environmental Protection ("HS&EP") policy applies to all employees and governs our actions and decisions every day. We also have a Code of Conduct and Ethics for Suppliers and Contractors that includes HS&EP guidelines required for doing business with GrafTech. GrafTech's focus on HS&EP is a top priority for all employees. We have built risk recognition into our HS&EP programs. From pre-job planning, safety walks and inspections, planned job observations, or training employees on health and safety best practices, we strive to identify and mitigate risks. In the spirit of continuous improvement, regular inspections, internal reviews and corporate audits are conducted to foster compliance with our high standards.

Diversity and Inclusion

As a global enterprise, we believe diversity is foundational to maintaining a competitive workforce in our industry. Unique perspectives promote business innovation and excellence. Therefore, we seek out individuals with different backgrounds and experiences, and we aim to foster an inclusive community that celebrates these differences. Our affirmative action plans, recruitment policies, and hiring practices support our diversity and inclusion objectives and we assign responsibilities for upholding policies, procedures, and practices for diverse and inclusive hiring and talent management at both the corporate and site levels. GrafTech affirms its position as an Equal Opportunity Employer and is committed to recruiting, employing, and promoting qualified veterans and disabled individuals, and we aim to ensure our people have equal opportunities related to job promotions, compensation and benefits, and personal development.

Our global footprint lends itself to organic diversity, and our employee base has varied educational backgrounds and life experiences. However, we strive to go beyond this organic diversity and be more intentional through our talent acquisition, retention, and development practices. As of December 31, 2022, 33% of our senior leadership team and 27% of our Board members were female.

Compensation and Total Rewards

We provide competitive compensation programs to help meet the needs of our employees. Our programs are designed to support the profitable growth of our business; attract, reward, and retain the talent we need to succeed; support the health and overall well-being of our employees; and reinforce a performance-based culture.

In addition to base compensation, we offer individual and group-based performance bonuses. Benefits packages include medical, dental, prescription, vision, group life insurance, short- and long-term disability, paid vacation and holidays, and tuition reimbursement. The tuition reimbursement program, in particular, helps employees who want to continue their education or seek specialized job training, and illustrates our commitment to continued learning and focus on professional development.

Employee Retention

We seek to retain the best people by providing them with opportunities to grow, build skills and be appreciated for their contributions as they work to serve our customers. Our employees are critical to our success and are the reason we are able to execute at a high level. We believe a continuous focus on employee engagement will help us provide high quality products to our customers. In October 2022, we completed our first global employee engagement survey that requested feedback from our employees on important issues on a variety of topics, including safety, pay, communication, and training. The majority of our employees participated in the survey. The responses to the survey helped us identify opportunities to further engage with our employees.

Employee Training and Development

Through our training programs, we help employees grow, innovate, and impact our business and industry. We have defined detailed profiles for each role at GrafTech that identify job-specific competencies to measure performance. Our

performance management system allows employees to work with their supervisor or the human resources department to create a GrafTech career and growth path using these profiles and to direct them to job-specific professional development training and continuing education opportunities.

We conduct mid-year performance reviews, as well as annual reviews, for all employees to assess both job competencies and GrafTech's five core competencies of health, safety, and environment; customer focus; drive for results; ethics and values; and peer relationships. In annual performance reviews specifically, we discuss progress towards personal career goals, refine career aspirations, and connect employees with specific pathways to achievement.

Available Information

We make available, free of charge, on or through our website, our annual reports on Form 10-K, our quarterly reports on Form 10-Q, our 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 and Exchange Act of 1934 (the "Exchange Act") as soon as reasonably practicable after we electronically file them with, or furnish them to, the U.S. Securities and Exchange Commission ("SEC"). We maintain our website at <http://www.graftech.com>. Information on, or accessible through, our website is not part of this Annual Report. We have included our website address only as an interactive textual reference and do not intend it to be an active link to our website.

Item 1A. Risk Factors

Our business, financial condition, results of operations, and cash flow can be affected by a number of factors, whether currently known or unknown, including but not limited to those described below. You should carefully read all of the information included in this Report and carefully consider, among other matters, the following risk factors, as well as any discussed under Part II, Item 7., "Management's Discussion and Analysis of Financial Condition and Results of Operations." Although the risks are organized by headings, and each risk is discussed separately, many are interrelated. Moreover, the risks below are not the only risks we face and additional risks not currently known to us or that we presently deem immaterial may emerge or become material at any time. The occurrence of any of the following risks could materially and adversely affect our business, financial condition, results of operations, and cash flow, in which case, the market price of our securities could decline. You should not interpret the disclosure of any risk factor to imply that the risk has not already materialized.

Risks related to our business and industry

We are dependent on the global steel industry generally and the EAF steel industry in particular, which historically have been highly cyclical, and a downturn in these industries may materially adversely affect our business.

We sell our products primarily to the EAF steel production industry. The EAF steel production industry historically has been highly cyclical and is affected significantly by general economic conditions. As a result, we have experienced periods of significant net losses.

Significant customers for the steel industry include companies in the automotive, construction, appliance, machinery, equipment and transportation industries, which are industries that were negatively affected by the general economic downturn and the deterioration in financial markets, including severely restricted liquidity and credit availability, in the recent past.

Our customers, including major steel producers, have in the past experienced and may again experience downturns or financial distress that could adversely impact our ability to collect our accounts receivable on a timely basis or at all.

Pricing for graphite electrodes has historically been cyclical and the price of graphite electrodes may decline in the future.

Pricing for graphite electrodes has historically been cyclical, reflecting the demand trends of the global EAF steelmaking industry and the supply of graphite electrodes. In addition, as petroleum needle coke reflects a significant percentage of the raw material cost of graphite electrodes, graphite electrodes have historically been priced at a spread to petroleum needle coke, which in the past has increased in tight demand markets. Between 2016 and 2022, our weighted-average realized price of graphite electrodes for non-LTAs was approximately \$6,500 per MT (on an inflation-adjusted basis using constant 2022 dollars).

During the last demand trough in 2016, our weighted-average realized price of graphite electrodes for non-LTAs fell to approximately \$3,000 per MT, on an inflation-adjusted basis using constant 2022 dollars. Following the significant rationalization of graphite electrode production globally, the resumption of growth in EAF steel production, falling scrap prices, reductions in Chinese steel exports and constrained supply of needle coke, graphite electrode prices reached record highs in 2018.

Prices as of December 31, 2022 have receded from the highs of 2018, and the price of graphite electrodes may decline in the future. Supply and demand normalized in 2019, tipping towards overcapacity that exerts downward pressure on graphite electrode prices, and spot prices fell 25% during 2019. Spot prices decreased further in 2020, bottoming out in the spring of 2021 before beginning to increase. Despite this increase, spot prices as of December 31, 2022 were below our weighted-average contract price for LTA contracted volume. Our business, financial condition and operating results could be materially and adversely affected to the extent prices for graphite electrodes decline in the future.

Global graphite electrode overcapacity has adversely affected graphite electrode prices in the past, and may adversely affect them again, which could negatively impact our sales, margins and profitability.

Overcapacity in the graphite electrode industry has adversely affected pricing in the past and may do so again. An increase in global graphite electrode production capacity that outpaces an increase in demand for graphite electrodes could adversely affect the price of graphite electrodes. We believe worldwide graphite electrode supply will increase in 2023 as a result of Chinese capacity additions. While growth in the Chinese EAF steel market may support some of these capacity additions, the additional graphite electrode capacity may exceed local Chinese requirements. Excess production capacity may result in manufacturers producing and exporting electrodes at prices that are lower than prevailing domestic prices, and sometimes at or below their cost of production. Excessive imports into the Americas and EMEA, which markets collectively made up 91% of our net sales for the year ended December 31, 2022, can also exert downward pressure on graphite electrode prices, which negatively affects our sales, margins and profitability.

The graphite industry is highly competitive. Our market share, net sales or net income could decline due to vigorous price and other competition.

Competition in the graphite industry (other than, generally, with respect to new products) is based primarily on price, product differentiation and quality, delivery reliability and customer service. Graphite electrodes, in particular, are subject to rigorous price competition. Competition with respect to new products is, and is expected to continue to be, based primarily on price, performance and cost effectiveness, customer service and product innovation. Competition could prevent implementation of price increases, require price reductions or require increased spending on R&D, marketing and sales that could adversely affect us. In such a competitive market, changes in market conditions, including customer demand and technological development, as well as increased exports by Chinese EAF steel suppliers could adversely affect our competitiveness, sales and/or profitability.

We are dependent on the supply of petroleum needle coke. Our results of operations could deteriorate if disruptions in the supply of petroleum needle coke occur for an extended period.

Petroleum needle coke is our key raw material used in the production of graphite electrodes. Seadrift currently provides the majority of our current petroleum needle coke requirements, and we purchase the remainder from external sources, as necessary. As a result, a disruption in Seadrift's production of petroleum needle coke could adversely affect our results of operations if we are forced to purchase petroleum needle coke from external sources at a higher cost. If a market shortage of petroleum needle coke occurs, we may be unable to acquire sufficient amounts of petroleum needle coke from external sources to support our needle coke requirements currently used in the production of graphite electrodes for sale in the spot market. As a result, a disruption in the supply of petroleum needle coke could have a material adverse effect on our business, financial condition, results of operations and cash flows.

We are relying on one facility in Monterrey, Mexico for the manufacturing of connecting pins, a necessary component of our graphite electrodes. Our results of operations could deteriorate if this facility would become unable to provide us with connecting pins and required volume.

We manufacture graphite connecting pins, which are used by customers to connect and fasten graphite electrodes together in a column for use in an EAF. For the past several years, all of our connecting pin production was performed at our Monterrey, Mexico facility. As a result, we are currently reliant on one production location for this critical component.

On September 15, 2022, inspectors from the State Attorney's Office for the Environment of the State of Nuevo León, Mexico visited GrafTech Mexico, S.A. de C.V.'s ("GrafTech Mexico," a subsidiary of the Company) graphite electrode manufacturing facility located in Monterrey, Mexico to inspect GrafTech Mexico's facility and certain of the facility's environmental and operating permits. At the conclusion of the inspection, the inspectors issued a Record of Inspection providing for the results of the inspection, their observations, and the imposition of a temporary suspension of GrafTech Mexico's facilities within seven days. As a result of the temporary suspension of our operations, our production volume was adversely affected in 2022 and our sales volume will be adversely affected in the first half of 2023.

Although the temporary suspension of operations was conditionally lifted on November 17, 2022, subject to the completion of certain agreed-upon activities, including the submission of an environmental impact study with respect to the facility's operations, we are pursuing alternatives with respect to the production and sourcing of connecting pins to reduce our reliance on one production location. If our Monterrey, Mexico facility were to become unable to continue to provide us with connecting pins in required volumes, at suitable quality levels, or in a cost-effective manner, we would be required to identify and obtain replacement manufacturing sources. There is no assurance that we would be able to obtain acceptable alternative sources on a cost-effective or timely basis, or at all. An extended interruption in the supply of connecting pins would result in the loss of sales, which could have a material adverse effect on our business, financial condition or operating results.

We are dependent on supplies of raw materials (in addition to petroleum needle coke). Our results of operations could deteriorate if those supplies increase in cost or are substantially disrupted for an extended period.

We purchase raw materials from a variety of sources. In many cases, we purchase them under short-term contracts or on the spot market, in each case at fluctuating prices. The availability and price of raw materials may be subject to curtailment or change due to:

- limitations, which may be imposed under new legislation or regulation;
- suppliers' allocations to meet demand from other purchasers during periods of shortage;
- interruptions or terminations in production by suppliers; and
- market and other events and conditions.

Petroleum and coal products, including decant oil and coal tar pitch, which are our principal raw materials other than petroleum needle coke, and energy, have been subject to significant price fluctuations. For example, Seadrift may not always be able to obtain an adequate quantity of suitable low-sulfur decant oil for the manufacture of petroleum needle coke, and capital may not be available to install equipment to allow use of higher sulfur decant oil (which is more readily available in the United States) if supplies of low-sulfur decant oil become more limited in the future. Further, low-sulfur emissions regulations adopted in 2020 by the International Maritime Organization have at times negatively affected pricing for low-sulfur decant oil and they may again in the future cause similar adverse impacts.

We have in the past entered into, and may continue in the future to enter into, derivative contracts and short-duration fixed-rate purchase contracts to effectively fix a portion of our exposure to certain products. These hedging strategies may not be available or successful in eliminating our exposure. A substantial increase in raw material prices that cannot be mitigated or passed on to customers or a continued interruption in supply, particularly in the supply of decant oil, would have a material adverse effect on our business, financial condition, results of operations or cash flows. These hedges may be insufficient or ineffective in protecting against the impact of these fluctuations.

Our business and our customers are subject to market changes in the availability and cost of electricity and natural gas that could adversely affect our business.

We are in an energy intensive industry that requires both natural gas and electricity in our manufacturing process. We primarily rely on third parties for the supply of our energy resources consumed in the manufacture of our products. The prices for and availability of third-party electricity and natural gas are subject to volatile market conditions, particularly in Europe. These market conditions often are affected by factors beyond our control and we may be unable to raise the price of our products to mitigate the effects of increased energy costs in our manufacturing processes. In addition, our customers are subject to these same market conditions and some, particularly those located in Europe, have chosen to idle their operations due to the costs of electricity in Europe. The idling of operations by our customers will decrease the demand for our graphite electrodes and could materially adversely affect our business, results of operations, financial condition and cash flows.

Our operations are subject to hazards which could result in significant liability to us.

Our operations are subject to hazards associated with manufacturing and the related use, storage, transportation and disposal of raw materials, products and wastes. These hazards include explosions, fires, severe weather (including but not limited to hurricanes or other adverse weather that may be increasing as a result of climate change) and natural disasters, industrial accidents, mechanical failures, discharges or releases of toxic or hazardous substances or gases, transportation interruptions, human error and terrorist activities. These hazards can cause personal injury and loss of life, severe damage to or destruction of property and equipment as well as environmental damage, and may result in suspension of operations and the imposition of civil and criminal liabilities, including penalties and damage awards. While we believe our insurance policies are in accordance with customary industry practices, such insurance may not cover all risks associated with the hazards of our

business and is subject to limitations, including deductibles and maximum liabilities covered. We may incur losses beyond the limits, or outside the coverage, of our insurance policies. In the future, we may not be able to obtain coverage at current levels, and our premiums may increase significantly on coverage that we maintain. Costs associated with unanticipated events in excess of our insurance coverage could have a material adverse effect on our business, competitive or financial position or our ongoing results of operations.

We are subject to a variety of legal, economic, social and political risks associated with our substantial operations in multiple countries, which could have a material adverse effect on our financial and business operations.

A substantial majority of our net sales are derived from sales outside the United States, and a majority of our operations and our property, plant and equipment and other long-lived assets are located outside the United States. As a result, we are subject to risks associated with operating in multiple countries, including:

- currency fluctuations and devaluations in currency exchange rates, including impacts of transactions in various currencies, translation of various currencies into dollars for U.S. reporting and financial covenant compliance purposes, and impacts on results of operations due to the fact that the costs of our non-U.S. operations are primarily incurred in local currencies while their products are primarily sold in dollars and euros;
- imposition of or increase in customs duties and other tariffs;
- imposition of or increases in currency exchange controls, including imposition of or increases in limitations on conversion of various currencies into dollars, euros, or other currencies, making of intercompany loans by subsidiaries or remittance of dividends, interest or principal payments or other payments by subsidiaries;
- imposition of or increases in revenue, income or earnings taxes and withholding and other taxes on remittances and other payments by subsidiaries;
- inflation, deflation and stagflation in any country in which we have a manufacturing facility;
- imposition of or increases in investment or trade restrictions by the United States or other jurisdictions or trade sanctions adopted by the United States;
- compliance with laws on anti-corruption, export controls, customs, sanctions and other laws governing our operations, including in challenging jurisdictions;
- inability to determine or satisfy legal requirements, effectively enforce contract or legal rights, including our rights under our LTAs and intellectual property rights, and obtain complete financial or other information under local legal, judicial, regulatory, disclosure and other systems; and
- nationalization or expropriation of assets, and other risks that could result from a change in government or government policy, or from other political, social or economic instability.

Any of these risks could have a material adverse effect on our business, financial condition, results of operations or cash flows, and we may not be able to mitigate these effects.

Our results of operations could deteriorate if our manufacturing operations were substantially disrupted for an extended period for any reason, including equipment failure, legal proceedings, climate change, natural disasters, public health crises, political crises or other catastrophic events.

Our manufacturing operations are subject to disruption due to equipment failure, extreme weather conditions, floods, hurricanes and tropical storms and similar events, major industrial accidents, including fires or explosions, cybersecurity attacks, strikes and lockouts, adoption of new laws or regulations, changes in interpretations of existing laws or regulations or changes in governmental enforcement policies, civil disruption, riots, terrorist attacks, war, public health crises, such as the COVID-19 pandemic, and other events. These events may also impact the operations of one or more of our suppliers. For example, the potential physical impacts of climate change on our operations are uncertain and will likely be particular to the geographic circumstances. These physical impacts may include changes in rainfall and storm patterns, shortages of water or other natural resources, changing sea levels, and changing global average temperatures. For instance, our Seadrift facility in Texas and our Calais facility in France are located in geographic areas less than 50 feet above sea level. As a result, any future rising sea levels could have an adverse impact on their operations and on their suppliers. In the event manufacturing operations are substantially disrupted at one of our primary operating facilities, such as the recent temporary suspension of our operations located in Monterrey, Mexico, we may not have the ability to increase production at our remaining operating facilities in order

to compensate without considerable time and expense. To the extent any of these events occur, our business, financial condition and operating results could be materially and adversely affected.

Plant operational improvements may be delayed or may not achieve the expected benefits.

Our ability to complete future operational improvements, including the reactivation of the remaining production activities in St. Marys (forming, extrusion and impregnation), may be delayed, interrupted or otherwise limited by the need to obtain environmental and other regulatory approvals, unexpected cost increases, availability of labor and materials, unforeseen hazards such as weather conditions, and other risks customarily associated with construction projects. Moreover, the costs of these activities could have a negative impact on our results of operations. In addition, these operational improvements may not achieve the expected benefits as a result of changes in market conditions, raw material shortages or other unforeseen contingencies.

We depend on third parties for certain construction, maintenance, engineering, transportation, warehousing and logistics services.

We contract with third parties for certain services relating to the design, construction and maintenance of various components of our production facilities and other systems. If these third parties fail to comply with their obligations, the facilities may not operate as intended, which may result in delays in the production of our products and materially adversely affect our ability to meet our production targets and satisfy customer requirements or we may be required to recognize impairment charges. In addition, production delays could cause us to miss deliveries and breach our contracts, which could damage our relationships with our customers and subject us to claims for damages under our contracts. Any of these events could have a material adverse effect on our business, financial condition, results of operations or cash flows.

We also rely primarily on third parties for the transportation of the products we manufacture. In particular, a significant portion of the goods we manufacture are transported to different countries, which requires sophisticated warehousing, logistics and other resources. If any of the third parties that we use to transport products are unable to deliver the goods we manufacture in a timely manner, we may be unable to sell these products at full value or at all, which could cause us to miss deliveries and breach our contracts, which could damage our relationships with our customers and subject us to claims for damages under our contracts. Any of these events could have a material adverse effect on our business, financial condition, results of operations or cash flows.

We may be subject to information technology systems failures, cybersecurity attacks, network disruptions and breaches of data security, which could compromise our information and expose us to liability.

Our information technology systems are an important element for effectively operating our business. Information technology systems or processes, and the information technology systems or processes of our customers, our third-party service providers, our vendors or other parties that have been entrusted with our information, including risks associated with any failure to maintain or upgrade our systems, network disruptions and breaches of data security could disrupt our operations by impeding our processing of transactions, our ability to protect customer or company information or our financial reporting, leading to increased costs. It is possible that future technological developments could adversely affect the functionality of our computer systems and require further action and substantial funds to prevent or repair computer malfunctions. Our computer systems, including our back-up systems, could be damaged or interrupted by power outages, computer and telecommunications failures, computer viruses, cybercrimes, internal or external security breaches, events such as fires, earthquakes, floods, tornadoes and hurricanes, or errors by our employees. Although we have taken steps to address these concerns by implementing network security, back-up systems and internal control measures, these steps may be insufficient or ineffective. Security and/or privacy breaches, acts of vandalism or terror, computer viruses, misplaced or lost data, programming, and/or human error or other similar events with respect to our information technology systems or processes or the information technology systems or processes of third-parties that have been entrusted with our information expose us to a risk of loss or misuse of this information, litigation and potential liability, which could have a material adverse effect on our business, financial condition, results of operations or cash flows.

If we are unable to successfully negotiate with the representatives of our employees, including labor unions, we may experience strikes and work stoppages.

We are party to collective bargaining agreements and similar agreements with our employees. As of December 31, 2022, approximately 524 employees, or 39% of our worldwide employees, were covered by collective bargaining or similar agreements, all of which were covered by agreements that expire, or are subject to renegotiation, at various times through December 31, 2023. Although we believe that, in general, our relationships with our employees are good, we cannot predict the outcome of current and future negotiations and consultations with employee representatives, which could have a material adverse effect on our business. We may not succeed in renewing or extending these agreements on terms satisfactory to us.

Although we have not had any material work stoppages or strikes during the past decade initiated by our employees, they may occur in the future during renewal or extension negotiations or otherwise. A material work stoppage, strike or other union dispute could adversely affect our business, financial condition, results of operations and cash flows.

We have significant goodwill on our balance sheet that is sensitive to changes in the market, which could result in impairment charges.

We had approximately \$171.1 million of goodwill on our balance sheet as of December 31, 2022. Goodwill is tested for impairment annually in the fourth quarter or more often if events or changes in circumstances indicate a potential impairment may exist. Factors that could indicate that our goodwill is impaired or that could increase the risk of future impairment include a decline in our stock price and market capitalization, lower than projected operating results and cash flows, and slower growth rates in our industry. Impairment testing incorporates our estimates of future operating results and cash flows, estimates of future growth rates, and our judgment regarding the applicable discount rates used on estimated operating results and cash flows. If we determine at a future time that impairment exists, it may result in a significant non-cash charge to earnings and lower stockholders' equity.

Our ability to grow and compete effectively depends on protecting our intellectual property. Failure to protect our intellectual property could adversely affect our business.

We believe that our intellectual property, consisting primarily of patents and proprietary know-how and information, is important to our growth. Our intellectual property portfolio is extensive, with over 135 U.S. and foreign patents and published patent applications, which we believe is more than any of our major competitors in the businesses in which we operate. Failure to protect our intellectual property may result in the loss of the exclusive right to use our technologies. We rely on patent, trademark, copyright and trade secret laws and confidentiality and restricted-use agreements to protect our intellectual property. However, some of our intellectual property is not covered by any patent or patent application or any such agreement. Intellectual property protection does not protect against technological obsolescence due to developments by others or changes in customer needs.

Patents are subject to complex factual and legal considerations. Accordingly, the validity, scope and enforceability of any particular patent can be uncertain. Therefore, we cannot assure you that:

- any of the U.S. or non-U.S. patents now or hereafter owned by us, or that third parties have licensed to us or may in the future license to us, will not be circumvented, challenged or invalidated;
- any of the U.S. or non-U.S. patents that third parties have non-exclusively licensed to us, or may non-exclusively license to us in the future, will not be licensed to others; or
- any of the patents for which we have applied or may in the future apply will be issued at all or with the breadth of claim coverage we seek.

Moreover, patents, even if valid, only provide protection for a specified limited duration. In addition, effective patent, trademark and trade secret protection may be limited or unavailable or we may not apply for it in the United States or in any of the other countries in which we operate.

The protection of our intellectual property rights may be achieved, in part, by prosecuting claims against others who we believe have misappropriated our technology or have infringed upon our intellectual property rights, as well as by defending against misappropriation or infringement claims brought by others against us. Our involvement in litigation to protect or defend our rights in these areas could result in a significant expense to us, adversely affect the development of sales of the related products, and divert the efforts of our technical and management personnel, regardless of the outcome of such litigation.

We cannot assure you that agreements designed to protect our proprietary know-how and information will not be breached, that we will have adequate remedies for any such breach, or that our strategic alliance suppliers and customers, consultants, employees or others will not assert rights against us with respect to intellectual property arising out of our relationships with them.

Third parties may claim that our products or processes infringe their intellectual property rights, which may cause us to pay unexpected litigation costs or damages or prevent us from selling our products or services.

From time to time, we may become subject to legal proceedings, including allegations and claims of alleged infringement or misappropriation by us of the patents and other intellectual property rights of third parties. We cannot assure you that the use of our patented technology or proprietary know-how or information does not infringe the intellectual property rights of others. In addition, attempts to enforce our own intellectual property claims may subject us to counterclaims that our

intellectual property rights are invalid, unenforceable or are licensed to the party against whom we are asserting the claim or that we are infringing that party's alleged intellectual property rights. We may also be obligated to indemnify affiliates or other partners who are accused of violating third parties' intellectual property rights by virtue of those affiliates or partners' agreements with us, and this could increase our costs in defending such claims and our damages.

Legal proceedings involving intellectual property rights, regardless of merit, are highly uncertain and can involve complex legal and scientific analyses, can be time consuming, expensive to litigate or settle and can significantly divert resources, even if resolved in our favor. Our failure to prevail in such matters could result in loss of intellectual property rights or judgments awarding substantial damages and injunctive or other equitable relief against us. If we were to be held liable or discover or be notified that our products or processes potentially infringe or otherwise violate the intellectual property rights of others, we may face a loss of reputation and may not be able to exploit some or all of our intellectual property rights or technology. If necessary, we may seek licenses to intellectual property of others. However, we may not be able to obtain the necessary licenses on terms acceptable to us or at all. Our failure to obtain a license from a third-party for that intellectual property necessary for the production or sale of any of our products could cause us to incur substantial liabilities and/or suspend the production or shipment of products or the use of processes requiring the use of that intellectual property. We may be required to substantially re-engineer our products or processes to avoid infringement.

Any of the foregoing may require considerable effort and expense, result in substantial increases in operating costs, delay or inhibit sales or preclude us from effectively competing in the marketplace, which in turn could have a material adverse effect on our business and financial results.

Our business, financial condition and results of operations continue to be adversely impacted by increased costs.

We continue to experience higher costs driven by recent global inflationary pressures, particularly for third-party needle coke, energy, and freight. We continue to take steps to mitigate these costs increases, however, we may not be able to fully offset these costs increases, which could lead to further adverse impacts on our business, financial condition and results of operations.

The COVID-19 pandemic has had, and could have, an adverse impact on our business, results of operations, financial position and cash flows.

The COVID-19 pandemic and preventative measures taken to contain or mitigate the pandemic have caused, and may cause, business slowdowns and significant disruption in the financial markets and economy both globally and in the United States. As a result of the pandemic, we continue to limit employee travel and have implemented a hybrid work policy for certain employees. While these measures have been necessary and appropriate, they have resulted in additional costs and have adversely impacted our business and financial performance.

The pandemic has adversely affected, and is expected to continue to adversely affect, our business, results of operations, financial position and cash flows. Such effects may be material and the potential impacts include, but are not limited to:

- adverse impacts on our customers, and resultant impacts on demand for our products;
- disruptions at our facilities, including reductions in operating hours, labor shortages and changes in operating procedures;
- disruptions in our supply chain due to transportation delays, travel restrictions, raw material cost increases and shortages, and closures of businesses or facilities; and
- volatility in the global financial markets, which could have a negative impact on our ability to access capital and additional sources of financing in the future.

In addition, we cannot predict the impact that the COVID-19 pandemic will have on our customers, employees, suppliers and distributors, and any adverse impacts on these parties may have a material adverse impact on our business. The impact of the COVID-19 pandemic may also exacerbate other risks discussed in this Annual Report, any of which could have a material effect on us.

Risks related to our indebtedness

Our indebtedness could limit our financial and operating activities and adversely affect our ability to incur additional debt to fund future needs and our ability to fulfill our obligations under our existing and future indebtedness.

Our credit agreement (as amended, the “2018 Credit Agreement”) provides for (i) an aggregate \$2,250 million senior secured term loan facility (the “2018 Term Loan Facility”) after giving effect to the June 2018 amendment (the “First Amendment”) that increased the aggregate principal amount of the 2018 Term Loan Facility from \$1,500 million to \$2,250 million and (ii) a \$330 million senior secured revolving credit facility after giving effect to the May 2022 amendment that increased the revolving commitments under the 2018 Credit Agreement by \$80 million from \$250 million (the “2018 Revolving Credit Facility” and, together with the 2018 Term Loan Facility, as amended, the “Senior Secured Credit Facilities”).

As of December 31, 2022, we had approximately \$921.8 million of secured indebtedness outstanding including borrowings under the Senior Secured Credit Facilities and our 4.625% Senior Secured Notes due 2028 (the “2020 Senior Secured Notes”). As of December 31, 2022, we had \$327.0 million available for borrowing under the 2018 Revolving Credit Facility (taking into account approximately \$3.0 million of outstanding letters of credit issued thereunder).

Interest expense for the years ended December 31, 2022 and December 31, 2021 was \$36.6 million and \$68.8 million, respectively.

Our indebtedness could:

- require us to dedicate a substantial portion of our cash flow to the payment of principal and interest, thereby reducing the funds available for operations and future business opportunities;
- make it more difficult for us to satisfy our obligations;
- limit our ability to borrow additional money if needed for other purposes, including working capital, capital expenditures, debt service requirements, acquisitions and general corporate or other purposes, on satisfactory terms or at all;
- limit our ability to adjust to changing economic, business and competitive conditions;
- place us at a competitive disadvantage with competitors who may have less indebtedness or greater access to financing;
- require us to reduce or delay capital expenditures or sell assets or operations to meet our scheduled debt service obligations;
- make us more vulnerable to an increase in interest rates, a downturn in our operating performance or a decline in general economic conditions; and
- make us more susceptible to changes in credit ratings, which could impact our ability to obtain financing in the future and increase the cost of such financing.

Compliance with our debt obligations under the Senior Secured Credit Facilities and 2020 Senior Secured Notes could materially limit our financial or operating activities, or hinder our ability to adapt to changing industry conditions, which could result in our losing market share, a decline in our revenue or a negative impact on our operating results.

The 2018 Credit Agreement and the indenture governing the 2020 Senior Secured Notes include covenants that could restrict or limit our financial and business operations.

The 2018 Credit Agreement and the indenture governing the 2020 Senior Secured Notes contain a number of restrictive covenants that, subject to certain exceptions and qualifications, restrict or limit our ability and the ability of our subsidiaries to, among other things:

- incur, repay or refinance indebtedness;
- create liens on or sell our assets;
- engage in certain fundamental corporate changes or changes to our business activities;
- make investments or engage in mergers or acquisitions;

- pay dividends or repurchase stock;
- engage in certain affiliate transactions;
- enter into agreements or otherwise restrict our subsidiaries from making distributions or paying dividends to the borrowers under the Senior Secured Credit Facilities or to us or certain of our subsidiaries, as applicable; and
- repay intercompany indebtedness or make intercompany distributions or pay intercompany dividends.

The 2018 Credit Agreement also contains certain affirmative covenants and contains a financial covenant that requires us to maintain a senior secured first lien net leverage ratio not greater than 4.00:1.00 when the aggregate principal amount of borrowings under the 2018 Revolving Credit Facility and outstanding letters of credit issued under the 2018 Revolving Credit Facility (except for undrawn letters of credit in an aggregate amount equal to or less than \$35 million), taken together, exceed 35% of the total amount of commitments under the 2018 Revolving Credit Facility.

