The ExOne Company
(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or Other Jurisdiction of Incorporation or Organization)

127 Industry Boulevard
North Huntingdon, PA 15642

(724) 863-9663

(Registrant’s telephone number, including area code)

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

Title of each class Trading symbol Name of each exchange on which registered
Common stock XONE The Nasdaq Stock Market

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 file 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 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 ☐
Non-accelerated filer ☐
Accelerated filer ☒
Smaller reporting company ☒
Emerging growth company ☐

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

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

The aggregate market value of common stock held by non-affiliates as of the last business day of the registrant’s most recently completed second fiscal quarter was $104.8 million.

As of March 12, 2020, 16,450,973 shares of common stock, par value $0.01 per share, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant’s definitive proxy statement to be filed pursuant to Regulation 14A of the general rules and regulations under the Securities Exchange Act of 1934, as amended, for its 2020 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K.
| PART I | Item 1. | Business | 1 |
| PART I | Item 1A. | Risk Factors | 8 |
| PART I | Item 1B. | Unresolved Staff Comments | 19 |
| PART I | Item 2. | Properties | 19 |
| PART I | Item 3. | Legal Proceedings | 19 |
| PART I | Item 4. | Mine Safety Disclosures | 19 |
| PART II | Item 5. | Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities | 20 |
| PART II | Item 6. | Selected Financial Data | 20 |
| PART II | Item 7. | Management’s Discussion and Analysis of Financial Condition and Results of Operations | 21 |
| PART II | Item 7A. | Quantitative and Qualitative Disclosures about Market Risk | 28 |
| PART II | Item 8. | Financial Statements and Supplementary Data | 29 |
| PART II | Item 9. | Changes in and Disagreements with Accountants on Accounting and Financial Disclosure | 59 |
| PART II | Item 9A. | Controls and Procedures | 59 |
| PART II | Item 9B. | Other Information | 59 |
| PART III | Item 10. | Directors, Executive Officers and Corporate Governance | 60 |
| PART III | Item 11. | Executive Compensation | 60 |
| PART III | Item 12. | Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters | 60 |
| PART III | Item 13. | Certain Relationships and Related Transactions, and Director Independence | 60 |
| PART III | Item 14. | Principal Accountant Fees and Services | 60 |
| PART IV | Item 15. | Exhibits and Financial Statement Schedules | 61 |
Item 1. Business.

General

As used in this Annual Report on Form 10-K, unless the context otherwise requires or indicates, the terms “ExOne,” “Company,” “we,” “our,” “ours,” and “us” refer to The ExOne Company and its wholly-owned subsidiaries.

Cautionary Statement Concerning Forward-Looking Statements

This Annual Report on Form 10-K may contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act with respect to our future financial or business performance, strategies, or expectations. Forward-looking statements typically are identified by words or phrases such as “trend,” “potential,” “opportunity,” “pipeline,” “believe,” “comfortable,” “expect,” “anticipate,” “current,” “intention,” “estimate,” “position,” “assume,” “outlook,” “continue,” “remain,” “maintain,” “sustain,” “seek,” “achieve,” as well as similar expressions, or future or conditional verbs such as “will,” “would,” “should,” “could” and “may.”

We caution that forward-looking statements are subject to numerous assumptions, risks and uncertainties, which change over time. Forward-looking statements speak only as of the date they are made and we assume no duty to and do not undertaking to update forward-looking statements. Actual results could differ materially from those anticipated in forward-looking statements and future results could differ materially from historical performance.

In addition to risk factors previously disclosed in our reports and those identified elsewhere in this report, the following factors, among others, could cause results to differ materially from forward-looking statements or historical performance: our ability to consistently generate operating profits; fluctuations in our revenues and operating results; our competitive environment and our competitive position; our ability to enhance our current three-dimensional (“3D”) printing machines and technology and develop and introduce new 3D printing machines; our ability to qualify more industrial materials in which we can print; demand for our products; the availability of skilled personnel; the impact of loss of key management; the impact of market conditions and other factors on the carrying value of long-lived assets; our ability to continue as a going concern; the impact of customer specific terms in machine sale agreements on the period in which we recognize revenue; risks related to global operations including effects of the coronavirus disease COVID-19; foreign currency; the adequacy of sources of liquidity; the amount and sufficiency of funds for required capital expenditures, working capital, and debt service; dependency on certain critical suppliers; nature or impact of alliances and strategic investments; reliance on critical information technology systems; the effect of litigation, contingencies and warranty claims; liabilities under laws and regulations protecting the environment; the impact of governmental laws and regulations; operating hazards, war, terrorism and cancellation or unavailability of insurance coverage; the impact of disruption of our manufacturing facilities or ExOne Adoption Centers (“EACs”); the adequacy of our protection of our intellectual property; and expectations regarding demand for our industrial products, operating revenues, operating and maintenance expenses, insurance expenses and deductibles, interest expenses, debt levels, and other matters with regard to outlook.

These and other important factors, including those discussed under Item 1A, “Risk Factors” and Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K, may cause our actual results of operations to differ materially from any future results of operations expressed or implied by the forward-looking statements contained in this Annual Report on Form 10-K. Before making a decision to purchase our common stock, you should carefully consider all of the factors identified in this Annual Report on Form 10-K that could cause actual results to differ from these forward-looking statements.

This Annual Report on Form 10-K may contain trademarks, service marks and trade names of other companies, which are the property of their respective owners. Solely for convenience, marks and trade names referred to in this Annual Report on Form 10-K may appear without the ® or TM symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the right of the applicable licensor to these marks and trade names. Third-party marks and trade names used herein are for nominative informational purposes only and their use herein in no way constitutes or is intended to be commercial use of such names and marks. The use of such third-party names and marks in no way constitutes or should be construed to be an approval, endorsement or sponsorship of us, our products or services, by the owners of such third-party names and marks.

Our History

Our business began as the advanced manufacturing business of the Extrude Hone Corporation, which manufactured its first 3D printing machine in 2003 using licensed technology developed by researchers at the Massachusetts Institute of Technology (“MIT”). In 2005, our business assets were transferred to The Ex One Company, LLC, a Delaware limited liability company, when Extrude Hone Corporation was acquired by a third party. In 2007, we were acquired by S. Kent Rockwell through his wholly-owned company, Rockwell Forest Products, Inc. On January 1, 2013, the Company was formed when The Ex One Company, LLC was merged with and into a Delaware corporation formed in December 2012, which changed its name to The ExOne Company. On February 12, 2013, we completed our initial public offering, raising $90.4 million in unrestricted net proceeds after underwriting commissions and offering costs. Subsequent secondary offerings of our common stock have resulted in raising $78.0 million in additional unrestricted net proceeds after underwriting commissions and offering costs.
The Additive Manufacturing Industry and 3D Printing

3D printing is the most common type of an emerging manufacturing technology that is broadly referred to as additive manufacturing (“AM”). In general, AM is a term used to describe a manufacturing process that produces 3D objects directly from digital or computer models through the repeated deposit of very thin layers of material. 3D printing is the process of joining materials from a digital 3D model, usually layer by layer, to make objects using a printhead, nozzle, or other printing technology. The terms “AM” and “3D printing” are often used interchangeably, as the media and marketplace have popularized the term 3D printing rather than AM, which is the industry term. AM represents a transformational shift from traditional forms of manufacturing (e.g., machining or tooling), which are sometimes referred to as subtractive manufacturing. We believe that AM and 3D printing are increasingly poised to displace traditional subtractive manufacturing methodologies in a growing range of industrial applications.

AM methods generally include the following:

- Material extrusion;
- Material jetting;
- Powder bed fusion;
- Directed energy deposition;
- Vat photopolymerization;
- Sheet lamination; and
- Binder jetting.

Each of the methods above includes one or more underlying technologies used to address specific applications. From our inception, our focus has been specifically targeted on binder jetting technologies for industrial applications.

Historically, AM had focused on prototyping and small, limited production in order to find acceptance of its varying technologies by end users in order to convince users of traditional methods of the viability of such new applications. As AM has evolved, the focus has progressed into production readiness and increasing reliability and repeatability standards associated with higher volumetric output and specifications that industrial applications demand.

ExOne and 3D Printing

We are a global provider of 3D printing machines and 3D printed and other products, materials and services to industrial customers. Our business primarily consists of manufacturing and selling 3D printing machines and printing products to specification for our customers using our installed base of 3D printing machines. Our machines serve direct and indirect applications. Direct printing produces a component; indirect printing makes a tool to produce a component. We offer pre-production collaboration and print products for customers through our network of EACs. We also supply the associated materials, including consumables and replacement parts, and other services, including training and technical support, that are necessary for purchasers of our 3D printing machines to print products. We believe that our ability to print in a variety of industrial materials, as well as our industry-leading volumetric output (as measured by build box size and printing speed), uniquely position us to serve the needs of industrial customers.

Our binder jetting technology was developed over 20 years ago by researchers at MIT. Our 3D printing machines build or print products from computer-aided drafting (“CAD”) models by depositing successive thin layers of particles of materials such as silicate sands or metal or ceramic powders in a “build box.” A moveable printhead passes over each layer and deposits a chemical binding agent in the selected areas where the finished product will be materialized. Each layer can be unique.

Depending on the industrial material used in printing, printed products may need post-production processing. We generally use silica sand or foundry sand for casting, both of which typically require no additional processing. Products printed in other materials, such as metals or ceramics, or for use in specific applications, may need varying amounts of heat treating or sintering, drying or curing, or other post-processing or finishing.

Pre-Print. We believe that our customers have the opportunity to take greater advantage of the design freedom that our 3D printing technology provides. Each of our 3D printing machines uses standard front-end software which gives us the ability to collaborate with our customers to develop and refine CAD designs that meet our customers’ specifications and can be read and processed by our 3D printing machines. We continue to invest in additional pre-print capabilities and resources that empower our customers to fully exploit the design freedom of 3D printing. This includes collaborative agreements with third parties, including our simulation software development agreement entered into with ANSYS, Inc. in November 2019.

Industrial Materials. We supply printing materials to our customers that have been qualified for use with our machines. As we experience increased demand for our products globally, it is essential that the material supply chain and distribution channels be in close proximity to our current and prospective customers. For the highest quality printed products, the sand grains and metal or ceramic particles used in the 3D printing process must be uniform in size and meet very specific tolerances. We continue to focus on material development activities associated with our 3D printing process, including collaborative arrangements with customers targeted at local supply resources.
Our Machines. Each of our 3D printing machine platforms include a computer processor which controls the printhead(s) utilized in applying layers of binding agent to a material spread across the build area. Our 3D printing machines are differentiated by the varying size of our build box profiles and the speed at which we can jet binding agent and effectively distribute materials in the printing process. We currently manufacture our 3D printing machines in both Germany and the United States. Our machines serve direct (metal or ceramic) and indirect (sand) applications. Direct printing produces a component; indirect printing makes a tool to produce a component. Our focus is on enhancing our existing machine technologies by expanding our material capabilities for both direct and indirect applications, growing the size of our platforms to meet the needs of industrial customer volume demands and optimizing the speed and quality of our printing processes.

Our 3D printing machines are used primarily to manufacture industrial products that are ordered in relatively low volumes, are highly complex and have a high value to the customer. Our technology is not appropriate for the mass production of simple parts, such as certain higher volume injection molded parts or certain higher volume parts made in metal stamping machines. Traditional manufacturing technology is more economical in making those parts. While we expect over time to be able to increase the kinds of parts that we can make more economically than using subtractive manufacturing, we do not expect to use our technology to make simple, low-cost, mass-produced parts for the foreseeable future.

Post-Print Processing. After a product is printed, the bound and unbound powder in the build box requires curing of the chemical binding agent. For indirect printing of sand molds and cores, curing may occur at room temperature and the printed product is complete after the binder is cured. For certain binder types, a drying process (utilizing an industrial microwave or other means) may be necessary. The mold or core is then poured at a foundry, yielding the finished metal product. We believe that our casting technology offers a number of advantages over traditional casting methods, including enhanced design complexity, increased yield, weight reduction and improved thermal range.

For direct printing, the product needs to be either sintered, or sintered and infiltrated. With sintering, the product is placed into a furnace in an inert atmosphere to sinter the bonded particles and form a strong bonded porous structure. The porous structure can be further infiltrated with another material to fill the voids. After the sintering and infiltration, the product can be polished and finished with a variety of standard industrial methods and coatings. We believe that our 3D printing capabilities enable customers to develop the ideal design for products, freeing them of some of the design constraints inherent in traditional manufacturing, in the industrial metal of choice and in a more efficient manner than traditional manufacturing methods.

Our Business Strategy
The principal elements of our growth strategy include:

- Expand Our Customer and Application Focus. We intend to leverage our substantial experience in binder jetting technology to focus on the
  highest value industries and applications. We have made a significant investment in our commercial operations to drive our growth in this area.

- Extend the Capabilities of Our Core Technology. We intend to expand our core binder jetting technology through our machine platforms
  while at the same time lowering the total cost of ownership of our systems for our customers. We are also focused on driving modularity
  among our various machine platforms for both direct and indirect applications.

- Execute on 3D Printed and Other Products, Materials and Services Revenue Growth. We intend to execute on our plan to expand our
  offerings for 3D printed and other products, materials and services while better leveraging our growing global installed base of 3D printers.

Customers and Sales

Our Customers
Our customers are located primarily in the Americas, Europe/Middle East/Africa (“EMEA”) and Asia Pacific (“APAC”) regions. We are a party to non-disclosure agreements with many of our customers and, therefore, are often prohibited from disclosing many of our customers’ identities. Our customers include a number of Fortune 500 companies that are leaders in their respective markets. During 2019 and 2018, we conducted a significant portion of our business with a limited number of customers, though not necessarily the same customers for each respective period. During 2019 and 2018, our five most significant customers represented 17.4% and 16.5% of our total revenue, respectively. During 2019 and 2018, there were no customers that individually represented 10.0% or greater of our total revenue. Sales of 3D printing machines are low volume, but generate significant revenue based on their per-unit pricing. Generally, sales of 3D printing machines are to different customers in each respective period. The timing of such sales may be dependent on various factors, including a customer’s capital budgeting cycle, its facility preparedness and the terms of the underlying arrangement with a customer
(including certain substantive acceptance provisions) which may vary from period to period. The nature of our revenue from 3D printing machines does not leave us dependent upon a single or a limited number of customers. Sales of 3D printed and other products, materials and services generally result in a significantly lower aggregate price per order as compared to 3D printing machine sales. The nature of our revenue from 3D printed and other products, materials and services does not leave us dependent upon a single or a limited number of customers.
Educating Our Customers

Educating our customers and raising awareness in our target markets about the many uses and benefits of our binder jetting technology is an important part of our sales process. We believe that customers who experience the efficiency gains, decreased lead-time, increased design flexibility, and decreased cost potential of 3D printing, as compared to subtractive manufacturing, are more likely to purchase our 3D printing machines and be repeat customers of our products and services. We educate our customers on the design freedom, speed, and other benefits of 3D printing by providing printing and design services and support through our EACs. We also seek to expose key potential users to our products through our EACs, installed machines at customers’ locations, university programs, and sales and marketing efforts. Additionally, our EACs provide our customers exposure to a greater variety of our latest machine platforms and material sets.

ExOne Adoption Centers

We have established a network of EACs in North Huntingdon, Pennsylvania; Troy, Michigan; Gersthofen, Germany; and Kanagawa, Japan. Each of our EACs are certified to ISO 9001:2015 standards with various scopes. Through our EACs, we provide sales and marketing and delivery of support and printing services to our customers. Our customers see our 3D printing machines in operation and can evaluate their production capabilities before ordering a 3D printing machine or a printed product or service. While our centers are scalable and have a well-defined footprint that can be easily replicated to serve additional regional markets, we are focusing on enhancing our existing centers to enable adoption rather than geographic expansion. As described below, enhancing our position in strategic locations around the world is an important part of our long-term business strategy.

Marketing and Sales

We market our products under the ExOne brand name in three major geographic regions — the Americas, EMEA and APAC. Our sales are made primarily by our global sales force. Our sales force is augmented, in certain territories, by representatives with specific industry or territorial expertise. Even where we are supported by a representative, substantially all of our product and service offerings provided by our EACs are sold directly to customers by us.

We believe that our direct selling relationship helps to create one of the building blocks for our business — the creation of true collaboration between us and industrial customers who are interested in 3D printing. Increasingly, industrial producers are considering shifting from subtractive manufacturing techniques to 3D printing. Our marketing efforts include educating potential customers about 3D printing technology through collaboration, starting with pre-production services and continuing with production and technical support at our EACs.

Competition

Other companies are active in the market for 3D printing products and services. These companies use a variety of AM methods, including:

- Material extrusion;
- Material jetting;
- Powder bed fusion;
- Directed energy deposition;
- Vat photopolymerization;
- Sheet lamination; and
- Binder jetting.

Some of the companies that have developed and employ one or more AM technologies include: 3D Systems Corporation, Stratasys Inc., HP Inc., Desktop Metal, EOS GmbH, SLM Solutions, EnvisionTEC, Voxeljet AG and General Electric Co.

We also compete with established subtractive manufacturers in the industrial products market. These companies often provide large-scale, highly capitalized facilities that are designed or built to fill specific production purposes, usually mass production. However, we believe that we are well positioned to expand our share of the industrial products market from these manufacturers as AM applications increase. As our technologies improve and our unit cost of production decreases, we expect to be able to compete with subtractive manufacturing on a wide range of products, thereby expanding our addressable market.

We believe that our competitive strengths include:

- **Volumetric Output Rate.** We believe that our binder jetting technology provides us the highest rate of volume output per unit of time among competing AM technologies. Because of our early entrance into the industrial market for AM and our investment in our core 3D printing technology, we have been able to improve the printing speed and expand the build box size of our 3D printing machines. As a result, we have made strides in improving the output efficiency of our 3D printing machines, as measured by volume output per unit of time. With continued advances in our core 3D printing technologies, we believe that our cost of production will continue to decline, increasing our ability to compete with subtractive manufacturing processes, particularly for complex products, effectively expanding our addressable market.
- **Printing Platform Size.** The volumetric size of the build box area upon which we construct a product is important to industrial customers who may want to either make a high number of products per job run or make an industrial product that has large dimensions and is heavy in final form. We believe that our technology and experience give us the potential to develop large footprint platforms to meet the production demands of current and potential industrial customers. In addition, we have created machine platforms in various size ranges in order to scale our technology to the varying demands of our customers.

- **Industrial Materials.** Our indirect 3D printing machines are able to manufacture sand molds and cores from silica sands and other specialty materials, which are the traditional materials for these casting products. Our direct 3D printing machines are capable of printing in a variety of industrial metals and ceramics. We are in varying stages of qualifying additional industrial materials for both indirect and direct applications and advancing materials that are printable in our machines. We also use liquid chemical binding agents during the printing process. We believe that our unique chemical binding agent technology can more readily achieve efficiency gains over time than other AM technologies, such as laser-fusing technologies.

- **International Presence.** Since our inception, we have structured our business to address major international markets. We have strategically established one or more EACs in each of the Americas, EMEA and APAC regions. Because many of our current or potential customers are global industrial companies, it is important that we have a presence in or near the areas where these companies have manufacturing facilities.

**Suppliers**

Our largest suppliers in 2019, based upon dollar volume of purchases, were Bauer GmbH & Co KG, Fuji Film Dimatix, Astro Manufacturing & Design and PEKO Precision Products.

We buy our industrial materials from several suppliers and, except as set forth below, the loss of any one would not materially adversely affect our business. We currently have a single supplier of certain printhead components for our 3D printing machines. While we believe that this printhead component supplier is replaceable, in the event of the loss of this supplier, we could experience delays and interruptions that might adversely affect the financial performance of our business. Additionally, we obtain certain pre-production services through design and data capture providers, and certain post-production services through vendors with whom we have existing and good relationships. The loss of any one of these providers or vendors would not materially adversely affect our business.

**Research and Development**

We spent $9.9 million and $10.7 million on research and development during 2019 and 2018, respectively. We expect to continue to invest in our research and development activities in the future.

A significant portion of our research and development expenditures have been focused on the following:

- Chemistry of print materials and binder formulation;
- Mechanics of droplet flight into beds of powder;
- Metallurgy of thermally processing metals that are printed through AM;
- Mechanical design elements of our 3D printing machines;
- Mechanics of spreading powders in a job box;
- Evaluation of product applications utilizing our 3D printing machines;
- Transfer of digital data through a series of software links to drive a printhead; and
- Synchronizing all of the above to print ever-increasing volumes of material per unit of time.

**Intellectual Property**

**Patents and Licenses.** Significant portions of our technology are covered by a variety of patents. Through December 31, 2016, we were the worldwide licensee of certain patents held by MIT for certain AM printing processes (the “MIT Patents”), with exclusive rights to practice the patents in certain fields including the application of the printing processes to metals (with sublicensing rights), and non-exclusive rights to practice the patents in certain fields including the application of the printing processes to certain non-metals (without sublicensing rights) which gave us a significant head start in the AM industry.

We hold patents as a result of our own technological developments. Our patents were issued in the United States and in various foreign jurisdictions, including Germany and Japan. As a result of our commitment to research and development, we also have applied for other patents for equipment, processes, materials and 3D printing applications in the United States and in various foreign countries. The expiration dates of our patents range from 2021 to 2038. We are also a minority owner of patent rights for several patents in the United States and in various foreign jurisdictions as a successor interest to a 2003 agreement made between Generis GmbH and Extrude Hone GmbH.
We continue from time to time to evaluate our current licenses and patents. On March 1, 2018, our ExOne GmbH subsidiary notified Voxeljet AG that it has materially breached a 2003 Patent and Know-How Transfer Agreement and asserted its rights to set off damages as a result of the breaches against the annual license fee that we pay to Voxeljet AG under the agreement.

We have developed know-how and trade secrets relative to our 3D printing technology and believe that our early entrance into the industrial market provides us with a timing and experience advantage. Through our investment in our technology, we have been able to qualify industrial materials for use in our 3D printing machines and we intend to continue such efforts. In addition, we have taken steps to protect much of our technology as a trade secret. Given the significant steps that we have taken to establish our experience in AM for industrial applications, as well as our ongoing commitment to research and development, we intend to maintain our preeminent position in the AM industry market.

**Trademarks.** We have registrations in the United States for the following trademarks: EXONE, X1 ExOne Digital Part Materialization (plus design), EXCAST, EXMAL, EXTEC, INNOVENT, INNOVENT+, M-FLEX, M-PRINT, S MAX, S-MAX, S-PRINT, X1, X1-LAB, and X1 EXONE COLLABORATE. ACCELERATE. INNOVATE. ACCELERATE. (plus design). We also have pending applications in the United States for the following trademarks: X1 25PRO, X1 160PRO, COLLABORATE. INNOVATE. ACCELERATE., and X1 EXONE (plus design). We also have registrations for the trademark EXONE in Canada, China, Europe (Community Trade Mark), Japan, and South Korea and an application pending for that trademark in Canada. We have registrations for X1 ExOne Digital Part Materialization (plus design) in Brazil, Canada, China, Europe (Community Trade Mark), Japan, and South Korea. We have an application pending in Canada for the trademark INNOVENT+. We have a registration for the trademark X1 in Europe (Community Trade Mark). We have registrations for a stylized form of X1 in Europe (Community Trade Mark). We have registrations for DIGITAL PART MATERIALIZATION in Japan and South Korea. We have registrations for the trademarks EXERIAL, INNOVENT, INNOVENT+, M-FLEX, S-MAX, and S-PRINT in Europe (Community Trade Mark). We also have registration for the trademark S-PRINT in Canada, China, and Japan.

**Trade Secrets.** The development of our products, processes and materials has involved a considerable amount of experience, manufacturing and processing know-how and research and development techniques that are not easily duplicated. We protect this knowledge as a trade secret through the confidentiality and non-disclosure agreements which all employees, customers and consultants are required to sign at the time they are employed or engaged by us. Additional information related to the risks associated with our intellectual property rights are described within Item 1A, “Risk Factors” of this Annual Report on Form 10-K.