These covenants and restrictions could affect our ability to operate our business and may limit our ability to react to market conditions or take advantage of potential business opportunities as they arise. Additionally, our ability to comply with these covenants may be affected by events beyond our control, including general economic and credit conditions and industry downturns.

If we fail to comply with the covenants in the 2018 Credit Agreement and the indenture governing the 2020 Senior Secured Notes, and are unable to obtain a waiver or amendment, an event of default would result, and the lenders and noteholders could, among other things, declare outstanding amounts due and payable or, with respect to the 2018 Credit Agreement, refuse to lend additional amounts to us or require deposit of cash collateral in respect of outstanding letters of credit. If we were unable to repay or pay the amounts due, the lenders under the 2018 Credit Agreement and the noteholders could, among other things, proceed against the collateral granted to them to secure the indebtedness, which includes substantially all of our and our U.S. subsidiaries' assets and certain assets of certain of our non-U.S. subsidiaries.

Risks related to tax matters

We are required to make payments under a Tax Receivable Agreement for certain tax benefits we may claim in the future, and the amounts we may pay could be significant.

In connection with the completion of our initial public offering ("IPO"), we entered into a tax receivable agreement (the "Tax Receivable Agreement") that provides Brookfield the right to receive future payments from us of 85% of the amount of cash savings, if any, in U.S. federal income tax and Swiss tax that we and our subsidiaries realize as a result of the utilization of certain tax assets attributable to periods prior to our IPO, including certain federal net operating losses ("NOLs"), previously taxed income under Section 959 of the Code, foreign tax credits, and certain NOLs in GrafTech Switzerland S.A. (collectively, the "Pre-IPO Tax Assets"). In addition, we pay interest on the payments we make to Brookfield with respect to the amount of this cash savings from the due date (without extensions) of our tax return where we realize this savings to the payment date at a rate equal to London Interbank Offered Rate ("LIBOR") plus 1.00% per annum. The term of the Tax Receivable Agreement commenced on April 23, 2018 and will continue until there is no potential for any future tax benefit payments.

We have made payments of approximately \$53.6 million related to the Tax Receivable Agreement. We expect that, based on current tax laws, future payments under the Tax Receivable Agreement relating to the Pre-IPO Tax Assets will be approximately \$15.6 million in the aggregate. The maximum amount over the term of the agreement is approximately \$70.0 million.

Risks related to government regulation

Stringent health, safety and environmental regulations applicable to our manufacturing operations and facilities could result in substantial costs related to compliance, sanctions or material liabilities and may affect the availability of raw materials.

We are subject to stringent environmental, health and safety laws and regulations relating to our current and former properties (including former onsite landfills over which we have retained ownership), other properties that neighbor ours or to which we sent wastes for treatment or disposal, as well as our current raw materials, products, and operations. Some of our products (including our raw materials) are subject to extensive environmental and industrial hygiene regulations governing the registration and safety analysis of their component substances. Coal tar pitch, which is classified as a substance of very high concern under the EU's Registration, Evaluation, Authorization and Restriction of Chemical Regulation ("REACH") regulations, is used in certain of our processes but in a manner that we believe does not currently require us to obtain a specific authorization under the REACH guidelines. Violations of these laws and regulations, or of the terms and conditions of permits

required for our operations, can result in damage claims, reputational harm, the imposition of substantial fines and sanctions and require the installation of costly pollution control or safety equipment or costly changes in operations to limit pollution or decrease the likelihood of injuries. In addition, we are currently conducting remediation and/or monitoring at certain current and former properties, including at our Monterrey, Mexico facility, and may become subject to material liabilities in the future for the investigation and cleanup of contaminated properties, including with respect to emerging contaminants or for properties on which we have ceased operations. We have been in the past, and could be in the future, subject to claims alleging personal injury, death or property damage resulting from exposure to hazardous substances, accidents or otherwise for conditions creating an unsafe workplace. Further, alleged noncompliance with or stricter enforcement of, or changes in interpretations of, existing laws and regulations, adoption of more stringent new laws and regulations, discovery of previously unknown contamination or imposition of new or increased requirements could require us to incur costs or become the basis of new or increased liabilities or reputational harm that have a material adverse impact on our operations, costs or results of operations. It is also possible that the impact of safety and environmental regulations on our suppliers could affect the availability and cost of our raw materials.

For example, legislators, regulators and others, as well as many companies, are considering ways to reduce emissions of greenhouse gases (“GHGs”) due to scientific, political and public concern that GHG emissions are altering the atmosphere in ways that are affecting, and are expected to continue to affect, the global climate. The EU has established GHG regulations and is revising its emission trading system for the period after 2020 in a manner that may require us to incur additional costs. The United States has required annual reporting of GHG emissions from certain large sources beginning in 2011 and various and regional state efforts to reduce GHG emissions have also been implemented. Further measures, in the United States, EU and many other countries, may be enacted in the future. In particular, in December 2015, more than 190 countries participating in the United Nations Framework Convention on Climate Change reached an international agreement related to curbing GHG emissions (the “Paris Agreement”). Further GHG regulations under the Paris Agreement or otherwise may take the form of a national or international cap-and-trade emissions permit system, a carbon tax, emissions controls, reporting requirements, or other regulatory initiatives. For more information, see the section entitled “Business.”

The further regulation of GHG emissions or other environmental regulations in countries in which we operate or market our products could impose additional costs, both direct and indirect, on our business, and on the businesses of our customers and suppliers, such as increased energy and insurance rates, higher taxes, new environmental compliance program expenses, including capital improvements, environmental monitoring and the purchase of emission credits, and other administrative costs necessary to comply with current and potential future requirements or limitations that may be imposed, as well as other unforeseen or unknown costs. To the extent that similar requirements and limitations are not imposed globally, this regulation may impact our ability to compete with companies located in countries that do not have these requirements or limitations. We may also experience a change in competitive position relative to industry peers, changes in prices received for products sold and changes to profit or loss arising from increased or decreased demand for our products. The impact of any future GHG regulatory requirements on our global business will be dependent upon the design of the regulatory schemes that are ultimately adopted and, as a result, we are unable to predict their significance to our operations at this time.

Global data and privacy protection laws applicable to us require substantial costs related to compliance, and any failure to comply could result in significant liability to us, including fines and penalties.

We collect data, including personally identifiable information of our employees, in the course of our business activities and transfer such data between our affiliated entities, to and from our business partners and to third-party service providers, which may be subject to global data privacy laws and cross-border transfer restrictions. While we take steps to comply with these legal requirements, any changes to such laws may impact our ability to effectively transfer data across borders in support of our business operations and any breach of such laws may lead to administrative, civil or criminal liability, as well as reputational harm to the Company and its employees. For example, the GDPR, introduced a number of obligations for subject companies, including obligations relating to data transfers and the security of personal data they process. We take steps to protect the security and integrity of the information we collect, but there is no guarantee that the steps we have taken will prevent inadvertent or unauthorized use or disclosure of such information, or prevent third parties from gaining unauthorized access to this information despite our efforts. Any such incident could result in legal claims or proceedings, liability under laws that protect the privacy of personally identifiable information (including the GDPR) and damage to our reputation.

The cost of ongoing compliance with global data protection and privacy laws and the potential fines and penalties levied in the event of a breach of such laws may have an adverse effect on our business and operations. For example, the GDPR currently provides that supervisory authorities in the EU may impose administrative fines for non-compliance of up to €20.0 million or 4% of the subject company’s annual, group-wide turnover (whichever is higher) and individuals who have suffered damage as a result of a subject company’s non-compliance with the GDPR also have the right to seek compensation from such company. We will need to continue dedicating financial resources and management time to compliance efforts with respect to global data protection and privacy laws, including the GDPR.

Risks related to our common stock

If the ownership of our common stock continues to be highly concentrated, it may prevent minority stockholders from influencing significant corporate decisions and may result in conflicts of interest.

As of January 31, 2023, Brookfield owned approximately 25% of our outstanding common stock. Accordingly, Brookfield has significant influence over all matters requiring a stockholder vote, including the election of directors; mergers, consolidations and acquisitions; the sale of all or substantially all of our assets and other decisions affecting our capital structure; the amendment of our Amended and Restated Certificate of Incorporation (“Amended Certificate of Incorporation”) and our Amended and Restated By-Laws (“Amended By-Laws”); and our winding up and dissolution. This concentration of ownership may delay, deter or prevent acts that would be favored by our other stockholders. The interests of Brookfield may not always coincide with our interests or the interests of our other stockholders. This concentration of ownership may also have the effect of delaying, preventing or deterring a change in control. Also, Brookfield may seek to cause us to take courses of action that, in its judgment, could enhance its investment in us, but that might involve risks to our other stockholders or adversely affect us or our other stockholders. As a result, the market price of our common stock could decline or stockholders might not receive a premium over the then-current market price of our common stock upon a change in control. In addition, this concentration of share ownership may adversely affect the trading price of our common stock because investors may perceive disadvantages in owning shares in a company with significant stockholders.

Our largest stockholder, Brookfield, whose representatives serve on our Board of Directors, has the right to engage or invest in the same or similar businesses as us.

Brookfield has other investments and business activities in addition to their ownership of us. Brookfield has the right, and has no duty to abstain from exercising such right, to engage or invest in the same or similar businesses as us, do business with any of our clients, customers or vendors or employ or otherwise engage any of our officers, directors or employees. If Brookfield or any of its officers, directors or employees acquire knowledge of a potential transaction that could be a corporate opportunity, they have no duty, to the fullest extent permitted by law, to offer such corporate opportunity to us, our stockholders or our affiliates.

In the event that any of our directors and officers who is also a director, officer or employee of Brookfield acquires knowledge of a corporate opportunity or is offered a corporate opportunity, provided that this knowledge was not acquired solely in such person’s capacity as our director or officer and such person acts in good faith, then to the fullest extent permitted by law such person is deemed to have fully satisfied such person’s fiduciary duties owed to us and is not liable to us, if Brookfield pursues or acquires the corporate opportunity or if Brookfield does not present the corporate opportunity to us.

Certain provisions, including in our Amended Certificate of Incorporation and our Amended By-Laws, could hinder, delay or prevent a change in control, which could adversely affect the price of our common stock.

Our Amended Certificate of Incorporation and Amended By-Laws contain provisions that could make it more difficult for a third-party to acquire us without the consent of our Board of Directors or Brookfield, including:

- provisions in our Amended Certificate of Incorporation and Amended By-Laws that prevent stockholders from calling special meetings of our stockholders, except where the Delaware General Corporation Law (“DGCL”) confers the right to fix the date of such meetings upon stockholders;
- advance notice requirements by stockholders with respect to director nominations and actions to be taken at annual meetings;
- provisions in our Amended Certificate of Incorporation provide for a classified Board of Directors such that only one of three classes of directors is elected each year, which prevents our stockholders from replacing the majority our directors at once;
- no provision in our Amended Certificate of Incorporation or Amended By-Laws provides for cumulative voting in the election of directors, which means that the holders of a majority of the outstanding shares of our common stock can elect all the directors standing for election;
- under our Amended Certificate of Incorporation, our Board of Directors have authority to cause the issuance of preferred stock from time to time in one or more series and to establish the terms, preferences and rights of any such series of preferred stock, all without approval of our stockholders; and
- nothing in our Amended Certificate of Incorporation precludes future issuances without stockholder approval of the authorized but unissued shares of our common stock.

These provisions may make it difficult and expensive for a third-party to pursue a tender offer, change in control or takeover attempt that is opposed by Brookfield, our management or our Board of Directors. Stockholders who might desire to participate in these types of transactions may not have an opportunity to do so, even if the transaction is favorable to such stockholders. These anti-takeover provisions could substantially impede the ability of stockholders to benefit from a change in control or to change our management and Board of Directors and, as a result, may adversely affect the market price of our common stock and your ability to realize any potential change of control premium.

Our Amended Certificate of Incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our Amended Certificate of Incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a breach of fiduciary duty;
- any action asserting a claim against us arising under the DGCL, our Amended Certificate of Incorporation or our Amended By-Laws; and
- any action asserting a claim against us that is governed by the internal-affairs doctrine.

This exclusive forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers, and other employees. If a court were to find the exclusive forum provision in our Amended Certificate of Incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could harm our business.

The market price of our common stock could be negatively affected by sales of substantial amounts of our common stock in the public markets.

The sale in the public markets of our common stock by Brookfield, which, as of January 31, 2023, owned approximately 25% of our outstanding common stock, or by our officers and directors, or the perception that these sales may occur, could cause the market price of our common stock to decline or cause the market price of our common stock to trade at a discount. Brookfield may from time to time seek to sell or otherwise dispose of some or all of its shares, including by transferring shares to affiliates, distributing shares to its partners, members or beneficiaries, or selling shares in underwritten offerings, block sales, open market transactions or otherwise. Brookfield and our officers and directors may also sell shares into the public markets in accordance with the requirements of Rule 144, and Brookfield is entitled to request that we facilitate SEC registration of their sales of shares pursuant to the terms of a registration rights agreement. A decline in the price of our common stock might impede our ability to raise capital through the issuance of additional common stock or other equity securities.

We cannot guarantee that our stock repurchase program will be fully consummated or that it will enhance long-term stockholder value. Stock repurchases could also increase the volatility of the trading price of our stock and will diminish our cash reserves.

Although our Board of Directors has authorized a stock repurchase program that does not have an expiration date, the program does not obligate us to acquire any particular amount of shares of common stock, and the stock repurchase program may be suspended or discontinued at any time at our discretion. We cannot guarantee that the program will be fully consummated or that it will enhance long-term stockholder value. The program could affect the trading price of our stock, and increase volatility, and any announcement of a termination of this program may result in a decrease in the trading price of our common stock. In addition, our use of this program will diminish our cash.

We may not pay cash dividends on our common stock.

We currently pay cash dividends on our common stock in accordance with our dividend policy. We cannot assure you, however, that we will pay dividends in the future in these amounts or at all. Our Board of Directors may change the timing and amount of any future dividend payments or eliminate the payment of future dividends in its sole discretion, without any prior notice to our stockholders.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The Company uses the following principal physical properties in connection with the manufacturing and sales of graphite electrodes and corporate administrative operations, all of which serve its only reportable segment, Industrial Materials. The total capacity utilization, reflecting production volume as a percentage of production capacity, of our graphite electrode manufacturing facilities in Calais, France, Monterrey, Mexico, Pamplona, Spain and St. Marys, Pennsylvania, was 68% and 72% for the years ended December 31, 2022 and December 31, 2021, respectively. Production capacity reflects expected maximum production volume during the period depending on product mix and expected maintenance outage. Actual production may vary. The properties that we own are encumbered by our 2018 Credit Agreement and our 2020 Senior Secured Notes.

<u>Location of Facility</u>	<u>Primary Use</u>	<u>Owned or Leased</u>
<i>Americas</i>		
Brooklyn Heights, Ohio	Corporate Headquarters, Innovation and Technology Center and Sales Office	Leased
Monterrey, Mexico	Graphite Electrode and Pin Manufacturing Facility and Sales Office	Owned
St. Marys, Pennsylvania	Graphite Electrode Manufacturing Facility	Owned
Port Lavaca, Texas	Petroleum Needle Coke Manufacturing Facility (Seadrift)	Owned
Salvador, Bahia, Brazil	Graphite Electrode Machine Shop and Sales Office	Owned
<i>Europe</i>		
Calais, France	Graphite Electrode Manufacturing Facility and Sales Office	Owned
Pamplona, Spain	Graphite Electrode Manufacturing Facility and Sales Office	Owned
Bussigny, Switzerland	Global Sales and Production Planning Office	Leased

Item 3. Legal Proceedings

We are involved in various investigations, lawsuits, claims, demands, labor disputes and other legal proceedings, including with respect to environmental and human exposure or other personal injury matters, arising out of or incidental to the conduct of our business. While it is not possible to determine the ultimate disposition of each of these matters and proceedings, we do not believe that their ultimate disposition will have a material adverse effect on our financial position, results of operations or cash flows. Additionally, we are involved in the following legal proceedings.

Arbitrations

We are involved in certain arbitrations as respondents/counterclaimants, pending before the International Chamber of Commerce with a few customers who, among other things, have failed to perform under their LTAs and in certain instances are seeking to modify or frustrate their contractual commitments to us. In particular, Aperam South America LTDA, Aperam Sourcing S.C.A., ArcelorMittal Sourcing S.C.A., and ArcelorMittal Brasil S.A. (collectively, the “Claimants”) initiated a single arbitration proceeding against two of the Company’s subsidiaries in the International Chamber of Commerce in June 2020. In June 2021, the Claimants filed their statement of claim, seeking approximately \$61.0 million plus interest in monetary relief and/or reimbursement in respect of several fixed price LTAs that were executed between such subsidiaries and the Claimants in 2017 and 2018. On December 16, 2022, the Claimants revised their calculation of damages to approximately \$178.9 million including interest, with damages covering the period from the first quarter of 2020 through the end of the third quarter of 2022 and interest covering the period from June 2020 through December 16, 2022. The Claimants argue, among other things, that they should no longer be required to comply with the terms of the LTAs that they signed due to an alleged drop in market prices for graphite electrodes in January 2020. Alternatively, the Claimants argue that they should not be required to comply with the LTAs that they signed due to alleged market circumstances at the time of execution. We believe we have valid defenses to these claims. We intend to vigorously defend them and enforce our rights under the LTAs.

Monterrey, Mexico Operations Shutdown

Background

On September 15, 2022, inspectors from the State Attorney's Office for the Secretary of Environment of the State of Nuevo León, Mexico visited GrafTech México graphite electrode manufacturing facility located in Monterrey, Mexico to inspect GrafTech Mexico's facility and certain of the facility's environmental and operating permits. At the conclusion of the inspection, the inspectors issued a Record of Inspection providing for the results of the inspection, their observations, and the imposition of a temporary suspension of GrafTech Mexico's facilities within seven days. In parallel, the Director of Comprehensive Atmospheric Management of the Undersecretary of Climate Change and Air Quality of the Ministry of the Environment of the State of Nuevo León formally denied GrafTech Mexico's previously requested modification to its operating license stating that such license was no longer valid. On September 22, 2022, GrafTech Mexico submitted observations and responses to the Record of Inspection, requested an extension of the shutdown of the facility until October 7, 2022, and requested a clarification of the scope of the shutdown. On September 23, 2022, inspectors from the State Attorney's Office for the Secretary of Environment visited GrafTech Mexico's manufacturing facility to verify the information presented in GrafTech Mexico's observations and responses submitted on September 22, 2022. On October 4, 2022, the State Attorney's Office for the Secretary of Environment granted an extension of the shutdown of the facility until October 7, 2022 and clarified the suspension permitting GrafTech Mexico to perform several activities, including extracting or withdrawing finished or unfinished product. On November 17, 2022, the State Attorney's Office for the Secretary of Environment lifted the suspension notice, subject to the completion of certain agreed-upon activities, including the submission of an environmental impact study with respect to the facility's operations, allowing the Monterrey facility to resume operations. Notwithstanding that the suspension notice has been conditionally lifted and that the Monterrey facility has resumed operations, GrafTech Mexico believes it is prudent to continue to pursue the related legal proceedings set forth below, particularly the amparo proceeding and the nullity proceeding.

Amparo Proceeding

On September 20, 2022, GrafTech Mexico filed an amparo proceeding before the First District Court for Administrative Matters of the State of Nuevo León arguing that the measure imposed by the Ministry of the Environment of the State of Nuevo León ordering a complete temporary suspension of operations violated GrafTech Mexico's constitutional rights and requested a provisional injunction and a definitive injunction that would last through the decision on the merits. The provisional injunction was denied by the court on September 26, 2022. On October 3, 2022, GrafTech Mexico appealed this decision before the Third Collegiate Court in Administrative Matters of the Fourth Circuit (Nuevo León), which appeal was also denied on October 24, 2022. On November 8, 2022, the judge denied the definitive injunction, and on November 23, 2022 GrafTech Mexico appealed this decision. With respect to the decision on the merits, on December 20, 2022, the judge reviewed all filings submitted during the proceeding. We expect a decision on the merits no later than March 2023, which will be subject to appeal by the parties.

Nullity Proceeding

Separately, on September 28, 2022, GrafTech Mexico filed a nullity proceeding with the Court of Administrative Justice of the State of Nuevo León requesting the court to set aside the determination of the Ministry of the Environment of the State of Nuevo León that the previously requested modification to the operating license was denied because GrafTech Mexico no longer had a valid operating license. On October 13, 2022, the court admitted the nullity proceeding and granted GrafTech Mexico's request for a preliminary injunction effectively deeming GrafTech Mexico's operating license valid pending the conclusion of the nullity proceeding. On October 27, 2022, the Ministry of the Environment of the State of Nuevo León challenged the court's decision granting GrafTech Mexico a preliminary injunction. GrafTech Mexico received notice of such challenge on October 28, 2022 and filed its response on November 17, 2022. On December 2, 2022, the Ministry of the Environment of the State of Nuevo León responded to GrafTech's petition, arguing that the Ministry's actions were legally permissible. GrafTech Mexico filed final pleadings on January 17, 2023. We expect the court to issue a ruling no later than April 2023, which will be subject to appeal by the parties.

Administrative Proceeding

On November 17, 2022, the State Attorney's Office for the Secretary of Environment issued a summons opening an administrative proceeding against GrafTech Mexico, citing the lack of an environmental impact authorization and environmental risk study with respect to the facility's operations. The summons ordered GrafTech Mexico to submit an environmental impact authorization and risk study within 30 business days. GrafTech Mexico submitted its environmental impact authorization and risk study for the full site on November 25, 2022, and filed its response to the summons on December 2, 2022. Once the State Attorney's Office for the Secretary of Environment initiates the summary argument period, GrafTech Mexico will have three business days to provide its summary arguments. A final resolution is expected to be issued within

fifteen business days from submission of the summary arguments, but can be extended up to an additional three months and is subject to appeal.

Brazil Clause IV

Pending litigation in Brazil has been brought by employees seeking to recover additional amounts and interest thereon under certain wage increase provisions applicable in 1989 and 1990 under collective bargaining agreements to which employers in the Bahia region of Brazil were a party (including our subsidiary in Brazil). Companies in Brazil have settled claims arising out of these provisions and, in May 2015, the litigation was remanded by the Brazilian Supreme Court in favor of the employees union. After denying an interim appeal by the Bahia region employers on June 26, 2019, the Brazilian Supreme Court finally ruled in favor of the employees union on September 26, 2019. The employers union has determined not to seek annulment of such decision. Separately, on October 1, 2015, a related action was filed by current and former employees against our subsidiary in Brazil to recover amounts under such provisions, plus interest thereon, which amounts together with interest could be material to us. If the Brazilian Supreme Court proceeding above had been determined in favor of the employers union, it would also have resolved this proceeding in our favor. In the first quarter of 2017, the state court initially ruled in favor of the employees. We appealed this state court ruling, and the appellate court issued a decision in our favor on May 19, 2020. The employees have further appealed and, on December 16, 2020, the court upheld the decision in favor of GrafTech Brazil. On February 22, 2021, the employees filed a further appeal and, on April 28, 2021, the court rejected the employees' appeal in favor of GrafTech Brazil. The employees filed a further appeal and on September 12, 2022 we filed our response in opposition. We intend to vigorously defend our position. As of December 31, 2022, we are unable to assess the potential loss associated with these proceedings as the claims do not currently specify the number of employees seeking damages or the amount of damages being sought.

Item 4. Mine Safety Disclosures

Not applicable.

Supplemental Item. Information about our Executive Officers

The following table sets forth information with respect to our current executive officers, including their ages.

Name	Age	Position
Marcel Kessler	56	Chief Executive Officer and President
Timothy K. Flanagan	45	Chief Financial Officer, Vice President of Finance and Treasurer
Jeremy S. Halford	50	Executive Vice President, Chief Operating Officer
Gina K. Gunning	56	Chief Legal Officer and Corporate Secretary
Iñigo Perez Ortiz	51	Senior Vice President, Commercial

Marcel Kessler became Chief Executive Officer and President and was elected to our Board of Directors in July 2022. Prior to joining the Company, Mr. Kessler previously served as the President and Chief Executive Officer of Pason Systems Inc. (TSX: PSI) ("Pason"), a global provider of specialized data management systems for oil and gas drilling, from 2011 to 2020, and has been a director of Pason since 2012 and is currently serving as the Chairman of the Board of Directors of Pason. Before joining Pason in 2011, Mr. Kessler was President, North America, of Exploration Logistics Group, an assistance, medical, safety and security solutions provider, President and Chief Executive Officer of CCR Technologies, a provider of solvent reclaiming services, and was a Partner at McKinsey & Company, a management consulting firm. Mr. Kessler holds a master's degree in Engineering with Distinction from the Swiss Federal Institute of Technology and a master's degree in Finance from the London Business School.

Timothy K. Flanagan joined the Company as Chief Financial Officer, Vice President of Finance and Treasurer in November 2021. Mr. Flanagan previously served as Executive Vice President, Chief Financial Officer of Cleveland-Cliffs Inc. (NYSE: CLF), a flat-rolled steel producer and supplier of iron ore pellets, from January 2017 to February 2019. Prior to being promoted to Executive Vice President, Chief Financial Officer of Cleveland-Cliffs, he held a variety of financial leadership roles at Cleveland-Cliffs Inc. since joining in 2008, including being responsible for the accounting, reporting, treasury and financial planning and analysis functions and serving as the Vice President, Corporate Controller and Chief Accounting Officer from March 2012 to December 2016. Before joining the Company, Mr. Flanagan served as Chief Financial Officer of Benesch, Friedlander, Coplan & Aronoff, LLP, an AmLaw 200 law firm, from June 2019 to November 2021. He has a B.S. in Accounting from the University of Dayton.

Jeremy S. Halford became Executive Vice President, Chief Operating Officer in October 2021. Mr. Halford joined the Company in May 2019 as Senior Vice President, Operations and Development. Mr. Halford previously served as the President of Arconic Engineered Structures, a producer of highly engineered titanium and aluminum components for the aerospace, defense and oil and gas markets, a position he held since January 2017. Mr. Halford also was President of Doncasters Aerospace, a manufacturer of components and assemblies for the civil and military aero engine and airframe markets, from 2014 to 2016, and Vice President, Global Business Development, Doncasters Group Limited from 2013 to 2014. Previously, he also was President of Mayfran International from 2012 to 2013, and spent seven years at Alcoa Corporation (NYSE: AA) ("Alcoa") in a variety of general management and strategy roles. Mr. Halford holds a Master of Business Administration degree from Harvard University and a Bachelor of Science degree in Mechanical Engineering from GMI Engineering and Management Institute (now Kettering University).

Gina K. Gunning joined the Company as Chief Legal Officer and Corporate Secretary in July 2018. She has more than 25 years of law firm and in-house corporate legal experience across multiple industries. Prior to joining GrafTech, she was an Associate General Counsel at FirstEnergy Corp., a distributor and generator of electricity, from 2012 to 2018, where she was responsible for legal matters involving SEC reporting, business development, and capital markets, as well as corporate and executive compensation topics. She also served as a partner at Jones Day. Ms. Gunning holds a Juris Doctor from Notre Dame Law School and a Bachelor of Arts in English from the University of Notre Dame.

Iñigo Perez Ortiz joined the Company as Senior Vice President, Commercial in February 2020. Mr. Perez most recently served as Vice President, Europe and Asia, Sales and Customer Service at Alcoa, a global industry leader in bauxite, alumina, and aluminum products, a position he held since 2017. Previously at Alcoa, Mr. Perez was Commercial Director, Europe and Asia Pacific from 2011 to 2017, Sales Manager, Europe from 2007 to 2011 and Sales Office Manager from 2002 to 2007. Prior to his career at Alcoa, Mr. Perez served in a variety of senior commercial roles at Autopulit S.A., Warner Electric and Babcock Wilcox Espanola, S.A. Mr. Perez holds a Master in Industrial Plans Management, Lean Manufacturing and Engineering degree from Polytechnic University of Barcelona, an Executive Master of Business Administration degree from Instituto de Empresa and a Mining Engineer degree from the University of the Basque Country.

PART II

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

Market Information

Our common stock is listed on the NYSE under the trading symbol "EAF."

Holders

As of December 31, 2022, there were seven registered holders of record of our common stock. A substantially greater number of holders of our common stock are "street name" or beneficial holders, whose shares of record are held by banks, brokers, and other financial institutions.

Dividend Policies and Restrictions

We currently pay a quarterly cash dividend of \$0.01 per share, or an aggregate of \$0.04 per share on an annualized basis. We expect to continue to pay this dividend out of cash generated from operations; we do not intend to incur indebtedness to fund regular, quarterly dividend payments.

We cannot assure you, however, that we will pay dividends in the future in these amounts or at all. Our Board of Directors may change the timing and amount of any future dividend payments or eliminate the payment of future dividends in its sole discretion, without any prior notice to our stockholders. Our ability to pay dividends will depend upon many factors, including our financial position and liquidity, results of operations, legal requirements, restrictions that may be imposed by the terms of our current and future credit facilities and other debt obligations and other factors deemed relevant by our Board of Directors.

For further discussion of the factors that may affect our business and our ability to pay dividends, see "Risk Factors-Risks related to our business and industry" and "Risk Factors-Risks related to our common stock-We may not pay cash dividends on our common stock."

Equity Compensation Plan Information

The information about our common stock that may be issued under our Omnibus Equity Incentive Plan as of December 31, 2022 is set forth in Item 12, "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters" of this Report under the caption "Equity Compensation Plan Information."

Issuer Purchases of Equity Securities

On July 31, 2019, we announced that our Board of Directors approved the repurchase of up to \$100.0 million of our common stock in open market purchases, including under Rule 10b5-1 and/or Rule 10b-18 plans. On November 4, 2021, we announced that our Board of Directors approved the repurchase of an additional \$150.0 million of our common stock under this program. Approximately \$99.0 million of the total \$250.0 million authorized remained available for stock repurchases as of December 31, 2022. The stock repurchase program has no expiration date. During the quarter ended December 31, 2022, there was no share repurchase activity.

Item 6. [Reserved]

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

The following discussion and analysis of our financial condition and results of operations should be read together with our Consolidated Financial Statements and the accompanying notes and other financial information appearing elsewhere in this Annual Report. Discussion and analysis regarding our financial condition and results of operations for 2021 as compared to 2020 is included in Item 7 of our Annual Report for the year-ended December 31, 2021, filed with the SEC on February 22, 2022. Information in this section is intended to assist the reader in obtaining an understanding of our Consolidated Financial Statements, the changes in certain key items in those financial statements from year-to-year, the primary factors that accounted for those changes, any known trends or uncertainties that we are aware of that may have a material effect on our future performance, as well as how certain accounting principles affect our Consolidated Financial Statements. This discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. See "Cautionary Note Regarding Forward-Looking Statements." Our actual results could differ materially from those forward-looking statements as a result of many factors, including those discussed in "Risk Factors" and elsewhere in this Annual Report.

Operational and Commercial Update

Sales volume for 2022 was approximately 149 thousand MT, consisting of LTA volume of 91 thousand MT and non-LTA volume of 58 thousand MT, representing a decrease of 11% compared to 167 thousand MT in 2021, consisting of LTA volume of 110 thousand MT and non-LTA volume of 57 thousand MT.

In 2022, our weighted-average realized price from LTAs was approximately \$9,500 per MT and our weighted-average realized price for non-LTA business sales of graphite electrodes was approximately \$6,000 per MT. Our weighted-average realized non-LTA price increased 34% compared to 2021. In 2021, our weighted-average realized price from LTAs was approximately \$9,500 per MT and our weighted-average realized price for non-LTA business sales of graphite electrodes was approximately \$4,500 per MT.

Our operations at our manufacturing site in Monterrey, Mexico, were temporarily suspended between September 15 and November 15, 2022, as described in our Current Report on Form 8-K furnished on September 16, 2022 and our Current Report on Form 8-K furnished on November 18, 2022. Refer to "Monterrey, Mexico Operations shutdown" in Item 3. Legal Proceedings.

Production volume for the full year 2022 was approximately 157 thousand MT, decreasing 5% compared to 2021, with the fourth quarter's production representing a 36% decline year-over-year, primarily reflecting the impact of the temporary suspension of our operations in Monterrey, Mexico.

Capital Structure and Capital Allocation

As of December 31, 2022, we had cash and cash equivalents of \$134.6 million and total debt of approximately \$921.8 million. Maintaining a disciplined capital allocation strategy that focuses on the preservation of cash remains a priority for us in order to support financial flexibility as we manage through near-term challenges. In the second half of 2022, we retained nearly all of our operating cash flow to increase our liquidity position by approximately \$80.0 million since the end of the second quarter of 2022. In the first half of the year, we voluntarily repaid \$110.0 million of our long-term debt and repurchased 6.7 million shares of our common stock for an aggregate of \$60.0 million. As we move into 2023, we will continue to manage our working capital levels. We expect our operating cash flow to be positive for 2023 and do not anticipate the need to borrow against our 2018 Revolving Credit Facility.

For the year ended December 31, 2022, our capital expenditures were \$72.2 million. Our capital expenditures in 2023 are expected to be in the range of \$55.0 million to \$60.0 million.

Outlook

As we enter 2023, we anticipate continued soft demand for graphite electrodes due to ongoing economic uncertainty and geopolitical conflict. In addition, we expect the suspension of our operations in Monterrey, Mexico in late 2022 will have a significant impact on our sales volume for the first half of 2023. Although the facility has resumed production, the suspension resulted in uncertainty during a key commitment window for customer purchases covering the first six months of 2023.

Reflecting these factors, we estimate our sales volume for the first six months of 2023 will be approximately half of the level reported in the same period of 2022, with the largest impact occurring in the first quarter. We anticipate that the graphite electrode sales volumes will be in the range of 15 thousand MT to 18 thousand MT for the first quarter of 2023. As we proceed into the second half of the year, we expect sales volume levels to recover, as we move past Monterrey suspension-

driven uncertainty and anticipate that a gradual improvement in market conditions will strengthen demand for graphite electrodes.

In response to these near-term challenges, we are proactively managing our operating costs, capital expenditures and working capital levels. Amongst other things, we expect to reduce our production volume from our two European facilities to approximately one third of their capacity for the first half of 2023 to align our production volume with our near-term outlook for graphite electrode demand.

In 2023, we expect a 17% to 20% year-over-year increase in our cost of goods sold per metric ton as fixed manufacturing costs will be recognized over a smaller volume base and as the higher cost of raw materials purchased in the latter part of 2022 affects cost of sales.

In 2023, the continuing shift in mix from LTA to non-LTA volume will have a significant impact on our revenue. For the first quarter 2023, we expect our weighted average non-LTA pricing to remain comparable to the 2022 full year average of approximately \$6,00 per metric ton.

The table of estimated shipments of graphite electrodes under existing LTAs has been updated as follows to reflect our current expectations:

	2023	2024
Estimated LTA volume ⁽¹⁾	27-32	13-16
Estimated LTA revenue ⁽²⁾	\$235-\$275	\$100-\$135 ⁽³⁾

(1) In thousands of MT

(2) In millions

(3) Includes expected termination fees from a few customers that have failed to meet certain obligations under their LTAs

The majority of the LTAs are defined as pre-determined fixed annual volume contracts while a small portion are defined with a specified volume range. For the years 2023 and 2024, the contractual revenue amounts above are based upon the minimum volume for those contracts with specified ranges. The actual revenue realized from these contracted volumes may vary in timing and total due to contract non-performance, force majeure notices, arbitrations, credit risk associated with certain customers facing financial challenges and customer demand related to contracted volume ranges. As it relates to the conflict between Ukraine and Russia, we have provided force majeure notices with respect to certain impacted LTAs. In the event of a force majeure, the LTAs provide our counterparties with the right to terminate the LTA if the force majeure event continues for more than six months after the delivery of the force majeure notice, with no continuing obligations of either party. Certain of our LTA counterparties have challenged the force majeure notices, but we will continue to enforce our contractual rights, while other LTAs have been terminated as a result of the force majeure period elapsing. The estimates of LTA volume and revenue as set forth above in the immediately preceding table includes (i) our current view of the validity of such force majeure notices and (ii) our current expectations of termination fees from our customers who have failed to meet certain obligations under their LTAs.

Key metrics used by management to measure performance

In addition to measures of financial performance presented in our Consolidated Financial Statements in accordance with generally accepted accounting principles in the United States ("GAAP"), we use certain other financial measures and operating metrics to analyze the performance of our Company. The "non-GAAP" financial measures consist of EBITDA, adjusted EBITDA, adjusted net income and adjusted earnings per share, which help us evaluate growth trends, establish budgets, assess operational efficiencies and evaluate our overall financial performance. The key operating metrics consist of sales volume, production volume, production capacity and capacity utilization.

Key financial measures

(in thousands, except per share amounts)	Year ended December 31,	
	2022	2021
Net sales	\$ 1,281,250	\$ 1,345,788
Net income	382,962	388,330
Earnings per share ⁽¹⁾	1.48	1.46
EBITDA ⁽²⁾	539,902	590,010
Adjusted net income ⁽²⁾	379,666	464,585
Adjusted earnings per share ⁽¹⁾⁽²⁾	1.47	1.74
Adjusted EBITDA ⁽²⁾	536,464	669,940

⁽¹⁾ Earnings per share represents diluted earnings per share. Adjusted earnings per share represents adjusted diluted earnings per share.

⁽²⁾ Non-GAAP financial measure; see below for information and reconciliations to the most directly comparable financial measures calculated and presented in accordance with GAAP.

Key operating measures

In addition to measures of financial performance presented in accordance with GAAP, we use certain operating metrics to analyze the performance of our company. The key operating metrics consist of sales volume, production volume, production capacity and capacity utilization. These metrics align with management's assessment of our revenue performance and profit margin, and will help investors understand the factors that drive our profitability.

Sales volume reflects the total volume of graphite electrodes sold for which revenue has been recognized during the period. For a discussion of our revenue recognition policy, see “—Critical accounting policies—Revenue recognition” in this section. Sales volume helps investors understand the factors that drive our net sales.

Production volume reflects graphite electrodes produced during the period. Production capacity reflects expected maximum production volume during the period depending on product mix and expected maintenance outage. Actual production may vary. Capacity utilization reflects production volume as a percentage of production capacity. Production volume, production capacity and capacity utilization help us understand the efficiency of our production and evaluate cost of sales.

(in thousands)	Year ended December 31,	
	2022	2021
Sales volume (MT) ⁽¹⁾	149.1	167.4
Production volume (MT) ⁽²⁾	157.1	165.2
Total production capacity(MT) ⁽³⁾⁽⁴⁾	230.0	230.0
Total capacity utilization ⁽⁴⁾⁽⁵⁾	68 %	72 %
Production capacity excluding St. Marys (MT) ⁽³⁾⁽⁶⁾	202.0	202.0
Capacity utilization excluding St. Marys ⁽⁵⁾⁽⁶⁾	78 %	82 %

⁽¹⁾ Sales volume reflects only graphite electrodes manufactured by us.

⁽²⁾ Production volume reflects graphite electrodes we produced during the period.

⁽³⁾ Production capacity reflects expected maximum production volume during the period depending on product mix and expected maintenance outage. Actual production may vary.

⁽⁴⁾ Includes graphite electrode facilities in Calais, France; Monterrey, Mexico; Pamplona, Spain; and St. Marys, Pennsylvania.

⁽⁵⁾ Capacity utilization reflects production volume as a percentage of production capacity.

⁽⁶⁾ Our St. Marys, Pennsylvania facility graphitizes a limited number of electrodes and pins sourced from our Monterrey, Mexico facility.

Non-GAAP financial measures

In addition to providing results that are determined in accordance with GAAP, we have provided certain financial measures that are not in accordance with GAAP. EBITDA, adjusted EBITDA, adjusted net income and adjusted EPS are non-GAAP financial measures. We define EBITDA, a non-GAAP financial measure, as net income or loss plus interest expense, minus interest income, plus income taxes and depreciation and amortization. We define adjusted EBITDA as EBITDA plus any pension and other post-employment benefit (OPEB) plan expenses, adjustments for public offerings and related expenses, non-cash gains or losses from foreign currency remeasurement of non-operating assets and liabilities in our foreign subsidiaries where the functional currency is the U.S. dollar, related party payable - Tax Receivable Agreement adjustments, non-cash stock-based compensation expense, non-cash fixed asset write-offs, value-added tax credit gains in Brazil and Change in

Control charges that were triggered as a result of the ownership of our largest stockholder falling below 30% of our total outstanding shares. For purposes of this section, a "Change in Control" occurred when Brookfield and any affiliates thereof ceased to own stock of the Company that constitutes at least thirty percent (30%) or thirty-five percent (35%), as applicable, of the total fair market value or total voting power of the stock of the Company. Adjusted EBITDA is the primary metric used by our management and our Board of Directors to establish budgets and operational goals for managing our business and evaluating our performance.

We monitor adjusted EBITDA as a supplement to our GAAP measures, and believe it is useful to present to investors, because we believe that it facilitates evaluation of our period-to-period operating performance by eliminating items that are not operational in nature, allowing comparison of our recurring core business operating results over multiple periods unaffected by differences in capital structure, capital investment cycles and fixed asset base. In addition, we believe adjusted EBITDA and similar measures are widely used by investors, securities analysts, ratings agencies, and other parties in evaluating companies in our industry as a measure of financial performance and debt-service capabilities.

Our use of adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for analysis of our results as reported under GAAP. Some of these limitations are:

- adjusted EBITDA does not reflect changes in, or cash requirements for, our working capital needs;
- adjusted EBITDA does not reflect our cash expenditures for capital equipment or other contractual commitments, including any capital expenditure requirements to augment or replace our capital assets;
- adjusted EBITDA does not reflect the interest expense or the cash requirements necessary to service interest or principal payments on our indebtedness;
- adjusted EBITDA does not reflect tax payments that may represent a reduction in cash available to us;
- adjusted EBITDA does not reflect expenses relating to our pension and OPEB plans;
- adjusted EBITDA does not reflect public offerings and related expenses;
- adjusted EBITDA does not reflect the non-cash gains or losses from foreign currency remeasurement of non-operating assets and liabilities in our foreign subsidiaries where the functional currency is the U.S. dollar;
- adjusted EBITDA does not reflect stock-based compensation expense;
- adjusted EBITDA does not reflect the non-cash write-off of fixed assets;
- adjusted EBITDA does not reflect related party payable - Tax Receivable Agreement adjustments;
- adjusted EBITDA does not reflect Change in Control charges;
- adjusted EBITDA does not reflect gains from the settlement of a value-added tax matter in Brazil; and
- other companies, including companies in our industry, may calculate EBITDA and adjusted EBITDA differently, which reduces its usefulness as a comparative measure.

We define adjusted net income, a non-GAAP financial measure, as net income or loss and exclude the items used to calculate adjusted EBITDA, less the tax effect of those adjustments. We define adjusted EPS, a non-GAAP financial measure, as adjusted net income divided by the weighted average diluted common shares outstanding during the period. We believe adjusted net income and adjusted EPS are useful to present to investors because we believe that they assist investors' understanding of the underlying operational profitability of the Company.

In evaluating EBITDA, adjusted EBITDA, adjusted net income and adjusted EPS, you should be aware that in the future, we will incur expenses similar to the adjustments in the reconciliations presented below, other than the Change in Control charges. Our presentations of EBITDA, adjusted EBITDA, adjusted net income, adjusted EPS, should not be construed as suggesting that our future results will be unaffected by these expenses or any unusual or non-recurring items. When evaluating our performance, you should consider EBITDA, adjusted EBITDA, adjusted net income, adjusted EPS, alongside other measures of financial performance and liquidity, including our net income (loss), EPS, respectively, and other GAAP measures.

The following tables reconcile our non-GAAP key financial measures to the most directly comparable GAAP measures:

Reconciliation of Net Income to Adjusted Net Income

	Year Ended December 31,	
	2022	2021
Net income	\$ 382,962	\$ 382,962
<u>Diluted income per common share:</u>		
Net income per share	\$ 1.48	\$ 1.48
Weighted average common shares outstanding	258,791,228	266,311,228
Net income	\$ 382,962	\$ 382,962
Adjustments, pre-tax:		
Pension and OPEB plan benefits ⁽¹⁾	(7,355)	(7,355)
Public offerings and related expenses ⁽²⁾	100	100
Non-cash losses (gains) on foreign currency remeasurement ⁽³⁾	521	521
Stock-based compensation expense ⁽⁴⁾	2,311	2,311
Non-cash fixed asset write-off ⁽⁵⁾	1,068	1,068
Related party Tax Receivable Agreement adjustment ⁽⁶⁾	(83)	(83)
Change in Control LTIP award ⁽⁷⁾	—	—
Change in Control stock-based compensation acceleration ⁽⁷⁾	—	—
Brazil value-added tax credit ⁽⁸⁾	—	(1,000)
Total non-GAAP adjustments pre-tax	\$ (3,438)	\$ (3,438)
Income tax impact on non-GAAP adjustments ⁽⁹⁾	(142)	(142)
Adjusted net income	\$ 379,666	\$ 400,000

- (1) Net periodic benefit credit for our pension and OPEB plans, including a mark-to-market (gain) loss, representing actuarial gains and losses that result from the remeasurement of plan assets and obligations due to changes in assumptions or experience. We recognize the actuarial gains and losses in connection with the annual remeasurement in earnings in the fourth quarter of each year.
- (2) Legal, accounting, printing and registration fees associated with the public offerings and related expenses.
- (3) Non-cash losses (gains) from foreign currency remeasurement of non-operating assets and liabilities of our non-U.S. subsidiaries where the functional currency is the U.S. dollar.
- (4) Non-cash expense for stock-based compensation grants.
- (5) Non-cash fixed asset write-off recorded for obsolete assets.
- (6) Non-cash expense adjustment for future payment to our sole pre-IPO stockholder for tax assets that are expected to be utilized.
- (7) In the second quarter of 2021, we incurred Change in Control charges as a result of the ownership of our largest stockholder, Brookfield, moving below 30% of our shares outstanding.
- (8) Gain from the settlement of a value-added tax matter in Brazil.
- (9) The tax impact on the non-GAAP adjustments is affected by their tax deductibility and the applicable jurisdictional tax rates.

Reconciliation of EPS to Adjusted EPS

	Year Ended December 31,	
	2022	2021
EPS	\$ 1.48	\$ 1.46
Adjustments per share:		
Pension and OPEB plan benefits ⁽¹⁾	(0.03)	(0.01)
Public offerings and related expenses ⁽²⁾	—	—
Non-cash losses on foreign currency remeasurement ⁽³⁾	—	—
Stock-based compensation ⁽⁴⁾	0.01	—
Non-cash fixed asset write-off ⁽⁵⁾	0.01	0.01
Related party Tax Receivable Agreement adjustment ⁽⁶⁾	—	—
Change in Control LTIP award ⁽⁷⁾	—	0.27
Change in Control stock-based compensation acceleration ⁽⁷⁾	—	0.06
Brazil value-added tax credit ⁽⁸⁾	—	(0.04)
Total non-GAAP adjustments pre-tax per share	(0.01)	0.29
Income tax impact on non-GAAP adjustments per share ⁽⁹⁾	—	0.01
Adjusted EPS	\$ 1.47	\$ 1.74

- (1) Net periodic benefit credit for our pension and OPEB plans, including a mark-to-market (gain) loss, representing actuarial gains and losses that result from the remeasurement of plan assets and obligations due to changes in assumptions or experience. We recognize the actuarial gains and losses in connection with the annual remeasurement in earnings in the fourth quarter of each year.
- (2) Legal, accounting, printing and registration fees associated with the public offerings and related expenses.
- (3) Non-cash losses (gains) from foreign currency remeasurement of non-operating assets and liabilities of our non-U.S. subsidiaries where the functional currency is the U.S. dollar.
- (4) Non-cash expense for stock-based compensation grants.
- (5) Non-cash fixed asset write-off recorded for obsolete assets.
- (6) Non-cash expense adjustment for future payment to our sole pre-IPO stockholder for tax assets that are expected to be utilized.
- (7) In the second quarter of 2021, we incurred Change in Control charges as a result of the ownership of our largest stockholder, Brookfield, moving below 30% of our total shares outstanding.
- (8) Gain from the settlement of a value-added tax matter in Brazil.
- (9) The tax impact on the non-GAAP adjustments is affected by their tax deductibility and the applicable jurisdictional tax rates.

Reconciliation of Net Income to Adjusted EBITDA

	Year Ended December 31,	
	2022	2021
Net income	\$ 382,962	\$ 388,330
Add:		
Depreciation and amortization	55,496	65,716
Interest expense	36,568	68,760
Interest income	(4,480)	(872)
Income taxes	69,356	68,076
EBITDA	539,902	590,010
Adjustments:		
Pension and OPEB plan benefits ⁽¹⁾	(7,355)	(2,545)
Public offerings and related expenses ⁽²⁾	100	663
Non-cash losses (gains) on foreign currency remeasurement ⁽³⁾	521	(119)
Stock-based compensation ⁽⁴⁾	2,311	1,917
Non-cash fixed asset write-off ⁽⁵⁾	1,068	3,197
Related party Tax Receivable Agreement adjustment ⁽⁶⁾	(83)	231
Change in Control LTIP award ⁽⁷⁾	—	73,384
Change in Control stock-based compensation acceleration ⁽⁷⁾	—	14,713
Brazil value-added tax credit ⁽⁸⁾	—	(11,511)
Adjusted EBITDA	\$ 536,464	\$ 669,940

- (1) Net periodic benefit credit for our pension and OPEB plans, including a mark-to-market (gain) loss, representing actuarial gains and losses that result from the remeasurement of plan assets and obligations due to changes in assumptions or experience. We recognize the actuarial gains and losses in connection with the annual remeasurement in earnings in the fourth quarter of each year.
- (2) Legal, accounting, printing and registration fees associated with the public offerings and related expenses.
- (3) Non-cash losses (gains) from foreign currency remeasurement of non-operating assets and liabilities of our non-U.S. subsidiaries where the functional currency is the U.S. dollar.
- (4) Non-cash expense for stock-based compensation grants.
- (5) Non-cash fixed asset write-off recorded for obsolete assets.
- (6) Non-cash expense adjustment for future payment to our sole pre-IPO stockholder for tax assets that are expected to be utilized.
- (7) In the second quarter of 2021, we incurred Change in Control charges as a result of the ownership of our largest stockholder, Brookfield, moving below 30% of our shares outstanding.
- (8) Gain from the settlement of a value-added tax matter in Brazil.

Results of Operations

Results of operations for 2022 as compared to 2021

The tables presented in our period-over-period comparisons summarize our Consolidated Statements of Operations and illustrate key financial indicators used to assess the consolidated financial results. Throughout our Management Discussion and Analysis of Financial Condition and Results of Operations ("MD&A"), insignificant changes may be deemed not meaningful and are generally excluded from the discussion.

(in thousands)	Year Ended December 31,		Increase/ Decrease	% Change
	2022	2021		
Net sales	\$ 1,281,250	\$ 1,345,788	\$ (64,538)	(5)%
Cost of sales	726,373	701,335	25,038	4 %
Gross profit	554,877	644,453	(89,576)	(14)%
Research and development	3,641	3,771	(130)	(3)%
Selling and administrative expenses	76,977	132,608	(55,631)	(42)%
Operating income	474,259	508,074	(33,815)	(7)%
Other income, net	(10,064)	(16,451)	(6,387)	(39)%
Related party Tax Receivable Agreement (benefit) expense	(83)	231	(314)	N/A
Interest expense	36,568	68,760	(32,192)	(47)%
Interest income	(4,480)	(872)	3,608	414 %
Income before provision for income taxes	452,318	456,406	(4,088)	(1)%
Provision for income taxes	69,356	68,076	1,280	2 %
Net income	\$ 382,962	\$ 388,330	\$ (5,368)	(1)%

Net sales decreased \$64.5 million, or 5%, compared to the prior year, reflecting an 11% decrease in sales volume of manufactured electrodes, primarily due to the impact of the temporary suspension of our Monterrey, Mexico facility, and a shift in the mix of our business to non-LTA volume from volume derived from our LTAs, partially offset by improved pricing on non-LTA volume. Our weighted-average realized price for non-LTAs in 2022 was \$6,000 per MT, or an increase of 34%, compared to a weighted-average realized price of \$4,500 per MT in 2021.

Cost of sales increased \$25.0 million, or 4%, in 2022 compared to 2021. Cost of sales for 2021 included \$30.7 million of one-time Long-term Incentive Plan ("LTIP") charges resulting from a Change in Control after our largest stockholder's ownership of our common stock was reduced below 30% of our outstanding common stock. Excluding this Change in Control charge, cost of sales increased \$55.7 million, or 8%. This increase was primarily due to an increase in our costs driven by recent global inflationary pressures, particularly for carbon-based inputs, energy and freight. In addition, in connection with the Monterrey temporary suspension, we recorded in cost of sales fixed manufacturing costs that would otherwise have been inventoried. These excess fixed manufacturing costs represented approximately \$16.0 million for the year, including approximately \$3.5 million of depreciation. Out of the \$16.0 million, approximately \$14.0 million was recorded in the fourth quarter.

Selling and administrative expenses decreased \$55.6 million, or 42%, in 2022 compared to 2021, primarily due to the aforementioned Change in Control event resulting in one-time charges recorded in 2021 of \$42.6 million of LTIP expense and \$12.9 million of accelerated stock-based compensation expense. Absent these charges, selling and administrative expenses would have been flat compared to the prior year.

Other income, net decreased \$6.4 million, or 39%, in 2022 compared to 2021. This was primarily the result of the absence of an \$11.5 million gain on a value-added tax matter in Brazil in 2021, partially offset by \$5.8 million of increased mark-to-market gains on our pension and OPEB plans in 2022.

Interest expense decreased \$32.2 million, or 47%, in 2022 compared to 2021 due to reductions to the principal of our variable-rate debt since the beginning of 2021, as well as a \$4.6 million gain realized upon the early redemption of \$67.0 million of our \$250.0 million de-designated interest rate swap. In addition, interest expense for 2022 includes \$7.1 million of mark-to-market gains related to the remaining \$183.0 million notional amount of our de-designated interest rate swap. See Note 7, "Interest Expense," and Note 8, "Fair Value Measurements and Derivative Instruments," to the Consolidated Financial Statements for additional details.

Interest income increased \$3.6 million, or 414%, in 2022 compared to 2021 due to interest received on past due payments from customers.

Provision for income taxes. The following table summarizes the provision for income taxes in 2022 and 2021:

	Year Ended December 31, 2022	Year Ended December 31, 2021
Provision for income taxes	\$ 69,356	\$ 68,076
Income before provision for income taxes	\$ 452,318	\$ 456,406
Effective income tax rate	15.3 %	14.9 %

The provision for income taxes increased \$1.3 million, or 2%, in 2022 compared to 2021 primarily due to the mix of worldwide earnings from various countries taxed at different rates and the U.S. taxation of Global Intangible Low Tax Income ("GILTI"), partially offset by reduced pre-tax income.

The effective tax rate for 2022 and 2021 was lower than the U.S. statutory rate of 21% primarily due to worldwide earnings from various countries taxed at different rates, partially offset by the net combined impact related to the U.S. taxation of GILTI and Foreign Tax Credits ("FTCs").

Currency Translation and Transactions

We translate the assets and liabilities of our non-U.S. subsidiaries into U.S. dollars for consolidation and reporting purposes in accordance with the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 830, *Foreign Currency Matters*. Foreign currency translation adjustments are generally recorded as part of stockholders' equity and identified as part of accumulated other comprehensive loss on the Consolidated Balance Sheets until such time as their operations are sold or substantially or completely liquidated.

We account for our Russian, Swiss, Luxembourg, United Kingdom and Mexican subsidiaries using the U.S. dollar as the functional currency, as sales and purchases are predominantly U.S. dollar-denominated. Our remaining subsidiaries use their local currency as their functional currency.

We also record foreign currency transaction gains and losses from non-permanent intercompany balances as part of cost of sales and other income, net.

Significant changes in currency exchange rates impacting us are described under "—Effects of Changes in Currency Exchange Rates" and "—Results of Operations" in this section.

Effects of Changes in Currency Exchange Rates

When the currencies of non-U.S. countries in which we have a manufacturing facility decline (or increase) in value relative to the U.S. dollar, this has the effect of reducing (or increasing) the U.S. dollar equivalent cost of sales and other expenses with respect to those facilities. In certain countries in which we have manufacturing facilities, and in certain export markets, we sell in currencies other than the U.S. dollar. Accordingly, when these currencies increase (or decline) in value relative to the U.S. dollar, this has the effect of increasing (or reducing) net sales. The result of these effects is to increase (or decrease) operating and net income.

The impact of these changes in the average exchange rates of other currencies against the U.S. dollar on our net sales was a decrease of \$11.7 million for 2022 and increases of \$5.5 million and \$3.6 million for 2021 and 2020, respectively.

The impact of these changes in the average exchange rates of other currencies against the U.S. dollar on our cost of sales was a decrease of \$20.6 million for 2022, an increase of \$10.1 million for 2021 and a decrease of \$4.9 million for 2020.

As part of our cash management, we also have intercompany loans between our subsidiaries. These loans are deemed to be temporary and, as a result, remeasurement gains and losses on these loans are recorded as currency gains or losses in other (income) expense, net on the Consolidated Statements of Operations.

We have in the past and may in the future use various financial instruments to manage certain exposures to risks caused by currency exchange rate changes, as described under "Quantitative and Qualitative Disclosures about Market Risk."

Liquidity and Capital Resources

Our sources of funds have consisted principally of cash flow from operations and debt, including our credit facilities (subject to continued compliance with the financial covenants and representations). Our uses of those funds (other than for operations) have consisted principally of dividends, capital expenditures, scheduled debt repayments, optional debt repayments, stock repurchases and other obligations. Disruptions in the U.S. and international financial markets could adversely affect our liquidity and the cost and availability of financing to us in the future.

We believe that we have adequate liquidity to meet our needs for at least the next 12 months and for the foreseeable future thereafter. As of December 31, 2022, we had liquidity of \$461.6 million, consisting of \$327.0 million of availability under our 2018 Revolving Credit Facility, after giving effect to \$3.0 million of letters of credit, and cash and cash equivalents of \$134.6 million. We remain subject to continued compliance with the financial covenant in our 2018 Revolving Credit Facility (see the "Financing Transactions" section and Note 5, "Long-Term Debt and Liquidity") and our future operating performance could result in the reduction of the availability under our 2018 Revolving Credit Facility. We expect our operating cash flow to be positive for 2023 and do not anticipate the need to borrow against our 2018 Revolving Credit Facility. We had long-term debt of \$921.8 million and short-term debt of \$0.1 million as of December 31, 2022. As of December 31, 2021, we had liquidity of \$304.2 million, consisting of \$246.7 million available under our 2018 Revolving Credit Facility, after giving effect to \$3.3 million of letters of credit, and cash and cash equivalents of \$57.5 million. We had long-term debt of \$1.0 billion and short-term debt of \$0.1 million as of December 31, 2021.

As of December 31, 2022 and 2021, \$92.3 million and \$49.1 million, respectively, of our cash and cash equivalents were located outside of the U.S. We repatriate funds from our foreign subsidiaries through dividends. All of our subsidiaries face the customary statutory limitation that distributed dividends do not exceed the amount of retained and current earnings. In addition, for our subsidiary in South Africa, the South Africa Central Bank imposes that certain solvency and liquidity ratios remain above defined levels after the dividend distribution, which historically has not materially affected our ability to repatriate cash from this jurisdiction. The cash and cash equivalents balances in South Africa were \$1.2 million and \$0.5 million as of December 31, 2022 and December 31, 2021, respectively. Upon repatriation to the United States, the foreign source portion of dividends we receive from our foreign subsidiaries is no longer subject to U.S. federal income tax as a result of the Tax Cuts and Jobs Act of 2017 ("Tax Act").

Cash flow and plans to manage liquidity. Our cash flow typically fluctuates significantly between quarters due to various factors. These factors include customer order patterns, fluctuations in working capital requirements, timing of tax and interest payments and other factors. We had positive cash flow from operating activities during each of the last three years. Cash from operations is expected to remain at positive sustained levels on an annual basis.

In July 2019, our Board of Directors authorized a program to repurchase up to \$100.0 million of our outstanding common stock. In November 2021, our Board of Directors authorized the repurchase of an additional \$150.0 million of stock repurchases under this program. We may purchase shares from time to time on the open market, including under Rule 10b5-1 and/or Rule 10b-18 plans. The amount and timing of repurchases are subject to a variety of factors including liquidity, stock price, applicable legal requirements, other business objectives and market conditions. In 2022, we repurchased 6.7 million shares of our common stock for an aggregate of \$60.0 million. As of December 31, 2022, we had \$99.0 million remaining under our stock repurchase authorization.

In December 2020, GrafTech Finance Inc. ("GrafTech Finance") issued \$500.0 million aggregate principal amount of 2020 Senior Secured Notes in a private offering. The 2020 Senior Secured Notes and related guarantees are secured on a pari passu basis by the collateral securing the Senior Secured Credit Facilities. All of the proceeds from the 2020 Senior Secured Notes were used to partially repay borrowings under our 2018 Term Loan Facility.

We repaid an additional \$110.0 million on our 2018 Term Loan Facility in 2022. We are committed to delivering value to our stockholders through our disciplined capital allocation strategy.

Prior to April 2020, we had paid a quarterly cash dividend of \$0.085 per share, or an aggregate of \$0.34 per share on an annualized basis. In April 2020, as a result of the deteriorating economic environment, our Board of Directors reduced our dividend rate to \$0.01 per share, or \$0.04 per share on an annualized basis. There can be no assurance that we will pay dividends in the future in these amounts or at all. Our Board of Directors may change the timing and amount of any future dividend payments or eliminate the payment of future dividends in its sole discretion, without any prior notice to our stockholders. Our ability to pay dividends will depend upon many factors, including our financial position and liquidity, results of operations, legal requirements, restrictions that may be imposed by the terms of our current and future credit facilities and other debt obligations and other factors deemed relevant by our Board of Directors.