**Seasonality**

Purchases of our 3D printing machines are often subject to the capital expenditure cycles of our customers. Generally, 3D printing machine sales are higher in our third and fourth quarters than in our first and second quarters; however, as acceptance of our 3D printing machines as a credible alternative to traditional methods of production grows, we expect to limit the seasonality we experience.

**Backlog**

At December 31, 2019, our backlog was approximately $31.1 million, of which approximately $27.1 million is expected to be fulfilled during the 12 months following such date. At December 31, 2018, our backlog was approximately $12.3 million.

**Environmental Matters**

Compliance with federal, state and local laws and regulations relating to the discharge of materials into the environment or otherwise relating to the protection of the environment has not had a material impact on capital expenditures, earnings or our competitive position. We are not the subject of any legal or administrative proceeding relating to the environmental laws of the United States or any country in which we have an office. We have not received any notices of any violations of any such environmental laws.

**Employees**

At December 31, 2019, we employed a total of 313 (271 full-time) employees at our five global locations. None of these employees is a party to a collective bargaining agreement, and we believe our relations with employees are good.

**Product, Geographic and Other Information**

Refer to Note 5 and Note 23 to the consolidated financial statements included in Part II Item 8 of this Annual Report on Form 10-K for product and geographic information related to our revenues (based on the country where the sale originated) and geographic information related to our long-lived assets (based on the physical location of assets). For information on risks related to our international operations refer to Item 1A, “Risk Factors”. Other information relating to our revenues, measurement of profit or loss and total assets is provided in the consolidated financial statements and related notes thereto in Part II Item 8 of this Annual Report on Form 10-K.
Sale-Leaseback of Gersthofen, Germany Facility

On December 10, 2019, ExOne Property GmbH and ExOne GmbH (our “German Subsidiaries”) entered into a purchase agreement (the “Purchase Agreement”) with Solidas Immobilien und Grundbesitz GmbH, a private, unaffiliated German real estate investor (the “Buyer”), for the sale of our European headquarters and operating facility in Gersthofen, Germany (the “Facility”) for a cash price of €17.0 million (approximately $18.5 million, of which approximately $2.2 million was received prior to December 31, 2019). Concurrently with the execution of the Purchase Agreement, ExOne GmbH and the Buyer entered into a rental contract (the “Lease”) for the leaseback of the Facility for an initial aggregate annual rent totaling €1.5 million (approximately $1.7 million), plus applicable taxes, which is fixed during the initial three-year term and is subject to adjustment on an annual basis (in accordance with the consumer price index for Germany) during the two five-year option extension periods. The sale-leaseback transaction closed on February 18, 2020.

Executive Offices

Our principal executive offices are located at 127 Industry Boulevard, North Huntingdon, Pennsylvania 15642 and our telephone number is (724) 863-9663.

Available Information

Our website address is http://www.exone.com. Information contained on our website is not incorporated by reference into this Annual Report on Form 10-K unless expressly noted.

We file reports with the Securities and Exchange Commission (“SEC”), which we make available on our website free of charge at http://www.exone.com/financials.cfm. These reports include Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, each of which is provided on our website as soon as reasonably practicable after we electronically file such materials with, or furnish them to, the SEC. We also make, or will make, available through our website other reports filed with or furnished to the SEC under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), including our proxy statements and reports filed by officers and directors under Section 16(a) of that Act. You can also read and copy any materials we file with the SEC at the SEC’s Public Reference Room at 100 F Street, N.E., Washington, DC 20549. You can obtain additional information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains a website (http://www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

You can obtain copies of exhibits to our filings electronically at the SEC’s website at www.sec.gov or by mail from the Public Reference Section of the SEC at 100 F Street, N.E., Washington, D.C. 20549 at prescribed rates. The exhibits are also available as part of the Annual Report on Form 10-K for the year ended December 31, 2019, which is available on our corporate website at www.exone.com. Stockholders may also obtain copies of exhibits without charge by contacting our General Counsel and Corporate Secretary at (724) 863-9663.
RISK FACTORS

As a smaller reporting company (“SRC”), we are not required to provide a statement of risk factors on our Annual Report on Form 10-K. However, we believe this information is valuable to our shareholders. We reserve the right to not provide risk factors in future filings.

You should carefully consider the following risks, together with all of the other information in this Annual Report on Form 10-K, including our consolidated financial statements and related notes, in evaluating our business, future prospects and an investment in our common stock. If any of the following risks and uncertainties develops into actual events, our business, financial condition, results of operations and cash flows could be materially adversely affected. In that case, the price of our common stock could decline and you may lose all or part of your investment.

Risks Related to Our Business and Industry

We may not be able to consistently generate operating profits.

Since our inception, we have not consistently generated operating profits, and we may be unable to consistently generate operating profits in the future if we are unable to execute on our business plan. Our operating expenses (which include research and development and selling, general and administrative expenses) were $32.5 million and $33.9 million for 2019 and 2018, respectively. Our research and development expenses are primarily for continued investment in our binder jetting technologies, including 3D printing machine development and materials development. Our selling, general and administrative expenses are primarily for employee-related costs and professional service fees, including those associated with managing a public company. We believe that our operating expenses may increase in future periods as we pursue our growth strategies. Increases in our research and development expenses and selling, general and administrative expenses will directly affect our future results of operations and may have an adverse effect on our financial condition.

Our revenues and operating results may fluctuate.

Our revenues and operating results have fluctuated in the past from quarter-to-quarter and year-to-year and are likely to continue to vary due to a number of factors, many of which are not within our control. Both our business and the AM industry are changing and evolving rapidly, and our historical operating results may not be useful in predicting our future operating results.

Our machine orders are often subject to the adoption and capital expenditure cycles of our customers. Thus, revenues and operating results for any future period are not predictable with any significant degree of certainty. Comparing our operating results on a period-to-period basis may not be meaningful. You should not rely on our past results as an indication of our future performance.

Fluctuations in our operating results and financial condition may occur due to a number of factors, including, but not limited to, those listed below and those identified throughout this "Risk Factors" section:

- Our ability to compete with competitors (some of which may also serve as current or future customers of our products) that have significantly more resources than we have, have larger and more experienced sales and service teams and have more experience bringing new products to the market;
- The mix of machines and products that we sell during any period;
- The length of the adoption cycle and sales cycle for our 3D printing machines;
- Entry of new competitors into our markets;
- Changes in our pricing policies or those of our competitors, including our response to price competition;
- Delays between our expenditures to develop and market new or enhanced machines and products or to develop, acquire or license new technologies and processes and the generation of sales related thereto;
- Changes in the amount we spend to promote our products and services;
- The geographic distribution of our sales;
- Changes in the cost of satisfying our warranty obligations and servicing our installed base of products;
- Our level of research and development activities and their associated costs and rates of success;
- Changes in the size and complexity of our organization;
- Interruptions to or other problems with our information technology systems, manufacturing processes or other operations;
- Changes in regulatory requirements governing the handling and use of certain chemicals or powders printed or used in our equipment;
- General economic and industry conditions that affect end-user demand and end-user levels of product design and manufacturing; or
- Changes in accounting rules and tax laws.

Due to the foregoing factors, you should not rely on quarter-to-quarter or year-to-year comparisons of our operating results as an indicator of future performance.

Customer demands for certain qualities and capabilities in our machines are constantly evolving. We may not be able to respond to customer demand as quickly as a better capitalized competitor may be able to respond.

Generally, our business is focused on the sale of 3D printing machines for, and products manufactured using, AM. We have encountered and will continue to encounter risks and difficulties frequently experienced by growing companies in a market subject to innovation and rapidly developing and changing technology. A variety of technologies have the capacity to compete against one another in the AM market, which is, in part, driven by technological advances and end-user requirements and preferences, as well as the emergence of new standards and practices. Our ability to compete in the industrial AM market depends, in large part, on our success in enhancing and developing new 3D printing machines, in enhancing our current 3D printing machines, in enhancing and adding to our technology, and in developing and qualifying materials with which we can print. We believe that to remain competitive we must continuously enhance and expand the functionality and features of our products and technologies. However, we may not be able to:

- Develop new products and technologies that address the increasingly sophisticated and varied needs of prospective end-users;
- Enhance our existing products and technologies;
- Continue to leverage advances in binder jet printing and other industrial printhead technology;
- Respond to technological advances and emerging industry standards and practices on a cost-effective and timely basis;
- Develop products that are cost-effective or that otherwise gain market acceptance;
- Distinguish ourselves from our competitors in our industry; and
- Adequately protect our intellectual property as we develop new products and technologies.

We face significant competition in many aspects of our business, which could cause our revenues and gross profit to decline. Competition could also cause us to reduce sales prices or to incur additional marketing or production costs, which could result in decreased revenue, increased costs and reduced margins.

We compete for customers with a wide variety of producers of equipment for models, prototypes, other 3D objects and end-use parts as well as producers of print materials and services for this equipment. Some of our existing and potential competitors are researching, designing, developing and marketing other types of competitive equipment, print materials and services. Many of these competitors have financial, marketing, manufacturing, distribution and other resources that are substantially greater than ours.

We also expect that future competition may arise from the development of allied or related techniques for equipment and print materials that are not encompassed by our patents, from the issuance of patents to other companies that may inhibit our ability to develop certain products, from our entry into new geographic markets and industries and from improvements to existing print materials and equipment technologies. In addition, a number of companies that have substantial resources have announced that they intend to begin producing 3D printing machines, which will further enhance the competition we face.

We intend to continue to follow a strategy of product development to enhance our position to the extent practicable. We cannot assure you that we will be able to maintain our current position in the field or continue to compete successfully against current and future sources of competition. If we do not keep pace with technological change and introduce new products, our revenues and demand for our products may decrease.

We may not be able to retain or hire the number of skilled employees that we need to achieve our business plan.

For our business to grow in accordance with our business plan, we will need to recruit, hire, integrate and retain additional employees with the technical competence and engineering skills to operate our machines, improve our technology and processes and expand our technological capability to print using an increasing variety of materials. People with these skills are in short supply and may not be available in sufficient numbers to allow us to meet the goals of our business plan. In addition, new employees often require significant training and, in many cases, take significant time before they achieve full productivity. As a result, we may incur significant costs to attract and retain employees, including significant expenditures related to salaries and benefits, and we may lose new employees to our competitors or other companies before we realize the benefit of our investment in recruiting and training them. Moreover, new employees may not be or become as productive as we expect, as we may face challenges in adequately or appropriately integrating them into our workforce and culture. If we cannot obtain the services of a sufficient number of technically skilled employees, we may not be able to achieve our planned rate of growth, which could adversely affect our results of operations.
Loss of key management or sales or customer service personnel could adversely affect our results of operations.

Our future success depends to a significant extent on the skills, experience and efforts of our management and other key personnel. We must continue to develop and retain a core group of management individuals if we are to realize our goal of continued expansion and growth. While we have not previously experienced significant problems attracting and retaining members of our management team and other key personnel, there can be no assurance that we will be able to continue to retain these individuals and the loss of any or all of these individuals could materially and adversely affect our business.

We may incur future impairment charges to our long-lived assets held and used.

As a result of continued operating losses and cash flow deficiencies, we have completed certain tests for the recoverability of long-lived assets held and used at the asset group level. Assessing the recoverability of long-lived assets held and used requires significant judgments and estimates by management. We will be required to conduct additional testing for the recoverability of long-lived assets held and used to the extent that a triggering event requiring such testing is identified in a future period. A significant decrease in the market price of a long-lived asset, adverse change in the use or condition of a long-lived asset, adverse change in the business climate or legal or regulatory factors impacting a long-lived asset and continued operating losses and cash flow deficiencies associated with a long-lived asset, among other indicators, could cause a future assessment to be performed which may result in an impairment of long-lived assets held and used. The amount of any impairment could be significant and could have a material adverse impact on our financial condition and results of operations for the period in which the impairment is recorded.

We may conclude that there is substantial doubt regarding our ability to continue as a going concern.

As a result of our continued operating losses, cash flow deficiencies and liquidity, we may conclude that there is substantial doubt regarding our ability to continue as a going concern. In connection with this conclusion, if our independent registered public accounting firm issues a “going concern” opinion, it could impair our ability to finance our operations through the sale of equity, incurring debt, or other financing alternatives. If we fail to raise sufficient additional capital, we will not be able to completely execute our business plan. As a result our business would be jeopardized and we may not be able to continue.

Some of our arrangements for 3D printing machines contain customer-specific provisions that may impact the period in which we recognize the related revenues under accounting principles generally accepted in the United States of America (“GAAP”).

Some customers that purchase 3D printing machines from us may require specific, customized factors relating to their intended use of the machine or the installation of the machine in the customers’ facilities. These specific, customized factors are often required by the customers to be included in our commercial agreements relating to the purchases. As a result, our responsiveness to our customers’ specific requirements has the potential to impact the period in which we recognize the revenue relating to that 3D printing machine sale. Similarly, some customers must build or prepare facilities to install our 3D printing machines, and the completion of such projects can be unpredictable, which can impact the period in which we recognize the revenue relating to that 3D printing machine sale.

Defects in new products or in enhancements to our existing products that give rise to product returns or warranty or other claims could result in material expenses, diversion of management time and attention, and damage to our reputation.

Our 3D printing machines may contain undetected defects or errors when first introduced or as enhancements are released that, despite testing, are not discovered until after a machine has been used. This could result in delayed market acceptance of those machines or claims from sales agents, end-users or others, which may result in litigation, increased end-user service and support costs and warranty claims, damage to our reputation and business or significant costs to correct the defect or error. We may from time to time become subject to warranty or product liability claims related to product quality issues that could lead us to incur significant expenses.

Our business is subject to risks associated with having significant operations in Germany and selling machines and other products in other non-United States locations.

We have significant manufacturing and development operations in Germany. In addition, a significant portion of our revenue is derived from transactions outside of the United States (60.8% and 54.3% for 2019 and 2018, respectively). Our operations outside of the United States are subject to risks associated with the political, regulatory and economic conditions of Germany and other countries in which we sell or service machines, such as:

- Challenges in providing solutions across a significant distance, in different languages and among different cultures;
- Civil unrest, acts of terrorism and similar events;
- Fluctuations in foreign currency exchange rates;
- Potentially longer sales and payment cycles;
- Potentially greater difficulties in collecting accounts receivable;
- Potentially adverse tax consequences;
- Reduced protection of intellectual property rights in certain countries;
- Different, complex and changing laws governing intellectual property rights; sometimes affording reduced protection of intellectual property rights in certain countries;
- Difficulties in staffing and managing foreign operations;
- Laws and business practices favoring local competition;
- Costs and difficulties of customizing products for foreign countries;
- Compliance with a wide variety of complex foreign laws, treaties and regulations;
- Restrictions imposed by local labor practices and laws on our business and operations;
- Rapid changes in government, economic and political policies and conditions; political or civil unrest or instability, terrorism or epidemics and other similar outbreaks or events;
- Operating in countries with a higher incidence of corruption and fraudulent business practices;
- Seasonal reductions in business activity in certain parts of the world, particularly during the summer months in Europe and at year end globally;
- Costs and difficulties of customizing products for foreign countries;
- Transportation delays;
- Tariffs, trade barriers and other regulatory or contractual limitations on our ability to sell or develop our products in certain foreign markets;
- Becoming subject to the laws, regulations and court systems of many jurisdictions;
- Specific and significant regulations, including the European Union’s (“EU”) General Data Protection Regulation (“GDPR”) which, as of May 2018, imposes compliance obligations on companies who possess and use data of EU residents, with resultant fines and penalties for failure to comply;
- Uncertainty and resultant political, financial and market instability arising from the United Kingdom’s exit from the EU (“Brexit”); and
- Risks of violations of Foreign Corrupt Practices Act or similar anti-bribery laws.

In addition, our operating results may be affected by volatility in currency exchange rates and our ability to effectively manage our currency transaction and translation risks because we generally conduct our business, earn revenue and incur costs in the local currency of the countries in which we operate. For example, the financial condition and results of operations of Germany operations are reported in euros and then translated to United States dollars at the applicable currency exchange rate for inclusion in our consolidated financial statements. We do not manage our foreign currency exposure in a manner that would eliminate the effects of changes in foreign exchange rates, which means that changes in exchange rates between these foreign currencies and the United States dollar will affect the recorded levels of our foreign assets and liabilities, as well as our revenues, cost of sales, and operating margins, and could result in exchange losses in any given reporting period. Given the volatility of exchange rates, we can give no assurance that we will be able to effectively manage our currency transaction and/or translation risks or that any volatility in currency exchange rates will not have an adverse effect on our results of operations.

Our commercial activities may be disrupted due to the outbreak of the new coronavirus-caused disease COVID-19.

A new coronavirus has caused the outbreak of a new disease, COVID-19, which has resulted in government-enforced travel and business closures in China and other countries. Our sales, installation and service of 3D printing machines in China and other countries may be disrupted and the future spread of the disease may cause our commercial efforts in other countries to be disrupted. We may incur expenses or delays resulting in such events outside of our control, which could have a material adverse effect on our business, operating results and financial condition.

We may need to raise additional capital from time to time if we are going to meet our growth strategy and may be unable to do so on attractive terms.

Expanding our business to execute our growth strategy may require additional investments of capital from time to time, and our existing sources of cash and any funds generated from operations may not provide us with sufficient capital. For various reasons, including any current non-compliance with existing or future lending arrangements, additional financing may not be available when needed, or may not be available on terms favorable to us. If we fail to obtain adequate capital on a timely basis or if capital cannot be obtained at reasonable costs, we may not be able to achieve our planned rate of growth, which will adversely affect our results of operations. Additional equity financing may result in ownership and economic dilution to our existing stockholders and/or require us to grant certain rights and preferences to new investors. Also, although S. Kent Rockwell, our Chairman and our controlling stockholder, has previously provided capital to us through related entities (including our existing related party revolving credit facility), he has no obligation to do so and our stockholders should have no expectation that he will do so in the future.
We currently rely on a single source to supply certain printhead components used by our 3D printing machines. While we believe that there are other suppliers of printhead components upon which we could rely, we could experience delays and interruptions if our supply is interrupted that might temporarily impact the financial performance of our business.

We may not be able to consummate and/or effectively integrate strategic transactions.

We may from time to time engage in strategic transactions with third parties if we determine that they will likely provide future financial and operational benefits. Successful completion of any strategic transaction depends on a number of factors that are not entirely within our control, including our ability to negotiate acceptable terms, conclude satisfactory agreements and obtain all necessary regulatory approvals. In addition, our ability to effectively integrate an investment into our existing business and culture may not be successful, which could jeopardize future operational performance for the combined businesses.

We explore from time to time various strategic investments and/or alliances. With respect to strategic investments and/or alliances that we may pursue, there is no guarantee that we will complete such transactions on favorable terms or at all. The exploration, negotiation, and consummation of strategic investments and/or alliances may involve significant expenditures by us, which may adversely affect our results of operations at the time such expenses are incurred. We may not be able to successfully negotiate and complete a specific investment or alliance on favorable terms. If we do complete transactions, they may not ultimately strengthen our competitive position or may not be accretive to us for a period of time which may be significant following the completion of such transaction.

We may be required to pay cash, incur debt and/or issue equity securities to pay for any such transaction, each of which could adversely affect our financial condition and the value of our common stock. Our use of cash to pay for transactions would limit other potential uses of our cash. The issuance or sale of equity or convertible debt securities to finance any such transactions would result in dilution to our stockholders. If we incur debt, it could result in increased fixed obligations and could also impose covenants or other restrictions that could impede our ability to manage our operations.

We rely on our information technology (“IT”) systems to manage numerous aspects of our business and customer and supplier relationships, and a disruption or failure of these systems could adversely affect our results of operations.

We rely on our IT systems to manage numerous aspects of our business and provide analytical information to management. We may incur significant costs in order to implement the security measures that we feel are necessary to protect our IT systems. However, our IT systems may remain vulnerable to damage despite our implementation of security measures that we deem to be appropriate. Our IT systems allow us to efficiently purchase products from our suppliers, provide procurement and logistic services, ship products to our customers on a timely basis, maintain cost-effective operations and provide service to our customers. Our IT systems are an essential component of our business and growth strategies, and a disruption to or failure of our IT systems, including our computer systems, could significantly limit our ability to manage and operate our business efficiently. Although we take steps to secure our IT systems, including our computer systems, intranet and internet sites, email and other telecommunications and data networks, the security measures we have implemented may not be effective and our systems may be vulnerable to, among other things, damage and interruption from power loss, including as a result of natural disasters, computer system and network failures, loss of telecommunication services, operator negligence, loss of data, security breaches and computer viruses. If our systems for protecting against cyber security risks prove not to be sufficient, we could be adversely affected by loss or damage of intellectual property, proprietary information, or client data, interruption of business operations, or additional costs to prevent, respond to, or mitigate cyber security attacks. Any such disruption or loss of business information could materially and adversely affect our reputation, brand, results of operations and financial condition.

We could be subject to personal injury, property damage, product liability, warranty and other claims involving allegedly defective products that we supply.

The products we supply are sometimes used in potentially hazardous applications, such as the assembled parts of an aircraft or automobile, that could result in death, personal injury, property damage, loss of production, punitive damages and consequential damages. While we have not experienced any such claims to date, actual or claimed defects in the products we supply could result in our being named as a defendant in lawsuits asserting potentially large claims.

We attempt to include legal provisions in our agreements with customers that are designed to limit our exposure to potential liability for damages arising from defects or errors in our products. However, it is possible that these limitations may not be effective as a result of unfavorable judicial decisions or laws enacted in the future. Any such lawsuit, regardless of merit, could result in material expense, diversion of management time and efforts and damage to our reputation, and could cause us to fail to retain or attract customers, which could adversely affect our results of operations.
We could face liability if our 3D printers are used by our customers to print dangerous objects.

Customers may use our 3D printing machines to print products that could be used in a harmful way or could otherwise be dangerous. For example, there have been news reports that 3D printing machines were used to print guns or other weapons. We have little, if any, control over what objects our customers print using our 3D printing machines, and it may be difficult, if not impossible, for us to monitor and prevent customers from printing weapons with our 3D printing machines. While we have never printed firearms in any of our EACs, there can be no assurance that we will not be held liable if someone were injured or killed by a weapon printed by a customer using one of our 3D printing machines.

If any of our manufacturing facilities or EACs are disrupted, sales of our products may be disrupted, which could result in loss of revenues and an increase in unforeseen costs.

We manufacture our machines at our facilities in Gersthofen, Germany and North Huntingdon, Pennsylvania. In addition, we have a network of EACs in the United States, Germany and Japan to provide sales and marketing and delivery of support and printing services to our customers. If the operations of these facilities are materially disrupted (including as a result of the coronavirus disease COVID-19), we would be unable to fulfill customer orders for the period of the disruption, we would not be able to recognize revenue on orders and we might need to modify our standard sales terms to secure the commitment of new customers during the period of the disruption and perhaps longer. Depending on the cause of the disruption, we could incur significant costs to remedy the disruption and resume product shipments. Such a disruption could have an adverse effect on our results of operations.

Our manufacturing facilities, and our suppliers’ and our customers’ facilities are vulnerable to disruption due to natural or other disasters, strikes and other events beyond our control.

A major earthquake, fire, tsunami, hurricane, cyclone or other disaster, such as a major flood, seasonal storms, nuclear event or terrorist attack affecting our facilities or the areas in which they are located, or affecting those of our customers or third party manufacturers or suppliers, could significantly disrupt our or their operations, and delay or prevent product shipment or installation during the time required to repair, rebuild or replace our or their damaged manufacturing facilities. These delays could be lengthy and costly. If any of our manufacturers’, suppliers’ or customers’ facilities are negatively impacted by such a disaster, production, shipment and installation of our 3D printing machines could be delayed, which can impact the period in which we recognize the revenue related to that 3D printing machine sale. Additionally, customers may delay purchases of our products until operations return to normal. Even if we are able to respond quickly to a disaster, the continued effects of the disaster could create uncertainty in our business operations. In addition, concerns about terrorism, the effects of a terrorist attack, political turmoil, labor strikes, war or the outbreak of epidemic diseases (including the outbreak of the coronavirus disease COVID-19) could have a negative effect on our operations and sales.