Potential uses of our liquidity include dividends, stock repurchases, capital expenditures, acquisitions, scheduled debt repayments, optional debt repayments and other general purposes. An improving economy, while resulting in improved results of operations, could increase our cash requirements to purchase inventories, make capital expenditures and fund payables and other obligations until increased accounts receivable are converted into cash. A downturn could significantly and negatively impact our results of operations and cash flows, which, coupled with increased borrowings, could negatively impact our credit ratings, our ability to comply with debt covenants, our ability to secure additional financing and the cost of such financing, if available.

In order to seek to reduce our credit risks, we may reduce our sales of, or refuse to sell (except for prepayment, cash on delivery or under letters of credit or parent guarantees), our products to some customers and potential customers. Our unrecovered trade receivables worldwide have not been material during the last two years individually or in the aggregate.

We manage our capital expenditures by taking into account quality, plant reliability, safety, environmental and regulatory requirements, prudent or essential maintenance requirements, global economic conditions, available capital resources, liquidity, long-term business strategy and return on invested capital for the relevant expenditures, cost of capital and return on invested capital of the Company as a whole among other factors. Capital expenditures totaled \$72.2 million in 2022. We anticipate capital expenditures between \$55.0 million and \$60.0 million in 2023.

In the event that operating cash flows fail to provide sufficient liquidity to meet our business needs, including capital expenditures, any such shortfall would need to be made up by increased borrowings under our 2018 Revolving Credit Facility, to the extent available.

Related Party Transactions

We have engaged in transactions with affiliates or related parties during 2022 and 2021, and we expect to continue to do so in the future. These transactions include ongoing obligations under the Tax Receivable Agreement, stockholders rights agreement, as amended, and registration rights agreement, each with Brookfield.

Cash flows

The following table summarizes our cash flow activities:

	Year Ended December 31,	
	2022	2021
	<i>(Dollars in thousands)</i>	
Cash flow provided by (used in):		
Operating activities	\$ 324,628	\$ 443,040
Investing activities	(71,970)	(57,860)
Financing activities	(176,267)	(471,792)
Net change in cash and cash equivalents	\$ 76,391	\$ (86,612)

Operating activities

Cash provided by operating activities totaled \$324.6 million in 2022 versus \$443.0 million in the prior-year period. The decrease in operating cash flow was primarily due to a \$83.2 million increase in cash used for working capital. Cash flow used for inventories was \$153.6 million in 2022 compared to \$28.2 million in 2021, driven primarily by increases in both costs and quantities of raw materials in 2022. Cash flow provided by accounts payable and accruals decreased \$58.8 million. In addition, cash provided by accounts receivable increased \$89.4 million versus the prior-year period due to timing and decreased sales in 2022.

Investing activities

Net cash used in investing activities was \$72.0 million in the year ended December 31, 2022 compared to \$57.9 million in the year ended December 31, 2021 primarily driven by increased capital expenditures.

Financing activities

Net cash used in financing activities decreased \$295.5 million primarily driven by a reduction in the amount of \$290.0 million of voluntary prepayments made on our 2018 Term Loan Facility in 2022. In addition, interest rate swap settlements provided \$6.4 million of cash in 2022, compared to using \$4.2 million of cash in 2021. Partially offsetting these items was a \$10.0 million increase in cash used for repurchases of our common stock during 2022.

Financing transactions

2018 Term Loan and 2018 Revolving Credit Facility

In February 2018, the Company entered into a credit agreement (as amended, the "2018 Credit Agreement"), which provides for (i) a \$2,250 million senior secured term facility (the "2018 Term Loan Facility") after giving effect to the June 2018 amendment (the "First Amendment") that increased the aggregate principal amount of the 2018 Term Loan Facility from \$1,500 million to \$2,250 million and (ii) a \$330 million senior secured revolving credit facility after giving effect to the May 2022 amendment that increased the revolving commitments under the 2018 Credit Agreement by \$80 million from \$250 million (the "2018 Revolving Credit Facility" and, together with the 2018 Term Loan Facility, the "Senior Secured Credit Facilities"). GrafTech Finance is the sole borrower under the 2018 Term Loan Facility while GrafTech Finance, GrafTech Switzerland SA ("Swissco") and GrafTech Luxembourg II S.à.r.l. ("Luxembourg Holdco" and, together with GrafTech Finance and Swissco, the "Co-Borrowers") are co-borrowers under the 2018 Revolving Credit Facility. The 2018 Term Loan Facility and the 2018 Revolving Credit Facility mature on February 12, 2025 and May 31, 2027, respectively. As of December 31, 2022 and 2021, there was no debt outstanding on the 2018 Revolving Credit Facility and there was \$3.0 million and \$3.3 million of letters of credit drawn against the 2018 Revolving Credit Facility, respectively.

The 2018 Term Loan Facility bears interest, at our option, at a rate equal to either (i) the Adjusted LIBO Rate (as defined in the 2018 Credit Agreement), plus an applicable margin equal to 3.00% per annum following an amendment in February 2021 (the "Second Amendment") that decreased the Applicable Rate (as defined in the 2018 Credit Agreement) by 0.50% for each pricing level or (ii) the ABR Rate (as defined in the 2018 Credit Agreement), plus an applicable margin equal to 2.00% per annum following the Second Amendment, in each case with one step down of 25 basis points based on achievement of certain public ratings of the 2018 Term Loan Facility. The Second Amendment also decreased the interest rate floor from 1.0% to 0.50% for the 2018 Term Loan Facility.

The 2018 Revolving Credit Facility bears interest, at our option, at a rate equal to either (i) the Adjusted Term SOFR Rate, and Adjusted EURIBOR Rate (each, as defined in the 2018 Credit Agreement), plus an applicable margin initially equal to 3.00% per annum or (ii) the ABR Rate, plus an applicable margin initially equal to 2.00% per annum, in each case with two 25 basis point step downs based on achievement of certain senior secured first lien net leverage ratios. In addition, we are required to pay a quarterly commitment fee on the unused commitments under the 2018 Revolving Credit Facility in an amount equal to 0.25% per annum.

The Senior Secured Credit Facilities are guaranteed by each of our domestic subsidiaries, subject to certain customary exceptions, and by GrafTech Luxembourg I S.à.r.l., a Luxembourg société à responsabilité limitée and an indirect wholly owned subsidiary of GrafTech, Luxembourg HoldCo, and Swissco (collectively, the "Guarantors") with respect to all obligations under the 2018 Credit Agreement of each of our foreign subsidiaries that is a Controlled Foreign Corporation (within the meaning of Section 956 of the Internal Revenue Code of 1986, as amended from time to time (the "Code")).

All obligations under the 2018 Credit Agreement are secured, subject to certain exceptions, by: (i) a pledge of all of the equity securities of each domestic Guarantor and of each other direct, wholly owned domestic subsidiary of GrafTech and any Guarantor, (ii) a pledge on no more than 65% of the equity interests of each subsidiary that is a Controlled Foreign Corporation (within the meaning of Section 956 of the Code), and (iii) security interests in, and mortgages on, personal property and material real property of each domestic Guarantor, subject to permitted liens and certain exceptions specified in the 2018 Credit Agreement. The obligations of each foreign subsidiary of GrafTech that is a Controlled Foreign Corporation under the 2018 Revolving Credit Facility are secured by (i) a pledge of all of the equity securities of each Guarantor that is a Controlled Foreign Corporation and of each direct, wholly owned subsidiary of any Guarantor that is a Controlled Foreign Corporation, and (ii) security interests in certain receivables and personal property of each Guarantor that is a Controlled Foreign Corporation, subject to permitted liens and certain exceptions specified in the 2018 Credit Agreement.

The 2018 Term Loan Facility amortizes at a rate of \$112.5 million per year payable in equal quarterly installments, with the remainder due at maturity. The Co-Borrowers are permitted to make voluntary prepayments at any time without premium or penalty. GrafTech Finance is required to make prepayments under the 2018 Term Loan Facility (without payment of a premium) with (i) net cash proceeds from non-ordinary course asset sales (subject to customary reinvestment rights and other customary exceptions and exclusions), and (ii) commencing with the Company's fiscal year ended December 31, 2019, 75% of Excess Cash Flow (as defined in the 2018 Credit Agreement), subject to step-downs to 50% and 0% of Excess Cash Flow based on achievement of a senior secured first lien net leverage ratio greater than 1.25 to 1.00 but less than or equal to 1.75 to 1.00 and less than or equal to 1.25 to 1.00, respectively. Scheduled quarterly amortization payments of the 2018 Term Loan Facility during any calendar year reduce, on a dollar-for-dollar basis, the amount of the required Excess Cash Flow prepayment for such calendar year, and the aggregate amount of Excess Cash Flow prepayments for any calendar year reduce subsequent quarterly amortization payments of the 2018 Term Loan Facility as directed by GrafTech Finance. As of December 31, 2022, we have satisfied all required amortization installments through the maturity date.

The 2018 Credit Agreement contains customary representations and warranties and customary affirmative and negative covenants applicable to GrafTech and restricted subsidiaries, including, among other things, restrictions on indebtedness, liens, investments, fundamental changes, dispositions, and dividends and other distributions. The 2018 Credit Agreement contains a financial covenant that requires GrafTech to maintain a senior secured first lien net leverage ratio not greater than 4.00:1.00 when the aggregate principal amount of borrowings under the 2018 Revolving Credit Facility and outstanding letters of credit issued under the 2018 Revolving Credit Facility (except for undrawn letters of credit in an aggregate amount equal to or less than \$35 million), taken together, exceed 35% of the total amount of commitments under the 2018 Revolving Credit Facility. The 2018 Credit Agreement also contains customary events of default. We were in compliance with all of our debt covenants as of December 31, 2022 and 2021.

2020 Senior Secured Notes

On December 22, 2020, GrafTech Finance issued \$500.0 million aggregate principal amount of the 2020 Senior Secured Notes at an issue price of 100% of the principal amount thereof in a private offering to qualified institutional buyers in accordance with Rule 144A under the Securities Act of 1933 (the "Securities Act") and to non-U.S. persons outside the United States under Regulation S under the Securities Act.

The 2020 Senior Secured Notes were issued pursuant to the indenture among GrafTech Finance, as issuer, the Company, as a guarantor, the other subsidiaries of the Company named therein as guarantors and U.S. Bank National Association, as trustee and notes collateral agent (the "Indenture").

The 2020 Senior Secured Notes are guaranteed on a senior secured basis by the Company and all of its existing and future direct and indirect U.S. subsidiaries that guarantee, or borrow under, the credit facilities under its 2018 Credit Agreement. The 2020 Senior Secured Notes are secured on a pari passu basis by the collateral securing the term loans under the 2018 Credit Agreement. GrafTech Finance, the Company and the other guarantors granted a security interest in such collateral, consisting of substantially all of their respective assets, as security for the obligations of GrafTech Finance, the Company and the other guarantors under the 2020 Senior Secured Notes and the Indenture pursuant to a collateral agreement, dated as of December 22, 2020 (the "Collateral Agreement"), among GrafTech Finance, the Company, the other subsidiaries of the Company named therein as grantors and U.S. Bank National Association, as collateral agent.

The 2020 Senior Secured Notes bear interest at the rate of 4.625% per annum, which accrues from December 22, 2020 and is payable in arrears on June 15 and December 15 of each year, commencing on June 15, 2021. The 2020 Senior Secured Notes will mature on December 15, 2028, unless earlier redeemed or repurchased, and are subject to the terms and conditions set forth in the Indenture.

GrafTech Finance may redeem some or all of the 2020 Senior Secured Notes at the redemption prices and on the terms specified in the Indenture. If the Company or GrafTech Finance experiences specific kinds of changes in control or the Company or any of its restricted subsidiaries sells certain of its assets, then GrafTech Finance must offer to repurchase the 2020 Senior Secured Notes on the terms set forth in the Indenture.

The Indenture contains certain covenants that, among other things, limit the Company's ability, and the ability of certain of its subsidiaries, to incur or guarantee additional indebtedness or issue preferred stock, pay distributions on, redeem or repurchase capital stock or redeem or repurchase subordinated debt, incur or suffer to exist liens securing indebtedness, make certain investments, engage in certain transactions with affiliates, consummate certain asset sales and effect a consolidation or merger, or sell, transfer, lease or otherwise dispose of all or substantially all assets. The Indenture contains events of default customary for agreements of its type (with customary grace periods, as applicable) and provides that, upon the occurrence of an event of default arising from certain events of bankruptcy or insolvency with respect to the Company or GrafTech Finance, all outstanding 2020 Senior Secured Notes will become due and payable immediately without further action or notice. If any other type of event of default occurs and is continuing, then the trustee or the holders of at least 30% in principal amount of the then outstanding 2020 Senior Secured Notes may declare all of the 2020 Senior Secured Notes to be due and payable immediately.

The entirety of the 2020 Senior Secured Notes proceeds was used to pay down a portion of our 2018 Term Loan Facility.

Fixed-rate obligations

As of December 31, 2022, we had \$500.0 million of fixed-rate debt consisting of our 2020 Senior Secured Notes and \$433.7 million of variable-rate debt. As of December 31, 2022, we had two remaining interest rate swap contracts with notional amounts totaling \$433.0 million that were modified in 2021 to align with the terms of the 2018 Term Loan Facility, maturing in third quarter of 2024. It is expected that these swaps will fix the cash flows associated with the forecasted interest payments on

this notional amount of debt to an effective fixed interest rate of 4.2%, which could be lowered to 3.95% depending on credit ratings. See Note 5, "Debt and Liquidity," to the Consolidated Financial Statements for details.

Material Cash Requirements. The following table summarizes our contractual and other material cash obligations as of December 31, 2022:

	Payments Due by Year Ending December 31,				
	Total	2023	2024-2025	2026-2027	2028+
<i>(Dollars in Thousands)</i>					
Contractual and Other Obligations					
Long-term debt (a)	\$ 933,976	\$ 124	\$ 433,852	\$ —	\$ 500,000
Interest on long-term debt (b)	184,403	41,986	73,042	46,892	22,483
Total contractual obligations	1,118,379	42,110	506,894	46,892	522,483
Pension plan contributions (c)	1,395	1,395	—	—	—
Related party Tax Receivable Agreement (d)	15,552	4,631	9,935	986	—
Total contractual and other obligations (e)	\$ 1,135,326	\$ 48,136	\$ 516,829	\$ 47,878	\$ 522,483

- (a) Represents our total debt from our 2018 Term Loan Facility with an outstanding balance of \$433.7 million, which matures on February 12, 2025, and from our 2020 Senior Secured Notes with an outstanding balance of \$500.0 million due in 2028 (see "Financing transactions" in this section for full details of these obligations).
- (b) Represents estimated interest payments required on our 2018 Term Loan Facility using a monthly LIBOR curve through February 2025, net of interest rate swap impacts and estimated interest payments on the 2020 Senior Secured Notes through December 15, 2028.
- (c) Represents estimated contributions under our defined benefit pension plans. Contributions in future periods will be dependent upon regulatory requirements, the plans' funded ratios, plan investment performance, discount rates, actuarial assumptions, plan amendments, our contribution objectives and other factors. We anticipate funding those contributions with cash on hand or cash generated from operations. It is not practical to estimate the required contributions beyond 2023 at the present time.
- (d) Represents Brookfield's right to receive future payments from us for 85% of the amount of cash savings, if any, in U.S. federal income tax and Swiss tax that we and our subsidiaries realize as a result of the utilization of certain tax assets attributable to periods prior to our IPO, including certain federal NOLs, previously taxed income under Section 959 of the Code, foreign tax credits, and certain NOLs in Swissco. In addition, we will pay interest on the payments we will make to Brookfield with respect to the amount of these cash savings from the due date (without extensions) of our tax return where we realize these savings to the payment date at a rate equal to LIBOR plus 1.00% per annum. The term of the Tax Receivable Agreement commenced on April 23, 2018 and will continue until there is no potential for any future tax benefit payments.
- (e) In addition, letters of credit of \$3.0 million were issued under the 2018 Revolving Credit Facility as of December 31, 2022.

Costs Relating to Protection of the Environment

We have been and are subject to increasingly stringent environmental protection laws and regulations. In addition, we have an on-going commitment to rigorous internal environmental protection standards. Environmental considerations are part of all significant operating and capital expenditure decisions. The following table sets forth certain information regarding environmental expenses and capital expenditures.

	Year Ended December 31,		
	2022	2021	2020
<i>(Dollars in thousands)</i>			
Expenses relating to environmental protection	\$ 22,395	\$ 16,914	\$ 11,075
Capital expenditures related to environmental protection	6,012	7,014	9,018

Critical accounting policies

Critical accounting policies are those that require difficult, subjective or complex judgments by management, often as a result of the need to make estimates about the effect of matters that are inherently uncertain and may change in subsequent periods. We use and rely on estimates in determining the economic useful lives of our assets, obligations under our employee

benefit plans, provisions for doubtful accounts, provisions for restructuring charges and contingencies, tax valuation allowances, evaluation of goodwill, other intangible assets, pension and OPEB and various other recorded or disclosed amounts, including inventory valuations. Estimates require us to use our judgment. While we believe that our estimates for these matters are reasonable, if the actual amount is significantly different than the estimated amount, our assets, liabilities or results of operations may be overstated or understated. The following accounting policies are deemed to be critical.

Goodwill. As a result of our acquisition by Brookfield, we have a significant amount of goodwill. Goodwill is tested for impairment annually or more frequently if an event or circumstance indicates that an impairment loss may have been incurred. When reviewing goodwill for impairment, we first perform a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value.

In performing a qualitative assessment, we consider business conditions and other factors including, but not limited to (i) adverse industry or economic trends, (ii) lower projections that may impact future operating results, (iii) sustained decline in our share price and (iv) overall financial performance and other events affecting the reporting units. If we conclude that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, then a quantitative impairment test is performed by estimating the fair value of the reporting unit and comparing it to its carrying value. If the carrying value of a reporting unit exceeds its fair value, we would record an impairment charge equal to the excess of the carrying value of the reporting unit over its fair value.

Application of the goodwill impairment test requires judgment, including the identification of reporting units, assignment of assets and liabilities to reporting units, assignment of goodwill to reporting units and determination of the fair value of each reporting unit. We estimate the fair value of each reporting unit using a discounted cash flow methodology under the income approach. This requires us to use significant judgment including estimation of future cash flows, which is based upon relevant market data, internal forecasts, estimation of the long-term growth for our business and determination of the weighted average cost of capital for purposes of establishing a discount rate.

It is possible that our assumptions about future performance, as well as the economic outlook and related conclusions regarding valuation, could change adversely, which may result in impairment that would have a material effect on our financial position and results of operations in future periods.

Refer to Note 1, "Business and Summary of Significant Accounting Policies" and Note 6, "Goodwill and Other Intangible Assets" to the Consolidated Financial Statements for information regarding our goodwill impairment testing.

Employee benefit plans. We sponsor various retirement and pension plans, including defined benefit and defined contribution plans and post-employment benefit plans that cover most employees worldwide. Excluding the defined contribution plans, accounting for these plans requires assumptions as to the discount rate, expected return on plan assets, expected salary increases and health care cost trend rate. See Note 11, "Retirement Plans and Post-employment Benefits," to the Consolidated Financial Statements for further details.

Impairments of long-lived assets. We may record impairment losses on long-lived assets used in operations when events and circumstances indicate that the assets might be impaired and the future undiscounted cash flows estimated to be generated by those assets are less than the carrying amount of those assets. Assets to be disposed are reported at the lower of the carrying amount or fair value less estimated costs to sell. Estimates of the future cash flows are subject to significant uncertainties and assumptions. If the actual value is significantly less than the estimated fair value, our assets may be overstated. Future events and circumstances, some of which are described below, may result in an impairment charge:

- new technological developments that provide significantly enhanced benefits over our current technology;
- significant negative economic or industry trends;
- changes in our business strategy that alter the expected usage of the related assets; and
- future economic results that are below our expectations used in the current assessments.

Accounting for income taxes. We are required to estimate our income taxes in each of the jurisdictions in which we operate. This process requires us to make the following assessments:

- estimate our actual current tax liability in each jurisdiction;
- estimate our temporary differences resulting from differing treatment of items for tax and accounting purposes (which result in deferred tax assets and liabilities that we include within the Consolidated Balance Sheets); and
- assess the likelihood that our deferred tax assets will be recovered from future taxable income and, if we believe that recovery is not more likely than not, a valuation allowance is established.

If our estimates are incorrect, our deferred tax assets or liabilities may be overstated or understated.

As of December 31, 2022, we had a valuation allowance of \$9.3 million against certain deferred tax assets. Our losses in certain tax jurisdictions in recent periods represented sufficient negative evidence to require a full valuation allowance. We also have a partial valuation allowance related to certain U.S. state net operating losses where realizability is unlikely due to discontinued operations in these states. Until we determine that we will generate sufficient jurisdictional taxable income to realize our net operating losses and deferred tax assets, we continue to maintain a valuation allowance.

Related-party Tax Receivable Agreement. On April 23, 2018, the Company entered into the Tax Receivable Agreement, which provides Brookfield, as the sole pre-IPO stockholder, the right to receive future payments from us for 85% of the amount of cash savings, if any, in U.S. federal income tax and Swiss tax that we and our subsidiaries realize as a result of the utilization of certain tax assets attributable to periods prior to our IPO, including the pre-IPO Tax Assets. In addition, we will pay interest on the payments we will make to Brookfield with respect to the amount of these cash savings from the due date (without extensions) of our tax return where we realize these savings to the payment date at a rate equal to LIBO Rate plus 1.00% per annum. The term of the Tax Receivable Agreement commenced on April 23, 2018 and will continue until there is no potential for any future tax benefit payments.

The calculation of the Tax Receivable Agreement liability requires significant judgment with regards to the assumptions underlying the forecast of future taxable income, in total and by jurisdiction, as well as their timing.

Revenue recognition. Revenue is recognized when a customer obtains control of promised goods, in an amount that reflects the consideration which we expect to receive in exchange for those goods.

To determine revenue recognition for arrangements that we determine are within the scope of ASC 606, the following five steps are performed: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) we satisfy a performance obligation. We only apply the five-step model to contracts when it is probable that we will collect the consideration we are entitled to in exchange for the goods or services we transfer to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, we assess the goods or services promised within each contract and determine those that are performance obligations, and assess whether each promised good or service is distinct. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

From 2018 to 2022, our revenue streams primarily consisted of LTAs and short-term purchase orders (deliveries within the year) directly with steel manufacturers. The promises of delivery of graphite electrodes represent the distinct performance obligations to which the contract consideration is allocated, based upon the electrode stand-alone selling prices for the class of customers at the time the agreements are executed. The performance obligations are considered to be satisfied at a point in time when control of the electrodes has been transferred to the customer. The Company has elected to treat the transportation of the electrodes from our premises to the customer's facilities as a fulfillment activity, and outbound freight cost is accrued when the graphite electrode performance obligation is satisfied. Any variable consideration is recognized up to its unconstrained amount (i.e., up to the amount for which it is probable that a significant reversal of the variable revenue will not happen).

Revenue recognition requires the estimation of the electrode stand-alone selling price, using a variety of inputs, from market observable information to internal pricing guidelines. The estimate of stand-alone selling price on the various classes of contracts is the basis for the allocation of revenue amongst periods for new and modified contracts. Historically the amount of contract assets and liabilities resulting from these estimates have been immaterial. See Note 2, "Revenue from Contracts with Customers," to the Consolidated Financial Statements for additional information.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risks, primarily from changes in interest rates, currency exchange rates, energy commodity prices and commercial energy rates. From time to time, we enter into transactions that have been authorized according to documented policies and procedures in order to manage these risks. These transactions relate primarily to financial instruments described below. Since the counterparties to these financial instruments are large commercial banks and similar financial institutions, we do not believe that we are exposed to material counterparty credit risk. We do not use financial instruments for trading purposes.

Our exposure to changes in interest rates results primarily from floating rate long-term debt tied to LIBO Rate, SOFR Rate or EURIBOR Rate.

Our exposure to changes in currency exchange rates results primarily from:

- sales made by our subsidiaries in currencies other than local currencies;
- raw material purchases made by our foreign subsidiaries in currencies other than local currencies; and
- investments in and intercompany loans to our foreign subsidiaries and our share of the earnings of those subsidiaries, to the extent denominated in currencies other than the U.S. dollar.

Our exposure to changes in energy commodity prices and commercial energy rates results primarily from the purchase or sale of refined oil products and the purchase of natural gas and electricity for use in our manufacturing operations.

Interest rate risk management. We periodically enter into agreements with financial institutions that are intended to limit our exposure to additional interest expense due to increases in variable interest rates. These instruments effectively cap our interest rate exposure. As of December 31, 2022 and 2021, we recorded unrealized pre-tax gains of \$27.4 million and \$5.9 million, respectively, on our interest rate swaps. See Note 8, "Fair Value Measurements and Derivative Instruments" for additional details.

Currency rate management. We enter into foreign currency derivatives from time to time to attempt to manage exposure to changes in currency exchange rates. These foreign currency derivatives, which include, but are not limited to, forward exchange contracts and purchased currency options, attempt to hedge global currency exposures. Forward exchange contracts are agreements to exchange different currencies at a specified future date and at a specified rate. Purchased currency options are instruments which give the holder the right, but not the obligation, to exchange different currencies at a specified rate at a specified date or over a range of specified dates. Forward exchange contracts and purchased currency options are carried at fair value.

Our outstanding foreign currency derivatives represented a net unrealized pre-tax loss of \$0.2 million at December 31, 2022 and a net unrealized gain of \$0.4 million as of December 31, 2021.

Energy commodity management. We have entered into commodity derivative contracts to effectively fix some or all of our exposure to refined oil products. The outstanding commodity derivative contracts represented net unrealized gain of \$8.5 million as of December 31, 2021. As of December 31, 2022, there were no commodity derivative contracts outstanding.

Sensitivity analysis. We use sensitivity analysis to quantify potential impacts that market rate changes may have on the underlying exposures as well as on the fair values of our derivatives. The sensitivity analysis for the derivatives represents the hypothetical changes in value of the hedge position and does not reflect the related gain or loss on the forecasted underlying transaction.

A hypothetical increase in interest rates of 100 basis points (1%) would have decreased our interest expense by \$0.2 million, net of the impact of our interest rate swap, for the year ended December 31, 2022. The same 100 basis points increase would have resulted in an increase of \$3.5 million in fair value of our interest rate swap portfolio.

As of December 31, 2022, a 10% appreciation or depreciation in the value of the U.S. dollar against foreign currencies from the prevailing market rates would result in a corresponding decrease of \$4.7 million or a corresponding increase of \$4.7 million, respectively, in the fair value of the foreign currency hedge portfolio.

Because of the high correlation between the hedging instrument and the underlying exposure, fluctuations in the value of the instruments are generally offset by reciprocal changes in the value of the underlying exposure.

For further information related to the financial instruments described above, see Note 1, "Business and Summary of Significant Accounting Policies" and Note 8, "Fair Value Measurement and Derivative Instruments" to the Consolidated Financial Statements for additional information.

Item 8. Financial Statements and Supplementary Data

(Unless otherwise noted, all dollars are presented in thousands)

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See the Table of Contents located at the beginning of this Report for more detailed page references to information contained in this Item.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of GrafTech International Ltd.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of GrafTech International Ltd. and subsidiaries (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of operations and comprehensive income, stockholders' equity (deficit), and cash flows for each of the three years in the period ended December 31, 2022, and the related notes (collectively referred to as the "financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2022, 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 financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, 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, 2022, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by COSO.

Basis for Opinions

The Company's management is responsible for these 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 an opinion on these financial statements and an opinion 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 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 financial statements included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. 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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the 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 - Refer to Notes 1 and 6 to the financial statements

Critical Audit Matter Description

The Company's goodwill balance was \$171.1 million as of December 31, 2022, which relates to one reporting unit. The Company assesses goodwill for impairment testing annually or more frequently if events or changes in circumstances indicate that the carrying value of a reporting unit might be impaired. In evaluating whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount, the Company performed a qualitative assessment of relevant events and circumstances that could impact the fair value of such reporting unit.

If, after assessing the totality of events and circumstances, it is deemed more likely than not that the fair value of the reporting unit is less than its carrying amount, the Company estimates the fair value of the reporting unit by performing a quantitative goodwill impairment assessment. As a result of the analysis performed as of December 31, 2022, the Company determined that the goodwill was not more likely than not impaired, and no quantitative assessment was necessary.

Qualitative factors included macroeconomic conditions, industry and market considerations, current discount rates, cost factors, historical and forecasted financial results and events specific to the reporting unit, which required a higher degree of auditor judgment to evaluate.

We identified the evaluation of qualitative goodwill impairment indicators, or qualitative factors, as a critical audit matter as the assessment of the potential impact that these qualitative factors have on the reporting unit's fair value required the application of subjective auditor judgment.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the relevant qualitative factors in the Company's December 31, 2022 qualitative assessment included the following, among others:

- Tested the effectiveness of controls related to the evaluation of the assumptions and inputs used as part of management's review of the qualitative assessment.
- We evaluated the qualitative factors used by management for reasonableness, which included an assessment of the impact of those factors when applied to the Company's last quantitative assessment performed.
- We compared the actual results of the reporting unit to the Company's historical forecasted performance to evaluate the accuracy of management's estimates.
- We evaluated whether the underlying assumptions of future performance for the reporting unit were consistent with information from analyst reports and macroeconomic industry and market considerations and whether there were other significant adverse considerations that would impact the underlying assumptions.
- With the assistance of our fair value specialists, we evaluated the impact of changes in discount rates by developing a range of independent estimates based upon industry peers, including testing the underlying information and the mathematical accuracy of the calculations.

/s/ DELOITTE & TOUCHE LLP

Cleveland, Ohio

February 14, 2023

We have served as the Company's auditor since 2015.

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

(Dollars in thousands, except share data)

	December 31,	
	2022	2021
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 134,641	\$ 57,514
Accounts and notes receivable, net of allowance for doubtful accounts of \$8,019 as of December 31, 2022 and \$6,835 as of December 31, 2021	145,574	207,547
Inventories	447,741	289,432
Prepaid expenses and other current assets	87,272	73,364
Total current assets	815,228	627,857
Property, plant and equipment	869,168	815,298
Less: accumulated depreciation	350,022	313,825
Net property, plant and equipment	519,146	501,473
Deferred income taxes	11,960	26,187
Goodwill	171,117	171,117
Other assets	86,727	85,684
Total assets	\$ 1,604,178	\$ 1,412,318
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 103,156	\$ 117,112
Long-term debt, current maturities	124	127
Accrued income and other taxes	40,592	57,097
Other accrued liabilities	89,349	56,405
Related party payable - Tax Receivable Agreement	4,631	3,828
Total current liabilities	237,852	234,569
Long-term debt	921,803	1,029,561
Other long-term obligations	50,822	68,657
Deferred income taxes	45,065	40,674
Related party payable - Tax Receivable Agreement long-term	10,921	15,455
Commitments and contingencies – Note 12		
Stockholders' equity:		
Preferred stock, par value \$0.01, 300,000,000 shares authorized, none issued	—	—
Common stock, par value \$0.01, 3,000,000,000 shares authorized, 256,597,342 and 263,255,708 shares issued and outstanding as of December 31, 2022 and December 31, 2021, respectively	2,566	2,633
Additional paid-in capital	745,164	761,412
Accumulated other comprehensive loss	(8,070)	(7,444)
Accumulated deficit	(401,945)	(733,199)
Total stockholders' equity	337,715	23,402
Total liabilities and stockholders' equity	\$ 1,604,178	\$ 1,412,318

See accompanying Notes to the Consolidated Financial Statements

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME
(Dollars in thousands, except per share data)

	Year Ended December 31,		
	2022	2021	2020
STATEMENTS OF OPERATIONS			
Net sales	\$ 1,281,250	\$ 1,345,788	\$ 1,224,361
Cost of sales	726,373	701,335	563,864
Gross profit	554,877	644,453	660,497
Research and development	3,641	3,771	3,975
Selling and administrative expenses	76,977	132,608	67,913
Operating income	474,259	508,074	588,609
Other (income) expense, net	(10,064)	(16,451)	3,330
Related party Tax Receivable Agreement (benefit) expense	(83)	231	(21,090)
Interest expense	36,568	68,760	98,074
Interest income	(4,480)	(872)	(1,750)
Income before provision for income taxes	452,318	456,406	510,045
Provision for income taxes	69,356	68,076	75,671
Net income	<u>\$ 382,962</u>	<u>\$ 388,330</u>	<u>\$ 434,374</u>
Basic income per common share:			
Net income per share	\$ 1.48	\$ 1.46	\$ 1.62
Weighted average common shares outstanding	258,781,843	266,251,097	267,916,483
Diluted income per common share:			
Net income per share	1.48	1.46	1.62
Weighted average common shares outstanding	258,791,228	266,317,194	267,930,644
STATEMENTS OF COMPREHENSIVE INCOME			
Net income	\$ 382,962	\$ 388,330	\$ 434,374
Other comprehensive (loss) income:			
Foreign currency translation adjustments, net of tax of \$0, \$0 and \$(162), respectively	(7,024)	(19,605)	6,568
Commodities, interest rate and foreign currency derivatives, net of tax of \$(2,591), \$(8,632) and \$5,399, respectively	6,398	31,802	(18,848)
Other comprehensive (loss) income, net of tax:	(626)	12,197	(12,280)
Comprehensive income	<u>\$ 382,336</u>	<u>\$ 400,527</u>	<u>\$ 422,094</u>

See accompanying Notes to the Consolidated Financial Statements

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

(Dollars in thousands)

	Year Ended December 31,		
	2022	2021	2020
Cash flow from operating activities:			
Net income	\$ 382,962	\$ 388,330	\$ 434,374
Adjustments to reconcile net income to cash provided by operations:			
Depreciation and amortization	55,496	65,716	62,963
Related party Tax Receivable Agreement (benefit) expense	(83)	231	(21,090)
Deferred income tax provision	17,022	(3,657)	20,241
Loss on extinguishment of debt	—	—	8,329
Non-cash stock-based compensation expense	2,311	16,631	2,665
Non-cash interest expense	(2,428)	12,051	6,192
Other adjustments	(8,023)	7,107	7,861
Net change in working capital*	(99,575)	(16,377)	86,438
Change in related party Tax Receivable Agreement	(3,745)	(21,799)	(27,857)
Change in long-term assets and liabilities	(19,309)	(5,193)	(16,470)
Net cash provided by operating activities	324,628	443,040	563,646
Cash flow from investing activities:			
Capital expenditures	(72,165)	(58,257)	(36,075)
Proceeds from the sale of fixed assets	195	397	379
Net cash used in investing activities	(71,970)	(57,860)	(35,696)
Cash flow from financing activities:			
Debt issuance and modification costs	(2,232)	(3,109)	(6,278)
Proceeds from the issuance of long-term debt	—	—	500,000
Principal payments on long-term debt	(110,124)	(400,142)	(896,360)
Repurchase of common stock	(60,000)	(50,000)	(30,099)
Payments for taxes related to net share settlement of equity awards	(230)	(4,077)	(71)
Proceeds from exercise of stock options	225	351	—
Dividends paid to non-related party	(7,770)	(7,439)	(8,603)
Dividends paid to related party	(2,559)	(3,206)	(22,272)
Interest rate swap settlements	6,423	(4,170)	—
Net cash used in financing activities	(176,267)	(471,792)	(463,683)
Net change in cash and cash equivalents	76,391	(86,612)	64,267
Effect of exchange rate changes on cash and cash equivalents	736	(1,316)	240
Cash and cash equivalents at beginning of period	57,514	145,442	80,935
Cash and cash equivalents at end of period	\$ 134,641	\$ 57,514	\$ 145,442

See accompanying Notes to the Consolidated Financial Statements

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS (Continued)

(Dollars in thousands)

	Year Ended December 31,		
	2022	2021	2020
<i>Supplemental disclosures of cash flow information:</i>			
<i>Net cash paid during the periods for:</i>			
Interest	\$ 39,503	\$ 56,333	\$ 86,962
Income taxes	67,122	63,791	73,971
<i>* Net change in working capital due to the following components:</i>			
Accounts and notes receivable, net	\$ 60,507	\$ (28,927)	\$ 63,557
Inventories	(153,579)	(28,165)	44,633
Prepaid expenses and other current assets	593	(31,921)	3,028
Income taxes payable	(15,029)	5,674	(12,420)
Accounts payable and accruals	7,748	66,591	(12,790)
Interest payable	185	371	430
Net change in working capital	<u>\$ (99,575)</u>	<u>\$ (16,377)</u>	<u>\$ 86,438</u>

See accompanying Notes to the Consolidated Financial Statements

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY (DEFICIT)
(Dollars in thousands, except share data)

	Issued Shares of Common Stock	Common Stock	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity (Deficit)
Balance as of December 31, 2019	270,485,308	\$ 2,705	\$ 765,419	\$ (7,361)	\$ (1,451,836)	\$ (691,073)
Net income	—	—	—	—	434,374	434,374
Other comprehensive (loss) income:						
Commodity and interest rate derivatives loss, net of tax of \$4,250	—	—	—	(15,594)	—	(15,594)
Commodity derivatives reclassification adjustments, net of tax of \$879	—	—	—	(3,254)	—	(3,254)
Foreign currency translation adjustments, net of tax of \$(162)	—	—	—	6,568	—	6,568
Total other comprehensive loss	—	—	—	(12,280)	—	(12,280)
Repurchase of common stock	(3,328,574)	(33)	(9,700)	—	(20,366)	(30,099)
Stock-based compensation	42,411	—	2,665	—	—	2,665
Payments for taxes related to net share settlement of equity awards	(10,598)	—	(30)	—	(41)	(71)
Dividends paid to related party (\$0.115 per share)	—	—	—	—	(22,272)	(22,272)
Dividends paid to non-related party (\$0.115 per share)	—	—	—	—	(8,603)	(8,603)
Adoption of ASC 326	—	—	—	—	(2,026)	(2,026)
Balance as of December 31, 2020	<u>267,188,547</u>	<u>\$ 2,672</u>	<u>\$ 758,354</u>	<u>\$ (19,641)</u>	<u>\$ (1,070,770)</u>	<u>\$ (329,385)</u>
Net income	—	—	—	—	388,330	388,330
Other comprehensive income (loss):						
Commodity and interest rate derivatives income, net of tax of \$(6,662)	—	—	—	24,525	—	24,525
Commodity and interest rate derivatives reclassification adjustments, net of tax of \$(1,970)	—	—	—	7,277	—	7,277
Foreign currency translation adjustments, net of tax of \$0	—	—	—	(19,605)	—	(19,605)
Total other comprehensive income	—	—	—	12,197	—	12,197
Repurchase of common stock	(4,658,544)	(46)	(13,091)	—	(36,863)	(50,000)
Stock-based compensation	1,009,545	11	16,620	—	—	16,631
Options exercised	33,500	—	351	—	—	351
Payments for taxes related to net share settlement of equity awards	(317,340)	(4)	(822)	—	(3,251)	(4,077)
Dividends paid to related party (\$0.04 per share)	—	—	—	—	(3,206)	(3,206)
Dividends paid to non-related party (\$0.04 per share)	—	—	—	—	(7,439)	(7,439)
Balance as of December 31, 2021	<u>263,255,708</u>	<u>\$ 2,633</u>	<u>\$ 761,412</u>	<u>\$ (7,444)</u>	<u>\$ (733,199)</u>	<u>\$ 23,402</u>
Net income	—	—	—	—	382,962	382,962
Other comprehensive income (loss):						
Commodity, interest rate and foreign currency derivatives income, net of tax of \$(5,060)	—	—	—	15,829	—	15,829
Commodity, interest rate and foreign currency derivatives reclassification adjustments, net of tax of \$2,469	—	—	—	(9,431)	—	(9,431)
Foreign currency translation adjustments, net of tax of \$0	—	—	—	(7,024)	—	(7,024)
Total other comprehensive loss	—	—	—	(626)	—	(626)
Repurchase of common stock	(6,662,421)	(67)	(18,721)	—	(41,212)	(60,000)
Stock-based compensation	1,348	—	2,311	—	—	2,311
Options exercised	25,000	—	225	—	—	225
Payments for taxes related to net share settlement of equity awards	(22,293)	—	(63)	—	(167)	(230)
Dividends paid to related party (\$0.04 per share)	—	—	—	—	(2,559)	(2,559)
Dividends paid to non-related party (\$0.04 per share)	—	—	—	—	(7,770)	(7,770)
Balance as of December 31, 2022	<u>256,597,342</u>	<u>\$ 2,566</u>	<u>\$ 745,164</u>	<u>\$ (8,070)</u>	<u>\$ (401,945)</u>	<u>\$ 337,715</u>

See accompanying Notes to the Consolidated Financial Statements

GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

(Dollars in thousands, except as otherwise noted)

(1) Business and Summary of Significant Accounting Policies

Discussion of Business and Structure

GrafTech is a leading manufacturer of high-quality graphite electrode products essential to the production of EAF steel and other ferrous and non-ferrous metals. References herein to “GTI,” “we,” “our,” or “us” refer collectively to the Company and its subsidiaries. On August 15, 2015, GTI became an indirect wholly owned subsidiary of Brookfield. In April 2018, we completed our IPO of 38,097,525 shares of our common stock held by Brookfield at a price of \$15.00 per share. We did not receive any proceeds related to the IPO. Our common stock is listed on the NYSE under the symbol “EAF.” Brookfield has since distributed a portion of its GrafTech common stock to the owners in the Brookfield consortium and sold shares of GrafTech common stock in public and private transactions, resulting in reduction of Brookfield's ownership of outstanding shares of GrafTech common stock to 24.9% as of December 31, 2022 and 24.3% as of December 31, 2021. See Note 14, "Stockholders' Equity," for more information. The increase in Brookfield's share ownership from December 31, 2021 to December 31, 2022 reflects a reduction of the Company's total outstanding shares due to the repurchase and retirement of 6.7 million shares of its common stock in 2022.

The Company's only reportable segment, Industrial Materials, is comprised of its two major product categories: graphite electrodes and petroleum needle coke products. Petroleum needle coke is our key raw material used in the production of graphite electrodes. The Company's vision is to provide highly engineered graphite electrode products, services and solutions to electric arc furnace operators.

Summary of Significant Accounting Policies

The Consolidated Financial Statements include the financial statements of the Company and its wholly owned subsidiaries. All intercompany transactions have been eliminated in consolidation.

Cash Equivalents

Cash equivalents consist of short-term, highly liquid investments with an original maturity of three months or less. Cash equivalents consist of certificates of deposit, money market funds and commercial paper.

Revenue Recognition

Revenue is recognized when a customer obtains control of promised goods. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled to receive in exchange for these goods.

To achieve this core principle, the following five steps are performed: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) a performance obligation is satisfied.

The Company sells the majority of its products directly to steel manufacturers located in various jurisdictions. The Company's contracts consist of longer-term take-or-pay sales contracts of graphite electrodes with initial terms of up to five years and short-term purchase orders (deliveries within one year). Collectability is assessed based on the customer's ability and intention to pay, reviewing a variety of factors including the customer's historical payment experience and published credit and financial information. Additionally, for multi-year contracts, we may require the customer to post a bank guarantee, guarantee of a parent, a letter of credit or a significant prepayment.

The promises of delivery of graphite electrodes represent the distinct performance obligations of the Company's contracts. A small portion of the Company's sales consist of deliveries of by-products of the manufacturing processes, such as graphite powders, naphta and gasoil.

Given their nature, the Company's performance obligations are satisfied at a point in time when control of the products has been transferred to the customer. In most cases, control transfer is deemed to happen at the delivery point of the products defined under the incoterms, usually at time of loading the truck or the vessel. The Company has elected to treat the

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transportation activity as a fulfillment activity instead of as a distinct performance obligation, and outbound freight cost is accrued when the product delivery promises are satisfied.

The transaction price is determined based on the consideration to which the Company will be entitled in exchange for transferring goods to the customer. Taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction and collected by the Company from a customer are excluded from the transaction price.

Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. The estimated variable consideration is reflected through revenue reversal accruals that are based on the Company's experience, as well as anticipated performance. Historically, these reversals have been insignificant. Additionally, when termination fees are invoiced under certain provisions of the LTAs, they are accounted for as an element of variable consideration that is constrained, i.e., not recognized, until collected.

Contracts that contain multiple distinct performance obligations require an allocation of the transaction price to each performance obligation based on a relative stand-alone selling price basis. The Company regularly reviews market conditions and internally approved pricing guidelines to determine stand-alone selling prices for the different types of its customer contracts. The stand-alone prices as known at contract inception are utilized as the basis to allocate the transaction price to the distinct performance obligations. The allocation of the transaction price to the performance obligations remains unchanged if stand-alone selling prices change after contract inception.

Changes to LTAs are reviewed to assess whether there has been a change in volume, price or both and whether any additional volumes are at their stand-alone selling price to determine whether the contract modification should be accounted for as (1) part of the existing contract, (2) the termination of the existing contract and the creation of a new contract or (3) a separate contract. Under the most commonly negotiated terms, the accounting is such that it treats these modified contracts as the termination of the existing contract and the creation of a new contract.

Inventories

Inventories are stated at the lower of cost or market. Cost is principally determined using the first-in, first-out ("FIFO") or average cost, which approximates FIFO, methods. Elements of cost in inventory include raw materials, energy costs, direct labor, manufacturing overhead and depreciation of manufacturing fixed assets.

The Company allocates fixed production overheads to the costs of conversion based on normal capacity utilization of the production facilities. The Company recognizes abnormal amounts of idle facility expense, freight, handling costs, and wasted materials (spoilage) as current period charges.

Property, Plant and Equipment

Expenditures for property, plant and equipment are recorded at cost. Maintenance and repairs of property and equipment are expensed as incurred. Expenditures for replacements and betterments are capitalized and the replaced assets are retired. Gains and losses from the sale of property, plant and equipment are included in cost of sales or other (income) expense, net on the Consolidated Statements of Operations. The Company depreciates its assets using the straight-line method over the estimated useful lives of the assets. The ranges of estimated useful lives are as follows:

	Years
Buildings	25-40
Land improvements	20
Machinery and equipment	5-20
Furniture and fixtures	5-10

The carrying value of fixed assets is assessed when events and circumstances indicating impairment are present. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of the assets to future undiscounted net cash flows expected to be generated by the assets. If the assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell.

Depreciation expense was \$45.4 million, \$55.0 million and \$51.5 million in 2022, 2021 and 2020, respectively. Accounts payable associated with capital expenditures totaled \$23.4 million and \$15.7 million as of December 31, 2022 and 2021, respectively.

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Leases

The Company determines if an arrangement is a lease at inception. When an arrangement contains a lease, the Company then determines if it meets any of the criteria to be classified as a finance lease. Leases with a term of 12 months or less are not recorded on the balance sheet.

Right of Use ("RoU") assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. RoU assets and lease liabilities are recognized at the lease commencement date based on the present value of the lease payments over the lease term. In order to compute the lease liability, when the rate implicit in the lease is not readily determinable, the Company discounts the lease payments using its estimated incremental borrowing rate for secured fixed rate debt over the same term, derived from information available at the lease commencement date. The Company's lease terms include the option to extend the lease when it is reasonably certain that option will be exercised.

Lease and non-lease components are treated as a single lease component, except for leases of warehouse space where they will be accounted for separately. Leases may include variable lease and variable non-lease components costs, which are accounted for as variable lease expense in the Consolidated Statements of Operations.

Accounts Receivable

Trade accounts receivable primarily arise from sales of goods to customers and distributors in the normal course of business.

Allowance for Doubtful Accounts

The Company recognizes credit losses at the time the financial assets originate or are acquired using a lifetime of expected credit losses measurement. The Company's expected losses are adjusted each period for changes in expected lifetime credit losses.

Debt Issuance Costs

Deferred financing costs are amortized over the terms of the related debt using the effective interest method. If the terms of renewed or modified debt instruments are deemed to be substantially different, all unamortized financing costs associated with the modified debt are charged to earnings in the current period. If the terms are not substantially different, the costs associated with the renewal are capitalized and amortized over the remaining term of the debt instrument. For modifications affecting a line of credit, fees paid to a creditor and any third party costs will be capitalized and amortized over the remaining term of the new arrangement. Any unamortized deferred financing costs associated with the old arrangement are either deferred and amortized over the life of the new arrangement or written off, depending upon the nature of the modification and cost. The balance of any unamortized financing costs on extinguished debt is expensed upon extinguishment.

Derivative Financial Instruments

We do not use derivative financial instruments for trading purposes. They are used to manage well-defined commercial risks associated with commodity purchases, interest rates and currency exchange rate risks. On the date that a derivative contract for a hedging instrument is entered into, the Company designates the derivative as either (1) a hedge of the exposure to changes in the fair value of a recognized asset or liability or of an unrecognized firm commitment (a fair value hedge), (2) a hedge of the exposure of a forecasted transaction or of the variability in the cash flows of a recognized asset or liability (a cash flow hedge), (3) a hedge of a net investment in a foreign operation (a net investment hedge) or (4) a contract not designated as a hedging instrument.

For a fair value hedge, both the effective and ineffective portions of the change in the fair value of the derivative are recorded in earnings and reflected in the Consolidated Statement of Operations on the same line as the gain or loss on the hedged item attributable to the hedged risk. For a cash flow hedge, the effective portion of the change in the fair value of the derivative is recorded in accumulated other comprehensive loss ("AOCL") in the Consolidated Balance Sheet. When the underlying hedged transaction is realized, the gain or loss included in AOCL is recorded in earnings and reflected in the Consolidated Statement of Operations on the same line as the gain or loss on the hedged item attributable to the hedged risk. For a net investment hedge, the effective portion of the change in the fair value of the derivative is recorded in cumulative translation adjustment, which is a component of AOCL in the Consolidated Balance Sheet and is de-recognized upon liquidation or sale of the entity. For contracts not designated as hedging instruments, changes in fair value are adjusted through the statement of operations.

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We formally document our hedge relationships, including the identification of the hedging instruments and the related hedged items, as well as our risk management objectives and strategies for undertaking the hedge transaction. Derivatives are recorded at fair value in prepaid expenses and other current assets, other long-term assets, other current liabilities and other long-term obligations in the consolidated balance sheets. We also formally assess, both at inception and at least quarterly thereafter, whether a derivative used in a hedging transaction is highly effective in offsetting changes in either the fair value or the cash flows of the hedged item. When it is determined that a derivative ceases to be highly effective or that the hedged transaction is no longer probable of occurring, we discontinue hedge accounting.

Foreign Currency Derivatives

We enter into foreign currency derivatives from time to time to manage exposure to changes in currency exchange rates. These instruments, which include, but are not limited to, forward exchange contracts and purchased currency options, attempt to hedge global currency exposures, relating to non-dollar denominated debt and identifiable foreign currency receivables, payables and commitments held by our foreign and domestic subsidiaries. Forward exchange contracts are agreements to exchange different currencies at a specified future date and at a specified rate. Purchased foreign currency options are instruments which give the holder the right, but not the obligation, to exchange different currencies at a specified rate at a specified date or over a range of specified dates. The result is the creation of a range in which a best and worst price is defined, while minimizing option cost. Forward exchange contracts and purchased currency options are carried at fair value.

These contracts may be designated as cash flow or fair value hedges to the extent that they are effective and are accounted for as described in section above ("Derivative Financial Instruments"). For derivatives that are not designated as a hedge, any gain or loss is immediately recognized in cost of sales on the Consolidated Statements of Operations. Derivatives used in this manner relate to risks resulting from assets or liabilities denominated in a foreign currency.

Commodity Contracts

We enter into derivative contracts for refined oil products from time to time. These contracts are entered into to protect against the risk that eventual cash flows related to these products will be adversely affected by future changes in prices. All commodity contracts are carried at fair value and are treated as cash flow hedges to the extent they are effective. Changes in their fair values are included in AOCL in the Consolidated Balance Sheets until settlement. Realized gains and losses resulting from settlement are first recognized in AOCL and are recorded in cost of sales on the Consolidated Statements of Operations when the underlying hedged item is realized.

Interest Rate Swap Contracts

We have entered into interest rate swap contracts that are "pay fixed, receive variable" with maturities of either two or five years. The Company's risk management objective is to fix its cash flows associated with the risk in variability in the one-month USD LIBOR for a portion of its outstanding debt under the 2018 Term Loan Facility (as defined in Note 5, "Debt and Liquidity"). It is expected that these swaps will fix the cash flows associated with the forecasted interest payments on this notional amount of debt. Designated interest rate swaps are carried at their fair value and are treated as cash flow hedges. Changes in their fair value are included in AOCL on the Consolidated Balance Sheets until settlement. Realized gains and losses resulting from the settlement are recognized in interest expense in the period of settlement. Changes in fair value of the de-designated portion of interest rate swaps are recorded in the statement of operations.

Income Taxes

We file a consolidated U.S. federal income tax return for GTI and its eligible domestic subsidiaries. Our non-U.S. subsidiaries file income tax returns in their respective local jurisdictions. We account for income taxes under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to temporary differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and tax benefit carry forwards. Deferred tax assets and liabilities at the end of each period are determined using enacted tax rates. A valuation allowance is established or maintained, when, based on currently available information and other factors, it is more likely than not that all or a portion of a deferred tax asset will not be realized.

Under the guidance on accounting for uncertainty in income taxes, we recognize the benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by taxing authorities, based on the technical merits of the position. The tax benefits recognized in the financial statements from such a position are measured based on the largest benefit that has a greater than fifty percent likelihood of being realized upon ultimate settlement. The guidance on accounting for uncertainty in income taxes also provides guidance on derecognition, classification, interest and penalties on income taxes, and accounting in interim periods.

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The Company treats taxes due on future U.S. inclusions in taxable income related to Global Intangible Low Tax Income ("GILTI") as a current period expense when incurred. See Note 13, "Income Taxes" for more information.

Recent Law Changes

On August 16, 2022, the U.S. enacted the Inflation Reduction Act of 2022, which includes a 15% minimum tax on book income of certain large corporations, a 1% excise tax on net stock repurchases after December 31, 2022, and several tax incentives to promote clean energy. The Company does not believe this legislation will have a material impact on its consolidated financial statements and will continue to assess the implications.

Related Party Tax Receivable Agreement

On April 23, 2018, the Company entered into a Tax Receivable Agreement that provides Brookfield, as the sole pre-IPO stockholder, the right to receive future payments from us for 85% of the amount of cash savings, if any, in U.S. federal income tax and Swiss tax that we and our subsidiaries realize as a result of the utilization of certain tax assets attributable to periods prior to our IPO, including certain federal net operating losses ("NOLs"), previously taxed income under Section 959 of the Internal Revenue Code of 1986, as amended from time to time (the "Code"), foreign tax credits, and certain NOLs in Swissco (collectively, the "Pre-IPO Tax Assets"). In addition, we will pay interest on the payments we will make to Brookfield with respect to the amount of these cash savings from the due date (without extensions) of our tax return where we realize these savings to the payment date at a rate equal to LIBOR plus 1.00% per annum. The term of the Tax Receivable Agreement commenced on April 23, 2018 and will continue until there is no potential for any future tax benefit payments.

The Tax Receivable Agreement liability is recorded based on the best estimate of the utilization of Pre-IPO Tax Assets and is revised annually in the fourth quarter or earlier if and when significant changes in the forecast are identified.

Retirement Plans and Post-Employment Benefits

We use actuarial methods and assumptions to account for our defined benefit pension plans and our post-employment benefits. We recognize in earnings the change in the fair value of plan assets and net actuarial gains and losses annually in the fourth quarter of each year with a mark-to-market adjustment ("MTM Adjustment") and whenever a plan is remeasured (e.g., due to a significant curtailment, settlement, etc.). Pension and post-employment benefits expense includes the MTM Adjustment, actuarially computed cost of benefits earned during the current service period, the interest cost on accrued obligations, the expected return on plan assets and adjustments due to plan settlements and curtailments. Contributions to the qualified U.S. retirement plan are made in accordance with the requirements of the Employee Retirement Income Security Act of 1974.

Additional information with respect to benefits plans is set forth in Note 11, "Retirement Plans and Post-Employment Benefits."

Stock-based Compensation

The Company recognizes stock-based compensation expense based on the grant date fair value of the award over the period during which an employee is required to provide service in exchange for the award. Stock-based awards include stock options, restricted stock units ("RSUs") and deferred share units ("DSUs"). The fair value of RSUs and DSUs is primarily based on the closing market price of a share of the Company's common stock on the date of grant, modified as appropriate to take into account the features of such grants. Stock options are granted with an exercise price equal to the closing price of the Company's common shares on the date of grant. The fair value of stock options is determined using a Black-Scholes option-pricing model, which incorporates assumptions regarding the expected volatility, the expected option life, the risk-free interest rate, and the expected dividend yield. The Company accounts for forfeitures as they occur. See Note 3, "Stock-Based Compensation" for additional information.

Environmental, Health and Safety Matters

Our operations are governed by laws addressing protection of the environment and worker safety and health. These laws provide for civil and criminal penalties and fines, as well as injunctive and remedial relief, for noncompliance and require remediation at sites where hazardous substances have been released into the environment.

We have been in the past, and may become in the future, the subject of formal or informal enforcement actions or proceedings regarding noncompliance with these laws or the remediation of company-related substances released into the environment. Historically, such matters have been resolved by negotiation with regulatory authorities resulting in commitments

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to compliance, abatement or remediation programs and in some cases payment of penalties. Historically, neither the commitments undertaken nor the penalties imposed on us have been material.

Environmental considerations are part of all significant capital expenditure decisions. Environmental remediation, compliance and management expenses were approximately \$22.4 million, \$16.9 million and \$11.1 million in 2022, 2021 and 2020, respectively. A charge to income is recorded when it is probable that a liability has been incurred and the cost can be reasonably estimated. When payments are fixed or determinable, the liability is discounted using a rate at which the payments could be effectively settled. The accrued liability relating to environmental remediation was \$4.4 million and \$4.9 million as of December 31, 2022 and 2021, respectively.

Our environmental liabilities do not take into consideration possible recoveries of insurance proceeds. Because of the uncertainties associated with environmental remediation activities at sites where we may be potentially liable, future expenses to remediate sites could be considerably higher than the accrued liability.

Foreign Currency Translation and Remeasurement

We translate the financial statements of foreign subsidiaries, whose local currency is their functional currency, to U.S. dollars using period-end exchange rates for assets and liabilities and average exchange rates for each period for revenues, expenses, gains and losses. Differences arising from exchange rate changes are included in AOCL on the Consolidated Balance Sheets until such time as the operations of such non-U.S. subsidiaries are sold or substantially or completely liquidated.

For our Russian, Swiss, Luxembourg, United Kingdom and Mexican subsidiaries, whose functional currency is the U.S. dollar, we remeasure non-monetary balance sheet accounts and the related income statement accounts at historical exchange rates. Resulting gains and losses arising from the fluctuations in currency for monetary accounts are recognized in other (income) expense, net, in the Consolidated Statements of Operations. Gains and losses arising from fluctuations in currency exchange rates on transactions denominated in currencies other than the functional currency are recognized in earnings as incurred.

We have non-dollar denominated intercompany loans between some of our foreign subsidiaries. These loans are subject to remeasurement gains and losses due to changes in currency exchange rates. One of these loans has been deemed to be essentially permanent prior to settlement and, as a result, remeasurement gains and losses on this loan were recorded as a component of AOCL on the Consolidated Balance Sheets. The remaining loans are deemed to be temporary and, as a result, remeasurement gains and losses on these loans are recorded as currency (gains) losses in other (income) expense, net, on the Consolidated Statements of Operations.

Goodwill and Other Intangible Assets

Goodwill is the excess of the acquisition cost of businesses over the fair value of the identifiable net assets acquired. We do not recognize deferred income taxes for the difference between the assigned value and the tax basis related to nondeductible goodwill. Goodwill is not amortized; however, impairment testing is performed annually or more frequently if circumstances indicate that impairment may have occurred. We perform the annual goodwill impairment test at December 31.

The annual goodwill impairment testing may begin with a qualitative assessment of potential impairment indicators in order to determine whether it is necessary to perform the quantitative goodwill impairment test.

Other amortizable intangible assets, which consist primarily of trademarks and trade names, technology and know-how and customer-related intangibles, are amortized over their estimated useful lives using the straight line or sum-of-the-years digits method. The estimated useful lives for each major category of amortizable intangible assets are:

	Years
Trade names	5-20
Technology and know-how	5-14
Customer-related intangibles	5-15

Additional information about goodwill and other intangibles is set forth in Note 6, "Goodwill and Other Intangible Assets."

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Major Maintenance and Repair Costs

We perform scheduled major maintenance of the storage and processing units at our Seadrift plant (referred to as “overhaul”). Time periods between overhauls vary by unit. We also perform significant maintenance and repair shutdown of the plant (referred to as “turnaround”) every other year.

Costs of overhauls and turnarounds include plant personnel, contract services, materials and rental equipment. We defer these costs when incurred and use the straight-line method to amortize them over the period of time estimated to lapse until the next scheduled overhaul of the applicable storage or processing unit. Under this policy, \$17.2 million was deferred in 2022 and \$0.7 million was deferred in 2021. Amortization of deferred maintenance costs totaled \$4.7 million, \$4.6 million and \$6.0 million in 2022, 2021 and 2020, respectively.

Earnings per share

The calculation of basic earnings per share is based on the weighted average number of common shares outstanding. Diluted earnings per share recognizes the dilution that would occur if stock options or restricted stock units were exercised or settled into common shares. See Note 15, “Earnings per Share.”

Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles (“GAAP”) requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent liabilities at the date of the Consolidated Financial Statements and the reported amounts of revenue and expenses. Significant estimates and assumptions are used for, but are not limited to, inventory valuation, pension and other post-employment benefits, allowance for doubtful accounts, contingent liabilities, accruals and valuation allowances, asset impairment, and environmental-related accruals. Actual results could differ from our estimates.

Reclassifications and Adjustments

Certain items previously reported in specific financial statement captions within the Consolidated Statements of Cash Flows have been reclassified between lines within cash flow from financing activities to conform to the current presentation.

Subsequent Events

We evaluate events that occur after the balance sheet date but before financial statements are issued to determine if a material event requires our amending the financial statements or disclosing the event. See Note 17, “Subsequent Events” for further details.

Recently Adopted Accounting Standards

In January 2021, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2021-01, *Reference Rate Reform (Topic 848): Scope*, which amended Topic 848 reference rate reform to clarify the scope and availability of expedients for certain derivative instruments affected by reference rate reform. We have elected various optional expedients in Topic 848 related to hedging relationships and expect to make future elections related to contract modifications and other hedging relationships. The future election and application of these expedients are not expected to have a material impact on our financial position, results of operations and cash flows.