Under applicable employment laws, we may not be able to enforce covenants not to compete and therefore may be unable to prevent our competitors from benefiting from the expertise of some of our former employees.

We generally enter into non-competition agreements with our employees. These agreements prohibit our employees, if they cease working for us, from competing directly with us or working for our competitors or customers for a limited period. We may be unable to enforce these agreements under the laws of the jurisdictions in which our employees work, including Germany and Japan, and it may be difficult for us to restrict our competitors from benefiting from the expertise of our former employees or consultants developed while working for us. If we cannot demonstrate that our legally protectable interests will be harmed, we may be unable to prevent our competitors from benefiting from the expertise of our former employees or consultants and our ability to remain competitive may be diminished.

Risks Related to Our Intellectual Property

We may not be able to protect our trade secrets and intellectual property.

Our success and future revenue growth will depend, in part, on our ability to protect our intellectual property. We cannot assure you that any of our existing or future intellectual property rights will be enforceable, will not be challenged, invalidated or circumvented, or will otherwise provide us with meaningful protection or any competitive advantage.

We rely primarily on a combination of trade secrets, patents, trademarks, confidentiality and non-disclosure agreements and other contractual arrangements with our employees, end-users and others to our competitive position to protect our proprietary technologies and processes globally. While some of our technology is licensed under patents belonging to others or is covered by process patents which are owned or applied for by us, we have devoted substantial resources to the development of our technology, trade secrets, know-how and other unregistered proprietary rights and much of our key technology is not protected by patents. In particular, in fast-growing markets such as China and India, our technology is not protected by patents.

Despite our efforts to protect our proprietary rights, it is possible that competitors or other unauthorized third parties may obtain, copy, use or disclose our technologies, inventions, processes or improvements. While we enter into various agreements intended to protect our proprietary rights, these agreements may be breached and confidential information may be willfully or unintentionally disclosed, and these agreements can be difficult and costly to enforce or may not provide adequate remedies if violated. In addition, our competitors or other parties may learn of our proprietary rights in some other way. Because we cannot legally prevent one or more other companies from developing similar or identical technology to our unpatented technology, it is likely that, over time, one or more other companies may be able to replicate our technology, thereby reducing our technological advantages. If we do not protect our technology or are unable to develop new technology that can be protected by patents or as trade secrets, we may face increased competition from other companies, which may adversely affect our results of operations.
We do, from time to time, apply for patent protection for some of our intellectual property. Our pending patent applications may not be granted. We cannot assure you that any of our existing or future patents will not be challenged, invalidated, or circumvented or will otherwise provide us with meaningful protection. Furthermore, patents are jurisdictional in nature and therefore only protect us in certain markets, rather than globally. We may not be able to obtain foreign patents corresponding to our United States or foreign patent applications. Even if foreign patents are granted, effective enforcement in foreign countries may not be available. If our patents do not adequately protect our technology, our competitors may be able to offer additive manufacturing systems or other products similar to ours. Our competitors may also be able to develop similar technology independently or design around our patents, and we may not be able to detect the unauthorized use of our proprietary technology or take appropriate steps to prevent such use. Any of the foregoing events would lead to increased competition and lower revenues or gross margins, which could adversely affect our operating results.

If our patents and other intellectual property protections do not adequately protect our technology, our competitors may be able to offer products similar to ours. We may not be able to detect the unauthorized use of our proprietary technology and processes or take appropriate steps to prevent such use. Our competitors may also be able to develop similar technology independently or design around our patents. Any of the foregoing events would lead to increased competition and lower revenue or gross profits, which would adversely affect our results of operations.

We may incur substantial costs enforcing or acquiring intellectual property rights and defending against third-party claims as a result of litigation or other proceedings.

In connection with the enforcement of our intellectual property rights, opposing third parties from obtaining patent rights or disputes related to the validity or alleged infringement of our or third-party intellectual property rights, including patent rights, we have been and may in the future be subject or party to claims, negotiations or complex, protracted litigation. Intellectual property disputes and litigation, regardless of merit, can be costly and disruptive to our business operations by diverting attention and energies of management and key technical personnel, and by increasing our costs of doing business. We may not prevail in any such dispute or litigation, and an adverse decision in any legal action involving intellectual property rights, including any such action commenced by us, could limit the scope of our intellectual property rights and the value of the related technology. While we strive to avoid infringing the intellectual property rights of third parties, we cannot provide any assurances that we will be able to avoid any infringement claims.

We may be subject to alleged infringement claims.

Our products and technology, including the technology that we license from others, may infringe the intellectual property rights of third parties. Patent applications in the United States and most other countries are confidential for a period of time until they are published, and the publication of discoveries in scientific or patent literature typically lags actual discoveries by several months or more. As a result, the nature of claims contained in unpublished patent filings around the world is unknown to us, and we cannot be certain that we were the first to conceive inventions covered by our patents or patent applications or that we were the first to file patent applications covering such inventions. Furthermore, it is not possible to know in which countries patent holders may choose to extend their filings under the Patent Cooperation Treaty or other mechanisms. In addition, we may be subject to intellectual property infringement claims from individuals, vendors and other companies, including those that are in the business of asserting patents, but are not commercializing products in the field of 3D printing. Any claims that our products or processes infringe the intellectual property rights of others, regardless of the merit or resolution of such claims, could cause us to incur significant costs in responding to, defending and resolving such claims, and may prohibit or otherwise impair our ability to commercialize new or existing products. Any infringement by us or our licensors of the intellectual property rights of third parties may have a material adverse effect on our business, financial condition and results of operations.

Third-party claims of intellectual property infringement successfully asserted against us may require us to redesign infringing technology or enter into costly settlement or license agreements on terms that are unfavorable to us, prevent us from manufacturing or licensing certain of our products, subject us to injunctions restricting our sale of products and use of infringing technology, cause severe disruptions to our operations or the markets in which we compete, impose costly damage awards or require indemnification of our sales agents and end-users. In addition, as a consequence of such claims, we may incur significant costs in acquiring the necessary third-party intellectual property rights for use in our products or developing non-infringing substitute technology. Any of the foregoing developments could seriously harm our business.

Certain of our employees and patents are subject to the laws of Germany.

Many of our employees work in Germany and are subject to German employment law. Ideas, developments, discoveries and inventions made by such employees and consultants are subject to the provisions of the German Act on Employees’ Inventions (Gesetz über Arbeitnehmererfindungen), which regulates the ownership of, and compensation for, inventions made by employees. We face the risk that disputes can occur between us and our employees or ex-employees pertaining to alleged non-adherence to the provisions of this act that may be costly to defend and take up our management’s time and efforts whether we prevail or fail in such dispute. In addition, under the German Act on Employees’ Inventions, certain employees retained rights to patents they invented or co-invented prior to 2009. Although most of these employees have subsequently assigned their interest in these patents to us, there is a risk that the compensation we provided to them may be deemed to be insufficient in the future and we may be required under German law to increase the compensation due to such employee for the use of their patent. In those cases where employees have not assigned their interests to us, we may need to pay compensation for the use of those patents. If we are required to pay additional compensation or face other disputes under the German Act on Employees’ Inventions, our results of operations could be adversely affected.
We may be subject to claims that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

Certain of our past and present employees were previously employed at other additive manufacturing companies, including our competitors or potential competitors. Some of these employees executed proprietary rights, non-disclosure and non-competition agreements in connection with such previous employment. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee’s former employer. We are not aware of any threatened or pending claims related to these matters, but in the future litigation may be necessary to defend against such claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable personnel or intellectual property rights. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

Risks Related to the Securities Markets and Ownership of Our Common Stock

We have broad discretion as to the use of the net proceeds from securities offerings and may not use them effectively.

We cannot specify with certainty how we may use the net proceeds from securities offerings. Our management has broad discretion in the application of the net proceeds, and we may use these proceeds in ways with which you may disagree or for purposes other than those contemplated at the time of the offering. The failure by our management to apply these funds effectively could have a material adverse effect on our business, financial condition and results of operations. Pending their use, we may invest the net proceeds from a securities offering in a manner that does not produce income or that loses value.

Sales of a significant number of shares of our common stock in the public markets, or the perception that such sales could occur, could depress the market price of our common stock.

Sales of a significant number of shares of our common stock in the public markets or utilization of our universal shelf registration statement could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity securities. We cannot predict the effect that future sales of our common stock, or the market perception that we are permitted to sell a significant number of our securities, would have on the market price of our common stock.

The market price of our common stock may fluctuate significantly.

The market price of our common stock has been and is expected to continue to be highly volatile and may be significantly affected by numerous factors, including the risk factors described in this report and other factors which are beyond our control and may not be directly related to our operating performance. These factors include:

- Significant volatility in the market price and trading volume of securities of companies in our sector, which is not necessarily related to the operating performance of these companies;
- Low average daily trading volumes commonly associated with a microcap entity;
- A high level of short interest in our common stock relative to our outstanding public float;
- The mix of products that we sell, and related services that we provide, during any period;
- Delays between our expenditures to develop and market new products and the generation of sales from those products;
- Changes in the amount that we spend to develop, acquire or license new products, technologies or businesses;
- Changes in our expenditures to promote our products and services;
- Changes in the cost of satisfying our warranty obligations and servicing our installed base of systems;
- Success or failure of research and development projects of us or our competitors;
- Announcements of technological innovations, new solutions or enhancements or strategic partnerships or acquisitions by us or one of our competitors;
- The public’s response to press releases or other public announcements by us or third parties, including our filings with the SEC;
- The general tendency towards volatility in the market prices of shares of companies that rely on technology and innovation;
- Changes in regulatory policies or tax guidelines;
- Changes or perceived changes in earnings or variations in operating results;
- Any shortfall in revenue or earnings from levels expected by investors or securities analysts;
- Threatened or actual litigation;
- Changes in our senior management; and
- General economic trends and other external factors.
One of our principal stockholders is able to exert substantial influence in determining the outcome of matters which require the approval of our stockholders.

Our Chairman, S. Kent Rockwell, beneficially owns approximately 28% of our outstanding shares of common stock. As a holder of 28% of our shares of common stock, Mr. Rockwell may have effective control over the election of our Board of Directors (“Board”) and the direction of our affairs. As a result, he could exert considerable influence over the outcome of any corporate matter submitted to our stockholders for approval, including the election of directors and any transaction that might cause a change in control, such as a merger or acquisition. Any stockholders in favor of a matter that is opposed by Mr. Rockwell would have to obtain a significant number of votes to overrule the votes controlled by Mr. Rockwell.

If equity research analysts do not publish research or reports about our business, or if they issue unfavorable commentary or downgrade our shares, the price of our shares could decline.

The trading market for our shares will rely in part on the research and reports that equity research analysts publish about us and our business. We do not have control over these analysts, and we do not have commitments from them to write research reports about us. The price of our shares could decline if one or more equity research analysts downgrades our shares, issues other unfavorable or inaccurate commentary or ceases publishing reports about us or our business.

The sale of shares by insiders, or even the perception that they may do so, could cause our stock price to decline.

The price of our shares could decline if there are substantial sales of our common stock, particularly by our directors, their affiliates or our executive officers or when there is a large number of shares of our common stock available for sale. The perception in the public market that our stockholders might sell our shares also could depress the market price of our shares. From time to time, we may conduct offerings of our securities and our executive officers, directors and selling stockholders would be subject to lock-up agreements that restrict their ability to transfer their shares following the offering. The market price of our shares may drop significantly when the restrictions on resale by our existing stockholders lapse and these stockholders are able to sell their shares into the market. If this occurs, it could impair our ability to raise additional capital through the sale of securities, should we desire to do so.

We incur increased costs as a result of operating as a public company, and our management is required to devote substantial time to compliance initiatives.

As a public company with shares listed on The Nasdaq Stock Market, we incur significant accounting, legal and other expenses that we would not incur as a private company. Although we now qualify as an SRC pursuant to Rule 12b-2 of the Exchange Act, we still incur significant costs associated with our compliance with the public company reporting requirements of the Exchange Act, requirements imposed by the Sarbanes-Oxley Act (most notably Section 404), the Dodd-Frank Wall Street Reform and Protection Act, and other rules adopted, and to be adopted, by the SEC and The Nasdaq Stock Market. Compliance with these rules and regulations result in increased legal and financial compliance costs and make certain activities more time-consuming and costly. They also make it more difficult for us to obtain director and officer liability insurance, and we incur substantial costs to maintain sufficient coverage.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure create uncertainty for public companies generally, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We have invested resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management’s time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected. We cannot predict or estimate the amount or timing of additional costs we may incur in the future to respond to these constantly evolving requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our Board, our Board committees or as executive officers.

We have never paid cash dividends on our common stock, and we do not anticipate paying any cash dividends on our common stock in the foreseeable future. Therefore, if our share price does not appreciate, our investors may not gain and could potentially lose on their investment in our shares.

We have never declared or paid cash dividends on our common stock, nor do we anticipate paying any cash dividends on our common stock in the foreseeable future. We currently intend to retain all available funds and any future earnings to fund the development and growth of our business and service and repay indebtedness, if any. As a result, capital appreciation, if any, of our shares will be investors’ sole source of gain for the foreseeable future.

16
We did not maintain adequate control over user access rights for a significant information technology system.

We did not maintain adequate control over application changes for a significant information technology system.

We did not maintain adequate control over pricing and discounts associated with sales of certain of our products.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective internal controls for financial reporting and disclosure controls and procedures. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. We are required under Section 404(a) of the Sarbanes-Oxley Act to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting. This assessment includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

Additionally, Section 404(b) of the Sarbanes-Oxley Act requires an attestation from our independent registered public accounting firm on the effectiveness of our internal control over financial reporting which began with our Annual Report on Form 10-K for the year ended December 31, 2018.

In connection with the preparation of our consolidated financial statements for the year ended December 31, 2019, we concluded that there are material weaknesses in the design and operating effectiveness of our internal control over financial reporting as defined in SEC Regulation S-X. A material weakness is a control deficiency, or combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis.

A description of the identified material weaknesses in internal control over financial reporting is as follows:

- We did not maintain adequate control over user access rights for a significant information technology system.
- We did not maintain adequate control over application changes for a significant information technology system.
- We did not maintain adequate control over pricing and discounts associated with sales of certain of our products.

During the three months ended December 31, 2019, as a result of the identification of the material weaknesses further described above, management has initiated the development of a remediation plan in an effort to ensure that our disclosure controls and procedures are effective. Our remediation plan is expected to include a comprehensive evaluation of the people, processes and systems responsible for each of the underlying control activities. We expect to complete this evaluation in 2020 and put measures in place in an effort to remediate the identified material weaknesses. However, we cannot be certain that the measures we may take will ensure that we establish and maintain adequate controls over our financial processes and reporting in the future or that material weaknesses identified will be remediated.

We documented and evaluated our internal control over financial reporting in order to report on the effectiveness of our internal controls as of December 31, 2019 and, as described in Item 9A, “Controls and Procedures”, management has determined that our internal control over financial reporting was ineffective as of December 31, 2019. Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, results of operations or cash flows. If we are unable to conclude that our internal control over financial reporting is effective, or if our independent registered public accounting firm determines we have a material weakness in our internal control over financial reporting, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, investor groups like Institutional Shareholder Services could initiate a withhold vote campaign with respect to the re-election of the members of our audit committee, and we could be subject to sanctions or investigations by The Nasdaq Stock Market, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

Notwithstanding the identified material weaknesses, management believes the consolidated financial statements included in this Annual Report on Form 10-K fairly present in all material respects our financial condition, results of operations and cash flows as of and for the periods presented in accordance with GAAP.
Provisions in our charter documents or Delaware law may inhibit a takeover or make it more difficult to effect a change in control, which could adversely affect the value of our common stock.

Our Certificate of Incorporation and Bylaws contain, and Delaware corporate law contains, provisions that could delay or prevent a change of control or changes in our management. These provisions will apply even if some of our stockholders consider the offer to be beneficial or favorable. If a change of control or change in management is delayed or prevented, the market price of our common stock could decline.

Raising additional capital by issuing securities may cause dilution to our stockholders.

We may need or desire to raise substantial additional capital in the future. Our future capital requirements will depend on many factors, including, among others:

- Research and development investments;
- Our degree of success in capturing a larger portion of the industrial products production market;
- The costs of establishing or acquiring sales, marketing, and distribution capabilities for our products;
- The costs of preparing, filing, and prosecuting patent applications, maintaining and enforcing our issued patents, and defending intellectual property-related claims;
- The extent to which we acquire or invest in businesses, products or technologies and other strategic relationships; and
- The costs of financing unanticipated working capital requirements and responding to competitive pressures.

If we raise additional funds by issuing equity or convertible debt securities, we may reduce the percentage ownership of our then-existing stockholders, and the holders of those newly-issued equity or convertible debt securities may have rights, preferences, or privileges senior to those possessed by our then-existing stockholders. Additionally, future sales of a substantial number of shares of our common stock or other equity-related securities in the public market could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity or equity-linked securities. We cannot predict the effect that future sales of our common stock or other equity-related securities would have on the market price of our common stock.
Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We have the following locations:

<table>
<thead>
<tr>
<th>Location</th>
<th>Nature of Facility</th>
<th>Owned or Leased</th>
<th>Approximate Square Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>United States</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Huntingdon, PA</td>
<td>Corporate Headquarters</td>
<td>Owned</td>
<td>67,886</td>
</tr>
<tr>
<td></td>
<td>3D Printing Machine Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3D Printing Machine Sales Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troy, MI</td>
<td>EAC</td>
<td>Owned</td>
<td>19,646</td>
</tr>
<tr>
<td>St. Clairsville, OH</td>
<td>EAC</td>
<td>Owned</td>
<td>12,800</td>
</tr>
<tr>
<td></td>
<td>Materials Research and Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gersthofen, Germany</td>
<td>European Headquarters</td>
<td>Leased(a)</td>
<td>200,585</td>
</tr>
<tr>
<td></td>
<td>3D Printing Machine Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3D Printing Machine Sales Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Asia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kanagawa, Japan</td>
<td>EAC</td>
<td>Owned</td>
<td>19,639</td>
</tr>
<tr>
<td></td>
<td>3D Printing Machine Sales Center</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) On December 10, 2019, ExOne Property GmbH and ExOne GmbH, our German subsidiaries, entered into a purchase agreement (the “Purchase Agreement”) with Solidas Immobilien und Grundbesitz GmbH, a private, unaffiliated German real estate investor (the “Buyer”), for the sale of our European headquarters and operating facility in Gersthofen, Germany (the “Facility”). Concurrently with the execution of the Purchase Agreement, ExOne GmbH and the Buyer entered into a rental contract for the leaseback of the Facility. The sale-leaseback transaction closed on February 18, 2020.

Item 3. Legal Proceedings.

We are subject to various litigation, claims, and proceedings which have been or may be instituted or asserted from time to time in the ordinary course of business. Management does not believe that the outcome of any pending or threatened matters will have a material adverse effect, individually or in the aggregate, on our financial position, results of operations or cash flows.

Item 4. Mine Safety Disclosures.

Not applicable.
Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information
Our common stock has been listed on The Nasdaq Stock Market since February 7, 2013, under the symbol “XONE.”

Stockholders
As of March 1, 2020, there were 33 stockholders of record. The actual number of holders of our common stock is greater than the number of record holders, and includes stockholders who are beneficial owners and whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

Dividend Policy
We do not anticipate that we will declare or pay regular dividends on our common stock in the foreseeable future, as we generally intend to invest any future earnings in the development and growth of our business. Future dividends, if any, will be at the discretion of our Board and will depend on many factors, including general economic and business conditions, our strategic plans, our financial results and condition, legal requirements, any contractual obligations or limitations, and other factors that our Board deems relevant.

Securities Authorized for Issuance Under Equity Compensation Plans
Our 2013 Equity Incentive Plan (the “Plan”) was adopted on January 24, 2013, and approved by our stockholders on August 19, 2013. The table below sets forth information with regard to securities authorized for issuance under the Plan as of December 31, 2019:

<table>
<thead>
<tr>
<th>Plan Category</th>
<th>Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights</th>
<th>Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights</th>
<th>Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in the First Column)(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Compensation Plans Approved by Security Holders</td>
<td>854,259</td>
<td>$9.34</td>
<td>627,934</td>
</tr>
<tr>
<td>Equity Compensation Plans Not Approved by Security Holders</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(a) On January 24, 2013, the Board adopted the 2013 Equity Incentive Plan (the “Plan”). In connection with the adoption of the Plan, 500,000 shares of common stock were reserved for issuance pursuant to the Plan, with automatic increases in such reserve available each year annually on January 1 from 2014 through 2023 equal to the lesser of 3.0% of the total outstanding shares of common stock as of December 31 of the immediately preceding year or, a number of shares of common stock determined by the Board, provided that the maximum number of shares authorized under the Plan did not exceed 1,992,241 shares, subject to certain adjustments. The maximum number of shares authorized under the Plan was reached on January 1, 2017. At December 31, 2019, 627,934 shares remained available for future issuances under the Plan.

We are an SRC as defined by Rule 12b-2 of the Exchange Act and are not required to provide the information under this item.

20
The following discussion and analysis should be read in conjunction with our consolidated financial statements and related notes thereto in Part II Item 8 of this Annual Report on Form 10-K. Certain statements contained in this discussion may constitute forward looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”) and Section 21E of the Exchange Act. These statements involve a number of risks, uncertainties and other factors that could cause actual results to differ materially from those reflected in any forward looking statements, as a result of a variety of risks and uncertainties, including those described under Item 1, “Business – Cautionary Statements Concerning Forward Looking Statements” and Item 1A, “Risk Factors”.

Overview

Our Business

We are the pioneer and global leader in binder jet 3D printing technology. Since 1995, we’ve been on a mission to deliver powerful 3D printers that solve our customers’ toughest problems and enable world-changing innovations. Our 3D printing systems quickly transform powder materials — including metals, ceramics, composites and sand — into precision parts, metalcasting molds and cores, and innovative tooling solutions. Industrial customers use our technology to save time and money, reduce waste, increase their manufacturing flexibility, and deliver designs and products that were once impossible. As home to the world’s leading team of binder jetting experts, we also provide specialized 3D printing services, including on-demand production of mission-critical parts, as well as engineering and design consulting.

Outlook

We are the global leader in industrial 3D printers utilizing binder jetting technology for non-polymer based materials. Our continued focus is to achieve profitable growth via three strategic initiatives:

- **Expand Both Our Customer and Application Focus.** We intend to leverage our substantial experience in binder jetting technology to focus on the highest value industries and applications. We have made a significant investment in our commercial operations to drive our growth in this area.

- **Extend the Capabilities of Our Core Technology.** We intend to expand our core binder jetting technology through our machine platforms while at the same time lowering the total cost of ownership of our systems for our customers. We are also focused on driving modularity among our various machine platforms for both direct and indirect applications.

- **Execute on 3D Printed and Other Products, Materials and Services Revenue Growth.** We intend to execute on our plan to expand our offerings for 3D printed and other products, materials and services while better leveraging our growing global installed base of 3D printers.

Our results for 2019 were impacted by a downturn in global manufacturing trends which specifically impacted the capital expenditure investments of our customers. During 2019, we introduced two new signature platforms (the X1 25Pro™ for direct applications and the S-MAX Pro™ for indirect applications), with physical deliveries of both systems commencing during the three months ended December 31, 2019. We ended the year with a record backlog balance of approximately $31,100. We expect the combination of our backlog at December 31, 2019 and an acceleration in market adoption of our newly introduced printer platforms to provide the basis for our growth in 2020 despite certain negative macroeconomic trends for global manufacturing, including the global market impact of the coronavirus disease COVID-19.