Accounting Guidance Issued But Not Adopted

In September 2022, the FASB issued ASU 2022-04, *Liabilities - Supplier Finance Programs (Subtopic 405-50): Disclosure of Supplier Finance Program Obligations*, which requires disclosures intended to enhance the transparency of supplier finance programs. The amendments in this ASU require buyers in a supplier finance program to disclose sufficient information about the program to allow a user of financial statements to understand the program’s nature, activity during the period, changes from period to period, and potential magnitude. The amendments are effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years, except for the disclosure of rollforward information, which is effective for fiscal years beginning after December 15, 2023. Early adoption is permitted. The amendments should be applied retrospectively to each period in which a balance sheet is presented, except for disclosure of rollforward information, which should be applied prospectively. The Company is currently evaluating the impact of adopting this guidance on its disclosures.

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(2) Revenue from Contracts with Customers

Disaggregation of Revenue

The following table provides information about disaggregated revenue by type of product and contract:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Graphite Electrodes - LTAs	\$ 870,287	\$ 1,040,214	\$ 1,069,772
Graphite Electrodes - Non-LTAs	351,140	258,426	123,845
By-products and other	59,823	47,148	30,744
Total Revenues	\$ 1,281,250	\$ 1,345,788	\$ 1,224,361

The Graphite Electrodes revenue categories include only graphite electrodes manufactured by GrafTech.

Contract Balances

Substantially all the Company's receivables relate to contracts with customers. Accounts receivable are recorded when the right to consideration becomes unconditional. Payment terms on invoices range from 30 to 120 days depending on the customary business practices of the jurisdictions in which we do business.

Certain short-term and longer-term sales contracts require up-front payments prior to the Company's fulfillment of any performance obligation. These contract liabilities are recorded as current or long-term deferred revenue, depending on the lag between the prepayment and the expected delivery of the related products. Additionally, deferred revenue or contract assets originate from contracts where the allocation of the transaction price to the performance obligations based on their relative stand-alone selling prices results in the timing of revenue recognition being different from the timing of the invoicing. In this case, deferred revenue is amortized into revenue based on the transaction price allocated to the remaining performance obligations and contract assets are realized through the contract invoicing.

The Company did not have any contract asset balances as of December 31, 2022. Contract assets as of December 31, 2021 were \$1.2 million, which are included in "Prepaid expenses and other current assets" on the Consolidated Balance Sheets.

Current deferred revenue is included in "Other accrued liabilities" and long-term deferred revenue is included in "Other long-term obligations" on the Consolidated Balance Sheets. The following table provides our contract liability balances as of December 31, 2022 and 2021.

	December 31, 2022	December 31, 2021
	<i>(Dollars in thousands)</i>	
Current deferred revenue	\$ 27,878	\$ 9,840
Long-term deferred revenue	—	4,303

The amount of revenue recognized in 2022 that was included in the December 31, 2021 deferred revenue current and long-term balances was \$2.5 million and \$0.1 million, respectively. The increase in the December 31, 2022 current deferred revenue balance versus the prior year was primarily driven by shipments relative to some contractual prepayments being postponed to the following year. Additionally, the balance includes cashed bank guarantees relative to outstanding arbitration proceedings whose outcome will determine timing of revenue recognition. The amount of revenue recognized in 2021 that was included in the December 31, 2020 deferred revenue current balance was \$5.5 million.

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Transaction Price Allocated to the Remaining Performance Obligations

The following table presents estimated revenues expected to be recognized in the corresponding period below related to performance obligations that are unsatisfied (or partially unsatisfied) at the end of reporting period. The revenue associated with our LTAs is expected to be approximately as follows:

	2023	2024
	<i>(Dollars in millions)</i>	
Estimated LTA revenue	\$235-\$275	\$100-\$135 ⁽¹⁾

⁽¹⁾ Includes expected termination fees from a few customers that have failed to meet certain obligations under their LTAs.

The majority of the LTAs are defined as pre-determined fixed annual volume contracts while a small portion are defined with a specified volume range. For the years 2023 and 2024, the contractual revenue amounts above are based upon the minimum volume for those contracts with specified ranges. The actual revenue realized from these contracted volumes may vary in timing and total due to contract non-performance, force majeure notices, arbitrations, credit risk associated with certain customers facing financial challenges and customer demand related to contracted volume ranges. As it relates to the conflict between Ukraine and Russia, we have provided force majeure notices with respect to certain impacted LTAs. In the event of a force majeure, the LTAs provide our counterparties with the right to terminate the LTA if the force majeure event continues for more than six months after the delivery of the force majeure notice, with no continuing obligations of either party. Certain of our LTA counterparties have challenged the force majeure notices, but we will continue to enforce our contractual rights, while other LTAs have been terminated as a result of the force majeure period elapsing. The estimates of LTA revenue as set forth above in the immediately preceding table includes (i) our current view of the validity of such force majeure notices and (ii) our current expectations of termination fees from our customers who have failed to meet certain obligations under their LTAs.

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(3) Stock-Based Compensation

The Company's Omnibus Equity Incentive Plan permits the granting of options and other stock-based awards (including restricted stock units ("RSUs") and deferred share units ("DSUs")). As of December 31, 2022, the aggregate number of shares authorized under the plan since its initial adoption was 15.0 million. Shares issued upon vesting of awards or exercise of options are new share issuances. Upon the vesting or payment of stock awards, an employee may elect receipt of the full share amount and either pay the resulting taxes or have the Company withhold shares to cover the tax obligation. At December 31, 2022, 11.2 million common stock shares were available for future issuance.

Stock-based compensation expense was \$2.3 million, \$16.6 million and \$2.7 million in 2022, 2021 and 2020, respectively. A majority of the expense, \$2.1 million in 2022, \$14.6 million in 2021 and \$2.3 million in 2020, was recorded as selling and administrative expenses in the Consolidated Statement of Operations, with the remaining expenses incurred as cost of sales. Stock-based compensation expense for 2021 included \$14.7 million, recorded in the second quarter of 2021, due to the Change in Control accelerated vesting provisions of certain of the Company's awards. For the purpose of these grants, a Change in Control occurred when Brookfield and any affiliates thereof ceased to own stock of the Company that constituted at least thirty percent (30%) or thirty-five percent (35%), as applicable, of the total fair market value or total voting power of the stock of the Company. Out of the \$14.7 million recorded with the Change in Control, \$0.9 million accelerated at the 35% ownership level and the remaining \$13.8 million accelerated at the 30% ownership level.

The Company derives a tax deduction measured by the excess of the market value over the grant price at the date stock-based compensation awards are exercised or vest. The Company recognized tax benefits of less than \$0.1 million, \$1.8 million and \$0.5 million in 2022, 2021 and 2020, respectively, relating to the issuance of common stock for the exercise/vesting of equity awards.

Stock Options. Non-qualified stock options may be granted to our employees and directors. Stock options vest over a five-year period, with one-fifth of the award vesting on the anniversary date of the grant in each of the next five years and expire 10 years from the date of grant. Option exercises are satisfied through the issuance of common shares. Compensation expense for stock options is based on the estimated fair value of the option on the date of the grant. We calculate the estimated fair value of the option using the Black-Scholes option-pricing model. The weighted average assumptions used in our Black-Scholes option pricing model for options granted in 2022, 2021 and 2020 were as follows:

	2022	2021	2020
Dividend yield	0.40% - 0.56%	0.32% - 0.35%	0.44% - 3.77%
Expected volatility	58.14 %	61.62 %	50.00 %
Risk-free interest rate	1.93% - 2.89%	1.10% - 1.21%	0.37% - 1.22%
Expected term in years	6.5 years	6.5 years	6.5 years

Dividend Yield. Our dividend yield estimate is based on our expected dividends and the stock price on the grant date.

Expected Volatility. We estimate the volatility of our common stock at the date of grant based on the historical volatility of the Company's stock. The volatility factor we use is based on our historical closing prices since our stock has been publicly traded.

Risk-Free Interest Rate. We base the risk-free interest rate on the implied yield currently available on U.S. Treasury zero-coupon issues with an equivalent remaining term equal to the expected life of the award.

Expected Term In Years. The expected life of awards granted represents the time period that the awards are expected to be outstanding. We determined the expected term of the grants using the "simplified" method as described by the Securities and Exchange Commission, since we do not have a history of stock option awards to provide a reliable basis for estimating such term.

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The following table summarizes activity related to stock options during 2022:

	Number of Options	Weighted- Average Exercise Price Per Share	Aggregate Intrinsic Value (thousands)	Weighted Average Remaining Term (Years)
Outstanding at December 31, 2021	1,616,720	\$ 13.08		
Granted	447,562	9.68		
Exercised	(25,000)	9.02		
Forfeited or expired	(149,115)	13.40		
Outstanding at December 31, 2022	1,890,167	\$ 12.30	\$ —	7.1 years
Vested and Expected to vest as of December 31, 2022	1,890,167	\$ 12.30	\$ —	7.1 years
Exercisable at December 31, 2022	1,460,664	\$ 12.88	\$ —	6.6 years

Outstanding options have exercise prices ranging from \$7.21 per share to \$20.00 per share.

A summary of the status and changes of stock options and the related average price per share follows:

	Number of Options	Weighted- Average Grant Date Fair Value
Outstanding unvested as of December 31, 2021	115,920	\$ 6.64
Granted	447,562	5.33
Vested	(49,936)	6.40
Forfeited	(84,043)	6.06
Outstanding unvested as of December 31, 2022	429,503	\$ 5.42

We recognized stock-based compensation expense of \$0.6 million, \$5.9 million and \$1.1 million in 2022, 2021 and 2020, respectively, relating to stock options. As of December 31, 2022, there was \$1.8 million of total unrecognized compensation cost related to unvested stock options, which is expected to be amortized over a weighted average period of 4.0 years. The total fair value of options vested was \$0.3 million in 2022, \$6.6 million in 2021 and \$1.1 million in 2020. There were 25,000 and 39,700 options exercised during 2022 and 2021, respectively. No options were exercised during 2020. Cash received from option exercises during 2022 and 2021 was \$0.2 million and \$0.4 million, respectively.

RSUs. RSUs constitute an agreement to deliver shares of common stock to the participant at the end of a vesting period. Compensation expense for RSUs is based on the closing price of our common stock on the date of grant, less forfeitures or cancellations of awards throughout the vesting period. RSUs vest over a five year period, with one-fifth of the award vesting on the anniversary date of the grant in each of the next five years. A summary of the status and changes of shares subject to RSU awards for employees and the related average price per share follows:

	Number of Shares	Weighted- Average Grant Date Fair Value
Outstanding unvested as of December 31, 2021	2,696	\$ 13.96
Granted	554,004	9.76
Cancelled	(78,035)	10.08
Vested	(1,348)	13.96
Outstanding unvested as of December 31, 2022	477,317	\$ 9.72

During 2022, 2021 and 2020, we recognized stock-based compensation expense of \$0.7 million, \$10.0 million and \$1.0 million, respectively, relating to RSU awards for employees. The total fair value of RSU awards vested during 2022 was less than \$0.1 million. The total fair value of RSU awards vested in 2021 and 2020 was \$10.8 million and \$0.6 million,

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respectively. As of December 31, 2022, \$3.9 million of expense with respect to non-vested RSUs has yet to be recognized and will be amortized into expense over a weighted-average period of approximately 4.2 years.

DSUs. DSUs are primarily granted to our independent directors in lieu of cash retainers and vest immediately upon grant. All whole DSUs will be settled in shares of our common stock after the Director's termination of service on the Board and any fractional shares will be settled in cash. During 2022, we granted 169,010 DSUs to our independent directors with a weighted-average grant date fair value of \$5.84 per share. During 2022, 2021 and 2020, we recognized stock-based compensation expense of \$1.0 million, \$0.7 million and \$0.6 million, respectively, relating to DSU awards. The total fair value of DSU awards vested was \$1.0 million in both 2022 and 2021 and \$0.5 million in 2020.

(4) Segment Reporting

Our Industrial Materials segment, our only reportable segment, manufactures high-quality graphite electrodes essential to the production of EAF steel and other ferrous and non-ferrous metals. Petroleum needle coke, a crystalline form of carbon derived from decant oil, is a key raw material used in the production of graphite electrodes. We utilize the majority of the needle coke that we produce internally to manufacture our graphite electrodes and as a result approximately 95% of our revenues from external customers are derived from the sale of graphite electrodes. No single customer accounted for 10% or more of the Company's net sales in 2022, 2021 or 2020.

The following tables summarize information as to the Company's operations in different geographic areas:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Net sales:			
United States	\$ 340,793	\$ 285,710	\$ 260,867
Americas (excluding the United States)	256,253	241,442	187,779
Asia Pacific	116,849	154,084	127,415
Europe, Middle East, Africa	567,355	664,552	648,300
Total	<u>\$ 1,281,250</u>	<u>\$ 1,345,788</u>	<u>\$ 1,224,361</u>
		December 31,	
		2022	2021
		<i>(Dollars in thousands)</i>	
Long-lived assets (a):			
United States		\$ 192,038	\$ 179,003
Mexico		124,024	123,997
Brazil		4,327	4,090
France		93,880	93,579
Spain		104,392	100,248
Other countries		485	556
Total		<u>\$ 519,146</u>	<u>\$ 501,473</u>

(a) Long-lived assets represent fixed assets, net of accumulated depreciation.

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(5) Debt and Liquidity

The following table presents our long-term debt:

	December 31, 2022	December 31, 2021
	<i>(Dollars in thousands)</i>	
2018 Term Loan Facility	\$ 433,708	\$ 543,708
2020 Senior Secured Notes	500,000	500,000
Other debt	268	429
Unamortized debt discount and issuance costs	(12,049)	(14,449)
Total debt	921,927	1,029,688
Less: Long-term debt, current portion	(124)	(127)
Long-term debt	\$ 921,803	\$ 1,029,561

2018 Term Loan and 2018 Revolving Credit Facility

In February 2018, the Company entered into a credit agreement (as amended, the “2018 Credit Agreement”), which provides for (i) a \$2,250 million senior secured term facility (the “2018 Term Loan Facility”) after giving effect to the June 2018 amendment (the “First Amendment”) that increased the aggregate principal amount of the 2018 Term Loan Facility from \$1,500 million to \$2,250 million and (ii) a \$330 million senior secured revolving credit facility after giving effect to the May 2022 amendment that increased the revolving commitments under the 2018 Credit Agreement by \$80 million from \$250 million (the “2018 Revolving Credit Facility” and, together with the 2018 Term Loan Facility, the “Senior Secured Credit Facilities”). GrafTech Finance Inc. (“GrafTech Finance”) is the sole borrower under the 2018 Term Loan Facility while GrafTech Finance, GrafTech Switzerland SA (“Swissco”) and GrafTech Luxembourg II S.à.r.l. (“Luxembourg Holdco”) and, together with GrafTech Finance and Swissco, the “Co-Borrowers”) are co-borrowers under the 2018 Revolving Credit Facility. The 2018 Term Loan Facility and the 2018 Revolving Credit Facility mature on February 12, 2025 and May 31, 2027, respectively. As of December 31, 2022 and 2021, there was no debt outstanding on the 2018 Revolving Credit Facility and there was \$3.0 million and \$3.3 million of letters of credit drawn against the 2018 Revolving Credit Facility, respectively.

The 2018 Term Loan Facility bears interest, at our option, at a rate equal to either (i) the Adjusted LIBO Rate (as defined in the 2018 Credit Agreement), plus an applicable margin equal to 3.00% per annum following an amendment in February 2021 (the “Second Amendment”) that decreased the Applicable Rate (as defined in the 2018 Credit Agreement) by 0.50% for each pricing level or (ii) the ABR Rate (as defined in the 2018 Credit Agreement), plus an applicable margin equal to 2.00% per annum following the Second Amendment, in each case with one step down of 25 basis points based on achievement of certain public ratings of the 2018 Term Loan Facility. The Second Amendment also decreased the interest rate floor from 1.00% to 0.50% for the 2018 Term Loan Facility.

The 2018 Revolving Credit Facility bears interest, at our option, at a rate equal to either (i) the Adjusted Term SOFR Rate, and Adjusted EURIBOR Rate (each, as defined in the 2018 Credit Agreement), plus an applicable margin initially equal to 3.00% per annum or (ii) the ABR Rate, plus an applicable margin initially equal to 2.00% per annum, in each case with two 25 basis point step downs based on achievement of certain senior secured first lien net leverage ratios. In addition, we are required to pay a quarterly commitment fee on the unused commitments under the 2018 Revolving Credit Facility in an amount equal to 0.25% per annum.

The Senior Secured Credit Facilities are guaranteed by each of our domestic subsidiaries, subject to certain customary exceptions, and by GrafTech Luxembourg I S.à.r.l., a Luxembourg société à responsabilité limitée and an indirect wholly owned subsidiary of GrafTech, Luxembourg HoldCo, and Swissco (collectively, the “Guarantors”) with respect to all obligations under the 2018 Credit Agreement of each of our foreign subsidiaries that is a Controlled Foreign Corporation (within the meaning of Section 956 of the Internal Revenue Code of 1986, as amended from time to time (the “Code”)).

All obligations under the 2018 Credit Agreement are secured, subject to certain exceptions, by: (i) a pledge of all of the equity securities of each domestic Guarantor and of each other direct, wholly owned domestic subsidiary of GrafTech and any Guarantor, (ii) a pledge on no more than 65% of the equity interests of each subsidiary that is a Controlled Foreign Corporation (within the meaning of Section 956 of the Code), and (iii) security interests in, and mortgages on, personal property and material real property of each domestic Guarantor, subject to permitted liens and certain exceptions specified in the 2018 Credit Agreement. The obligations of each foreign subsidiary of GrafTech that is a Controlled Foreign Corporation under the 2018 Revolving Credit Facility are secured by (i) a pledge of all of the equity securities of each Guarantor that is a Controlled

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Foreign Corporation and of each direct, wholly owned subsidiary of any Guarantor that is a Controlled Foreign Corporation, and (ii) security interests in certain receivables and personal property of each Guarantor that is a Controlled Foreign Corporation, subject to permitted liens and certain exceptions specified in the 2018 Credit Agreement.

The 2018 Term Loan Facility amortizes at a rate of \$112.5 million per year payable in equal quarterly installments, with the remainder due at maturity. The Co-Borrowers are permitted to make voluntary prepayments at any time without premium or penalty. GrafTech Finance is required to make prepayments under the 2018 Term Loan Facility (without payment of a premium) with (i) net cash proceeds from non-ordinary course asset sales (subject to customary reinvestment rights and other customary exceptions and exclusions), and (ii) commencing with the Company's fiscal year ended December 31, 2019, 75% of Excess Cash Flow (as defined in the 2018 Credit Agreement), subject to step-downs to 50% and 0% of Excess Cash Flow based on achievement of a senior secured first lien net leverage ratio greater than 1.25 to 1.00 but less than or equal to 1.75 to 1.00 and less than or equal to 1.25 to 1.00, respectively. Scheduled quarterly amortization payments of the 2018 Term Loan Facility during any calendar year reduce, on a dollar-for-dollar basis, the amount of the required Excess Cash Flow prepayment for such calendar year, and the aggregate amount of Excess Cash Flow prepayments for any calendar year reduce subsequent quarterly amortization payments of the 2018 Term Loan Facility as directed by GrafTech Finance. As of December 31, 2022, we had satisfied all required amortization installments through such date.

The 2018 Credit Agreement contains customary representations and warranties and customary affirmative and negative covenants applicable to GrafTech and restricted subsidiaries, including, among other things, restrictions on indebtedness, liens, investments, fundamental changes, dispositions, and dividends and other distributions. The 2018 Credit Agreement contains a financial covenant that requires GrafTech to maintain a senior secured first lien net leverage ratio not greater than 4.00 to 1.00 when the aggregate principal amount of borrowings under the 2018 Revolving Credit Facility and outstanding letters of credit issued under the 2018 Revolving Credit Facility (except for undrawn letters of credit in an aggregate amount equal to or less than \$35.0 million), taken together, exceed 35% of the total amount of commitments under the 2018 Revolving Credit Facility. The 2018 Credit Agreement also contains customary events of default. The Company was in compliance with all of its debt covenants as of December 31, 2022 and 2021.

2020 Senior Secured Notes

In December 2020, GrafTech Finance issued \$500.0 million aggregate principal amount of 4.625% senior secured notes due 2028 (the "2020 Senior Secured Notes") in a private offering. The 2020 Senior Secured Notes and related guarantees are secured on a pari passu basis by the collateral securing the Senior Secured Credit Facilities. All of the proceeds from the 2020 Senior Secured Notes were used to partially repay borrowings under our 2018 Term Loan Facility.

The 2020 Senior Secured Notes pay interest in arrears on June 15 and December 15 of each year, with the principal due in full on December 15, 2028. Prior to December 15, 2023, up to 40% of the 2020 Senior Secured Notes may be redeemed with the net cash proceeds of certain equity offerings at a price equal to 104.625% of the principal amount thereof, together with accrued and unpaid interest, if any. The 2020 Senior Secured Notes may be redeemed, in whole or in part, at any time prior to December 15, 2023 at a price equal to 100% of the principal amount of the notes redeemed plus a premium together with accrued and unpaid interest, if any, to, but not including, the redemption date. Thereafter, the 2020 Senior Secured Notes may be redeemed, in whole or in part, at various prices depending on the date redeemed.

The indenture governing the 2020 Senior Secured Notes (the "Indenture") contains certain covenants that, among other things, limit the Company's ability, and the ability of certain of its subsidiaries, to incur or guarantee additional indebtedness or issue preferred stock, pay distributions on, redeem or repurchase capital stock or redeem or repurchase subordinated debt, incur or suffer to exist liens securing indebtedness, make certain investments, engage in certain transactions with affiliates, consummate certain asset sales and effect a consolidation or merger, or sell, transfer, lease or otherwise dispose of all or substantially all assets. Pursuant to the Indenture, if our pro forma consolidated first lien net leverage ratio is no greater than 2.00 to 1.00, we can make restricted payments so long as no default or event of default has occurred and is continuing. If our pro forma consolidated first lien net leverage ratio is greater than 2.00 to 1.00, we can make restricted payments pursuant to certain baskets.

The Indenture contains events of default customary for agreements of its type (with customary grace periods, as applicable) and provides that, upon the occurrence of an event of default arising from certain events of bankruptcy or insolvency with respect to the Company or GrafTech Finance, all outstanding 2020 Senior Secured Notes will become due and payable immediately without further action or notice. If any other type of event of default occurs and is continuing, then the

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trustee or the holders of at least 30% in principal amount of the then outstanding 2020 Senior Secured Notes may declare all of the 2020 Senior Secured Notes to be due and payable immediately.

(6) Goodwill and Other Intangible Assets

Goodwill and indefinite-lived intangible assets are required to be reviewed annually for impairment. Goodwill is tested for impairment at the reporting unit level on an annual basis and between annual tests if an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying value. The Company's annual impairment tests performed in 2022, 2021 and 2020 did not result in the fair value of its reporting unit being less than its carrying value. We performed the step 0 qualitative assessment in 2022 and 2021. The goodwill balance, which relates to one reporting unit, was \$171.1 million as of each of December 31, 2022 and 2021.

The following table summarizes acquired intangible assets with determinable useful lives by major category which are included in "Other assets" on our Consolidated Balance Sheets:

	December 31, 2022			December 31, 2021		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
<i>(Dollars in thousands)</i>						
Trade names	\$ 22,500	\$ (15,869)	\$ 6,631	\$ 22,500	\$ (13,935)	\$ 8,565
Technology and know-how	55,300	(42,371)	12,929	55,300	(38,486)	16,814
Customer-related intangibles	64,500	(32,513)	31,987	64,500	(28,195)	36,305
Total finite-lived intangible assets	<u>\$ 142,300</u>	<u>\$ (90,753)</u>	<u>\$ 51,547</u>	<u>\$ 142,300</u>	<u>\$ (80,616)</u>	<u>\$ 61,684</u>

Amortization expense of intangible assets was \$10.1 million, \$10.7 million and \$11.4 million in 2022, 2021 and 2020, respectively. Estimated annual amortization expense for the next five years will approximate \$9.2 million in 2023, \$8.0 million in 2024, \$7.3 million in 2025, \$6.7 million in 2026 and \$6.1 million in 2027.

(7) Interest Expense

The following table presents an analysis of interest expense:

	Year Ended December 31,		
	2022	2021	2020
<i>(Dollars in thousands)</i>			
Interest incurred on debt	\$ 43,609	\$ 56,731	\$ 83,555
Accretion of original issue discount on 2018 Term Loan Facility	1,200	3,387	5,340
Amortization of debt issuance and modification costs	3,475	8,642	9,179
Unrealized mark-to-market gain on de-designated interest rate swap	(7,111)	—	—
Gain upon partial termination of embedded derivative	(4,605)	—	—
Total interest expense	<u>\$ 36,568</u>	<u>\$ 68,760</u>	<u>\$ 98,074</u>

Interest rates

The 2020 Senior Secured Notes carry a fixed interest rate of 4.625%. The 2018 Term Loan Facility had an interest rate of 7.38% as of December 31, 2022, 3.50% as of December 31, 2021 and 4.50% as of December 31, 2020. The Company has several interest rate swap contracts to fix its cash flows associated with the risk in variability in the one-month USD London Interbank Offered Rate ("USD LIBOR") for the 2018 Term Loan Facility. The interest rate swaps fixed the cash flows associated with the payments on our Term Loan Facility to an effective fixed interest rate of 4.2% throughout 2022. See Note 5, "Debt and Liquidity" for details of our debt and Note 8, "Fair Value Measurements and Derivative Instruments" for additional details on our interest rate swaps and embedded derivative.

In 2022, the Company made voluntary prepayments of \$110.0 million under its 2018 Term Loan Facility. In connection with this, the Company recorded \$0.5 million of accelerated accretion of the original issue discount and \$0.8 million of accelerated amortization of the debt issuance cost.

In 2021, the Company made voluntary prepayments of \$400.0 million under its 2018 Term Loan Facility. In connection with this, the Company recorded \$2.3 million of accelerated accretion of the original issue discount and \$3.7 million of accelerated amortization of the debt issuance costs. The Company also recorded \$1.6 million of modification costs related to the 2018 Term Loan Facility repricing in the first quarter of 2021.

In December 2020, the proceeds from the issuance of the \$500.0 million 2020 Senior Secured Notes were used to repay \$500.0 million of principal on the 2018 Term Loan Facility. The repayment of the 2018 Term Loan Facility was accounted for as a partial debt extinguishment and triggered \$3.2 million of accelerated accretion of the original issue discount and \$5.2 million of accelerated amortization of the debt issuance costs. The 2020 Senior Secured Notes were accounted for as new debt and the related debt issuance costs were deferred.

(8) Fair Value Measurements and Derivative Instruments

Fair Value Measurements

Depending on the inputs, we classify each fair value measurement as follows:

- Level 1 – Quoted market prices in active markets for identical assets or liabilities.
- Level 2 – Inputs other than Level 1 inputs that are either directly or indirectly observable.
- Level 3 – Unobservable inputs developed using estimates and assumptions developed by the Company, which reflect those that a market participant would use.

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The following tables present the classification of our assets and liabilities measured at fair value on a recurring basis:

December 31, 2022	Total	Level 1	Level 2	Level 3
Assets:	<i>(Dollars in thousands)</i>			
Foreign currency derivatives	\$ 92	\$ —	\$ 92	\$ —
Interest rate swap contracts	27,384	—	27,384	—
Total assets at fair value	\$ 27,476	\$ —	\$ 27,476	\$ —
Liabilities:				
Foreign currency derivatives	\$ 282	\$ —	\$ 282	\$ —
Total liabilities at fair value	\$ 282	\$ —	\$ 282	\$ —
December 31, 2021	Total	Level 1	Level 2	Level 3
Assets:	<i>(Dollars in thousands)</i>			
Foreign currency derivatives	\$ 388	\$ —	\$ 388	\$ —
Commodity derivative contracts	8,469	—	8,469	—
Interest rate swap contracts	6,060	—	6,060	—
Total assets at fair value	\$ 14,917	\$ —	\$ 14,917	\$ —
Liabilities:				
Foreign currency derivatives	\$ 2	\$ —	\$ 2	\$ —
Interest rate swap contracts	140	—	140	—
Total liabilities at fair value	\$ 142	\$ —	\$ 142	\$ —

The carrying amounts and fair values of financial instruments, other than cash and cash equivalents, short-term notes and accounts receivable, accounts payable and other current payables, are shown in the table above. The carrying value of cash and cash equivalents, receivables and accounts payable approximate fair value due to the short-term nature of these instruments.

The fair value of our debt as of December 31, 2022 and 2021 was \$843.2 million and \$1,051.6 million, respectively. The fair values were determined using Level 2 quoted market prices for the same or similar debt instruments.

Additional fair value information related to our pension funds' assets can be found in Note 11, "Retirement Plans and Post-Employment Benefits."

Derivative Instruments

In the normal course of business, we are exposed to certain risks related to fluctuations in currency exchange rates, commodity prices and interest rates. We use various derivative financial instruments, primarily foreign currency derivatives, commodity derivative contracts and interest rate swaps as part of our overall strategy to manage risks from these market fluctuations.

Certain of our derivative contracts contain provisions that require us to provide collateral. Since the counterparties to these financial instruments are large commercial banks and similar financial institutions, we do not believe that we are exposed to material counterparty credit risk. We do not anticipate nonperformance by any of the counterparties to our instruments.

Foreign currency derivatives

We enter into foreign currency derivatives from time to time to attempt to manage exposure to changes in currency exchange rates. These foreign currency instruments, which include, but are not limited to, forward exchange contracts and purchased currency options, are used to hedge global currency exposures such as foreign currency denominated debt, receivables, payables, sales and purchases.

Foreign currency forward and swap contracts are used to mitigate the foreign exchange risk of balance sheet items. These derivatives are fair value hedges. Gains and losses from these derivatives are recorded in cost of sales and they are largely offset by the financial impact of translating foreign currency-denominated payables and receivables.

In the first quarter of 2022, we entered into foreign currency derivatives with maturities of one month to 12 months in order to protect against the risk that cash flows associated with certain sales and purchases denominated in a currency other than

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the U.S. dollar will be adversely affected by future changes in foreign exchange rates. These derivatives are designated as cash flow hedges. The resulting unrealized gains or losses from these derivatives are recorded in AOCL and subsequently, when realized, are reclassified to net sales or cost of sales in the Consolidated Statements of Operations when the hedged exposures affect earnings.

Commodity derivative contracts

We have entered into commodity derivative contracts for refined oil products. These contracts were entered into to protect against the risk that eventual cash flows related to these products will be adversely affected by future changes in prices. In the fourth quarter of 2017, we began to enter into LTAs with many of our customers and began to hedge the cash flows related to these contracts. The unrealized gains or losses related to commodity derivative contracts designated as cash flow hedges are recorded in accumulated other comprehensive income ("AOCI") and subsequently, when realized, are reclassified to the Consolidated Statement of Operations when the hedged item impacts earnings, which is when the finished product is sold. The last of our commodity derivative contracts matured as of June 30, 2022 and no new contracts were entered during 2022.

Interest rate swap contracts

We utilize interest rate swaps to limit exposure to market fluctuations on our variable-rate debt. Each derivative agreement's unrealized gain or loss is recorded in AOCL and, when realized, is recorded to interest expense.