On December 10, 2019, ExOne Property GmbH and ExOne GmbH (our “German Subsidiaries”), entered into a purchase agreement (the “Purchase Agreement”) with Solidas Immobilien und Grundbesitz GmbH, a private, unaffiliated German real estate investor (the “Buyer”), for the sale of our European headquarters and operating facility in Gersthofen, Germany (the “Facility”) for a cash price of €17,000 (approximately $18,500, of which approximately $2,200 was received prior to December 31, 2019). Concurrently with the execution of the Purchase Agreement, ExOne GmbH and the Buyer entered into a rental contract (the “Lease”) for the leaseback of the Facility for an initial aggregate annual rent totaling €1,500 (approximately $1,700), plus applicable taxes, which is fixed during the initial three-year term and is subject to adjustment on an annual basis (in accordance with the consumer price index for Germany) during the two five-year option extension periods. The sale-leaseback transaction closed on February 18, 2020.

As a result of the completion of the sale-leaseback transaction further described above, we expect the following effects on our results of operations, financial condition and cash flows:

- As indicated, we expect to incur annual rent expense commencing during the three months ending March 31, 2020 of approximately $1,700 (with an expected allocation of approximately $1,300, $200 and $200 to cost of sales, research and development and selling, general and administrative expenses, respectively, based on the relative utilization of the Facility). This is in place of annual depreciation associated with the Facility of approximately $600 (allocated approximately $400, $100 and $100 to cost of sales, research and development and selling, general and administrative expenses, respectively, based on the relative utilization of the Facility).

- We expect to record a gain on sale of property and equipment during the three months ending March 31, 2020 of approximately $1,400.

- We expect to record a right-of-use asset and corresponding operating lease liability of approximately $4,500.
Backlog
At December 31, 2019, our backlog was approximately $31,100 of which approximately $27,100 is expected to be fulfilled during the 12 months following such date. At December 31, 2018, our backlog was approximately $12,300.

Seasonality
Purchases of our 3D printing machines are often subject to the capital expenditure cycles of our customers. Generally, 3D printing machine sales are higher in our third and fourth fiscal quarters than in our first and second fiscal quarters; however, as acceptance of our 3D printing machines as a credible alternative to traditional methods of production grows, we expect to limit the seasonality we experience.

Financial Measures
We use several financial and operating metrics to measure our business. We use these metrics to assess the progress of our business, make decisions on where to allocate capital, time and technology investments, and assess longer-term performance within our marketplace. The key metrics are as follows:

Revenue. Our revenue consists of sales of our 3D printing machines and 3D printed and other products, materials and services.

3D printing machines. 3D printing machine revenues consist of 3D printing machine sales and leasing arrangements. Sales of 3D printing machines may also include optional equipment and services (installation, training and other services delivered at the time of installation). 3D printing machine sales and leasing arrangements are influenced by a number of factors including, among other things, the adoption rate of our 3D printing technology, end-user product design and manufacturing activity, the capital expenditure budgets of end-users and potential end-users and other macroeconomic factors. Purchases or leases of our 3D printing machines, particularly our higher-end, higher-priced systems, typically involve long sales cycles. Several factors can significantly affect revenue reported for our 3D printing machines for a given period including a customer’s capital budgeting cycle, its facility preparedness and the terms of the underlying arrangement with a customer (including certain substantive acceptance provisions) which may vary from period to period.

3D printed and other products, materials and services. 3D printed and other products, materials and services consist of sales derived from our global EAC network (including 3D printed components or tools and castings), consumable materials, aftermarket (including replacement parts for the network of 3D printing machines installed by our global customer base and services for maintenance) and certain funded research and development arrangements. Our EACs utilize our 3D printing machine technology to print products to the specifications of customers. In addition, our EACs provide support and services such as pre-production collaboration prior to printing products for a customer. Sales of consumable materials and aftermarket (replacement parts and service maintenance contracts) are directly linked to our growing network of 3D printing machines installed by our global customer base. Funded research and development includes both commercial and government arrangements which generally apply our additive manufacturing technologies (specifically binder jetting) to one or more specific materials or applications.

Cost of Sales and Gross Profit. Our cost of sales consists primarily of direct labor (related to our global workforce), materials (for both the manufacture of 3D printing machines and for our EAC and other manufacturing operations) and overhead to produce 3D printing machines and 3D printed and other products, materials and services. Also included in cost of sales are license fees (based upon a percentage of revenue of qualifying products and processes) for the use of intellectual property, warranty costs and other overhead associated with our production processes.

Our gross profit is influenced by a number of factors, the most important of which is the volume and mix of sales of our 3D printing machines and 3D printed and other products, materials and services. As 3D printing machine sales are cyclical, we seek to achieve a balance in revenue from 3D printing machines and 3D printed and other products, materials and services in order to maximize gross profit while managing business risk. In addition, we expect to reduce our cost of sales over time by continued research and development and supply chain activities directed towards achieving increased efficiencies in our production processes and lowering total cost of ownership of our 3D printing machines.

Operating Expenses. Our operating expenses consist of research and development expenses and selling, general and administrative expenses.

Research and development expenses. Our research and development expenses consist primarily of salaries and related personnel expenses aimed at 3D printing machine development and materials qualification activities. Additional costs include the related software and materials, laboratory supplies, and costs for facilities and equipment (including 3D printing machines used in materials qualification activities). Research and development expenses are charged to operations as they are incurred. We capitalize the cost of materials, equipment and facilities that have future alternative uses in research and development projects or otherwise.
Selling, general and administrative expenses. Our selling, general and administrative expenses consist primarily of employee-related costs (salaries and benefits) of our executive officers, sales and marketing (including sales commissions), finance, accounting, information technology and human resources personnel. Other significant general and administrative costs include the facility costs related to our United States and European headquarters and external costs for legal, audit, consulting and other professional services.

Interest Expense. Interest expense consists principally of the interest cost associated with our related party revolving credit facility, and outstanding long-term debt.

(Benefit) Provision for Income Taxes. We are taxed as a corporation for United States federal, state, local and foreign income tax purposes. Current statutory tax rates in the jurisdictions in which we operate, the United States, Germany, Japan and Italy (through December 2018), are 21%, 30%, 31% and 24%, respectively.

Results of Operations

Net Loss

Net loss for 2019 was $15,095, or $0.93 per basic and diluted share, compared with a net loss of $12,667, or $0.78 per basic and diluted share, for 2018. The increase in our net loss was principally due to a reduction in our revenues and gross profit, as well as the absence of a gain from an insurance recovery recorded during 2018 for a 3D printing machine damaged by a third party freight company while in transit, all of which was offset by a reduction in our research and development and selling, general and administrative expenses (all changes further described below).

Revenue

The following table summarizes revenue by product group for each of the years ended December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D printing machines</td>
<td>$27,232</td>
<td>$36,393</td>
</tr>
<tr>
<td>3D printed and other products, materials and services</td>
<td>$26,044</td>
<td>$28,251</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$53,276</td>
<td>$64,644</td>
</tr>
</tbody>
</table>

Revenue for 2019 was $53,276 compared with revenue of $64,644 for 2018, a decrease of $11,368, or 17.6%. The decrease in revenue was attributable to both of our product groups. The decrease in revenues from 3D printing machines resulted from a lower volume of units sold (44 3D printing machines sold during 2019, as compared to 56 3D printing machines sold during 2018) and a lower average selling price of units sold (primarily due to the mix of 3D printing machines sold). The decrease in revenues from 3D printed and other products, materials and services principally resulted from a decrease in revenues from our direct EAC printing operations (mostly due to the timing of orders from a key customer), indirect EAC printing operations (mostly due to lower volumes of printed products and the impact of exiting our Houston, Texas facility in August 2018, such facility contributing $951 in revenue during 2018) and materials (mostly due to reductions in pricing based on external competition) offset by an increase in aftermarket sales based on an increased global installed base of 3D printing machines and a higher contribution from research and development arrangements primarily due to a new automotive project which commenced during the three months ended December 31, 2019. Revenue was also impacted by approximately $800 due to unfavorable exchange rates (principally the euro versus the United States dollar) during 2019.

Cost of Sales and Gross Profit

Cost of sales for 2019 was $35,848 compared with cost of sales of $43,703 for 2018, a decrease of $7,855, or 18.0%. Gross profit for 2019 was $17,428 compared with gross profit of $20,941 for 2018. Gross profit percentage was 32.7% for 2019 compared with gross profit percentage of 32.4% for 2018. The decrease in our gross profit was primarily due to a decrease in our volume of products sold resulting in a reduction in leverage of our fixed cost base and net negative experience related to product warranties of $519. These decreases were offset by cost savings associated with our 2018 global cost realignment program (primarily fixed overhead costs associated with our former Houston, Texas facility). In addition, we realized net benefits in cost of sales relating to a reduction in net charges associated with slow-moving, obsolete and lower of cost or net realizable value inventories of $730 (primarily due to the $561 charge associated with our industrial microwave inventories recorded during 2018) and amounts associated with exit activities including a gain from disposal of property and equipment of $145 associated with our former Houston, Texas property recorded during the three months ended December 31, 2019 and the absence of $236 in exit costs associated with our Desenzano del Garda, Italy and Houston, Texas facility consolidations during 2018.
Research and Development

Research and development expenses for 2019 were $9,884 compared with research and development expenses of $10,744 for 2018, a decrease of $860, or 8.0%. The decrease in research and development expenses was primarily due to decreases in employee-related costs (principally salaries and benefits) of $119 and consulting and professional fees of $715 (both reductions primarily as a result of our 2018 global cost realignment program) and a decrease in equity-based compensation of $189, including amounts awarded under our annual incentive programs as a result of underperformance against 2019 targets. These decreases were offset by an increase in material costs of $317, primarily associated with our development of the X1 25Pro™ direct 3D printing machine and S-MAX Pro™ indirect 3D printing machine.

Selling, General and Administrative

Selling, general and administrative expenses for 2019 were $22,592 compared with selling, general and administrative expenses of $23,194 for 2018, a decrease of $602, or 2.6%. The decrease in selling, general and administrative expenses was principally due to a decrease in employee-related costs (salaries and benefits) of $1,202 (including $708 in employee termination costs associated with the change in our Chief Executive Officer and our 2018 global cost realignment program, recorded during the three months ended June 2018) and consulting and professional fees of $299 (reduction associated with our 2018 global cost realignment program). These decreases were offset by a net increase associated with equity-based compensation of $419 (principally associated with changes in executive management in May 2019) offset by a reduction in amounts awarded under our annual incentive programs as a result of underperformance against 2019 targets, a net increase in net provisions for bad debts of $221 and a net increase in selling costs (an increase in sales promotion and trade show expenses offset by lower external commissions on lower sales) of $354, primarily due to our investment in the GIFA international foundry show in Dusseldorf, Germany in 2019 (a once every four-year event).

Interest Expense

Interest expense for 2019 was $343 compared with interest expense of $254 for 2018, an increase of $89, or 35.0%. The increase in interest expense was principally due to an increase in interest incurred in connection with our related party revolving credit facility ($260 in 2019 as compared to $160 in 2018, primarily due to an increase in borrowings between 2019 and 2018).

Other Expense (Income) — Net

Other expense (income) — net for 2019 was $111 compared with other expense (income) — net of ($744) for 2018. The change of $855 was primarily due to the absence of $819 of a realized gain associated with an insurance recovery for a 3D printing machine damaged by a third party freight company while in transit.

(Benefit) Provision for Income Taxes

The (benefit) provision for income taxes for 2019 and 2018 was ($407) and $160, respectively. The effective tax rate for 2019 and 2018 was 2.6% (benefit on a loss) and 1.3% (provision on a loss), respectively. For 2019, the effective tax rate differed from the United States federal statutory rate of 21% primarily due to net changes in valuation allowances and the reversal of previously recorded liabilities for uncertain tax positions (further described below). For 2018, the effective tax rate differed from the United States federal statutory rate of 21% primarily due to net changes in valuation allowances.

We have provided a valuation allowance for certain of our net deferred tax assets as a result of our inability to generate consistent net operating profits in certain jurisdictions in which we operate. As such, certain benefits from deferred taxes in any of the periods presented in our consolidated financial statements have been fully offset by changes in the valuation allowance for net deferred tax assets. We continue to assess our future taxable income by jurisdiction based on our recent historical operating results, the expected timing of reversal of temporary differences, various tax planning strategies that we may be able to enact in future periods, the impact of potential operating changes on our business and our forecast results from operations in future periods based on available information at the end of each reporting period. To the extent that we are able to reach the conclusion that deferred tax assets are realizable based on any combination of the above factors in a single, or multiple, taxing jurisdictions, a reversal of the related portion of our existing valuation allowances may occur.

At December 31, 2018, our ExOne GmbH (2010-2013) and ExOne Property GmbH (2013) subsidiaries were under examination by local taxing authorities in Germany without significant adjustment to previously established tax positions. As a result, during the three months ended March 31, 2019, we recorded a reversal of certain of our previously recorded liabilities for uncertain tax positions of $1,075, of which $257 was offset against net operating loss carryforwards.

Restructuring

In August 2018, we committed to a plan to consolidate certain of our 3D printing operations from our Houston, Texas facility into our Troy, Michigan facility. These actions were taken as part of our efforts to optimize our business model and maximize our facility utilization. During 2018, we recorded a charge of $28 split between cost of sales ($15) and selling, general and administrative expense ($13) associated with involuntary employee terminations related to this plan. During 2018, we recorded an additional charge of $1 (to cost of sales) associated with asset impairments related to this plan. There are no additional charges expected to be incurred associated with this plan in future periods. We settled all amounts associated with involuntary employee terminations during 2018.
We have estimated a reduction in our annual revenues of approximately $1,400 as a result of the consolidation of our 3D printing operations from our Houston, Texas facility into our Troy, Michigan facility. Revenues associated with our Houston, Texas facility were $951 for 2018. We have estimated annualized cost savings related to this consolidation of approximately $1,800, with approximately $1,600 in the form of cash cost savings (principally employee-related and other operating costs) and approximately $200 in the form of reduced depreciation expense. Cost savings estimates associated with the exit of this facility are allocated $1,600 to cost of sales and $200 to selling, general and administrative expenses. We have invested realized cost savings associated with this plan into technological or process advancements that support either long-term cost benefits or revenue growth.

In connection with the exit of our Houston, Texas facility, we reclassified $822 in property and equipment (principally land and building) associated with certain long-lived assets meeting required criteria as held for sale (included in prepaid expenses and other current assets in the accompanying consolidated balance sheet at December 31, 2018). During the three months ended December 31, 2019, we sold this property and equipment to a third party, resulting in net proceeds to us of $967 and a gain from disposal of property and equipment of $145 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss).

In December 2017, we committed to a plan to consolidate certain of our 3D printing operations from our Desenzano del Garda, Italy facility into our Gersthofen, Germany facility. These actions were taken as part of our efforts to optimize our business model and maximize our facility utilization. During 2018, we recorded charges of $258 associated with other exit costs ($17) and asset impairments ($241) related to this plan. In addition, during 2018, we recorded a gain from disposal of property and equipment of $51 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss). Charges associated with other exit costs recorded during 2018 were recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss. Charges associated with asset impairments recorded during 2018 were recorded to cost of sales as a component of depreciation expense in the accompanying statement of consolidated operations and comprehensive loss. Other exit costs relate to the remaining facility rent due under a non-cancellable operating lease following the cessation of operations at the facility in January 2018. Asset impairment charges relate to certain leasehold improvements associated with the exited facility and other equipment which was abandoned by us. There are no additional charges expected to be incurred associated with this plan in future periods. We settled all amounts associated with involuntary employee terminations and facility rentals during 2018.

The consolidation of our 3D printing operations from our Desenzano del Garda, Italy facility into our Gersthofen, Germany facility did not have a significant impact on our revenues. We have estimated annualized cost savings related to this consolidation of approximately $875, with approximately $600 in the form of cash cost savings (principally employee-related and other operating costs) and approximately $275 in the form of reduced depreciation expense. Cost savings estimates associated with the exit of this facility are allocated $625 to cost of sales and $250 to selling, general and administrative expenses. We have invested realized cost savings associated with this plan into technological or process advancements that support either long-term cost benefits or revenue growth.

**Impairment**

During the three months ended December 31, 2019, as a result of continued operating losses and cash flow deficiencies, we identified a triggering event requiring a test for the recoverability of long-lived assets held and used at the asset group level. Assessing the recoverability of long-lived assets held and used requires significant judgments and estimates by management.

For purposes of testing long-lived assets for recoverability, we operate as three separate asset groups: United States, Europe and Japan. In assessing the recoverability of long-lived assets held and used, we determined the carrying amount of long-lived assets held and used to be in excess of the estimated future undiscounted net cash flows of the related assets. We proceeded to determine the fair value of our long-lived assets held and used, principally through use of the market approach. Our use of the market approach included consideration of market transactions for comparable assets. Management concluded that the fair value of long-lived assets held and used exceeded their carrying value and, as such, no impairment loss was recorded.

A significant decrease in the market price of a long-lived asset, adverse change in the use or condition of a long-lived asset, adverse change in the business climate or legal or regulatory factors impacting a long-lived asset and continued operating losses and cash flow deficiencies associated with a long-lived asset, among other indicators, could cause a future assessment to be performed which may result in an impairment of long-lived assets held and used, resulting in a material adverse effect on our financial position and results of operations.

**Impact of Inflation**

Our results of operations and financial condition are presented based on historical cost. While it is difficult to accurately measure the impact of inflation due to the imprecise nature of the estimates required, we believe the effects of inflation, if any, on our results of operations and financial condition are not significant.

**Liquidity and Capital Resources**

**Liquidity**

We have incurred a net loss in each of our annual periods since our inception. We incurred net losses of $15,095 and $12,667 for 2019 and 2018, respectively. At December 31, 2019, we had $5,265 in unrestricted cash and cash equivalents.
We have received cumulative unrestricted net proceeds from the sale of our common stock (through our initial public offering and subsequent secondary offerings) of $168,361 to fund our operations. In March 2018, we entered into a three-year, $15,000 revolving credit facility with a related party to provide additional funding for working capital and general corporate purposes. At December 31, 2019, there were no amounts outstanding under the related party revolving credit facility. In February 2020, following completion of a sale-leaseback transaction associated with our European headquarters and operating facility in Gersthofen, Germany (further described below), we entered into an amendment to our related party revolving credit facility which reduced the amount available under the related party revolving credit facility to $10,000 and extended the term of the related party revolving credit facility through March 2024, among other changes. In June 2018, we initiated the 2018 global cost realignment program focused on a reduction in our production overhead costs and operating expenses in an effort to drive efficiency in our operations and preserve capital. Actions associated with this program were completed in December 2018.

In February 2020, we completed a sale and leaseback of our European headquarters and operating facility in Gersthofen, Germany. This transaction resulted in unrestricted net proceeds to us of approximately $18,500 (of which approximately $2,200 was received during 2019) to provide additional funding for working capital and general corporate purposes.

We believe that our existing capital resources will be sufficient to support our operating plan. If we anticipate that our actual results will differ from our operating plan, we believe we have sufficient capabilities to enact cost savings measures to preserve capital. We may also seek to raise additional capital to support our growth through additional debt, equity or other alternatives (including asset sales) or a combination thereof.

**Related Party Revolving Credit Facility**

On March 12, 2018, we and our ExOne Americas LLC and ExOne GmbH subsidiaries, as guarantors (collectively, the "Loan Parties"), entered into a Credit Agreement and related ancillary agreements with LB Holdings, LLC ("LBM"), a company controlled by S. Kent Rockwell, who was our Executive Chairman (a related party) at such date and is currently Chairman of our Board, relating to a $15,000 revolving credit facility (the "LBM Credit Agreement") to provide additional funding for working capital and general corporate purposes. The LBM Credit Agreement provided a credit facility for a term of three years (through March 12, 2021) bearing interest at a rate of one month LIBOR plus an applicable margin of 500 basis points (6.8% and 7.5% at December 31, 2019 and 2018, respectively). The LBM Credit Agreement required a commitment fee of 75 basis points, or 0.75%, on the unused portion of the facility, payable monthly in arrears. In addition, an up-front commitment fee of 125 basis points, or 1.25% ($188), was required at closing. Borrowings under the LBM Credit Agreement were collateralized by the accounts receivable, inventories and machinery and equipment of the Loan Parties. At December 31, 2019 and 2018, the total carrying value of collateral was approximately $31,000 and $30,000, respectively. At December 31, 2019 and 2018, the total estimated fair value of collateral significantly exceeded the maximum borrowing capacity under the LBM Credit Agreement.

Borrowings under the LBM Credit Agreement are required to be in minimum increments of $1,000. We may terminate or reduce the credit commitment at any time during the term of the LBM Credit Agreement without penalty. We may also make prepayments against outstanding borrowings under the LBM Credit Agreement at any time without penalty.

The LBM Credit Agreement contains several affirmative covenants including prompt payment of liabilities and taxes; maintenance of insurance, properties, and licenses; and compliance with laws. The LBM Credit Agreement also contains several negative covenants including restricting the incurrence of certain additional debt; prohibiting future liens (other than permitted liens); prohibiting investment in third parties; limiting the ability to pay dividends; limiting mergers, acquisitions, and dispositions; and limiting the sale of certain property and equipment of the Loan Parties. The LBM Credit Agreement does not contain any financial covenants. The LBM Credit Agreement also contains events of default, including, but not limited to, cross-default to certain other debt, breaches of representations and warranties, change of control events and breaches of covenants.

LBM was determined to be a related party based on common control by S. Kent Rockwell. Accordingly, we do not consider the LBM Credit Agreement indicative of a fair market value lending. Prior to execution, the LBM Credit Agreement was reviewed and approved by the Audit Committee of the Board and subsequently by a sub-committee of independent members of the Board. At the time of execution of the LBM Credit Agreement, the $15,000 in available loan proceeds was deposited into an escrow account with an unrelated, third party financial institution acting as escrow agent pursuant to a separate Escrow Agreement by and among the parties. Loan proceeds held in escrow are available to us upon our submission to the escrow agent of a loan request. Such proceeds will not be available to LBM until payment in-full of the obligations under the LBM Credit Agreement and termination of the LBM Credit Agreement. Payments of principal and other obligations will be made to the escrow agent, while interest payments will be made directly to LBM. Provided there exists no potential default or event of default, the LBM Credit Agreement and Escrow Agreement prohibit any acceleration of repayment of any amount outstanding under the LBM Credit Agreement and prohibit termination of the LBM Credit Agreement or withdrawal from escrow of any unused portion of the available loan proceeds.

During 2019, we had borrowings of $4,000 under the LBM Credit Agreement, all of which were subsequently repaid prior to December 31, 2019. There were no borrowings by us under the LBM Credit Agreement during 2018.
On February 18, 2020, the Loan Parties and LBM entered into a First Amendment to the LBM Credit Agreement (the “LBM Amendment”) which (i) reduced the available capacity under the revolving credit facility to $10,000, (ii) extended the term until March 31, 2024, (iii) increased the commitment fee to 100 basis points, or 1.00%, on the unused portion of the revolving credit facility, and (iv) provided a process for the replacement of the LIBOR index after 2021. In addition, the accounts receivable related to our ExOne GmbH subsidiary no longer serve as collateral for borrowings under the LBM Credit Agreement.

We do not consider the amended revolving credit facility with LBM to be indicative of a fair market value lending based on the prior determination of LBM as a related party. Prior to execution, the LBM Amendment was reviewed and approved by the Audit Committee of the Board and subsequently by a sub-committee of independent members of the Board.