In the third quarter of 2019, we entered into interest rate swap contracts that are "pay fixed, receive variable." Our risk management objective was to fix our cash flows associated with the risk of variability in the one-month USD LIBOR for a portion of our outstanding debt. It was expected that the swaps would fix the cash flows associated with the forecasted interest payments on our debt to an effective fixed interest rate of 4.2%, which could be lowered to 3.95% depending on credit ratings. Since their modification concurrent with the 2018 Term Loan Facility modification in the first quarter of 2021, the swaps contain an other-than-insignificant financing element. As such, they are considered hybrid instruments composed of a debt host and an embedded derivative and the associated cash (outflows)/inflows are classified as financing (use)/source of cash.

The debt host portion amounted to a liability of \$3.8 million as of December 31, 2022, with \$2.3 million included in "Other accrued liabilities" and \$1.5 million in "Other long-term obligations" on the Consolidated Balance Sheets. As of December 31, 2021, the debt host portion amounted to a liability of \$7.0 million, with \$2.6 million included in "Other accrued liabilities" and \$4.4 million included in "Other long-term obligations" on the Consolidated Balance Sheets. The corresponding loss is accounted for in AOCL and is being amortized over the remaining life of the swaps. The associated embedded derivative is treated as a cash flow hedge.

In the first quarter of 2022, in connection with the repayment of principal on our 2018 Term Loan Facility discussed in Note 4, "Debt and Liquidity," and our probability assessment of the variable-rate debt remaining outstanding through the term of the swaps, we de-designated one interest rate swap contract with a \$250.0 million notional amount, maturing in the third quarter of 2024. The fair value of the embedded derivative at the de-designation date was a gain of \$6.6 million and was recorded in AOCI and will be amortized into interest expense over the remaining life of the swap. The change in fair value of the de-designated embedded derivative in 2022 resulted in a gain of \$7.1 million and was recorded in interest expense in the Consolidated Statements of Operations.

In the third quarter of 2022, we redeemed \$67.0 million of our \$250.0 million notional amount de-designated interest rate swap and recorded in interest expense in the Consolidated Statements of Operations a gain of \$4.6 million on the reduction of the embedded derivative. The partial redemption of the interest rate swap also triggered a \$0.7 million accelerated settlement of the associated debt host.

All derivatives are recorded on the balance sheet at fair value. If the derivative is designated and effective as a cash flow hedge, changes in the fair value of the derivative are recognized in AOCL until the hedged item is recognized in earnings. The ineffective portion of a derivative's fair value, if any, is recognized in earnings immediately. If a derivative is not a hedge, changes in the fair value are adjusted through earnings. The fair values of the outstanding derivatives are recorded on the balance sheet as assets (if the derivatives are in a gain position) or liabilities (if the derivatives are in a loss position). The fair values will also be classified as short-term or long-term depending upon their maturity dates.

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The notional amounts of our outstanding derivative instruments as of December 31, 2022 and 2021 were as follows:

	December 31, 2022	December 31, 2021
	Notional Amount	Notional Amount
	<i>(Dollars in thousands)</i>	
Derivative instruments designated as hedges:		
Commodity derivative contracts	\$ —	\$ 19,474
Interest rate swap contracts	250,000	500,000
Derivative instruments not designated as hedges:		
Foreign currency derivatives	\$ 70,420	\$ 99,260
Interest rate swap contracts	183,000	—

The following table summarizes the fair value of our outstanding derivatives designated as hedges (on a gross basis) and balance sheet classification as of December 31, 2022 and 2021:

	December 31, 2022	December 31, 2021
	Fair Value	Fair Value
	<i>(Dollars in thousands)</i>	
Prepaid and other current assets		
Commodity derivative contracts	\$ —	\$ 8,469
Interest rate swap contracts	10,246	—
Total	\$ 10,246	\$ 8,469
Other assets		
Interest rate swap contracts	\$ 5,575	\$ 6,060
Total	\$ 5,575	\$ 6,060
Other accrued liabilities		
Interest rate swap contracts	\$ —	\$ (140)
Total	\$ —	\$ (140)
Net asset	\$ 15,821	\$ 14,389

As a result of the settlement of commodity derivative contracts and foreign currency derivatives, as of December 31, 2022, net realized pre-tax gains of \$17.6 million and net realized pre-tax losses of \$5.5 million were reported in AOCL and will be released to earnings within the following 12 months. In addition, we recorded \$0.8 million of ineffectiveness income to cost of sales in the Consolidated Statements of Operations in 2022 related to the settlement of commodity derivative contracts. No ineffectiveness expense was recorded in 2021 or 2020. See the table below for amounts recognized on the effective portion of our commodity derivative contracts in the Statement of Operations.

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The realized (gains) losses on cash flow hedges are recognized in the Statements of Operations when the hedged item impacts earnings and are as follows for the years ended December 31, 2022, 2021 and 2020:

		Amount of (Gain)/Loss Recognized		
		2022	2021	2020
Location of Realized (Gain)/Loss Recognized in the Consolidated Statement of Operations		(Dollars in thousands)		
Derivatives designated as cash flow hedges:				
Foreign currency derivatives	Cost of sales	\$ 1,975	\$ —	\$ —
Commodity derivative contracts	Cost of sales	(11,452)	6,440	(4,134)
Interest rate swaps	Interest expense	(2,423)	1,846	4,390

Pre-tax gains and losses on non-designated derivatives recognized in earnings are as follows:

		Amount of (Gain)/Loss Recognized		
		2022	2021	2020
Location of Realized (Gain)/Loss Recognized in the Consolidated Statement of Operations		(Dollars in thousands)		
Derivatives not designated as hedges:				
Foreign currency derivatives	Cost of sales, other (income) expense, net	\$ (938)	\$ 3,895	\$ (2,671)
Commodity derivative contracts	Cost of sales	—	(1,399)	(530)
Interest rate swaps	Interest expense	(11,716)	866	—

The following table summarizes the fair value of our outstanding derivatives not designated as hedges (on a gross basis) and balance sheet classification as of December 31, 2022 and 2021:

	December 31, 2022	December 31, 2021
	Fair Value	Fair Value
<i>(Dollars in thousands)</i>		
Prepaid and other current assets		
Interest rate swap contracts	\$ 7,492	\$ —
Foreign currency derivatives	92	388
Other assets		
Interest rate swap contracts	4,071	—
Other accrued liabilities		
Foreign currency derivatives	(282)	(2)
Net asset	\$ 11,373	\$ 386

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(9) Supplementary Balance Sheet Detail

The following tables present supplementary balance sheet details:

	December 31, 2022	December 31, 2021
	<i>(Dollars in thousands)</i>	
Inventories:		
Raw materials and supplies	\$ 216,761	\$ 132,113
Work in process	192,821	127,127
Finished goods	38,159	30,192
	<u>\$ 447,741</u>	<u>\$ 289,432</u>
Prepaid expenses and other current assets:		
Prepaid expenses	\$ 15,261	\$ 8,193
Value-added tax and other indirect taxes receivable	39,417	40,861
Spare parts inventory	12,990	12,408
Other current assets	19,604	11,902
	<u>\$ 87,272</u>	<u>\$ 73,364</u>
Property, plant and equipment:		
Land and improvements	\$ 48,478	\$ 49,201
Buildings	82,054	79,660
Machinery and equipment and other	655,823	621,808
Construction in progress	82,813	64,629
	<u>\$ 869,168</u>	<u>\$ 815,298</u>
Other accrued liabilities:		
Payrolls (including incentive programs)	\$ 10,799	\$ 16,904
Employee benefits	6,921	7,272
Deferred revenue	27,878	9,840
Other	43,751	22,389
	<u>\$ 89,349</u>	<u>\$ 56,405</u>
Other long-term obligations:		
Post-employment benefits	\$ 11,996	\$ 14,597
Pension and related benefits	22,768	31,139
Other	16,058	22,921
	<u>\$ 50,822</u>	<u>\$ 68,657</u>

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The following table presents an analysis of the allowance for doubtful accounts for the years ended December 31:

	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Balance at beginning of year	\$ 6,835	\$ 8,243	\$ 5,474
Charge to retained earnings - ASC 326 adoption impact	—	—	2,026
Charge (credit) to income	1,585	(1,266)	1,458
Deductions	(401)	(142)	(715)
Balance at end of year	<u>\$ 8,019</u>	<u>\$ 6,835</u>	<u>\$ 8,243</u>

(10) Leases

The Company leases certain transportation and mobile manufacturing equipment such as railcars and forklifts, as well as real estate.

The components of lease expense are as follows:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Operating lease cost	\$ 5,441	\$ 5,399	\$ 6,138
Short-term lease cost	163	408	159
Variable lease cost	756	453	429
Total lease cost	<u>\$ 6,360</u>	<u>\$ 6,260</u>	<u>\$ 6,726</u>

Supplemental cash-flow and other information related to leases is as follows:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
RoU assets obtained in exchange for new operating lease liabilities (non-cash)	\$ 2,303	\$ 5,584	\$ 5,262
Cash payments for operating leases	(4,015)	(5,466)	(6,177)

Supplemental balance sheet information related to leases is as follows:

		December 31,	
		2022	2021
		(Dollars in thousands)	
	Location		
Operating RoU lease assets	Other assets	\$ 5,741	\$ 7,646
Current operating lease liabilities	Other accrued liabilities	3,575	4,109
Non-current operating lease liabilities	Other long-term obligations	2,304	3,528
Total operating lease liabilities		\$ 5,879	\$ 7,637
Weighted average remaining lease term (in years)		2.1	2.3
Weighted average discount rate		4.65 %	4.31 %

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As of December 31, 2022, future minimum lease payments under noncancellable operating leases were as follows:

	<i>(Dollars in thousands)</i>
2023	3,648
2024	1,530
2025	601
2026	284
2027	139
2028 and thereafter	—
Total lease payments	\$ 6,202
Less: Imputed interest	(323)
Present value of lease payments	\$ 5,879

As of December 31, 2022, the Company has not entered into any additional operating lease commitments that have yet to commence.

(11) Retirement Plans and Post-Employment Benefits

Retirement Plans

On February 26, 1991, we formed our own retirement plan covering substantially all our U.S. employees. Under our plan, covered employees earned benefit payments based primarily on their service credits and wages subsequent to February 26, 1991.

Prior to that date, substantially all our U.S. employees were participants in the U.S. retirement plan of Union Carbide Corporation (“Union Carbide”). While service credit was frozen, covered employees continued to earn benefits under the Union Carbide plan based on their final average wages through February 26, 1991, adjusted for salary increases (not to exceed six percent per annum) through January 26, 1995, the date Union Carbide ceased to own a minimum 50% of the equity of GTI. The Union Carbide plan is responsible for paying retirement and death benefits earned as of February 26, 1991.

Effective January 1, 2002, we established a defined contribution plan for U.S. employees. Certain employees had the option to remain in our defined benefit plan for an additional period of up to five years. Employees not covered by this option had their benefits under our defined benefit plan frozen as of December 31, 2001, and began participating in the defined contribution plan.

Effective March 31, 2003, we curtailed our qualified benefit plan and the benefits were frozen as of that date for the U.S. employees who had the option to remain in our defined benefit plan. We also closed our non-qualified U.S. defined benefit plan for the participating salaried workforce. The employees began participating in the defined contribution plan as of April 1, 2003.

Pension coverage for employees of foreign subsidiaries is provided, to the extent deemed appropriate, through separate plans. Obligations under such plans are systematically provided for by depositing funds with trustees, under insurance policies or by book reserves.

The components of our consolidated net pension costs are set forth in the following table:

	Year Ended December 31,					
	2022		2021		2020	
	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign
	<i>(Dollars in thousands)</i>					
Service cost	\$ 1,390	\$ 1,220	\$ 1,328	\$ 1,349	\$ 1,322	\$ 1,183
Interest cost	3,242	227	2,962	111	3,949	174
Expected return on assets	(3,960)	(640)	(4,213)	(545)	(4,730)	(401)
Mark-to-market (gain) loss	(181)	(7,801)	(2,428)	(1,327)	613	2,596
Net periodic benefit (credit) cost	\$ 491	\$ (6,994)	\$ (2,351)	\$ (412)	\$ 1,154	\$ 3,552

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The mark-to-market gain in 2022 was primarily the result of a favorable change in the discount rate, partially offset by a worse than expected return on plan assets. The mark-to-market gain in 2021 was the result of a favorable change in the discount rate and favorable foreign currency translation, as well as a better than expected return on plan assets, particularly for the U.S. plans. The mark-to-market loss in 2020 was the result of an unfavorable change in the discount rate, new employee obligations and unfavorable foreign currency translation, partially offset by a better than expected return on plan assets, particularly for the U.S. plans.

The reconciliation of the beginning and ending balances of our pension plans' benefit obligations, fair value of assets, and funded status at December 31, 2022 and 2021 are shown below.

	December 31, 2022		December 31, 2021	
	U.S.	Foreign	U.S.	Foreign
	(Dollars in thousands)			
Changes in Benefit Obligation:				
Net benefit obligation at beginning of period	\$ 129,906	\$ 38,571	\$ 140,254	\$ 38,716
Service cost	1,390	1,220	1,328	1,349
Interest cost	3,242	227	2,962	111
Participant contributions	—	557	—	580
Foreign currency exchange changes	—	(660)	—	(1,318)
Actuarial gain	(24,202)	(7,293)	(4,316)	(1,104)
Benefits paid	(10,343)	(1,557)	(10,322)	237
Net benefit obligation at end of period	<u>\$ 99,993</u>	<u>\$ 31,065</u>	<u>\$ 129,906</u>	<u>\$ 38,571</u>
Changes in Plan Assets:				
Fair value of plan assets at beginning of period	\$ 109,961	\$ 26,913	\$ 115,568	\$ 25,082
Actual return on plan assets	(20,061)	1,148	2,325	799
Foreign currency exchange rate changes	—	(325)	—	(746)
Employer contributions	449	972	2,390	961
Participant contributions	—	557	—	580
Benefits paid	(10,343)	(1,557)	(10,322)	237
Fair value of plan assets at end of period	<u>\$ 80,006</u>	<u>\$ 27,708</u>	<u>\$ 109,961</u>	<u>\$ 26,913</u>
Funded status (underfunded):	<u>\$ (19,987)</u>	<u>\$ (3,357)</u>	<u>\$ (19,945)</u>	<u>\$ (11,658)</u>
Amounts recognized in the statement of financial position:				
Other accrued liabilities	\$ (409)	\$ (167)	\$ (420)	\$ (44)
Other long-term obligations	(19,578)	(3,190)	(19,525)	(11,614)
Net amount recognized	<u>\$ (19,987)</u>	<u>\$ (3,357)</u>	<u>\$ (19,945)</u>	<u>\$ (11,658)</u>

The accumulated benefit obligation for all defined benefit pension plans was \$129.5 million and \$166.1 million as of December 31, 2022 and 2021, respectively.

Plan Assets

The accounting guidance on fair value measurements specifies a hierarchy based on the observability of inputs used in valuation techniques (Level 1, 2 and 3). See Note 8, "Fair Value Measurements and Derivative Instruments" for a discussion of the fair value hierarchy.

The following describes the methods and significant assumptions used to estimate the fair value of the investments:

Cash and cash equivalents – Valued at cost. Cash equivalents are valued at net asset value as provided by the administrator of the fund.

Foreign government bonds – Valued by the trustees using various pricing services of financial institutions.

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Fixed insurance contracts – Valued at the present value of the guaranteed payment streams.

Collective trusts – Valued at the net asset value provided by the administrator of the fund (the practical expedient). The net asset value is primarily based on quoted market prices of the underlying securities for which quoted market prices of the underlying securities of the funds. Some of the underlying investments include securities for which quoted market prices are not available and are valued using data obtained by the trustee from the best available source or market value. This method may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, although we believe its valuation method is appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The fair value of other plan assets by category is summarized below (dollars in thousands):

December 31, 2022				
	Level 1	Level 2	Level 3	Total
U.S. Plan Assets				
Cash and cash equivalents	\$ 706	\$ —	\$ —	\$ 706
International Plan Assets				
Foreign government bonds	—	1,023	—	1,023
Fixed insurance contracts	—	—	26,685	26,685
Total international plan assets	\$ —	\$ 1,023	\$ 26,685	\$ 27,708
U.S. Plan - Investments measured at net asset value				\$ 79,300
Total	\$ 706	\$ 1,023	\$ 26,685	\$ 107,714

December 31, 2021				
	Level 1	Level 2	Level 3	Total
U.S. Plan Assets				
Cash and cash equivalents	\$ 715	\$ —	\$ —	\$ 715
International Plan Assets				
Foreign government bonds	\$ —	\$ 910	\$ —	\$ 910
Fixed insurance contracts	—	—	26,003	26,003
Total international plan assets	\$ —	\$ 910	\$ 26,003	\$ 26,913
U.S. Plan - Investments measured at net asset value				\$ 109,246
Total	\$ 715	\$ 910	\$ 26,003	\$ 136,874

The following table presents the changes for those financial instruments classified within Level 3 of the valuation hierarchy for international plan pension assets for the years ended December 31, 2022 and 2021 (dollars in thousands):

	Fixed Insurance Contracts
Balance at December 31, 2020	\$ 24,118
Gain / contributions / currency impact	1,900
Distributions	(15)
Balance at December 31, 2021	26,003
Gain / contributions / currency impact	864
Distributions	(182)
Balance at December 31, 2022	\$ 26,685

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We annually re-evaluate assumptions and estimates used in projecting pension assets, liabilities and expenses. These assumptions and estimates may affect the carrying value of pension assets, liabilities and expenses in our Consolidated Financial Statements. Assumptions used to determine net pension costs and projected benefit obligations are:

Pension Benefit Obligations Key Assumptions

	December 31,	
	2022	2021
Weighted average assumptions to determine benefit obligations:		
Discount rate	4.43 %	2.14 %
Rate of compensation increase	1.71 %	1.46 %

Pension Cost Key Assumptions

Weighted average assumptions to determine net cost:

Discount rate	2.14 %	1.78 %
Expected return on plan assets	3.50 %	3.48 %
Rate of compensation increase	1.46 %	1.46 %

We adjust our discount rate annually in relation to the rate at which the benefits could be effectively settled. Discount rates are set for each plan in reference to the yields available on AA-rated corporate bonds of appropriate currency and duration. The appropriate discount rate is derived by developing an AA-rated corporate bond yield curve in each currency. The discount rate for a given plan is the rate implied by the yield curve for the duration of that plan's liabilities. In certain countries, where little public information is available on which to base discount rate assumptions, the discount rate is based on government bond yields or other indices and approximate adjustments to allow for the differences in weighted durations for the specific plans and/or allowance for assumed credit spreads between government and AA-rated corporate bonds.

The expected return on assets assumption represents our best estimate of the long-term return on plan assets and generally was estimated by computing a weighted average return of the underlying long-term expected returns on the different asset classes, based on the target asset allocations. The expected return on assets assumption is a long-term assumption that is expected to remain the same from one year to the next unless there is a significant change in the target asset allocation, the fees and expenses paid by the plan or market conditions.

The rate of compensation increase is based on the long-term inflation rate projection of the jurisdictions where we have active plans and on any incremental change due to merit or productivity.

Plan Assets. The following table presents our retirement plan weighted average asset allocations at December 31, 2022, by asset category:

	Percentage of Plan Assets December 31, 2022	
	U.S.	Foreign
Equity securities and return seeking assets	20 %	— %
Fixed income, debt securities, or cash	80 %	100 %
Total	100 %	100 %

Investment Policy and Strategy. The investment policy and strategy of the U.S. plan is to invest approximately 20% in equities and return seeking assets and approximately 80% in fixed income securities. Rebalancing is undertaken monthly. To the extent we maintain plans in other countries, target asset allocation is 100% fixed income investments. For each plan, the investment policy is set within both asset return and local statutory requirements.

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Information for our pension plans with an accumulated benefit obligation in excess of plan assets at December 31, 2022 and 2021 follows:

	2022		2021	
	U.S.	Foreign	U.S.	Foreign
	<i>(Dollars in thousands)</i>			
Accumulated benefit obligation	\$ 99,993	\$ 1,884	\$ 129,906	\$ 35,247
Fair value of plan assets	80,006	—	109,961	26,003

Information for our pension plans with a projected benefit obligation in excess of plan assets at December 31, 2022 and 2021 follows:

	2022		2021	
	U.S.	Foreign	U.S.	Foreign
	<i>(Dollars in thousands)</i>			
Projected benefit obligation	\$ 99,993	\$ 31,065	\$ 129,906	\$ 37,412
Fair value of plan assets	80,006	27,708	109,961	26,003

Following is our projected future pension plan cash flow by year:

	U.S.	Foreign
	<i>(Dollars in thousands)</i>	
Expected contributions in 2023:		
Expected employer contributions	\$ 409	\$ 986
Expected employee contributions	—	—
Estimated future benefit payments reflecting expected future service for the years ending December 31:		
2023	\$ 9,136	\$ 1,430
2024	9,009	2,912
2025	8,936	1,519
2026	8,836	2,648
2027	8,608	1,842
Next five years	38,940	12,201

Post-Employment Benefit Plans

We have legacy post-employment medical coverage and life insurance benefits for eligible retired employees in the U.S. and in certain foreign jurisdictions. Effective December 31, 2005, all U.S. post-employment medical coverage plans were frozen.

The post-employment benefit plans are un-funded and our periodic contributions correspond to the amount of benefits paid in the period. Our funding contributions were \$1.2 million and \$1.4 million in 2022 and 2021, respectively.

The estimated liability for post-employment benefit plans was \$13.5 million and \$16.0 million as of December 31, 2022 and 2021, respectively. The Company recognized income of \$0.9 million in the Consolidated Statement of Operations for post-employment benefits in 2022 and expense of \$0.5 million and \$0.7 million for 2021 and 2020, respectively. Included in post-employment benefit expense are mark-to-market gains of \$1.6 million and \$0.1 million in 2022 and 2021, respectively, and a mark-to-market gain of less than \$0.1 million for 2020.

Savings Plan

Our employee savings plan provides eligible employees the opportunity for long-term savings and investment. The plan allows employees to contribute up to 5% of pay as a basic contribution and an additional 45% of pay as supplemental contribution. In 2022, 2021 and 2020, the Company's contributions to our savings plan were \$3.0 million, \$2.5 million and \$2.2 million, respectively.

(12) Commitments and Contingencies

Legal Proceedings

We are involved in various investigations, lawsuits, claims, demands, labor disputes and other legal proceedings, including with respect to environmental and human exposure or other personal injury matters, arising out of or incidental to the conduct of our business. While it is not possible to determine the ultimate disposition of each of these matters and proceedings, we do not believe that their ultimate disposition will have a material adverse effect on our financial position, results of operations or cash flows. Additionally, we are involved in the following legal proceedings.

We are involved in certain arbitrations as respondents/counterclaimants, pending before the International Chamber of Commerce with a few customers who, among other things, have failed to perform under their LTAs and in certain instances are seeking to modify or frustrate their contractual commitments to us. In particular, Aperam South America LTDA, Aperam Sourcing S.C.A., ArcelorMittal Sourcing S.C.A., and ArcelorMittal Brasil S.A. (collectively, the "Claimants") initiated a single arbitration proceeding against two of the Company's subsidiaries in the International Chamber of Commerce in June 2020. In June 2021, the Claimants filed their statement of claim, seeking approximately \$61.0 million plus interest in monetary relief and/or reimbursement in respect of several fixed price LTAs that were executed between such subsidiaries and the Claimants in 2017 and 2018. On December 16, 2022, the Claimants revised their calculation of damages to approximately \$178.9 million including interest, covering the period from the first quarter of 2020 through the end of the third quarter of 2022 and interest covering the period from June 2020 through December 16, 2022. The Claimants argue, among other things, that they should no longer be required to comply with the terms of the LTAs that they signed due to an alleged drop in market prices for graphite electrodes in January 2020. Alternatively, the Claimants argue that they should not be required to comply with the LTAs that they signed due to alleged market circumstances at the time of execution. We believe we have valid defenses to these claims. We intend to vigorously defend them and enforce our rights under the LTAs.

Pending litigation in Brazil has been brought by employees seeking to recover additional amounts and interest thereon under certain wage increase provisions applicable in 1989 and 1990 under collective bargaining agreements to which employers in the Bahia region of Brazil were a party (including our subsidiary in Brazil). Companies in Brazil have settled claims arising out of these provisions and, in May 2015, the litigation was remanded by the Brazilian Supreme Court in favor of the employees union. After denying an interim appeal by the Bahia region employers on June 26, 2019, the Brazilian Supreme Court finally ruled in favor of the employees union on September 26, 2019. The employers union has determined not to seek annulment of such decision. Separately, on October 1, 2015, a related action was filed by current and former employees against our subsidiary in Brazil to recover amounts under such provisions, plus interest thereon, which amounts together with interest could be material to us. If the Brazilian Supreme Court proceeding above had been determined in favor of the employers union, it would also have resolved this proceeding in our favor. In the first quarter of 2017, the state court initially ruled in favor of the employees. We appealed this state court ruling, and the appellate court issued a decision in our favor on May 19, 2020. The employees have further appealed and, on December 16, 2020, the court upheld the decision in favor of GrafTech Brazil. On February 22, 2021, the employees filed a further appeal and, on April 28, 2021, the court rejected the employees' appeal in favor of GrafTech Brazil. The employees filed a further appeal and on September 12, 2022 we filed our response in opposition. We intend to vigorously defend our position. As of December 31, 2022, we are unable to assess the potential loss associated with these proceedings as the claims do not currently specify the number of employees seeking damages or the amount of damages being sought.

Product Warranties

We generally sell products with a limited warranty. We accrue for known warranty claims if a loss is probable and can be reasonably estimated. We also accrue for estimated warranty claims incurred based on a historical claims charge analysis. Claims accrued but not yet paid and the related activity within the reserve for 2021 and 2022 are as follows:

		(Dollars in thousands)
Balance as of December 31, 2020	\$	1,997
Product warranty charges/adjustments		1,183
Payments and settlements		(2,092)
Balance as of December 31, 2021	\$	1,088
Product warranty charges/adjustments		456
Payments and settlements		(724)
Balance as of December 31, 2022	\$	820

Related Party Tax Receivable Agreement

On April 23, 2018, the Company entered into the Tax Receivable Agreement that provides Brookfield, as the sole Pre-IPO stockholder, the right to receive future payments from us for 85% of the amount of cash savings, if any, in U.S. federal income tax and Swiss tax that we and our subsidiaries realize as a result of the utilization of the pre-IPO Tax Assets. In addition, we will pay interest on the payments we will make to Brookfield with respect to the amount of these cash savings from the due date (without extensions) of our tax return where we realize these savings to the payment date at a rate equal to LIBOR plus 1.00% per annum. The term of the Tax Receivable Agreement commenced on April 23, 2018 and will continue until there is no potential for any future tax benefit payments.

As of December 31, 2022, total Tax Receivable Agreement liability was \$15.5 million, of which \$4.6 million was classified as a current liability "Related party payable - Tax Receivable Agreement" on the Consolidated Balance Sheets and \$10.9 million was classified as a long-term liability in "Related party payable - Tax Receivable Agreement long-term" on the Consolidated Balance Sheets.

As of December 31, 2021, the total Tax Receivable Agreement liability was \$19.3 million, of which \$3.8 million was classified as a current liability "Related party payable - Tax Receivable Agreement" on the Consolidated Balance Sheets and \$15.5 million was classified as a long-term liability in "Related party payable - Tax Receivable Agreement long-term" on the Consolidated Balance Sheets.

Long-term Incentive Plan

The long-term incentive plan ("LTIP") was adopted by the Company in August 2015 and amended and restated in March 2018. The purpose of the plan was to retain senior management of the Company, to incentivize them to make decisions with a long-term view and to influence behavior in a way that is consistent with maximizing value for the pre-IPO stockholder of the Company in a prudent manner. Each participant was allocated a number of profit units, with a maximum of 30,000 profit units ("Profit Units") available under the plan. Awards of Profit Units generally vested in equal increments over a five-year period beginning on the first anniversary of the grant date of the Profit Units, subject to continued employment with the Company through each vesting date. If a participant ceased to provide services prior to any applicable vesting date for any reason, other than a termination for cause, then the participant forfeited all unvested Profit Units and any vested Profit Units remained outstanding. If a participant had been terminated for cause, both vested and unvested Profit Units would have been forfeited. Upon a Change in Control (as defined in the LTIP), the Profit Units entitled the participant to a payment based on a percentage of the sum of (i) all net "Sale Proceeds" (as defined in the LTIP) received by Brookfield Capital IV L.P. and its affiliates ("Brookfield Capital IV") less (ii) the "Threshold Value" (as defined in the LTIP), with such payment amount being determined by the Company's Board of Directors in its sole discretion. In the event that, in connection with a Change in Control, Brookfield Capital IV disposes of less than 100% of its ownership interest in the Company, the amount of the Sale Proceeds in excess of the Threshold Value shall be determined on a pro-rata basis by reference to the percentage of ownership interest disposed, as determined by the Board of Directors of the Company.

The May 2021 secondary offering of our common stock by Brookfield Capital IV constituted a Change in Control under the LTIP. A Change in Control under the LTIP is defined as, among other things, a transaction or series of transactions (including, without limitation, the consummation of a combination, share purchases, recapitalization, redemption, issuance of capital stock, consolidation, reorganization or otherwise) pursuant to which following a public offering of the Company's stock, Brookfield Capital IV ceases to have a beneficial ownership interest in at least 30% of the Company's outstanding voting securities (effective on the first of such date). Upon completion of the May 2021 secondary offering, Brookfield beneficially owned approximately 24% of the Company's outstanding voting securities. Accordingly, the Company settled the vested Profit Units in lump sum payments within 30 days following the Change in Control. In the second quarter 2021, the settlement of the Profit Units resulted in the recording of a pre-tax charge of \$73.4 million, of which \$30.7 million was recorded in cost of sales and \$42.7 million was recorded in selling and administrative expense. To date, \$71.8 million of the charges have been settled in cash by the Company while the remainder of the liability, related to payroll taxes, is expected to be paid in subsequent quarters, which will satisfy all obligations under the LTIP.

Mexico Value-Added Tax ("VAT")

In July 2019, the Mexican Tax Authority ("MTA") opened an audit of the VAT filings of one of the Company's subsidiaries in Mexico for the period of January 1 to April 30, 2019. In September 2021, the MTA issued a tax assessment, claiming improper use of a certain VAT exemption rule for purchases from a foreign affiliate. The Company filed an administrative appeal against the tax assessment with the MTA's appeals office. In November 2022, the MTA appeal's office concluded its review and confirmed the tax assessment. The Company believes that the purchases from a foreign affiliate are exempt from VAT back-up withholding and in December 2022, the Company filed a Claim for Nullity with the Chamber Specialized in exclusive resolution of substance of the Federal Court of Administrative Justice. At the time of filing, the tax assessment for the four month period under audit amounted to approximately \$23.5 million, including penalties, inflation and interest.

After the filing of the Claim for Nullity, in January 2023, the MTA notified the same subsidiary in Mexico of its intent to assess \$51.0 million, including penalties, inflation and interest for the period January 1 to December 31, 2018, asserting the same improper use of certain VAT exemption rules on purchases from a foreign affiliate. In Mexico, each tax assessment requires a separate claim. The Company intends to pursue administrative appeal procedures with the MTA to try and resolve this matter.