Amendment to GmbH Credit Agreement
On February 24, 2020, ExOne GmbH entered into an amendment and replacement of its credit agreement with a German bank (the “Amended GmbH Credit Agreement”). The Amended GmbH Credit Agreement eliminates the overdraft credit and short-term loan features of its credit arrangement and replaces them with an increased capacity amount of €3,500 (approximately $3,800) for the issuance of financial guarantees and letters of credit for commercial transactions requiring security. The cash collateral requirement for the issuance of financial guarantees and letters of credit for commercial transactions requiring security has been eliminated for amounts up to €1,000 (approximately $1,000) as the amendment provides the German bank with a collateral interest in the accounts receivable of ExOne GmbH. Amounts in excess of €1,000 (approximately $1,000) continue to require cash collateral.

Cash Flows
The following table summarizes the significant components of cash flows for each of the years ended December 31 and our cash, cash equivalents, and restricted cash balances for each of the periods indicated:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net cash used for operating activities</td>
<td>$(5,304)</td>
<td>$(11,775)</td>
</tr>
<tr>
<td>Net cash provided by (used for) investing activities</td>
<td>2,520</td>
<td>(1,229)</td>
</tr>
<tr>
<td>Net cash provided by financing activities</td>
<td>59</td>
<td>105</td>
</tr>
<tr>
<td>Effect of exchange rate changes on cash, cash equivalents, and restricted cash</td>
<td>(172)</td>
<td>(139)</td>
</tr>
<tr>
<td>Net change in cash, cash equivalents, and restricted cash</td>
<td>$(2,897)</td>
<td>$(13,038)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2019</th>
<th>December 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and cash equivalents</td>
<td>$5,265</td>
<td>$7,592</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>978</td>
<td>1,548</td>
</tr>
<tr>
<td>Cash, cash equivalents, and restricted cash</td>
<td>$6,243</td>
<td>$9,140</td>
</tr>
</tbody>
</table>

Operating Activities
Net cash used for operating activities for 2019 was $5,304 compared with net cash used for operating activities of $11,775 for 2018. The decrease of $6,471 was due to a net decrease in working capital attributable to an increase in net cash inflows from customers (principally due to the timing of cash collections on 3D printing machine sales) offset by an increase in net cash outflows related to inventory production of our 3D printing machines and the timing of payments to our suppliers and vendors for our production and operating expenses. The net decrease in working capital was partially offset by an increase in our net loss (further described above).

Investing Activities
Net cash provided by investing activities for 2019 was $2,520 compared with net cash used for investing activities of $1,229 for 2018.

For 2019, net cash provided by investing activities included cash inflows of $3,186 in proceeds from the sale of property and equipment, including $967 in proceeds from the sale of our former Houston, Texas facility (further described above) and a deposit of $2,216 on the sale of our Gersthofen, Germany facility (further described below). These cash inflows were offset by $666 in cash outflows associated with capital expenditures.

For 2018, net cash used for investing activities included $1,327 in cash outflows associated with capital expenditures. These cash outflows were offset by cash inflows of $98 in proceeds from the sale of property and equipment.

We expect our 2020 capital expenditures to be limited to spending associated with sustaining our existing operations and strategic asset acquisition and deployment (estimated spending of approximately $2,000 to $3,000).

In February 2020, the Company completed a sale and leaseback of its European headquarters and operating facility in Gersthofen, Germany. This transaction resulted in unrestricted net proceeds to the Company of approximately $18,500 (of which approximately $2,200 was received during 2019) to provide additional funding for working capital and general corporate purposes.
Financing Activities

Net cash provided by financing activities for 2019 was $59 compared with net cash provided by financing activities of $105 for 2018. For 2019, net cash provided by financing activities included $289 in cash inflows associated with proceeds from the exercise of employee stock options. These cash inflows were offset by cash outflows of $149 in principal payments on long-term debt and $68 associated with taxes related to the net settlement of equity-based awards.

For 2018, net cash provided by financing activities included $529 in cash inflows associated with proceeds from the exercise of employee stock options. These cash inflows were offset by cash outflows of $265 in debt issuance costs associated with our revolving credit facility with a related party (further described above) and $142 in principal payments on long-term debt. At December 31, 2019, we identified that we were not in compliance with the annual cash flow-to-debt service ratio covenant associated with our building note payable (outstanding indebtedness of $1,384 at December 31, 2019). We requested and were granted a waiver related to compliance with this annual covenant at December 31, 2019 and through December 31, 2020. Related to our 2019 non-compliance, there were no cross-default provisions or related impacts on other lending or financing agreements.

Off-Balance Sheet Arrangements

In the course of our normal operations, our ExOne GmbH subsidiary issues financial guarantees and letters of credit to third parties in connection with certain commercial transactions requiring security. At December 31, 2019, total outstanding financial guarantees and letters of credit issued by us were $560 (€499) with expiration dates ranging from February 2020 through February 2023. At December 31, 2018, total outstanding guarantees and letters of credit issued by us were $1,140 (€992).

For further discussion related to financial guarantees and letters of credit issued by us, refer to Note 14 and Note 24 to the consolidated financial statements in Part II Item 8 of this Annual Report on Form 10-K.

Recently Issued and Adopted Accounting Guidance

Refer to Note 1 to the consolidated financial statements included in Part II Item 8 of this Annual Report on Form 10-K.

Critical Accounting Policies and Estimates

Refer to Note 1 to the consolidated financial statements included in Part II Item 8 of this Annual Report on Form 10-K.

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

We are an SRC as defined by Rule 12b-2 of the Exchange Act and are not required to provide the information under this item.
### Item 8. Financial Statements and Supplementary Data.

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management’s Report on Internal Control Over Financial Reporting</td>
<td>30</td>
</tr>
<tr>
<td>Reports of Independent Registered Public Accounting Firm</td>
<td>31</td>
</tr>
<tr>
<td>Statement of Consolidated Operations and Comprehensive Loss</td>
<td>34</td>
</tr>
<tr>
<td>Consolidated Balance Sheet</td>
<td>35</td>
</tr>
<tr>
<td>Statement of Consolidated Cash Flows</td>
<td>36</td>
</tr>
<tr>
<td>Statement of Changes in Consolidated Stockholders’ Equity</td>
<td>37</td>
</tr>
<tr>
<td>Notes to the Consolidated Financial Statements</td>
<td>38</td>
</tr>
</tbody>
</table>
Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act). Our internal control over financial reporting is designed to provide reasonable assurance to management and the Board of Directors regarding the preparation and fair presentation of published financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. We conducted an assessment of the effectiveness of our internal control over financial reporting based on the criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission (2013 Framework). Based on our assessment, as a result of certain material weaknesses in our internal control over financial reporting (further described below), we believe that, as of December 31, 2019, our internal control over financial reporting is ineffective.

In connection with the preparation of our consolidated financial statements for the year ended December 31, 2019, we concluded that there are material weaknesses in the design and operating effectiveness of our internal control over financial reporting as defined in SEC Regulation S-X. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected on a timely basis.

A description of the identified material weaknesses in internal control over financial reporting is as follows:

- We did not maintain adequate control over user access rights for a significant information technology system.
- We did not maintain adequate control over application changes for a significant information technology system.
- We did not maintain adequate control over pricing and discounts associated with sales of certain of our products.

As a result of the identification of the material weaknesses further described above, management has initiated the development of a remediation plan in an effort to ensure that our disclosure controls and procedures are effective. Our remediation plan is expected to include a comprehensive evaluation of the people, processes and systems responsible for each of the underlying control activities. We expect to complete this evaluation in 2020 and put measures in place in an effort to remediate the identified material weaknesses. However, we cannot be certain that the measures we may take will ensure that we establish and maintain adequate controls over our financial processes and reporting in the future or that material weaknesses identified will be remediated.

Notwithstanding the identified material weaknesses further described above, management believes that the consolidated financial statements and related notes thereto included in this Annual Report on Form 10-K fairly present, in all material respects, our financial condition, results of operations and cash flows for the periods presented.

The effectiveness of internal control over financial reporting as of December 31, 2019 has been audited by Schneider Downs & Co. Inc., an independent registered public accounting firm which also audited our consolidated financial statements. Schneider Downs’ attestation reports on the consolidated financial statements and internal control over financial reporting are included under the headings “Report of Independent Registered Public Accounting Firm.”

/s/ John F. Hartner
John F. Hartner
Chief Executive Officer

/s/ Douglas D. Zemba
Douglas D. Zemba
Chief Financial Officer
Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
of The ExOne Company

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of The ExOne Company and Subsidiaries (collectively, the “Company”) as of December 31, 2019 and 2018, and the related consolidated statements of operations and comprehensive loss, changes in stockholders’ equity, and cash flows for each of the years in the two-year period ended December 31, 2019, and the related notes (collectively referred to as the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2019 and 2018, and the results of its consolidated operations and its cash flows for each of the years in the two-year period ended December 31, 2019, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated March 12, 2020, expressed an adverse opinion.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the 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 audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

We have served as the Company’s auditor since 2016.

/s/ Schneider Downs & Co. Inc.

Schneider Downs & Co. Inc.
Pittsburgh, Pennsylvania
March 12, 2020
Adverse Opinion on Internal Control over Financial Reporting

We have audited The ExOne Company and Subsidiaries’ (the Company’s) internal control over financial reporting as of December 31, 2019, 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, because of the effect of the material weaknesses described in the following paragraph on the achievement of the objectives of the control criteria, the Company has not maintained effective internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control—Integrated Framework (2013) issued by COSO.

A material weakness is a control deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the Company’s annual or interim financial statements will not be prevented or detected on a timely basis. The following material weaknesses have been identified and included in management’s assessment.

- The Company did not maintain adequate control over:
  - User access rights for a significant information technology system;
  - Application changes for a significant information technology system; and
  - Pricing and discounts associated with sales of certain of the Company’s products.

These material weaknesses were considered in determining the nature, timing, and extent of audit tests applied in our audit of the 2019 financial statements, and this report does not affect our report dated March 12, 2020, on those financial statements.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets and the related consolidated statements of operations and comprehensive loss, changes in stockholders’ equity, and cash flows of the Company, and our report dated March 12, 2020, expressed an unqualified opinion.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying “Management’s Report on Internal Control over Financial Reporting.” Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit 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 audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.
Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Schneider Downs & Co. Inc.

Schneider Downs & Co. Inc.
Pittsburgh, Pennsylvania
March 12, 2020
### The ExOne Company and Subsidiaries

**Statement of Consolidated Operations and Comprehensive Loss**

*(in thousands, except per-share amounts)*

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$53,276</td>
<td>$64,644</td>
</tr>
<tr>
<td>Cost of sales</td>
<td>35,848</td>
<td>43,703</td>
</tr>
<tr>
<td><strong>Gross profit</strong></td>
<td>17,428</td>
<td>20,941</td>
</tr>
<tr>
<td><strong>Operating expenses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>9,884</td>
<td>10,744</td>
</tr>
<tr>
<td>Selling, general and administrative</td>
<td>22,592</td>
<td>23,194</td>
</tr>
<tr>
<td><strong>Loss from operations</strong></td>
<td>(15,048)</td>
<td>(12,997)</td>
</tr>
<tr>
<td><strong>Other expense (income)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest expense</td>
<td>343</td>
<td>254</td>
</tr>
<tr>
<td><strong>Other expense (income)— net</strong></td>
<td>111</td>
<td>(744)</td>
</tr>
<tr>
<td><strong>Loss before income taxes</strong></td>
<td>(454)</td>
<td>(490)</td>
</tr>
<tr>
<td><strong>(Benefit) provision for income taxes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net loss</td>
<td>$15,095</td>
<td>$12,667</td>
</tr>
<tr>
<td><strong>Net loss per common share:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>$(0.93)</td>
<td>$(0.78)</td>
</tr>
<tr>
<td>Diluted</td>
<td>$(0.93)</td>
<td>$(0.78)</td>
</tr>
<tr>
<td><strong>Comprehensive loss:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net loss</td>
<td>$15,095</td>
<td>$12,667</td>
</tr>
<tr>
<td>Foreign currency translation adjustments</td>
<td>(735)</td>
<td>(1,264)</td>
</tr>
<tr>
<td><strong>Comprehensive loss</strong></td>
<td>$15,830</td>
<td>$(13,931)</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these consolidated financial statements.
The ExOne Company and Subsidiaries
Consolidated Balance Sheet
(in thousands, except share amounts)

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$5,265</td>
<td>$7,592</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>978</td>
<td>1,548</td>
</tr>
<tr>
<td>Accounts receivable— net</td>
<td>6,522</td>
<td>6,393</td>
</tr>
<tr>
<td>Current portion of net investment in sales-type leases— net</td>
<td>213</td>
<td>302</td>
</tr>
<tr>
<td>Inventories— net</td>
<td>19,770</td>
<td>15,930</td>
</tr>
<tr>
<td>Prepaid expenses and other current assets</td>
<td>2,182</td>
<td>2,438</td>
</tr>
<tr>
<td>Total current assets</td>
<td>34,930</td>
<td>34,203</td>
</tr>
<tr>
<td>Property and equipment— net</td>
<td>38,895</td>
<td>41,906</td>
</tr>
<tr>
<td>Net investment in sales-type leases— net of current portion— net</td>
<td>738</td>
<td>1,351</td>
</tr>
<tr>
<td>Other noncurrent assets</td>
<td>803</td>
<td>222</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>$75,366</td>
<td>$77,682</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current portion of long-term debt</td>
<td>$153</td>
<td>$144</td>
</tr>
<tr>
<td>Accounts payable</td>
<td>5,818</td>
<td>4,376</td>
</tr>
<tr>
<td>Accrued expenses and other current liabilities</td>
<td>7,100</td>
<td>6,049</td>
</tr>
<tr>
<td>Current portion of contract liabilities</td>
<td>11,846</td>
<td>2,343</td>
</tr>
<tr>
<td>Total current liabilities</td>
<td>24,917</td>
<td>12,912</td>
</tr>
<tr>
<td>Long-term debt— net of current portion</td>
<td>1,211</td>
<td>1,364</td>
</tr>
<tr>
<td>Contract liabilities— net of current portion</td>
<td>286</td>
<td>527</td>
</tr>
<tr>
<td>Other noncurrent liabilities</td>
<td>370</td>
<td>104</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>26,784</td>
<td>14,907</td>
</tr>
<tr>
<td><strong>Stockholders’ equity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common stock, $0.01 par value, 200,000,000 shares authorized, 16,346,960 (2019) and 16,234,201 (2018) shares issued and outstanding</td>
<td>163</td>
<td>162</td>
</tr>
<tr>
<td>Additional paid-in capital</td>
<td>176,850</td>
<td>175,214</td>
</tr>
<tr>
<td>Accumulated deficit</td>
<td>(116,948)</td>
<td>(101,853)</td>
</tr>
<tr>
<td>Accumulated other comprehensive loss</td>
<td>(11,483)</td>
<td>(10,748)</td>
</tr>
<tr>
<td><strong>Total stockholders’ equity</strong></td>
<td>48,582</td>
<td>62,775</td>
</tr>
<tr>
<td><strong>Total liabilities and stockholders’ equity</strong></td>
<td>$75,366</td>
<td>$77,682</td>
</tr>
</tbody>
</table>

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

35
## The ExOne Company and Subsidiaries
### Statement of Consolidated Cash Flows
### (in thousands)

For the years ended December 31,

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net loss</td>
<td>$(15,095)</td>
<td>$(12,667)</td>
</tr>
<tr>
<td>Adjustments to reconcile net loss to net cash used for operations:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>4,581</td>
<td>5,503</td>
</tr>
<tr>
<td>Equity-based compensation</td>
<td>1,416</td>
<td>968</td>
</tr>
<tr>
<td>Amortization of debt issuance costs</td>
<td>93</td>
<td>75</td>
</tr>
<tr>
<td>Provision for bad debts— net</td>
<td>279</td>
<td>58</td>
</tr>
<tr>
<td>Provision for slow-moving, obsolete and lower of cost or net realizable value inventories— net</td>
<td>292</td>
<td>1,022</td>
</tr>
<tr>
<td>Gain from disposal of property and equipment— net</td>
<td>(147)</td>
<td>(51)</td>
</tr>
<tr>
<td>Foreign exchange losses on intercompany transactions— net</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>Deferred income taxes</td>
<td>(199)</td>
<td>—</td>
</tr>
<tr>
<td>Changes in assets and liabilities, excluding effects of foreign currency translation adjustments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in accounts receivable</td>
<td>2</td>
<td>1,452</td>
</tr>
<tr>
<td>Decrease in net investment in sales-type leases</td>
<td>269</td>
<td>185</td>
</tr>
<tr>
<td>Increase in inventories</td>
<td>(5,713)</td>
<td>(3,441)</td>
</tr>
<tr>
<td>Increase in prepaid expenses and other assets</td>
<td>(632)</td>
<td>(335)</td>
</tr>
<tr>
<td>Increase in accounts payable</td>
<td>1,514</td>
<td>195</td>
</tr>
<tr>
<td>(Decrease) increase in accrued expenses and other liabilities</td>
<td>(1,308)</td>
<td>181</td>
</tr>
<tr>
<td>Increase (decrease) in contract liabilities</td>
<td>9,281</td>
<td>(4,988)</td>
</tr>
<tr>
<td><strong>Net cash used for operating activities</strong></td>
<td>$(5,304)</td>
<td>$(11,775)</td>
</tr>
<tr>
<td><strong>Investing activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital expenditures</td>
<td>(666)</td>
<td>(1,327)</td>
</tr>
<tr>
<td>Proceeds from sale of property and equipment</td>
<td>3,186</td>
<td>98</td>
</tr>
<tr>
<td><strong>Net cash provided by (used for) investing activities</strong></td>
<td>2,520</td>
<td>(1,229)</td>
</tr>
<tr>
<td><strong>Financing activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proceeds from related party revolving credit facility</td>
<td>4,000</td>
<td>—</td>
</tr>
<tr>
<td>Payments on related party revolving credit facility</td>
<td>(4,000)</td>
<td>—</td>
</tr>
<tr>
<td>Payments on long-term debt</td>
<td>(149)</td>
<td>(142)</td>
</tr>
<tr>
<td>Proceeds from exercise of employee stock options</td>
<td>289</td>
<td>529</td>
</tr>
<tr>
<td>Taxes related to the net share settlement of equity-based awards</td>
<td>(68)</td>
<td>—</td>
</tr>
<tr>
<td>Debt issuance costs</td>
<td>—</td>
<td>(265)</td>
</tr>
<tr>
<td>Other</td>
<td>(13)</td>
<td>(17)</td>
</tr>
<tr>
<td><strong>Net cash provided by financing activities</strong></td>
<td>59</td>
<td>105</td>
</tr>
<tr>
<td>Effect of exchange rate changes on cash, cash equivalents, and restricted cash</td>
<td>(172)</td>
<td>(139)</td>
</tr>
<tr>
<td>Net change in cash, cash equivalents, and restricted cash</td>
<td>(2,897)</td>
<td>(13,038)</td>
</tr>
<tr>
<td>Cash, cash equivalents, and restricted cash at beginning of period</td>
<td>9,140</td>
<td>22,178</td>
</tr>
<tr>
<td>Cash, cash equivalents, and restricted cash at end of period</td>
<td>$6,243</td>
<td>$9,140</td>
</tr>
<tr>
<td><strong>Supplemental disclosure of cash flow information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash paid for interest</td>
<td>$222</td>
<td>$169</td>
</tr>
<tr>
<td>Cash paid for income taxes</td>
<td>$199</td>
<td>$103</td>
</tr>
<tr>
<td><strong>Supplemental disclosure of noncash investing and financing activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer of internally developed 3D printing machines from inventories to property and equipment for internal use or leasing activities</td>
<td>$2,572</td>
<td>$2,194</td>
</tr>
<tr>
<td>Transfer of internally developed 3D printing machines from property and equipment to inventories for sale</td>
<td>$1,206</td>
<td>$1,042</td>
</tr>
<tr>
<td>Property and equipment included in accounts payable</td>
<td>$71</td>
<td>$79</td>
</tr>
<tr>
<td>Property and equipment reclassified as assets held for sale</td>
<td>$—</td>
<td>$822</td>
</tr>
<tr>
<td>Property and equipment acquired through financing arrangements</td>
<td>$—</td>
<td>$14</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these consolidated financial statements.
The ExOne Company and Subsidiaries
Statement of Changes in Consolidated Stockholders’ Equity
(in thousands)

<table>
<thead>
<tr>
<th></th>
<th>Common stock</th>
<th>Additional paid-in capital</th>
<th>Accumulated deficit</th>
<th>Accumulated other comprehensive loss</th>
<th>Total stockholders' equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance at December 31, 2017</strong></td>
<td>16,125</td>
<td>$161</td>
<td>$173,718</td>
<td>$(89,186)</td>
<td>$(9,484)</td>
</tr>
<tr>
<td>Net loss</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>(12,667)</td>
<td>—</td>
</tr>
<tr>
<td>Other comprehensive loss</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>(1,573)</td>
<td>—</td>
</tr>
<tr>
<td>Effect of dissolution of ExOne Italy S.r.l.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>309</td>
</tr>
<tr>
<td>Equity-based compensation</td>
<td>—</td>
<td>—</td>
<td>968</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Exercise of employee stock options</td>
<td>67</td>
<td>1</td>
<td>528</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Common stock issued from equity incentive plan</td>
<td>42</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Balance at December 31, 2018</strong></td>
<td>16,234</td>
<td>$162</td>
<td>$175,214</td>
<td>$(101,853)</td>
<td>$(10,748)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Common stock</th>
<th>Additional paid-in capital</th>
<th>Accumulated deficit</th>
<th>Accumulated other comprehensive loss</th>
<th>Total stockholders' equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance at December 31, 2018</strong></td>
<td>16,234</td>
<td>$162</td>
<td>$175,214</td>
<td>$(101,853)</td>
<td>$(10,748)</td>
</tr>
<tr>
<td>Net loss</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>(15,095)</td>
<td>—</td>
</tr>
<tr>
<td>Other comprehensive loss</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>(735)</td>
<td>—</td>
</tr>
<tr>
<td>Equity-based compensation</td>
<td>—</td>
<td>—</td>
<td>1,416</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Exercise of employee stock options</td>
<td>40</td>
<td>1</td>
<td>288</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Taxes related to the net share settlement of equity-based awards</td>
<td>—</td>
<td>—</td>
<td>(68)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Common stock issued from equity incentive plan</td>
<td>73</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Balance at December 31, 2019</strong></td>
<td>16,347</td>
<td>$163</td>
<td>$176,850</td>
<td>$(116,948)</td>
<td>$(11,483)</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these consolidated financial statements.
Note 1. Summary of Significant Accounting Policies

Organization
The ExOne Company (“ExOne”) is a corporation organized under the laws of the state of Delaware. ExOne was formed on January 1, 2013, when The Ex One Company, LLC, a Delaware limited liability company, merged with and into a Delaware corporation, which survived and changed its name to The ExOne Company (the “Reorganization”). As a result of the Reorganization, The Ex One Company, LLC became ExOne, the common and preferred interest holders of The Ex One Company, LLC became holders of common stock and preferred stock, respectively, of ExOne and the subsidiaries of The Ex One Company, LLC became the subsidiaries of ExOne. The consolidated financial statements include the accounts of ExOne and its wholly-owned subsidiaries, ExOne Americas LLC (United States); ExOne GmbH (Germany); ExOne Property GmbH (Germany); ExOne KK (Japan); and through December 2018, ExOne Italy S.r.l. (Italy). Collectively, the consolidated group is referred to as the “Company”.

On December 28, 2018, the Company completed a dissolution of its ExOne Italy S.r.l. (Italy) subsidiary. The purpose of this dissolution was to further simplify the Company’s legal structure. There were no significant tax-related impacts associated with the dissolution of this subsidiary. Refer to Note 3 for further discussion related to certain foreign exchange impacts associated with the dissolution of ExOne Italy S.r.l (Italy).