The Company believes that its application of the VAT exemption rules is appropriate and, accordingly, does not believe that it is probable that it will incur a loss related to this matter for either of the two periods under the MTA's audit. The Company intends to vigorously defend its position.

(13) Income Taxes

Income before the provision for income taxes was derived from the following sources:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
U.S.	\$ 55,107	\$ (69,087)	\$ 51,672
Foreign	397,211	525,493	458,373
Income before provision for income taxes	<u>\$ 452,318</u>	<u>\$ 456,406</u>	<u>\$ 510,045</u>

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The provision for income taxes consists of the following:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
U.S. income taxes:			
Current	\$ 3,590	\$ 645	\$ (7,660)
Deferred	13,302	2,132	27,822
	16,892	2,777	20,162
Foreign income taxes:			
Current	48,744	71,088	63,092
Deferred	3,720	(5,789)	(7,583)
	52,464	65,299	55,509
Provision for income taxes	\$ 69,356	\$ 68,076	\$ 75,671

The increase in the provision for income taxes in 2022 versus 2021 is primarily due to the mix of worldwide earnings from various countries taxed at different rates and the U.S. taxation of GILTI, partially offset by the reduction in pre-tax income.

The provision for income taxes differed from the amount computed by applying the U.S. federal income tax rate of 21% for the years ended December 31, 2022, 2021 and 2020 to income before the provision for income taxes as set forth in the following table:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Tax at statutory U.S. federal rate	\$ 94,987	\$ 95,845	\$ 107,109
Impact of U.S. Tax Cuts and Jobs Act of 2017 - GILTI	38,153	51,016	45,539
Impact of Tax Receivable Agreement	(39)	49	(4,429)
Valuation allowance	(1,259)	(2,208)	(980)
State taxes, net of federal tax benefit	2,182	1,414	3,591
U.S. tax impact of foreign earnings (net of foreign tax credits)	348	537	2,113
Establishment/resolution of uncertain tax positions	(40)	(48)	(78)
Adjustment for foreign income taxed at different rates	(25,656)	(38,530)	(38,464)
Foreign tax credits	(34,264)	(43,821)	(37,280)
Change-in-Control-related compensation	(1,432)	10,626	—
Other	(3,624)	(6,804)	(1,450)
Provision for income taxes	\$ 69,356	\$ 68,076	\$ 75,671

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The tax effects of temporary differences that give rise to significant components of the deferred tax assets and deferred tax liabilities at December 31, 2022 and 2021 are set forth in the following table:

	December 31,	
	2022	2021
	(Dollars in thousands)	
Deferred tax assets:		
Post-employment and other employee benefits	\$ 15,088	\$ 17,375
Foreign tax credit and other carryforwards	25,856	32,452
Capitalized research and experimental costs	736	1,935
Environmental reserves	1,040	1,133
Inventory adjustments	5,767	10,545
Long-term contract option amortization	934	982
Previously taxed income	8,304	5,229
Other	2,695	2,246
Total gross deferred tax assets	60,420	71,897
Less: valuation allowance	(9,269)	(10,550)
Total deferred tax assets	51,151	61,347
Deferred tax liabilities:		
Fixed assets	\$ 51,410	\$ 51,595
Inventory	14,649	8,834
Goodwill and acquired intangibles	10,089	9,502
Mark-to-market hedges	3,903	2,824
Other	4,205	3,079
Total deferred tax liabilities	84,256	75,834
Net deferred tax liability	\$ (33,105)	\$ (14,487)

At each reporting period, the Company assesses the need for valuation allowances against deferred tax assets and whether it is more likely than not that deferred tax benefits will be realized in each jurisdiction. Consideration is given to all available evidence, both positive and negative, in assessing the need for a valuation allowance. Examples of positive evidence include a strong earnings history, an event or events that would increase the Company's taxable income or reduce expenses, or tax planning strategies that would create the ability to realize deferred tax assets. Examples of negative evidence include cumulative losses in recent years or a history of tax attributes expiring unused. In circumstances where the negative evidence outweighs the positive evidence, the Company has established or maintained valuation allowances on the jurisdiction's net deferred tax assets. However, the recognition of the valuation allowance does not limit the Company's ability to utilize these tax assets on a tax return in the future should taxable income be realized in sufficient amount to realize the assets.

Valuation allowance activity for the years ended December 31, 2022, 2021 and 2020 is as follows:

	(Dollars in thousands)
Balance as of December 31, 2019	\$ 13,736
Credited to income	(980)
Translation adjustment	17
Balance as of December 31, 2020	\$ 12,773
Credited to income	(2,208)
Translation adjustment	(15)
Balance as of December 31, 2021	\$ 10,550
Credited to income	(1,259)
Translation adjustment	(22)
Balance as of December 31, 2022	\$ 9,269

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The decrease in the valuation allowance in 2022 was primarily attributable to changes in expected future utilization, state law changes and expiration of U.S. state NOL carryforwards during the year. The reduction in the valuation allowance in 2021 resulted primarily from expirations of NOL carryforwards upon which a valuation allowance was previously recorded.

As of December 31, 2022, the Company had a total foreign tax credit carryforward of \$6.9 million. These tax credit carryforwards begin to expire in 2027. In addition, the Company had state NOL carryforwards of \$163.8 million (net of federal benefit), which can be carried forward from five to 20 years. These state NOL carryforwards resulted in a deferred tax asset of \$12.2 million as of December 31, 2022. The Company also has U.S. state tax credits of \$0.1 million as of December 31, 2022. The Company's foreign loss carryforwards on a gross basis were \$6.8 million as of December 31, 2022 and may be carried forward indefinitely.

As of December 31, 2022, the Company had unrecognized tax benefits of \$0.1 million, which, if recognized, would have a favorable impact on the effective tax rate. No material amounts of accrued interest or penalties have been recorded as of December 31, 2022 or 2021. A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	<i>(Dollars in thousands)</i>	
Balance as of December 31, 2020	\$	125
Lapse of statute of limitations		(45)
Foreign currency impact		(7)
Balance as of December 31, 2021	\$	73
Lapse of statute of limitations		(40)
Foreign currency impact		3
Balance as of December 31, 2022	\$	36

It is reasonably possible that there will be no more unrecognized tax benefits within 12 months due to settlements and the expiration of statutes of limitation.

The Company files income tax returns in the U.S. federal jurisdiction, and various state and foreign jurisdictions. All U.S. federal tax years prior to 2018 are generally closed by statute or have been audited and settled with the applicable domestic tax authorities. Other jurisdictions are generally closed for years prior to 2017.

As of December 31, 2022, the Company has accumulated undistributed earnings generated by its foreign subsidiaries of approximately \$1.2 billion. Because \$1.1 billion of such earnings have previously been subject to taxation by way of the transition tax on foreign earnings required by the Tax Cuts and Jobs Act of 2017, as well as the current and previous years' GILTI inclusion, any additional taxes due with respect to such earnings or the excess of the amount for financial reporting over the tax basis of GrafTech's foreign investments would generally be limited to foreign withholding and state taxes. The Company intends, however, to indefinitely reinvest these earnings and expect future U.S. cash generation to be sufficient to meet future U.S. cash needs.

(14) Stockholders' Equity

The following information should be read in conjunction with the Consolidated Statement of Stockholders' Equity (Deficit).

Common Stock Repurchases

On July 31, 2019, the Company announced that its Board of Directors approved the repurchase of up to \$100.0 million of its common stock in open market purchases, including under Rule 10b5-1 and/or Rule 10b-18 plans. On November 4, 2021, the Company announced that its Board of Directors approved the repurchase of an additional \$150.0 million of its common stock under this program. The stock repurchase program does not have an expiration date.

The Company repurchased 6,662,421 shares of its common stock for \$60.0 million in 2022, 4,658,544 shares of its common stock for \$50.0 million in 2021 and 3,328,574 shares of its common stock for \$30.1 million in 2020, under the stock repurchase program. The amount and timing of repurchases are subject to a variety of factors including liquidity, stock price, applicable legal requirements, other business objectives and market conditions.

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As of December 31, 2022, approximately \$99.0 million remained available for stock repurchases under this authorization.

Dividends

The Company paid quarterly dividends of \$0.085 through the first quarter of 2020. Effective in the second quarter of 2020, the quarterly dividend was reduced to \$0.01 per share.

Accumulated other comprehensive loss

The balance in our AOCL is set forth in the following table:

	December 31, 2022	December 31, 2021
	<i>(Dollars in thousands)</i>	
Foreign currency translation adjustments, net of tax	\$ (29,354)	\$ (22,330)
Commodities, interest rate and foreign currency derivatives, net of tax	21,284	14,886
Total AOCL	\$ (8,070)	\$ (7,444)

(15) Earnings per Share ("EPS")

The following table presents a reconciliation of the numerator and denominator of basic and diluted EPS:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands, except per share amounts)</i>		
Numerator for basic and diluted EPS:			
Net income	\$ 382,962	\$ 388,330	\$ 434,374
Denominator:			
Weighted average common shares outstanding for basic calculation	258,781,843	266,251,097	267,916,483
Add: Effect of equity awards	9,385	66,097	14,161
Weighted average common shares outstanding for diluted calculation	258,791,228	266,317,194	267,930,644
Basic EPS	\$ 1.48	\$ 1.46	\$ 1.62
Diluted EPS	\$ 1.48	\$ 1.46	\$ 1.62

Basic EPS is calculated by dividing net income by the weighted average number of common shares outstanding, which included 243,006, 130,624 and 73,320 shares of participating securities in 2022, 2021 and 2020, respectively. Diluted EPS is calculated by dividing net income by the sum of the weighted average number of common shares outstanding plus the additional common shares that would have been outstanding if potentially dilutive securities had been issued.

The weighted average common shares outstanding for the diluted earnings per share calculation excludes consideration of 2,240,655, 1,499,128 and 1,667,325 equivalent shares in 2022, 2021 and 2020, respectively, as these shares are anti-dilutive. See Note 14, "Stockholders' Equity" for details of the Company's common stock repurchases in 2022, 2021 and 2020.

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(16) Other (Income) Expense, net

The following table presents the details of other (income) expense:

	Year Ended December 31,		
	2022	2021	2020
	<i>(Dollars in thousands)</i>		
Brazil value-added tax credit	\$ —	\$ (11,511)	\$ —
Non-service pension and other post-employment (income) expense	(9,950)	(5,298)	3,584
Bank charges	938	1,098	962
Other	(1,052)	(740)	(1,216)
Total other (income) expense, net	<u>\$ (10,064)</u>	<u>\$ (16,451)</u>	<u>\$ 3,330</u>

In May 2021, the Brazilian Supreme Court ruled definitely to exclude the ICMS (state value-added tax) from the basis of calculation of certain federal value-added taxes, specifically the tax relative to the program of social integration ("PIS") and to the contribution for the financing of social security ("COFINS"), and confirmed the methodology for calculating the PIS-COFINS tax credit to which taxpayers are entitled. The Company's Brazilian subsidiary had previously filed a legal claim on this matter and is entitled to receive tax credits and interest dating back to five years preceding the date of the claim. The overpayments, plus interest, of PIS-COFINS related to the period from June 2005 to August 2021 represented \$11.5 million, net of legal fees. In the fourth quarter of 2021, the Company's subsidiary obtained approval by the Brazilian Tax Authorities to start offsetting the PIS-COFINS credit against the current federal value-added tax payable and recorded the one-time credit as a realizable gain. As of December 31, 2022, the Company had offset \$9.7 million of the credit. The balance of the PIS-COFINS credit is expected to be utilized within the next 12 months and is reported within "Prepaid expenses and other current assets" on the Consolidated Balance Sheet.

Non-service pension and other post-employment (income) expense includes the components of pension and post-employment costs other than service cost. The Company recognized non-service pension and other post-employment income in 2022 and 2021 due to the recognition of mark-to-market gains of \$9.6 million and \$3.8 million, respectively. In 2020, the Company recognized mark-to-market losses of \$3.2 million. See Note 11, "Retirement Plans and Post-Employment Benefits" for further discussion.

(17) Subsequent Events

Dividend declaration

On February 9, 2023, the Board of Directors declared a dividend of \$0.01 per share of common stock to stockholders of record as of the close of business on February 28, 2023, to be paid on March 31, 2023.

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

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

Management is responsible for establishing and maintaining adequate disclosure controls and procedures. Disclosure controls and procedures are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to management, including our Chief Executive Officer and the Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Management, with the participation of our Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that these controls and procedures were effective as of December 31, 2022.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act as a process, designed by, or under the supervision of, the chief executive officer and chief financial officer and effected by the Board of Directors, management and other personnel of a company, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP, and includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of assets of the company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP and that receipts and expenditures of the company are being made only in accordance with authorizations of management and the Board of Directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets of the company that could have a material effect on its financial statements.

Internal control over financial reporting has inherent limitations which 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 because the level of compliance with related policies or procedures may deteriorate.

Management, with the participation of our Chief Executive Officer and Chief Financial Officer, has conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2022 using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in *Internal Control-Integrated Framework (2013)*. Based on that assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2022. The effectiveness of the Company's internal control over financial reporting as of December 31, 2022 has been audited by Deloitte & Touche LLP, our independent registered public accounting firm, as stated in their report, which is presented elsewhere in this Annual Report.

Changes in Internal Control over Financial Reporting

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

Item 9B. Other Information

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information regarding our executive officers is set forth in the Supplemental Item to Part I of this Report under the caption "Supplemental Item. Information about our Executive Officers" and is incorporated herein by reference.

We adopted a Code of Conduct and Ethics that applies to our employees, directors and officers, including our Chief Executive Officer and President and our Chief Financial Officer, Vice President Finance and Treasurer. A copy of the Code of Conduct and Ethics is publicly available on our website at <https://www.graftech.com/investors/default.aspx#governance>. Any waiver or amendment of the Code of Conduct and Ethics for executive officers or directors (i) may be made only by the Audit Committee, (ii) will be promptly disclosed as required by applicable U.S. federal securities laws and the listing standards of the NYSE and (iii) will be available in the "Investors" section of our website, www.graftech.com.

The remaining information required by this Item is incorporated herein by reference from the sections entitled "Proposal 1 Elect Three Directors for a Three-Year Term or Until Their Successors are Elected and Qualified" and "Committees of the Board of Directors" in our Proxy Statement for the Annual Meeting of Stockholders expected to be held on or about May 11, 2023.

We will provide disclosure of delinquent Section 16(a) reports, if any, in our Proxy Statement in the section entitled "Delinquent Section 16(a) Reports," and such disclosure, if any, is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this item is incorporated by reference from the sections entitled "Compensation Discussion and Analysis," "Compensation Tables and Related Information," "CEO Pay Ratio," "Director Compensation Program," "2022 Director Compensation Table," "Risk Oversight," "Compensation Committee Report" and "Compensation Committee Interlocks and Insider Participation" in the Proxy Statement.

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

The information regarding security ownership of certain beneficial owners and management required by this item is incorporated by reference from the section entitled "Security Ownership of Certain Beneficial Owners and Management" in the Proxy Statement.

Equity Compensation Plan Information

The following table provides information about our common stock that may be issued under our Omnibus Equity Incentive Plan as of December 31, 2022.

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	2,730,124 ⁽¹⁾	\$12.30 ⁽²⁾	11,180,365
Equity compensation plans not approved by security holders	—	—	—
Total	2,730,124 ⁽¹⁾	\$12.30 ⁽²⁾	11,180,365

(1) This amount represents 1,890,167 shares of common stock subject to outstanding stock options, 477,317 shares of common stock subject to outstanding restricted stock units and 362,640 shares of stock subject to outstanding deferred share units.

(2) The weighted-average exercise price does not take into account shares of common stock subject to outstanding restricted stock units or outstanding deferred share units.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this item is incorporated by reference from the sections entitled "Certain Relationships and Related Party Transactions," "Director Independence" and "Committees of the Board of Directors" in the Proxy Statement.

Item 14. Principal Accountant Fees and Services

The information required by this item is incorporated by reference from the section entitled "Independent Auditor Fees and Other Matters" in the Proxy Statement.

PART IV

Item 15. Exhibit and Financial Statement Schedules

(a) The following documents are filed as part of this Report:

(1) Financial Statements

The following financial statements are set forth under Part II, Item 8 of this Annual Report:

- Report of Independent Registered Public Accounting Firm;
- Consolidated Balance Sheets as of December 31, 2022 and December 31, 2021;
- Consolidated Statements of Operations and Comprehensive Income for the fiscal years ended December 31, 2022, December 31, 2021 and December 31, 2020;
- Consolidated Statements of Cash Flows for the fiscal years ended December 31, 2022, December 31, 2021 and December 31, 2020;
- Consolidated Statements of Stockholders' Equity (Deficit) for the fiscal years ended December 31, 2022, December 31, 2021 and December 31, 2020; and
- Notes to the Consolidated Financial Statements.

(2) Financial Statement Schedules

All schedules have been omitted because the required information is included in the consolidated financial statements or the notes thereto, or because it is not required.

(3) Exhibits

The exhibits listed in the following table have been filed or furnished, as applicable, with this Annual Report, or have been incorporated herein by reference.

Exhibit Number	Description of Exhibit
2.1	<u>Agreement and Plan of Merger dated as of May 17, 2015 among GrafTech International Ltd., BCP IV GrafTech Holdings LP and Athena Acquisition Subsidiary, Inc. (incorporated herein by reference to Exhibit 2.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed May 18, 2015).</u>
3.1	<u>Amended and Restated Certificate of Incorporation of GrafTech International Ltd. (incorporated herein by reference to Exhibit 3.1 to GrafTech International Ltd.'s Quarterly Report on Form 10-Q filed May 1, 2019).</u>
3.2	<u>Amended and Restated By-Laws of GrafTech International Ltd. (incorporated herein by reference to Exhibit 3.2 to GrafTech International Ltd.'s Registration Statement on Form S-1/A (Registration No. 333-223791) filed April 13, 2018).</u>
4.1	<u>Registration Rights Agreement, dated as of April 23, 2018, by and between GrafTech International Ltd. and BCP GrafTech Holdings LP (incorporated herein by reference to Exhibit 4.1 to GrafTech International Ltd.'s Form 10-Q filed on August 3, 2018).</u>
4.2	<u>Stockholder Rights Agreement, dated as of April 23, 2018, by and between GrafTech International Ltd. and BCP IV GrafTech Holdings LP (incorporated herein by reference to Exhibit 4.2 to GrafTech International Ltd.'s Form 10-Q filed on August 3, 2018).</u>

- 4.3 [Amendment No. 1 to Stockholder Rights Agreement, dated November 6, 2019 by and between GrafTech International Ltd. and BCP IV GrafTech Holdings LP \(incorporated herein by reference to Exhibit 4.3 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 21, 2020\).](#)
- 4.4 [Description of securities \(incorporated herein by reference to Exhibit 4.4 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 21, 2020\).](#)
- 4.5 [Indenture, dated as of December 22, 2020, among GrafTech Finance Inc., as issuer, GrafTech International Ltd., as a guarantor, the subsidiary guarantors party thereto, and U.S. Bank National Association, as trustee and collateral agent, relating to GrafTech Finance Inc.'s 4.625% Senior Secured Notes due 2028 \(incorporated herein by reference to Exhibit 4.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed December 23, 2020\).](#)
- 4.6 [Form of 4.625% Senior Secured Notes due 2028 of GrafTech Finance Inc. \(included in Exhibit 4.5\) \(incorporated herein by reference to Exhibit 4.2 to GrafTech International Ltd.'s Current Report on Form 8-K filed December 23, 2020\).](#)
- 10.1 [Credit Agreement, dated February 12, 2018, among GrafTech International Ltd., as Holdings, GrafTech Finance Inc., GrafTech Switzerland SA and GrafTech Luxembourg II S.A.R.L., as co-borrowers, the lenders and issuing banks party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent and Collateral Agent \(incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.2 [First Amendment to the Credit Agreement, dated June 15, 2018, among GrafTech International Ltd., GrafTech Finance Inc., GrafTech Switzerland SA, GrafTech Luxembourg II S.A.R.L. each of the entities listed as an "Incremental Term Lender" on the signature pages thereto, JPMorgan Chase Bank, N.A., as Administrative Agent, and for purposes of Sections 5 and 6 thereof only, each of the entities listed as "Guarantor" on the signature pages thereto \(incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Quarterly Report on Form 10-Q filed on August 3, 2018\).](#)
- 10.3 [Guarantee Agreement, dated February 12, 2018, among GrafTech International Ltd., GrafTech Finance Inc., the other subsidiaries of GrafTech International Ltd. from time to time party thereto, in favor of JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.2 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.4 [Collateral Agreement, dated as of February 12, 2018, among GrafTech International Ltd., GrafTech Finance Inc., the other grantors party thereto and JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.3 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.5 [European Guarantee and Luxembourg Security Agreement, dated as of February 12, 2018, by GrafTech Luxembourg I S.A.R.L., GrafTech Luxembourg II S.A.R.L., GrafTech Switzerland SA in favor of JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.4 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.6 [Pledge Agreement, dated as of February 12, 2018, by GrafTech Switzerland SA in favor of JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.5 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.7 [Pledge Agreement, dated as of February 12, 2018, by GrafTech Luxembourg I S.A.R.L. in favor of JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.6 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.8 [Pledge Agreement, dated as of February 12, 2018, by GrafTech Luxembourg II S.A.R.L. in favor of JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.7 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.9 [Patent Security Agreement, dated as of February 12, 2018, among GrafTech International Holdings Inc., as Grantor, and JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.8 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.10 [Trademark Security Agreement, dated as of February 12, 2018, among GrafTech International Holdings Inc., as Grantor, and JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.9 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.11 [Copyright Security Agreement, dated as of February 12, 2018, among GrafTech International Holdings, Inc., as Grantor, and JPMorgan Chase Bank, N.A., as Collateral Agent \(incorporated herein by reference to Exhibit 10.10 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.12 [Share Pledge Agreement, dated February 12, 2018, between GrafTech Luxembourg I S.A.R.L., as Pledgor, and JPMorgan Chase Bank, N.A., as Collateral Agent, in the presence of GrafTech Luxembourg II S.A.R.L. \(incorporated herein by reference to Exhibit 10.11 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)

- 10.13 [Share Pledge Agreement, dated as of February 12, 2018, between GrafTech International Holdings Inc., as Pledgor, and JPMorgan Chase Bank, N.A., as Collateral Agent, in the presence of GrafTech Luxembourg I S.A.R.L. \(incorporated herein by reference to Exhibit 10.12 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.14 [Swiss Security Agreement, dated as of February 12, 2018, by GrafTech Switzerland SA and JPMorgan Chase Bank, N.A., as the Assignee and Collateral Agent \(incorporated herein by reference to Exhibit 10.13 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.15* [Tax Receivable Agreement, dated as of April 23, 2018, between GrafTech International Ltd. and Brookfield Capital Partners IV GP, Ltd.](#)
- 10.16+ [Form of Indemnification Agreement with Directors and Executive Officers \(incorporated herein by reference to Exhibit 10.15 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed March 26, 2018\).](#)
- 10.17+ [Employment Agreement, effective March 1, 2018, between GrafTech International Holdings Inc. and David J. Rintoul \(incorporated herein by reference to Exhibit 10.20 to GrafTech International Ltd.'s Registration Statement on Form S-1 \(Registration No. 333-223791\) filed March 20, 2018\).](#)
- 10.18+ [GrafTech International Ltd. Omnibus Equity Incentive Plan \(incorporated herein by reference to Exhibit 10.24 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed April 4, 2018\).](#)
- 10.19+ [Form of Stock Option Agreement for the GrafTech International Ltd. Omnibus Equity Incentive Plan \(incorporated herein by reference to Exhibit 10.25 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed April 4, 2018\).](#)
- 10.20+ [Form of Stock Option Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan for David Rintoul \(incorporated herein by reference to Exhibit 10.26 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed April 4, 2018\).](#)
- 10.21+ [Form of Deferred Share Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan for Non-Employee Directors \(incorporated herein by reference to Exhibit 10.27 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed April 4, 2018\).](#)
- 10.22+ [Form of Deferred Share Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan for David Rintoul \(incorporated herein by reference to Exhibit 10.28 to GrafTech International Ltd.'s Registration Statement on Form S-1/A \(Registration No. 333-223791\) filed April 4, 2018\).](#)
- 10.23+ [Amendment to Deferred Share Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan for David Rintoul \(incorporated herein by reference to Exhibit 10.32 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2019\).](#)
- 10.24+ [Amended and Restated GrafTech International Ltd. Director Deferred Fee Plan, amended as of November 1, 2018 \(incorporated herein by reference to Exhibit 10.33 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2019\).](#)
- 10.25+ [Form of Deferred Share Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan for Non-Employee Directors \(adopted November 1, 2018\) \(incorporated herein by reference to Exhibit 10.34 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2019\).](#)
- 10.26+ [Summary of Modifications to Employment Agreement, effective March 1, 2018, between GrafTech International Holdings Inc. and David J. Rintoul \(incorporated herein by reference to Exhibit 10.35 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2019\).](#)
- 10.27+ [Form of Stock Option Grant Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan \(incorporated herein by reference to Exhibit 10.2 to GrafTech International Ltd.'s Quarterly Report on Form 10-Q filed May 1, 2019\).](#)
- 10.28 [Collateral Agreement, dated as of December 22, 2020, among GrafTech Finance Inc., GrafTech International Ltd., the other subsidiary grantors party thereto, and U.S. Bank National Association, as collateral agent \(incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed December 23, 2020\).](#)
- 10.29 [Second Amendment to the Credit Agreement, dated February 17, 2021, among GrafTech International Ltd., GrafTech Finance Inc., GrafTech Luxembourg II S.À.R.L., GrafTech Switzerland SA, JPMorgan Chase Bank, N.A., as Administrative Agent, and the lenders and issuing banks party thereto \(incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed on February 19, 2021\).](#)
- 10.30 [Third Amendment, dated as of May 31, 2022, by and among GrafTech International Ltd., GrafTech Finance Inc., GrafTech Luxembourg II S.à r.l., GrafTech Switzwerland SA, JPMorgan Chase Bank, N.A., as administrative agent, the New Revolving Lenders \(as defined therein\), the Consenting Revolving Lenders \(as defined therein\), each of the entities listed as an "Incremental Revolving Lender" on the signature pages thereto and for purposes of Sections 5, 7 and 8 thereof only, each of the entities listed as a "Guarantor" on the signature pages thereto \(incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed June 2, 2022\).](#)

10.31+	<u>GrafTech International Ltd. Short-Term Incentive Plan (incorporated herein by reference to Exhibit 10.35 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2022).</u>
10.32+	<u>Form of Restricted Stock Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2022 Version) (incorporated herein by reference to Exhibit 10.36 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2022).</u>
10.33+	<u>Form of Stock Option Grant Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2022 Version) (incorporated herein by reference to Exhibit 10.37 to GrafTech International Ltd.'s Annual Report on Form 10-K filed February 22, 2022).</u>
10.34+	<u>Form of Restricted Stock Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2022 Non-US Version) (incorporated herein by reference to Exhibit 10.4 to GrafTech International Ltd.'s Quarterly Report on Form 10-Q filed August 5, 2022).</u>
10.35+	<u>Form of Stock Option Grant Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2022 Non-US Version) (incorporated herein by reference to Exhibit 10.5 to GrafTech International Ltd.'s Quarterly Report on Form 10-Q filed August 5, 2022).</u>
10.36+	<u>Employment Agreement, dated June 27, 2022 by and between GrafTech International Holdings, Inc. and Marcel Kessler (incorporated herein by reference to Exhibit 10.1 to GrafTech International Ltd.'s Current Report on Form 8-K filed June 28, 2022).</u>
10.37+	<u>Consulting Agreement, dated June 27, 2022 by and between GrafTech International Holdings, Inc. and Rintoul Consulting Services, LLC (incorporated herein by reference to Exhibit 10.2 to GrafTech International Ltd.'s Current Report on Form 8-K filed June 28, 2022).</u>
10.38*+	<u>Form of Retention Bonus Agreement.</u>
10.39*+	<u>Form of Director Restricted Stock Units Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2023 Version).</u>
10.40*+	<u>Form of Director Deferred Restricted Stock Units Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2023 Version).</u>
10.41*+	<u>Amended and Restated GrafTech International Ltd. Director Deferred Fee Plan, amended and restated effective as of April 1, 2023.</u>
10.42*+	<u>Form of Director Deferred Share Unit Agreement under the GrafTech International Ltd. Omnibus Equity Incentive Plan (2023 Version).</u>
21.1*	<u>List of subsidiaries of GrafTech International Ltd.</u>
23.1*	<u>Consent of Deloitte & Touche LLP, Independent Registered Public Accounting Firm.</u>
31.1*	<u>Certification pursuant to Rule 13a-14(a) under the Exchange Act by Marcel Kessler, Chief Executive Officer and President (Principal Executive Officer).</u>
31.2*	<u>Certification pursuant to Rule 13a-14(a) under the Exchange Act by Timothy K. Flanagan, Chief Financial Officer, Vice President and Treasurer (Principal Financial Officer).</u>
32.1**	<u>Certification pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 by Marcel Kessler, Chief Executive Officer and President (Principal Executive Officer).</u>
32.2**	<u>Certification pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 by Timothy K. Flanagan, Chief Financial Officer, Vice President Finance and Treasurer (Principal Financial Officer).</u>
101	The following financial information from GrafTech International Ltd.'s Annual Report on Form 10-K for the year ended December 31, 2022 formatted in Inline XBRL (Extensible Business Reporting Language) includes: (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations and Comprehensive Income, (iii) the Consolidated Statements of Cash Flows, (iv) the Consolidated Statements of Stockholders' Equity (Deficit), and (v) Notes to the Consolidated Financial Statements.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

* Filed herewith

** Furnished herewith

+ Indicates management contract or compensatory plan or arrangement

Item 16. Form 10-K Summary

None.

SIGNATURES

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

GRAFTECH INTERNATIONAL LTD.

February 14, 2023

By: /s/ Marcel Kessler

Marcel Kessler

Title: Chief Executive Officer and President

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

<u>Signatures</u>	<u>Title</u>	<u>Date</u>
/s/ Marcel Kessler	Chief Executive Officer and President and Director (Principal Executive Officer)	February 14, 2023
Marcel Kessler		
/s/ Timothy K. Flanagan	Chief Financial Officer, Vice President Finance and Treasurer (Principal Financial and Accounting Officer)	February 14, 2023
Timothy K. Flanagan		
/s/ Denis A. Turcotte	Chairman and Director	February 14, 2023
Denis A. Turcotte		
/s/ Brian L. Acton	Director	February 14, 2023
Brian L. Acton		
/s/ Catherine L. Clegg	Director	February 14, 2023
Catherine L. Clegg		
/s/ Michel J. Dumas	Director	February 14, 2023
Michel J. Dumas		
/s/ Leslie D. Dunn	Director	February 14, 2023
Leslie D. Dunn		
/s/ Debra Fine	Director	February 14, 2023
Debra Fine		
/s/ Jean-Marc Germain	Director	February 14, 2023
Jean-Marc Germain		
/s/ David Gregory	Director	February 14, 2023
David Gregory		
/s/ Henry R. Keizer	Director	February 14, 2023
Henry R. Keizer		
/s/ Anthony R. Taccone	Director	February 14, 2023
Anthony R. Taccone		