The Company filed a registration statement on Form S-3 (No. 333-223690) with the Securities and Exchange Commission (“SEC”) on March 15, 2018. The purpose of the Form S-3 was to register, among other securities, debt securities. Subsidiaries of the Company are co-registrants with the Company (“Subsidiary Guarantors”), and the registration statement registered guarantees of debt securities by one or more of the Subsidiary Guarantors. The Subsidiary Guarantors are 100% owned by the Company and any guarantees by the Subsidiary Guarantors will be full and unconditional. There have been no transactions undertaken subject to the Form S-3 since its initial filing.

Basis of Presentation
The consolidated financial statements of the Company are prepared in conformity with accounting principles generally accepted in the United States of America (“GAAP”). All material intercompany transactions and balances have been eliminated in consolidation.

Use of Estimates
The preparation of these consolidated financial statements requires the Company to make certain judgments, estimates and assumptions regarding uncertainties that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure of contingent assets and liabilities. Areas that require significant judgments, estimates and assumptions include accounting for accounts receivable (including the allowance for doubtful accounts); inventories (including the allowance for slow-moving and obsolete inventories); product warranty reserves; contingencies; income taxes (including the valuation allowance on certain deferred tax assets and liabilities for uncertain tax positions); equity-based compensation (including the valuation of certain equity-based compensation awards issued by the Company); and testing for impairment of long-lived assets (including the identification of asset groups by management, estimates of future cash flows of identified asset groups and fair value estimates used in connection with assessing the valuation of identified asset groups). The Company bases its estimates on historical experience and on various other assumptions that are believed to be reasonable, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

38
For the Company to qualify for recognition as a completed sale, within one year; the long-lived asset (asset group) is expected to qualify for recognition as a completed sale, within one year; the long-lived asset (asset group) is available for immediate sale in its present condition subject only to terms that are usual and customary for such long-lived assets (asset groups); an active program to locate a buyer and other actions required to complete the plan to sell the long-lived asset (asset group) have been initiated; the sale of the long-lived asset (asset group) is probable, and transfer of the long-lived asset (asset group) is expected to qualify for recognition as a completed sale, within one year; the long-lived asset (asset group) is being actively marketed for sale at a price that is reasonable in relation to its current fair value; and actions required to complete the plan indicate that it is unlikely that significant changes to the plan will be made or that the plan will be withdrawn.

Cash, Cash Equivalents, and Restricted Cash
The Company considers all highly liquid instruments with maturities when purchased of three months or less to be cash equivalents. The Company’s policy is to invest cash in excess of short-term operating and debt-service requirements in such cash equivalents. These instruments are stated at cost, which approximates fair value because of the short maturity of the instruments. The Company maintains cash balances with financial institutions located in the United States, Germany and Japan. The Company places its cash with high quality financial institutions and believes its risk of loss is limited; however, at times, account balances may exceed international and federally insured limits. The Company has not experienced any losses associated with these cash balances. Restricted cash includes any cash balance held by the Company subject to restriction on withdrawal or use.

Inventories
The Company values all of its inventories at the lower of cost, as determined on the first-in, first-out method or net realizable value. Overhead is allocated to work in process and finished goods based upon normal capacity of the Company’s production facilities. Fixed overhead associated with production facilities that are being operated below normal capacity are recognized as a period expense rather than being capitalized as a product cost. An allowance for slow-moving and obsolete inventories is provided based on historical consumption experience, anticipated product demand and product design changes. These provisions reduce the cost basis of the respective inventories and are recorded as a charge to cost of sales.

Property and Equipment
Property and equipment are recorded at cost and depreciated on a straight-line basis over the estimated useful lives of the related assets, generally three to forty years. Leasehold improvements are amortized on a straight-line basis over the shorter of their estimated useful lives or the estimated or contractual lives of the related leases. Gains or losses from the sale of assets are recognized upon disposal or retirement of the related assets. Repairs and maintenance are charged to expense as incurred.

The Company evaluates long-lived assets held and used for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets (asset group) may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets (asset group) to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets (asset group) exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is calculated as the excess of carrying value of assets (asset group) over their fair value. The determination of what constitutes an asset group, the associated undiscounted net cash flows, the fair value of assets (asset group) and the estimated useful lives of assets require significant judgments and estimates by management. No impairment loss related to held and used assets was recorded by the Company during 2019 or 2018.

The Company evaluates long-lived assets held for sale for impairment when the associated long-lived asset (asset group) is first determined to meet the held for sale criteria and in each reporting period thereafter until a disposal is executed or a change in plan occurs. A long-lived asset (asset group) is first determined to meet the held for sale criteria when: management, having the authority to approve the action, commits to a plan to sell the long-lived asset (asset group); the long-lived asset (asset group) is available for immediate sale in its present condition subject only to terms that are usual and customary for sales of such long-lived assets (asset groups); an active program to locate a buyer and other actions required to complete the plan to sell the long-lived asset (asset group) have been initiated; the sale of the long-lived asset (asset group) is probable, and transfer of the long-lived asset (asset group) is expected to qualify for recognition as a completed sale, within one year; the long-lived asset (asset group) is being actively marketed for sale at a price that is reasonable in relation to its current fair value; and actions required to complete the plan indicate that it is unlikely that significant changes to the plan will be made or that the plan will be withdrawn.

39
Income Taxes
The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision for income taxes represents income taxes paid or payable (or received or receivable) for the current year plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid and result from differences between the financial and tax bases of assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted. Valuation allowances are established when necessary to reduce deferred tax assets to the amount expected to be realized.

The Company’s foreign subsidiaries are taxed as corporations under the taxing regulations of those respective countries. As a result, the accompanying statement of consolidated operations and comprehensive loss includes a provision for income taxes related to these foreign jurisdictions. Any undistributed earnings are intended to be permanently reinvested in the respective subsidiaries, with the exception of ExOne Property GmbH. The deferred taxes on the outside basis difference of the Company’s investment in ExOne Property GmbH were not significant at December 31, 2019.

The Company recognizes the income tax benefit from an uncertain tax position only if it is more likely than not that the income tax position will be sustained on examination by the taxing authorities based upon the technical merits of the position. The income tax benefits recognized in the consolidated financial statements from such positions are then measured based upon the largest amount that has a greater than 50% likelihood of being realized upon settlement. Income tax benefits that do not meet the more likely than not criteria are recognized when effectively settled, which generally means that the statute of limitations has expired or that the appropriate taxing authority has completed its examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related income tax benefits are recognized.

Taxes on Revenue Producing Transactions
Taxes assessed by governmental authorities on revenue producing transactions, including sales, excise, value added and use taxes, are recorded on a net basis (excluded from revenue) in the accompanying statement of consolidated operations and comprehensive loss.

Research and Development
The Company is involved in research and development of new methods and technologies relating to its products. Research and development expenses are charged to operations as they are incurred. The Company capitalizes the cost of certain materials, equipment and facilities that have alternative future uses in research and development projects or otherwise.

Advertising
Advertising costs are charged to expense as incurred, and were not significant for 2019 or 2018.

Defined Contribution Plan
The Company sponsors a defined contribution savings plan under section 401(k) of the Internal Revenue Code. Under the plan, participating employees in the United States may elect to defer a portion of their pre-tax earnings, up to the Internal Revenue Service’s annual contribution limit. During 2019 and 2018, the Company made discretionary matching contributions of 50% of the first 8% of employee contributions, subject to certain Internal Revenue Service limitations. Discretionary matching contributions made by the Company during 2019 and 2018 were $304 and $320, respectively.

Equity-Based Compensation
The Company recognizes compensation expense for equity-based grants using the straight-line attribution method in which the expense is recognized ratably over the requisite service period based on the grant date fair value of the related award. Forfeitures of pre-vesting equity-based grants are recognized as they are incurred and result in an offset to equity-based compensation expense in the period of recognition. Fair value of equity-based awards is estimated on the date of grant using the Black-Scholes option pricing model.

Recently Adopted Accounting Guidance
On January 1, 2019, the Company adopted FASB ASU 2014-09, “Revenue from Contracts with Customers.” This ASU created a comprehensive framework for all entities in all industries to apply in the determination of when to recognize revenue and, therefore, supersedes virtually all existing revenue recognition requirements and guidance. This framework is expected to provide a consistent and comparable methodology for revenue recognition. The core principle of the guidance is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. To achieve this principle, an entity should apply the following steps: identify the contract(s) with a customer, identify the performance obligations in the contract(s), determine the transaction price, allocate the transaction price to the performance obligations in the contract(s), and recognize revenue when, or as, the entity satisfies a performance obligation. The Company adopted this guidance using the modified retrospective approach. Revenue from the Company’s sale of three-dimensional (“3D”) printing machines and 3D printed and other products, materials and services continues to generally be recognized when the related machines, products or materials are delivered or accepted by the Company’s customers or as the related services are performed by the Company. As such, the adoption of this guidance did not have a material impact on the Company's financial position or results of operations. The Company has included the enhanced disclosures required by this guidance in its consolidated financial statements (Note 5).
On January 1, 2019, the Company adopted FASB ASU 2016-02, “Leases.” This ASU requires lessees to recognize a right-of-use asset and lease liability on the consolidated balance sheet for leases classified as operating leases. For leases with a term of twelve months or less, a lessee is permitted to make an accounting policy election by class of underlying asset not to recognize a right-of-use asset and lease liability. Additionally, when measuring assets and liabilities arising from a lease, optional payments should be included only if the lessee is reasonably certain to exercise an option to extend the lease, exercise a purchase option, or not exercise an option to terminate the lease. A right-of-use asset represents an entity’s right to use the underlying asset for the lease term, and a lease liability represents an entity’s obligation to make lease payments. Previously, an asset and liability only were recorded for leases classified as capital leases (financing leases). The measurement, recognition, and presentation of expenses and cash flows arising from leases by a lessee remains the same. In connection with the adoption of this guidance, the Company has completed an assessment resulting in an accumulation of all of its leasing arrangements and has validated the information for accuracy and completeness. Upon adoption of the new lease guidance, management recorded a right-of-use asset and lease liability, each in the amount of approximately $400, on the Company’s consolidated balance sheet for various types of operating leases, including certain machinery and other equipment and vehicles. This amount is equivalent to the aggregate future minimum lease payments on a discounted basis. The Company has also elected to apply the package of transitional practical expedients of the new lease guidance by allowing the Company to not: (1) reassess if expired or existing contracts are, or contain, leases; (2) reassess lease classification for any expired or existing leases; and (3) reassess initial direct costs for any existing leases. Additionally, in July 2018, the FASB issued guidance to provide for an additional transition method to the new lease guidance, whereby an entity can choose to not reflect the impact of the new lease guidance in the prior periods included in its consolidated financial statements. The Company has utilized this additional transition method in connection with its adoption on January 1, 2019. The Company has included the enhanced disclosures required by this guidance in its consolidated financial statements (Note 13).

On January 1, 2019, the Company adopted FASB ASU 2016-15, “Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments.” This ASU is intended to reduce diversity in practice in how certain cash receipts and payments are presented and classified in the statement of consolidated cash flows. The standard provides guidance in a number of situations including, among others, settlement of zero-coupon bonds, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims, and distributions received from equity method investees. The ASU also provides guidance for classifying cash receipts and payments that have aspects of more than one class of cash flows. The adoption of this ASU did not have an effect on the consolidated financial statements of the Company.

Recently Issued Accounting Guidance

The Company considers the applicability and impact of all ASUs issued by the FASB. Recently issued ASUs not listed below either were assessed and determined to be not applicable or are currently expected to have no impact on the consolidated financial statements of the Company.

In June 2016, the FASB issued ASU 2016-13, “Financial Instruments – Credit Losses.” This ASU added a new impairment model (known as the current expected credit loss (“CECL”) model) that is based on expected losses rather than incurred losses. Under the new guidance, an entity recognizes an allowance its estimate of expected credit losses. The CECL model applies to most debt instruments, trade receivables, lease receivables, financial guarantee contracts, and other loan commitments. The CECL model does not have a minimum threshold for recognition of impairment losses and entities will need to measure expected credit losses on assets that have a low risk of loss. As a smaller reporting company pursuant to Rule 12b-2 of the Securities Exchange Act of 1934, as amended, these changes become effective for the Company on January 1, 2023. Management is currently evaluating the potential impact of these changes on the consolidated financial statements of the Company.

Note 2. Liquidity

The Company has incurred a net loss in each of its annual periods since its inception. As shown in the accompanying statement of consolidated operations and comprehensive loss, the Company incurred a net loss of $15,095 and $12,667 for 2019 and 2018, respectively. At December 31, 2019, the Company had $5,265 in unrestricted cash and cash equivalents.

Since its inception, the Company has received cumulative unrestricted net proceeds from the sale of its common stock (through its initial public offering and subsequent secondary offerings) of $168,361 to fund its operations.

In March 2018, the Company entered into a three-year, $15,000 revolving credit facility with a related party (Note 15) to provide additional funding for working capital and general corporate purposes. At December 31, 2019, there were no amounts outstanding under the related party revolving credit facility.

In February 2020, following completion of a sale-leaseback transaction associated with the Company’s European headquarters and operating facility in Gersthofer, Germany (further described below), the Company entered into an amendment to its related party revolving credit facility agreement (Note 24) which reduced the amount available under the related party revolving credit facility to $10,000 and extended the term of the related party revolving credit facility through March 2024, among other changes.
In June 2018, the Company initiated the 2018 global cost realignment program focused on a reduction in the Company’s production overhead costs and operating expenses in an effort to drive efficiency in its operations and preserve capital. Actions associated with this program were completed in December 2018.

In February 2020, the Company completed a sale and leaseback of its European headquarters and operating facility in Gersthofen, Germany (Note 24). This transaction resulted in unrestricted net proceeds to the Company of approximately $18,500 (of which approximately $2,200 was received during 2019) to provide additional funding for working capital and general corporate purposes.

Management believes that the Company’s existing capital resources will be sufficient to support the Company’s operating plan. If management anticipates that the Company’s actual results will differ from its operating plan, management believes it has sufficient capabilities to enact cost savings measures to preserve capital. The Company may also seek to raise additional capital to support its growth through additional debt, equity or other alternatives (including asset sales) or a combination thereof.

**Note 3. Accumulated Other Comprehensive Loss**

The following table summarizes changes in the components of accumulated other comprehensive loss for the periods indicated:

<table>
<thead>
<tr>
<th>For the years ended December 31,</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign currency translation adjustments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance at beginning of period</td>
<td>$(10,748)</td>
<td>$(9,484)</td>
</tr>
<tr>
<td>Other comprehensive loss before recclassifications</td>
<td>$(735)</td>
<td>$(1,573)</td>
</tr>
<tr>
<td>Amounts reclassified from accumulated other comprehensive loss</td>
<td>—</td>
<td>309</td>
</tr>
<tr>
<td>Balance at end of period</td>
<td>$(11,483)</td>
<td>$(10,748)</td>
</tr>
</tbody>
</table>

Foreign currency translation adjustments consist of the effect of translation of functional currency financial statements (denominated in the euro and Japanese yen) to the reporting currency of the Company (United States dollar) and certain long-term intercompany transactions between subsidiaries for which settlement is not planned or anticipated in the foreseeable future. For 2018, foreign currency translation adjustments also included $245 in a foreign exchange loss recognized in connection with the settlement of an intercompany note payable with ExOne Italy S.r.l. previously identified as a long-term investment in the subsidiary (Note 1) and $64 associated with the dissolution of the related subsidiary (both amounts recognized in other (income) expense – net in the accompanying statement of consolidated operations and comprehensive loss). There were no tax impacts associated with such reclassifications.

Other than the amounts identified above, no amounts were reclassified to earnings for any of the periods presented. There were no tax impacts related to income tax rate changes for any of the periods presented.

**Note 4. Loss Per Share**

The Company presents basic and diluted loss per common share amounts. Basic loss per common share is calculated by dividing net loss available to common stockholders by the weighted average number of common shares outstanding during the applicable period. Diluted loss per share is calculated by dividing net loss available to common stockholders by the weighted average number of common shares and common equivalent shares outstanding during the applicable period.

As the Company incurred a net loss during 2019 and 2018, basic average common shares outstanding and diluted average common shares outstanding were the same because the effect of potential shares of common stock, including stock options (854,259 — 2019 and 621,986 — 2018) and unvested restricted stock issued (66,513 — 2019 and 67,001 — 2018), was anti-dilutive.

The information used to compute basic and diluted net loss per common share was as follows for the periods indicated:

<table>
<thead>
<tr>
<th>For the years ended December 31,</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net loss</td>
<td>$(15,095)</td>
<td>$(12,667)</td>
</tr>
<tr>
<td>Weighted average shares outstanding (basic and diluted)</td>
<td>16,309,259</td>
<td>16,176,415</td>
</tr>
<tr>
<td>Net loss per common share:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>$(0.93)</td>
<td>$(0.78)</td>
</tr>
<tr>
<td>Diluted</td>
<td>$(0.93)</td>
<td>$(0.78)</td>
</tr>
</tbody>
</table>
Note 5. Revenue

The Company derives revenue from the sale of 3D printing machines and 3D printed and other products, materials and services. Revenue is recognized when the Company satisfies its performance obligation(s) under a contract (either implicit or explicit) by transferring the promised product or service to a customer either when (or as) the customer obtains control of the product or service. A performance obligation is a promise in a contract to transfer a distinct product or service to a customer. A contract’s transaction price is allocated to each distinct performance obligation.

Revenue is measured as the amount of consideration the Company expects to receive in exchange for transferring products or providing services. As such, revenue is recorded net of returns, allowances, customer discounts, and incentives. Sales, value add, and other taxes collected from customers and remitted to governmental authorities are accounted for on a net (excluded from revenue) basis. Shipping and handling costs are included in cost of sales.

Certain of the Company’s contracts with customers provide for multiple performance obligations. Sales of 3D printing machines may also include optional equipment, materials, replacement components and services (installation, training and other services, including maintenance services and/or an extended warranty). Certain other contracts have a single performance obligation, as the promise to transfer products or services is not separately identifiable from other promises in the contract and, therefore, not distinct. For contracts with multiple performance obligations, the Company allocates the contract’s transaction price to each performance obligation using the Company’s best estimate of stand-alone selling price for each distinct product or service in the contract, which is generally based on an observable price.

The Company’s revenue from products is transferred to customers at a point in time. The Company’s contracts for 3D printing machines generally include substantive customer acceptance provisions. Revenue under these contracts is recognized when customer acceptance provisions have been satisfied. For all other product sales, the Company recognizes revenue at the point in time in which the customer obtains control of the product, which is generally when product title passes to the customer upon delivery. In limited cases, title does not transfer and revenue is not recognized until the customer has received the products at its physical location.

The Company’s revenue from service arrangements includes deferred maintenance contracts and extended warranties that can be purchased at the customer’s option. The Company generally provides a standard one-year warranty on the Company’s 3D printing machines, which is considered an assurance type warranty, and not considered a separate performance obligation (Note 12). Revenue associated with deferred maintenance contracts is generally recognized at a point in time when the related services are performed where sufficient historical evidence indicates that the costs of performing the related services under the contract are not incurred on a straight-line basis, with such revenue recognized in proportion to the costs expected to be incurred. Revenue associated with extended warranties is generally recognized over time on a straight-line basis over the related contract period.

The Company’s revenue from service arrangements includes contracts with the federal government under fixed-fee, cost reimbursable and time and materials arrangements (certain of which may have periods of performance greater than one year). Revenue under these contracts is generally recognized over time using an input measure based upon labor hours incurred and provisional rates provided under the contracts. As such, the nature of these contracts may give rise to variable consideration, primarily based upon completion of the Company’s annual Incurred Cost Submission filing as required by the federal government. Historically, amounts associated with variable consideration have not been significant.

The Company’s revenue from service arrangements includes certain research and development services. Revenue under research and development service contracts is generally recognized over time using an output measure, specifically units or parts delivered, based upon certain customer acceptance and delivery requirements. Revenue recognized over time using an output measure is not significant.

The following table summarizes the Company’s revenue by product group for the periods indicated:

<table>
<thead>
<tr>
<th>For the years ended December 31,</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D printing machines</td>
<td>$27,232</td>
<td>$36,393</td>
</tr>
<tr>
<td>3D printed and other products, materials and services</td>
<td>$26,044</td>
<td>$28,251</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$53,276</strong></td>
<td><strong>$64,644</strong></td>
</tr>
</tbody>
</table>

Revenue from 3D printing machines includes leasing revenue whereby the Company is the lessor of 3D printing machines to its customers. Leasing revenue is accounted for under ASU 2016-02 (Note 13).

The timing of revenue recognition, billings and cash collections results in billed receivables, unbilled receivables (contract assets) and deferred revenue and customer prepayments (contract liabilities) in the accompanying condensed consolidated balance sheet. The Company considers a number of factors in its evaluation of the creditworthiness of its customers, including past due amounts, past payment history, and current economic conditions. For 3D printing machines, the Company’s terms of sale vary by transaction. To reduce credit risk in connection with 3D printing machine sales, the Company may, depending upon the circumstances, require customers to furnish letters of credit or bank guarantees or to provide advanced payment (either partial or in full). For 3D printed and other products and materials, the Company’s terms of sale generally require payment within 30 to 60 days after delivery, although the Company also recognizes that longer payment periods are customary in certain countries where it transacts business. Service arrangements are generally billed in accordance with specific contract terms and are typically billed in advance or in proportion to performance of the related services. There were no other significant changes in contract liabilities during 2019. Contract assets are not significant.
assets held and used requires significant judgments and estimates by management. 

During the three months ended December 31, 2019, as a result of continued operating losses and cash flow deficiencies, the Company identified a triggering event requiring a test for the recoverability of long-lived assets held and used at the asset group level. Assessing the recoverability of long-lived assets held and used requires significant judgments and estimates by management.

Note 7. Impairment

Houston, Texas

In August 2018, the Company committed to a plan to consolidate certain of its 3D printing operations from its Houston, Texas facility into its Troy, Michigan facility. These actions were taken as part of the Company’s efforts to optimize its business model and maximize its facility utilization. During 2018, the Company recorded a charge of $28 split between cost of sales ($15) and selling, general and administrative expense ($13) associated with involuntary employee terminations related to this plan. During 2018, the Company recorded an additional charge of $1 (to cost of sales) associated with asset impairments related to this plan. There are no additional charges expected to be incurred associated with this plan in future periods. The Company settled all amounts associated with involuntary employee terminations during 2018.

In connection with the Company’s exit of its Houston, Texas facility, the Company reclassified $822 in property and equipment (principally land and building) associated with certain long-lived assets meeting required criteria as held for sale (included in prepaid expenses and other current assets in the accompanying consolidated balance sheet at December 31, 2018). During the three months ended December 31, 2019, the Company sold this property and equipment to a third party, resulting in net proceeds to the Company of $967 and a gain from disposal of property and equipment of $145 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss).

Desenzano del Garda, Italy

In December 2017, the Company committed to a plan to consolidate certain of its 3D printing operations from its Desenzano del Garda, Italy facility into its Gersthofen, Germany facility. These actions were taken as part of the Company’s efforts to optimize its business model and maximize its facility utilization. During 2018, the Company recorded charges of $250 associated with other exit costs ($17) and asset impairments ($241) related to this plan. In addition, during 2018, the Company recorded a gain from disposal of property and equipment of $51 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss). Charges associated with other exit costs recorded during 2018 were recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss. Charges associated with asset impairments recorded during 2018 were recorded to cost of sales as a component of depreciation expense in the accompanying statement of consolidated operations and comprehensive loss. Other exit costs relate to the remaining facility rent due under a non-cancellable operating lease following the cessation of operations at the facility in January 2018. Asset impairment charges relate to certain leasehold improvements associated with the exited facility and other equipment which was abandoned by the Company. There are no additional charges expected to be incurred associated with this plan in future periods. The Company settled all amounts associated with involuntary employee terminations and facility rentals during 2018.

Note 7. Impairment

During the three months ended December 31, 2019, as a result of continued operating losses and cash flow deficiencies, the Company identified a triggering event requiring a test for the recoverability of long-lived assets held and used at the asset group level. Assessing the recoverability of long-lived assets held and used requires significant judgments and estimates by management.
For purposes of testing long-lived assets for recoverability, the Company operates as three separate asset groups: United States, Europe and Japan. In assessing the recoverability of long-lived assets held and used, the Company determined the carrying amount of long-lived assets held and used to be in excess of the estimated future undiscounted net cash flows of the related assets. The Company proceeded to determine the fair value of its long-lived assets held and used, principally through use of the market approach. The Company’s use of the market approach included consideration of market transactions for comparable assets. Management concluded that the fair value of long-lived assets held and used exceeded their carrying value and, as such, no impairment loss was recorded.

A significant decrease in the market price of a long-lived asset, adverse change in the use or condition of a long-lived asset, adverse change in the business climate or legal or regulatory factors impacting a long-lived asset and continued operating losses and cash flow deficiencies associated with a long-lived asset, among other indicators, could cause a future assessment to be performed which may result in an impairment of long-lived assets held and used, resulting in a material adverse effect on the financial position and results of operations of the Company.

**Note 8. Cash, Cash Equivalents, and Restricted Cash**

The following provides a reconciliation of cash, cash equivalents, and restricted cash as reported in the accompanying consolidated balance sheet to the same such amounts shown in the accompanying statement of consolidated cash flows at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and cash equivalents</td>
<td>$5,265</td>
<td>$7,592</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>978</td>
<td>1,548</td>
</tr>
<tr>
<td><strong>Cash, cash equivalents, and restricted cash</strong></td>
<td><strong>$6,243</strong></td>
<td><strong>$9,140</strong></td>
</tr>
</tbody>
</table>

Restricted cash at December 31, 2019 and 2018 includes $470 and $1,044, respectively, associated with cash collateral required by a German bank for short-term financial guarantees issued by ExOne GmbH in connection with certain commercial transactions requiring security (Note 14).

Refer to Note 24 for further discussion related to an amendment to this cash collateral requirement effective in February 2020.

Restricted cash at December 31, 2019 and 2018 includes $508 and $504, respectively, associated with cash collateral required by a United States bank to offset certain short-term, unsecured lending commitments associated with the Company’s corporate credit card program. Each of the balances described are considered legally restricted by the Company.

**Note 9. Inventories**

Inventories consisted of the following at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials and components</td>
<td>$8,841</td>
<td>$7,747</td>
</tr>
<tr>
<td>Work in process</td>
<td>4,922</td>
<td>5,147</td>
</tr>
<tr>
<td>Finished goods</td>
<td>6,007</td>
<td>3,036</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$19,770</strong></td>
<td><strong>$15,930</strong></td>
</tr>
</tbody>
</table>

Raw materials and components consist of consumable materials and component parts and subassemblies associated with 3D printing machine manufacturing and support activities. Work in process consists of 3D printing machines and other products in varying stages of completion. Finished goods consist of 3D printing machines and other products prepared for sale in accordance with customer specifications.

At December 31, 2019 and 2018, the allowance for slow-moving and obsolete inventories was $3,443 and $4,143, respectively, and has been reflected as a reduction to inventories (principally raw materials and components). The following table summarizes changes in the allowance for slow-moving and obsolete inventories for the periods indicated:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance at beginning of period</strong></td>
<td>$4,143</td>
<td>$3,437</td>
</tr>
<tr>
<td>Provision for slow-moving and obsolete inventories—net</td>
<td>292</td>
<td>993</td>
</tr>
<tr>
<td>Reductions for physical disposal (sale or scrap) of previously reserved amounts</td>
<td>(914)</td>
<td>(138)</td>
</tr>
<tr>
<td>Foreign currency translation adjustments</td>
<td>(78)</td>
<td>(149)</td>
</tr>
<tr>
<td><strong>Balance at end of period</strong></td>
<td><strong>$3,443</strong></td>
<td><strong>$4,143</strong></td>
</tr>
</tbody>
</table>
During 2018, the Company recorded a charge of $561 to cost of sales in the accompanying statement of consolidated operations and comprehensive loss attributable to certain industrial microwave inventories based on a sustained absence of demand for such curing solutions and a decision by the Company to discontinue future manufacturing of such industrial microwaves.

During 2018, the Company recorded net charges of $29 to cost of sales in the accompanying statement of consolidated operations and comprehensive loss associated with certain raw materials and components and work in process inventories for which cost was determined to exceed net realizable value. There were no such net charges recorded during 2019.

**Note 10. Property and Equipment**

Property and equipment consisted of the following at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
<th>Economic Life (in years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>$6,980</td>
<td>$7,024</td>
<td>N/A</td>
</tr>
<tr>
<td>Buildings and related improvements</td>
<td>25,675</td>
<td>25,895</td>
<td>5 - 40</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>19,531</td>
<td>20,667</td>
<td>3 - 20</td>
</tr>
<tr>
<td>Other</td>
<td>7,086</td>
<td>7,121</td>
<td>3 - 20</td>
</tr>
<tr>
<td>Less: Accumulated depreciation</td>
<td>(21,478)</td>
<td>(19,306)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>37,794</td>
<td>41,401</td>
<td></td>
</tr>
<tr>
<td>Construction-in-progress</td>
<td>1,101</td>
<td>505</td>
<td></td>
</tr>
<tr>
<td>Property and equipment– net</td>
<td>$38,895</td>
<td>$41,906</td>
<td></td>
</tr>
</tbody>
</table>

Machinery and equipment includes assets leased by the Company of $63 and $101 at December 31, 2019 and 2018, respectively.

Machinery and equipment includes assets leased to customers (principally 3D printing machines and related equipment) under operating lease arrangements of $1,309 and $2,345 at December 31, 2019 and 2018, respectively. The carrying value of these assets was $426 and $1,264 at December 31, 2019 and 2018, respectively.

Depreciation expense was $4,581 and $5,439 for 2019 and 2018, respectively. During 2018, the Company recorded $64 in amortization expense related to intangible assets associated with a 2014 acquisition. Such intangible assets had no net book value at December 31, 2019 or 2018. There was no amortization expense recorded during 2019.

Refer to Note 24 for further discussion related to a sale-leaseback transaction associated with the Company’s European headquarters and operating facility in Gersthofen, Germany completed in February 2020 and the related impact expected on property and equipment during the three months ending March 31, 2020.

**Note 11. Accrued Expenses and Other Current Liabilities**

Accrued expenses and other current liabilities consisted of the following at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposit liability on sale of property and equipment</td>
<td>$2,243</td>
<td>$ —</td>
</tr>
<tr>
<td>Accrued payroll and related costs</td>
<td>1,382</td>
<td>1,895</td>
</tr>
<tr>
<td>Accrued license fees</td>
<td>1,020</td>
<td>721</td>
</tr>
<tr>
<td>Product warranty reserves</td>
<td>866</td>
<td>1,670</td>
</tr>
<tr>
<td>Income taxes payable</td>
<td>503</td>
<td>90</td>
</tr>
<tr>
<td>Accrued professional fees</td>
<td>272</td>
<td>215</td>
</tr>
<tr>
<td>Liability for uncertain tax positions</td>
<td>—</td>
<td>820</td>
</tr>
<tr>
<td>Other</td>
<td>814</td>
<td>638</td>
</tr>
<tr>
<td></td>
<td>$7,100</td>
<td>$6,049</td>
</tr>
</tbody>
</table>

**Note 12. Product Warranty Reserves**

Substantially all of the Company’s 3D printing machines are covered by a standard twelve-month warranty. Generally, at the time of sale, a liability is recorded (with an offset to cost of sales) based upon the expected cost of replacement parts and labor to be incurred over the life of the standard warranty. Expected cost is estimated using historical experience for similar products. The Company periodically assesses the adequacy of the product warranty reserves based on changes in these factors and records any necessary adjustments if actual experience indicates that adjustments are necessary. Future claims experience could be materially different from prior results because of the introduction of new, more complex products, a change in the Company’s warranty policy in response to industry trends, competition or other external forces, or manufacturing changes that could impact product quality. In the event that the Company determines that its current or future product repair and replacement costs exceed estimates, an adjustment to these reserves would be charged to cost of sales in the period such a determination is made.

46
The following table summarizes changes in product warranty reserves (such amounts reflected in accrued expenses and other current liabilities in the accompanying consolidated balance sheet) for the periods indicated:

<table>
<thead>
<tr>
<th>For the year ended December 31,</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning of period</td>
<td>$1,670</td>
<td>$1,300</td>
</tr>
<tr>
<td>Provisions for new issuances</td>
<td>1,125</td>
<td>1,803</td>
</tr>
<tr>
<td>Payments</td>
<td>(1,514)</td>
<td>(960)</td>
</tr>
<tr>
<td>Reserve adjustments</td>
<td>(399)</td>
<td>(434)</td>
</tr>
<tr>
<td>Foreign currency translation adjustments</td>
<td>(16)</td>
<td>(39)</td>
</tr>
<tr>
<td>Balance at end of period</td>
<td>$866</td>
<td>$1,670</td>
</tr>
</tbody>
</table>

Note 13. Leases

Lessee

The Company leases machinery and other equipment and vehicles under operating lease arrangements (with initial terms greater than twelve months), expiring in various years through 2026. In addition, the Company leases certain equipment and vehicles under finance (previously capital) lease arrangements, which are not significant.

For all operating lease arrangements (with the exception of short-term lease arrangements), the Company presents at the commencement date: a lease liability, which is a lessee’s obligation to make lease payments arising from a lease, measured on a discounted basis; and a right-of-use asset, which is an asset that represents the lessee’s right to use, or control the use of, a specified asset for the lease term.

The Company has elected, as a practical expedient, not to separate non-lease components from lease components, and instead account for each separate component as a single lease component for all lease arrangements, as lessee. In addition, the Company has elected, as a practical expedient, not to apply lease recognition requirements to short-term lease arrangements, generally those with a lease term of less than twelve months, for all classes of underlying assets. In determining the lease term, the Company considers the likelihood of lease renewal options and lease termination provisions. As a result, lease payments under these short-term lease arrangements are recognized in the accompanying condensed statement of consolidated operations and comprehensive loss on a straight-line basis over the lease term.

The Company uses its incremental borrowing rate in determining the present value of lease payments, as the implicit rate of the lease arrangements is generally not readily determinable.

Through July 2019, certain of the Company’s operating lease arrangements were with related parties under common control (Note 21). Lease cost under operating lease agreements with related parties, included within short-term lease cost below, was $28 for 2019.

Future minimum lease payments of operating lease arrangements (with initial terms greater than twelve months) at December 31, 2019, were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>$178</td>
</tr>
<tr>
<td>2021</td>
<td>142</td>
</tr>
<tr>
<td>2022</td>
<td>117</td>
</tr>
<tr>
<td>2023</td>
<td>20</td>
</tr>
<tr>
<td>2024</td>
<td>11</td>
</tr>
<tr>
<td>Thereafter</td>
<td>470</td>
</tr>
</tbody>
</table>

Less: Present value discount (38)

Total operating lease liabilities $432

For 2019 and 2018, lease cost under operating lease arrangements was $389 (including $189 relating to short-term lease arrangements) and $235, respectively.
Supplemental information related to operating lease arrangements (with initial terms greater than twelve months) was as follows at December 31, 2019 and for the year then ended:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating lease right-of-use assets included in other noncurrent assets</td>
<td>432</td>
</tr>
<tr>
<td>Operating lease liabilities included in accrued expenses and other current liabilities</td>
<td>158</td>
</tr>
<tr>
<td>Operating lease liabilities included in other noncurrent liabilities</td>
<td>274</td>
</tr>
<tr>
<td>Right-of-use assets obtained in exchange for new operating lease liabilities</td>
<td>209</td>
</tr>
<tr>
<td>Cash paid for amounts included in the measurement of operating lease liabilities</td>
<td>198</td>
</tr>
<tr>
<td>Weighted average remaining lease term (in years)</td>
<td>3.1</td>
</tr>
<tr>
<td>Weighted average discount rate</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

Refer to Note 24 for further discussion related to a sale-leaseback transaction associated with the Company’s European headquarters and operating facility in Gersthofen, Germany completed in February 2020 and the related impact expected on right-of-use assets and operating lease liabilities during the three months ending March 31, 2020.

As previously disclosed under the prior lease accounting standard, future minimum lease payments of operating lease arrangements (with initial terms greater than twelve months) at December 31, 2018, were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>170</td>
</tr>
<tr>
<td>2020</td>
<td>111</td>
</tr>
<tr>
<td>2021</td>
<td>76</td>
</tr>
<tr>
<td>2022</td>
<td>67</td>
</tr>
<tr>
<td>2023</td>
<td>12</td>
</tr>
<tr>
<td>Thereafter</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>441</strong></td>
</tr>
</tbody>
</table>

**Lessor**

The Company leases machinery and equipment to customers (principally 3D printing machines and related equipment) under lease arrangements classified as either operating leases or sales-type leases. The Company’s operating lease arrangements have initial terms generally ranging from one to five years, certain of which may contain extension or termination clauses, or both. Such operating lease arrangements also generally include a purchase option to acquire the related machinery and equipment at the end of the lease term for either a fixed amount as determined at inception, or a subsequently negotiated fair market value. At December 31, 2019, the Company estimated that the total fair market value significantly exceeded the related net book value of the machinery and equipment held under the Company’s operating lease arrangements. The Company’s sales-type lease arrangements generally include transfer of ownership at the end of the lease term, and as such, the Company’s net investment in sale-type lease arrangements presented in the Company’s accompanying condensed consolidated balance sheet generally does not include an amount of unguaranteed residual value.

For certain of its arrangements, the Company separates and allocates (Note 5) certain non-lease components (principally maintenance services) from lease components. Sales, value add, and other taxes collected from customers and remitted to governmental authorities are accounted for on a net (excluded from lease income) basis. In determination of the lease term, the Company considers the likelihood of lease renewal options and lease termination provisions. Additionally, certain of the Company’s lease arrangements do not qualify as sale-type leases as collectability is not reasonably assured.

The Company recognized the following components under operating and sales-type lease arrangements in the accompanying statement of consolidated operations and comprehensive loss for the periods indicated:

<table>
<thead>
<tr>
<th>For the years ended December 31,</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operating</td>
<td>Sales-type</td>
</tr>
<tr>
<td>Revenue</td>
<td>$1,523</td>
<td>$—</td>
</tr>
<tr>
<td>Interest income(a)</td>
<td>$—</td>
<td>$94</td>
</tr>
</tbody>
</table>

(a) Interest income related to sales-type leases is recorded as a component of revenue in the accompanying statement of consolidated operations and comprehensive loss for each of the periods presented.
The Company’s net investment in sales-type leases consisted of the following at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future minimum lease payments receivable</td>
<td>$1,595</td>
<td>$1,969</td>
</tr>
<tr>
<td>Less: Allowance for doubtful accounts</td>
<td>(501)</td>
<td></td>
</tr>
<tr>
<td>Net future minimum lease payments receivable</td>
<td>1,094</td>
<td>1,969</td>
</tr>
<tr>
<td>Less: Unearned interest income</td>
<td>(143)</td>
<td>(316)</td>
</tr>
<tr>
<td>Net investment in sales-type leases</td>
<td>$951</td>
<td>$1,653</td>
</tr>
</tbody>
</table>

During 2019, the Company recorded a provision for bad debt of $416 based on a deterioration in credit quality of a lessee. There were no such provisions recorded during 2018.

Future minimum lease payments of non-cancellable operating and sales-type lease arrangements at December 31, 2019, were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Operating</th>
<th>Sales-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>$527</td>
<td>$424</td>
</tr>
<tr>
<td>2021</td>
<td>48</td>
<td>380</td>
</tr>
<tr>
<td>2022</td>
<td>—</td>
<td>380</td>
</tr>
<tr>
<td>2023</td>
<td>—</td>
<td>411</td>
</tr>
<tr>
<td>2024</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Thereafter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total minimum lease payments</td>
<td>$575</td>
<td>$1,595</td>
</tr>
<tr>
<td>Less: Allowance for doubtful accounts</td>
<td>(501)</td>
<td></td>
</tr>
<tr>
<td>Less: Present value discount</td>
<td>(143)</td>
<td></td>
</tr>
<tr>
<td>Future minimum lease payments receivable</td>
<td>$951</td>
<td></td>
</tr>
</tbody>
</table>

As previously disclosed under the prior lease accounting standard, minimum future rentals under non-cancellable operating and sales-type lease arrangements at December 31, 2018, were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Operating</th>
<th>Sales-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$687</td>
<td>$409</td>
</tr>
<tr>
<td>2020</td>
<td>148</td>
<td>382</td>
</tr>
<tr>
<td>2021</td>
<td>48</td>
<td>382</td>
</tr>
<tr>
<td>2022</td>
<td>—</td>
<td>382</td>
</tr>
<tr>
<td>2023</td>
<td>—</td>
<td>414</td>
</tr>
<tr>
<td>Thereafter</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>$883</td>
<td>$1,969</td>
</tr>
</tbody>
</table>

Note 14. Contingencies and Commitments

**Contingencies**

On March 1, 2018, the Company’s ExOne GmbH subsidiary notified Voxeljet AG that it has materially breached a 2003 Patent and Know-How Transfer Agreement and asserted its rights to set-off damages as a result of the breaches against the annual license fee due by the Company under the agreement. At this time, the Company cannot reasonably estimate a contingency, if any, related to this matter.

The Company is subject to various litigation, claims, and proceedings which have been or may be instituted or asserted from time to time in the ordinary course of business. Management does not believe that the outcome of any pending or threatened matters will have a material adverse effect, individually or in the aggregate, on the financial position, results of operations or cash flows of the Company.

**Financial Guarantees and Letters of Credit**

In the normal course of its operations, ExOne GmbH issues financial guarantees and letters of credit to third parties in connection with certain commercial transactions requiring security. ExOne GmbH maintains a credit facility agreement with a German bank (the “GmbH Credit Agreement”) which provides for various short-term financings in the form of overdraft credit, financial guarantees, letters of credit and collateral security for commercial transactions for approximately $1,400 (€1,300). In addition, ExOne GmbH may use the GmbH Credit Agreement for short-term, fixed-rate loans in minimum increments of approximately $100 (€100) with minimum terms of at least thirty days. The overdraft credit interest rate is fixed at 10.2% while the interest rate associated with commercial transactions requiring security (financial guarantees, letters of credit or collateral security) is fixed at 1.75%. The GmbH
Credit Agreement has an indefinite term and is subject to cancellation by either party at any time upon repayment of amounts outstanding or expiration of commercial transactions requiring security. There is no commitment fee associated with the GmbH Credit Agreement. Financial guarantees and letters of credit issued under the GmbH Credit Agreement require cash collateral equal to the related contract amount (Note 8). There are no negative covenants associated with the GmbH Credit Agreement. The GmbH Credit Agreement has been guaranteed by the Company. At December 31, 2019 and 2018, there were no outstanding borrowings in the form of overdraft credit or short-term loans under the GmbH Credit Agreement. At December 31, 2019, total outstanding financial guarantees and letters of credit issued by ExOne GmbH under the GmbH Credit Agreement were $470 ($419) with expiration dates ranging from February 2020 through December 2021. At December 31, 2018, total outstanding guarantees and letters of credit issued by ExOne GmbH under the GmbH Credit Agreement were $1,044 ($912).

In addition to amounts issued by ExOne GmbH under the GmbH Credit Agreement, from time to time, ExOne GmbH enters into separate agreements with the same German bank for additional capacity for financial guarantees and letters of credit associated with certain commercial transactions requiring security. Terms of the separate agreements are substantially similar to those of the GmbH Credit Agreement. At December 31, 2019 and 2018, ExOne GmbH had a singular financial guarantee outstanding under a separate agreement for $90 ($80) and $96 ($80), respectively, with an expiration date of February 2023. Related to this separate agreement, the requirement for cash collateral was waived by the German bank as it also represents the counterparty in the related transaction.

Refer to Note 24 for further discussion related to an amendment and replacement of the GmbH Credit Agreement completed in February 2020.

**Note 15. Related Party Revolving Credit Facility**

On March 12, 2018, ExOne and its ExOne Americas LLC and ExOne GmbH subsidiaries, as guarantors (collectively, the “Loan Parties”), entered into a Credit Agreement and related ancillary agreements with LBM Holdings, LLC (“LBM”), a company controlled by S. Kent Rockwell, who was the Executive Chairman of the Company (a related party) at such date and is currently Chairman of the Board of Directors (the “Board”) of the Company, relating to a $15,000 revolving credit facility (the “LBM Credit Agreement”) to provide additional funding for working capital and general corporate purposes. The LBM Credit Agreement provided a credit facility for a term of three years (through March 12, 2021) bearing interest at a rate of one month LIBOR plus an applicable margin of 500 basis points (6.5% and 7.5% at December 31, 2019 and 2018, respectively). The LBM Credit Agreement required a commitment fee of 75 basis points, or 0.75%, on the unused portion of the facility, payable monthly in arrears. In addition, an up-front commitment fee of 125 basis points, or 1.25% ($188), was required at closing. Borrowings under the LBM Credit Agreement were collateralized by the accounts receivable, inventories and machinery and equipment of the Loan Parties. At December 31, 2019 and 2018, the total carrying value of collateral was approximately $31,000 and $30,000, respectively. At December 31, 2019 and 2018, the total estimated fair value of collateral significantly exceeded the maximum borrowing capacity under the LBM Credit Agreement. Borrowings under the LBM Credit Agreement are required to be in minimum increments of $1,000. ExOne may terminate or reduce the credit commitment at any time during the term of the LBM Credit Agreement without penalty. ExOne may also make prepayments against outstanding borrowings under the LBM Credit Agreement at any time without penalty.

The LBM Credit Agreement contains several affirmative covenants including prompt payment of liabilities and taxes; maintenance of insurance, properties, and licenses; and compliance with laws. The LBM Credit Agreement also contains several negative covenants including restricting the incurrence of certain additional debt; prohibiting future liens (other than permitted liens); prohibiting investment in third parties; limiting the ability to pay dividends; limiting mergers, acquisitions, and dispositions; and limiting the sale of certain property and equipment of the Loan Parties. The LBM Credit Agreement also contains events of default, including, but not limited to, cross-default to certain other debt, breaches of representations and warranties, change of control events and breaches of covenants.

LBM was determined to be a related party based on common control by S. Kent Rockwell. Accordingly, the Company does not consider the LBM Credit Agreement indicative of a fair market value lending. Prior to execution, the LBM Credit Agreement was reviewed and approved by the Audit Committee of the Board and subsequently by a sub-committee of independent members of the Board. At the time of execution of the LBM Credit Agreement, the $15,000 in available loan proceeds was deposited into an escrow account with an unrelated, third party financial institution acting as escrow agent pursuant to a separate Escrow Agreement by and among the parties. Loan proceeds held in escrow are available to the Company upon its submission to the escrow agent of a loan request. Such proceeds will not be available to LBM until payment in-full of the obligations under the LBM Credit Agreement and termination of the LBM Credit Agreement. Payments of principal and other obligations will be made to the escrow agent, while interest payments will be made directly to LBM. Provided there exists no potential default or event of default, the LBM Credit Agreement and Escrow Agreement prohibit any acceleration of repayment of any amount outstanding under the LBM Credit Agreement and prohibit termination of the LBM Credit Agreement or withdrawal from escrow of any unused portion of the available loan proceeds.

During 2019, the Company had borrowings of $4,000 under the LBM Credit Agreement, all of which were subsequently repaid prior to December 31, 2019. There were no borrowings by the Company under the LBM Credit Agreement during 2018.
The Company incurred $265 in debt issuance costs associated with the LBM Credit Agreement (including the aforementioned up front commitment fee paid at closing to LBM).

During 2019, the Company recorded interest expense relating to the LBM Credit Agreement of $260. Included in interest expense for 2019 was $88 associated with amortization of debt issuance costs (resulting in $107 in remaining debt issuance costs at December 31, 2019, of which $88 was included in prepaid expenses and other current assets and $19 was included in other noncurrent assets in the accompanying consolidated balance sheet). Included in interest expense for 2019 was $66 and $106 associated with interest on borrowings and the commitment fee on the unused portion of the revolving credit facility, respectively, of which at December 31, 2019 $28 was included in accounts payable in the accompanying consolidated balance sheet. Amounts payable to LBM at December 31, 2019 were settled by the Company in January 2020.

During 2018, the Company recorded interest expense related to the LBM Credit Agreement of $160.

Refer to Note 24 for further discussion related to an amendment to the LBM Credit Agreement completed in February 2020.

**Note 16. Long-Term Debt**

Long-term debt consisted of the following at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>Unamortized Debt Issuance Costs</td>
<td>Net</td>
</tr>
<tr>
<td>Building note payable</td>
<td>$1,384</td>
<td>(20)</td>
</tr>
<tr>
<td>Less: Amount due within one year</td>
<td>(157)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>$1,227</td>
<td>(16)</td>
</tr>
<tr>
<td>Principal</td>
<td>Unamortized Debt Issuance Costs</td>
<td>Net</td>
</tr>
<tr>
<td>Building note payable</td>
<td>$1,533</td>
<td>(25)</td>
</tr>
<tr>
<td>Less: Amount due within one year</td>
<td>(149)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>$1,384</td>
<td>(20)</td>
</tr>
</tbody>
</table>

Terms of the building note payable include monthly payments of $18 including interest at 4.00% through May 2017, and subsequently, monthly payments of $19 including interest at the monthly average yield on United States Treasury Securities plus 3.25% for the remainder of the term through May 2027. The building note payable is collateralized by the Company’s facility located in North Huntingdon, Pennsylvania which had a carrying value of $4,929 at December 31, 2019.

At December 31, 2019, the Company identified that it was not in compliance with the annual cash flow-to-debt service ratio covenant associated with the building note payable. The Company requested and was granted a waiver related to compliance with this annual covenant at December 31, 2019 and through December 31, 2020. Related to the 2019 non-compliance, there were no cross-default provisions or related impacts on other lending or financing agreements.

Future maturities of long-term debt at December 31, 2019, were as follows:

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Thereafter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$157</td>
<td>166</td>
<td>175</td>
<td>184</td>
<td>193</td>
<td>509</td>
<td>$1,384</td>
</tr>
</tbody>
</table>

**Note 17. Income Taxes**

The components of loss before taxes were as follows:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$(16,452)</td>
<td>$(16,262)</td>
</tr>
<tr>
<td>Foreign</td>
<td>950</td>
<td>3,755</td>
</tr>
<tr>
<td>Loss before income taxes</td>
<td>$(15,502)</td>
<td>$(12,507)</td>
</tr>
</tbody>
</table>

51
The (benefit) provision for income taxes consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$ 4</td>
<td>—</td>
<td>$ 4</td>
<td>$ 18</td>
<td>$ —</td>
<td>$ 18</td>
</tr>
<tr>
<td>Foreign</td>
<td>(212)</td>
<td>(199)</td>
<td>(411)</td>
<td>142</td>
<td>—</td>
<td>142</td>
</tr>
<tr>
<td>(Benefit) provision for income taxes</td>
<td>(208)</td>
<td>(199)</td>
<td>(407)</td>
<td>$ 160</td>
<td>—</td>
<td>160</td>
</tr>
</tbody>
</table>

A reconciliation of the provision for income taxes at the United States statutory rate to the effective rate of the Company for the years ended December 31 was as follows:

- United States statutory rate (21%) $ (3,255) $ (2,626)
- Effect of foreign disregarded entity (151) (129)
- Taxes on foreign operations 64 259
- Net change in valuation allowances 4,224 1,798
- Reduction in uncertain tax positions (818) —
- Permanent differences 83 (165)
- Return to provision adjustments (163) 331
- Deferred tax adjustments (318) 810
- Other (73) (118)
- (Benefit) provision for income taxes $ (407) $ 160

Effective tax rate 2.6% (1.3)%

The Tax Cuts and Jobs Act ("United States Tax Reform") reduced the United States federal statutory rate from 34% to 21% beginning in 2018. United States Tax Reform also required companies to remeasure its domestic deferred tax balances to the lower corporate income tax rate for the 2017 tax year. Additionally, United States Tax Reform created taxes on certain foreign sourced earnings known as the global intangible low-taxed income ("GILTI") tax beginning with tax year 2018. The Company has elected to account for GILTI as a period cost in the year the tax is incurred. The accounting for the tax effects of United States Tax Reform was completed as of December 31, 2018 under SEC Staff Accounting Bulletin No. 118.

The components of deferred income tax assets and liabilities consisted of the following at December 31:

<table>
<thead>
<tr>
<th>Deferred tax assets</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts receivable</td>
<td>$ 110</td>
<td>$ 46</td>
</tr>
<tr>
<td>Inventories</td>
<td>710</td>
<td>1,077</td>
</tr>
<tr>
<td>Accrued expenses and other current liabilities</td>
<td>477</td>
<td>489</td>
</tr>
<tr>
<td>Net operating loss carryforwards</td>
<td>27,710</td>
<td>24,419</td>
</tr>
<tr>
<td>Tax credit carryforwards</td>
<td>676</td>
<td>676</td>
</tr>
<tr>
<td>Other</td>
<td>1,968</td>
<td>1,059</td>
</tr>
<tr>
<td>Valuation allowance</td>
<td>(30,666)</td>
<td>(26,563)</td>
</tr>
<tr>
<td>Total deferred tax assets</td>
<td>985</td>
<td>1,203</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deferred tax liabilities</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property and equipment</td>
<td>690</td>
<td>703</td>
</tr>
<tr>
<td>Other</td>
<td>94</td>
<td>501</td>
</tr>
<tr>
<td>Total deferred tax liabilities</td>
<td>784</td>
<td>1,204</td>
</tr>
<tr>
<td>Net deferred tax assets (liabilities)(a)</td>
<td>$ 201</td>
<td>$ (1)</td>
</tr>
</tbody>
</table>

\(a\) At December 31, 2019, net deferred tax assets were reflected in other noncurrent assets in the accompanying consolidated balance sheet. At December 31, 2018, net deferred tax liabilities were reflected in other noncurrent liabilities in the accompanying consolidated balance sheet.

The Company has provided a valuation allowance for certain of its net deferred tax assets as a result of the Company not generating consistent net operating profits in certain jurisdictions in which it operates. As such, certain benefits from deferred taxes in any of the periods presented have been fully offset by changes in the valuation allowance for net deferred tax assets. The Company continues to assess its future taxable income by jurisdiction based on recent historical operating results, the expected timing of reversal of temporary differences, various tax planning strategies that the Company may be able to enact in future periods, the impact of potential operating changes on the business and forecast results from operations in future periods based on available information at the end of each reporting period. To the extent that the Company is able to reach the conclusion that its net deferred tax assets are realizable based on any combination of the above factors in a single, or in multiple, taxing jurisdictions, a reversal of the related portion of the Company’s existing valuation allowances may occur.
The following table summarizes changes to the Company’s valuation allowances for the years ended December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning of period</td>
<td>$26,563</td>
<td>$25,690</td>
</tr>
<tr>
<td>Net increases in allowances</td>
<td>3,857</td>
<td>1,247</td>
</tr>
<tr>
<td>Net increases in net operating losses offset by uncertain tax positions</td>
<td>368</td>
<td>551</td>
</tr>
<tr>
<td>Foreign currency translation adjustments</td>
<td>(122)</td>
<td>(925)</td>
</tr>
<tr>
<td>Balance at end of period</td>
<td>$30,666</td>
<td>$26,563</td>
</tr>
</tbody>
</table>

At December 31, 2019, the Company had $98,725 in net operating loss carryforwards, subject to certain limitations, $70,100 of which expire from 2033 to 2037, and $676 in tax credit carryforwards which expire in 2023, to offset the future taxable income of its United States subsidiary. At December 31, 2019, the Company had $2,428 in net operating loss carryforwards which expire from 2022 through 2026, to offset the future taxable income of its Japanese subsidiary. At December 31, 2019, the Company had $19,503 in net operating loss carryforwards, which do not expire but may be limited as to their use in a particular period, to offset the future taxable income of its German subsidiary.

At December 31, 2018, the Company had a liability for uncertain tax positions related primarily to certain intercompany transactions.

A reconciliation of the beginning and ending amount of unrecognized tax benefits (including accrued interest and penalties) at December 31 was as follows:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning of period</td>
<td>$1,186</td>
<td>$1,775</td>
</tr>
<tr>
<td>Additions based on tax positions related to the current year</td>
<td>—</td>
<td>60</td>
</tr>
<tr>
<td>Additions for tax positions of prior years</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>Reductions for tax positions of prior years</td>
<td>(1,186)</td>
<td>(606)</td>
</tr>
<tr>
<td>Settlements</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Foreign currency translation adjustments</td>
<td>(5)</td>
<td>(43)</td>
</tr>
<tr>
<td>Balance at end of period</td>
<td>—</td>
<td>$1,186</td>
</tr>
</tbody>
</table>

The Company includes interest and penalties related to income taxes as a component of the provision for income taxes in the accompanying statement of consolidated operations and comprehensive loss (there were no such interest or penalties included in the provision for income taxes in 2019 or 2018).

At December 31, 2018, there were $820 in unrecognized tax benefits (including accrued interest and penalties) that if recognized would affect the annual effective tax rate (such amounts were included in accrued expenses and other current liabilities in the accompanying consolidated balance sheet at December 31, 2018).

At December 31, 2018, the Company’s ExOne GmbH (2010-2013) and ExOne Property GmbH (2013) subsidiaries were under examination by local taxing authorities in Germany. In January 2019, this examination was concluded by the local taxing authorities in Germany without significant adjustment to previously established tax positions. As a result, during the three months ended March 31, 2019, the Company recorded a reversal of certain of its previously recorded liabilities for uncertain tax positions of $1,075, of which $257 was offset against net operating loss carryforwards. During 2019, the Company’s ExOne GmbH and ExOne Property GmbH subsidiaries were subject to a tax examination by local taxing authorities in Germany related to their respective 2014 tax years. In December 2019, this examination was concluded by the local taxing authorities in Germany without significant adjustment to previously established tax positions. As a result, during the three months ended December 31, 2019, the Company recorded a reversal of certain of its previously recorded liabilities for uncertain tax positions of $111, all of which was offset against net operating loss carryforwards.

During 2018, in connection with its periodic re-assessment of its uncertain tax positions, the Company determined that the uncertain tax positions related to its ExOne KK (Japan) subsidiary no longer met the more likely than not criteria, and as a result, the related liability was reversed in-full. No amount was recorded as a component of the provision for income taxes due to existing net operating loss carryforwards.
The Company files income tax returns in the United States, Germany, Japan and Italy (through 2018). The following table summarizes tax years remaining subject to examination for each of the Company’s subsidiaries at December 31, 2019:

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Tax Years Remaining Subject to Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Germany</td>
<td>2015-2019</td>
</tr>
<tr>
<td>Japan</td>
<td>2017-2019</td>
</tr>
<tr>
<td>Italy</td>
<td>2014-2018</td>
</tr>
</tbody>
</table>

Note 18. Equity-Based Compensation

On January 24, 2013, the Board adopted the 2013 Equity Incentive Plan (the “Plan”). In connection with the adoption of the Plan, 500,000 shares of common stock were reserved for issuance pursuant to the Plan, with automatic increases in such reserve available each year annually on January 1 from 2014 through 2023 equal to the lesser of 3.0% of the total outstanding shares of common stock as of December 31 of the immediately preceding year or, a number of shares of common stock determined by the Board, provided that the maximum number of shares authorized under the Plan did not exceed 1,992,241 shares, subject to certain adjustments. The maximum number of shares authorized under the Plan was reached on January 1, 2017. At December 31, 2019, 627,934 shares remained available for future issuances under the Plan.

Stock options and restricted stock issued by the Company under the Plan are generally subject to service conditions resulting in annual vesting on the anniversary of the date of grant over a period typically ranging between one and three years. Certain stock options and restricted stock issued by the Company under the Plan vest immediately upon issuance. Stock options issued by the Company under the Plan have contractual lives which expire over a period typically ranging between five and ten years from the date of grant subject to continued service to the Company by the participant.

On February 7, 2018, the Compensation Committee of the Board adopted the 2018 Annual Incentive Program (the “2018 Program”) as a subplan under the Plan. The 2018 Program provided an opportunity for performance-based compensation to senior executive officers of the Company, among others. The target annual incentive for each 2018 Program participant was expressed as a percentage of base salary and was conditioned on the achievement of certain financial goals (as approved by the Compensation Committee of the Board) or a combination of financial and non-financial goals. The Compensation Committee of the Board retained negative discretion over amounts payable under the 2018 Program. During 2018, total compensation expense associated with the 2018 Program was $460, split between cost of sales ($91), research and development ($127) and selling general and administrative expenses ($242) in the accompanying statement of consolidated operations and comprehensive loss, of which $167 was settled in equity by the Company in March 2019 resulting in the issuance of 10,076 shares of unrestricted common stock. In connection with the issuance of shares related to the 2018 Program, the Company made cash payments for taxes of $68 relating to the net settlement of the equity-based awards. There were no similar cash payments for taxes or net settlement of equity-based awards during 2018.

On February 6, 2019, the Compensation Committee of the Board adopted the 2019 Annual Incentive Program (the “2019 Program”) as a subplan under the Plan. The 2019 Program provided an opportunity for performance-based compensation to senior executive officers of the Company, among others. The target annual incentive for each 2019 Program participant was expressed as a percentage of base salary and was conditioned on the achievement of certain financial goals (as approved by the Compensation Committee of the Board) or a combination of financial and non-financial goals. The Compensation Committee of the Board retained negative discretion over amounts payable under the 2019 Program. During 2019, there was no compensation expense associated with the 2019 Program as a result of underperformance against the 2019 financial goals of the Company. No shares of unrestricted common stock are expected to be issued in connection with the 2019 Program as a result.

The following table summarizes the total equity-based compensation expense recognized by the Company:

<table>
<thead>
<tr>
<th>Equity-based compensation expense recognized:</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock options</td>
<td>$709</td>
<td>$357</td>
</tr>
<tr>
<td>Restricted stock</td>
<td>696</td>
<td>433</td>
</tr>
<tr>
<td>Other(a)</td>
<td>11</td>
<td>178</td>
</tr>
<tr>
<td>Total equity-based compensation expense before income taxes</td>
<td>1,416</td>
<td>968</td>
</tr>
<tr>
<td>Benefit for income taxes(b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total equity-based compensation expense net of income taxes</td>
<td>$1,416</td>
<td>$968</td>
</tr>
</tbody>
</table>

(a) For 2019, Other represents expense associated with employee contractual amounts to be settled in equity. For 2018, Other represents expense associated with the 2018 Program and other employee contractual amounts to be settled in equity.

(b) The benefit for income taxes from equity-based compensation for each of the periods presented has been determined to be $0 based on valuation allowances against net deferred tax assets.
At December 31, 2019, total future compensation expense related to unvested awards yet to be recognized by the Company was $874 for stock options and $143 for restricted stock. Total future compensation expense related to unvested awards yet to be recognized by the Company is expected to be recognized over a weighted-average remaining vesting period of 1.5 years.

The fair value of stock options was estimated on the date of grant using the Black-Scholes option pricing model with the following assumptions:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted average fair value per stock option</td>
<td>$2.51 - $3.68</td>
<td>$2.23 - $4.16</td>
</tr>
<tr>
<td>Volatility</td>
<td>53.3% - 60.1%</td>
<td>54.1% - 63.7%</td>
</tr>
<tr>
<td>Average risk-free interest rate</td>
<td>1.5% - 2.5%</td>
<td>2.5% - 3.0%</td>
</tr>
<tr>
<td>Dividend yield</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Expected term (years)</td>
<td>2.5 - 3.5</td>
<td>2.5 - 3.3</td>
</tr>
</tbody>
</table>

For certain stock option awards, volatility is estimated based on the historical volatility of the Company when the expected term of the award is less than the period for which the Company has been publicly traded. For certain stock option awards, volatility is estimated based on the historical volatilities of certain peer group companies when the expected term of the award exceeds the period for which the Company has been publicly traded. The average risk-free rate is based on a weighted average yield curve of risk-free interest rates consistent with the expected term of the awards. Expected dividend yield is based on historical dividend data as well as future expectations. Expected term is calculated using the simplified method as the Company does not have sufficient historical exercise experience upon which to base an estimate.

The activity for stock options was as follows:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Options</td>
<td>Weighted Average Exercise Price</td>
<td>Weighted Average Grant Date Fair Value</td>
</tr>
<tr>
<td>Stock options granted</td>
<td>319,310</td>
<td>$7.34</td>
</tr>
<tr>
<td>Stock options exercised</td>
<td>(40,432)</td>
<td>$7.17</td>
</tr>
<tr>
<td>Stock options forfeited</td>
<td>(9,773)</td>
<td>$7.67</td>
</tr>
<tr>
<td>Stock options expired</td>
<td>(36,832)</td>
<td>$16.94</td>
</tr>
</tbody>
</table>

Outstanding at beginning of period = 621,986

Stock options granted = 319,310

Stock options exercised = (40,432)

Stock options forfeited = (9,773)

Stock options expired = (36,832)

Outstanding at end of period = 854,259

Exercisable at end of period = 494,884

Expected to vest at end of period = 359,375

At December 31, 2019, intrinsic value associated with stock options exercisable and stock options expected to vest was $45 and $116, respectively. The weighted average remaining contractual term of stock options exercisable and stock options expected to vest at December 31, 2019, was 3.8 and 4.7 years, respectively. Stock options with an aggregate intrinsic value of $358 were exercised by employees during 2019, resulting in proceeds to the Company from the exercise of stock options of $289. Stock options with an aggregate intrinsic value of $586 were exercised by employees during 2018, resulting in proceeds to the Company from the exercise of stock options of $529. The Company received no income tax benefit related to stock option exercises in either period.

The activity for restricted stock was as follows:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares of Restricted Stock</td>
<td>Weighted Average Grant Date Fair Value</td>
<td>Shares of Restricted Stock</td>
</tr>
<tr>
<td>Outstanding at beginning of period</td>
<td>67,001</td>
<td>$8.30</td>
</tr>
<tr>
<td>Restricted stock granted</td>
<td>66,763</td>
<td>$8.98</td>
</tr>
<tr>
<td>Restricted stock vested</td>
<td>(62,251)</td>
<td>$8.65</td>
</tr>
<tr>
<td>Restricted stock forfeited</td>
<td>(5,000)</td>
<td>$6.75</td>
</tr>
<tr>
<td>Outstanding at end of period</td>
<td>66,513</td>
<td>$8.76</td>
</tr>
<tr>
<td>Expected to vest at end of period</td>
<td>66,513</td>
<td>$8.76</td>
</tr>
</tbody>
</table>

Restricted stock vesting during 2019 and 2018 had a fair value of $535 and $326, respectively.
Note 19. Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities which are required to be recorded at fair value, the Company considers the principal or most advantageous market in which the Company would transact and the market-based risk measurements or assumptions that market participants would use in pricing the asset or liability, such as inherent risk, transfer restrictions and credit risk.

The Company applies the following fair value hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement:

**Level 1**
Observable inputs such as quoted prices in active markets for identical investments that the Company has the ability to access.

**Level 2**
Inputs include:
- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs, other than quoted prices in active markets, that are observable either directly or indirectly; and
- Inputs that are derived principally from, or corroborated by, observable market data by correlation or other means.

**Level 3**
Inputs that are generally unobservable and typically reflect management’s estimates of assumptions that market participants would use in pricing the asset or liability.

The Company is required to disclose its estimate of the fair value of material financial instruments, including those recorded as assets or liabilities in its consolidated financial statements, in accordance with GAAP. At December 31, 2019 and 2018, the Company had no financial instruments (assets or liabilities) measured at fair value on a recurring basis.

The carrying values and fair values of other financial instruments (assets and liabilities) not required to be recorded at fair value were as follows at December 31:

<table>
<thead>
<tr>
<th></th>
<th>2019 Carrying Value</th>
<th>2019 Fair Value</th>
<th>2018 Carrying Value</th>
<th>2018 Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and cash equivalents</td>
<td>$5,265</td>
<td>$5,265</td>
<td>$7,592</td>
<td>$7,592</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>$978</td>
<td>$978</td>
<td>$1,548</td>
<td>$1,548</td>
</tr>
<tr>
<td>Debt issuance costs(a)</td>
<td>$107</td>
<td>—</td>
<td>$195</td>
<td>—</td>
</tr>
<tr>
<td>Current portion of long-term debt(b)</td>
<td>$153</td>
<td>$157</td>
<td>$144</td>
<td>$149</td>
</tr>
<tr>
<td>Long-term debt—net of current portion(b)</td>
<td>$1,211</td>
<td>$1,227</td>
<td>$1,364</td>
<td>$1,384</td>
</tr>
</tbody>
</table>

(a) Represents debt issuance costs associated with the Company’s related party revolving credit facility (Note 15) of which $88 are included in prepaid expenses and other current assets for both periods and $19 and $107 are included in other noncurrent assets in the accompanying consolidated balance sheet at December 31, 2019 and 2018, respectively.

(b) Carrying values as December 31, 2019 and 2018 are net of unamortized debt issuance costs of $20 and $25, respectively.

The carrying amounts of cash and cash equivalents, restricted cash and current portion of long-term debt approximate fair value due to their short-term maturities. The fair value of long-term debt – net of current portion has been estimated by management based on the consideration of applicable interest rates (including certain instruments at variable or floating rates). Cash and cash equivalents and restricted cash were classified as Level 1; Current portion of long-term debt and long-term debt – net of current portion were classified as Level 2.

Note 20. Concentration of Credit Risk

During 2019 and 2018, the Company conducted a significant portion of its business with a limited number of customers, though not necessarily the same customers for each respective period. During 2019 and 2018, the Company’s five most significant customers represented 17.4% and 16.5% of total revenue, respectively. At December 31, 2019 and 2018, accounts receivable from the Company’s five most significant customers were $3,230 and $2,344, respectively.

Note 21. Related Party Transactions

Purchases of products and/or services from related parties during 2019 and 2018, were $63 and $27, respectively. Purchases of products and/or services by the Company during each of the respective periods primarily included website design services and leased office space (through July 2019) from related parties under common control by S. Kent Rockwell (currently the Chairman of the Board of the Company and previously the Executive Chairman and Chief Executive Officer of the Company). Also included in purchases of products and/or services by the Company during 2019, was the purchase of a 3D printing machine and certain ancillary equipment for $30 from an educational institution determined to be a related party on the basis that S. Kent Rockwell serves as a trustee of the educational institution.

None of the transactions met a threshold requiring review and approval by the Audit Committee of the Board.
Amounts due to related parties associated with the purchase of products and/or services at December 31, 2018 were $1 and are reflected in accounts payable in the accompanying condensed consolidated balance sheet. There were no amounts due to related parties associated with the purchase of products and/or services at December 31, 2019.

The Company also receives the benefit of the corporate use of an airplane from a related party under common control by S. Kent Rockwell for no consideration. The Company estimates the fair market value of the benefits received during 2019 was $3. The Company estimates the fair market value of the benefits received during 2018 was $0.

Refer to Note 15 and Note 24 for further discussion relating to the Company’s revolving credit facility with a related party.

**Note 22. Other Expense (Income) – Net**

Other (income) expense – net consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain on settlement of insurance claim</td>
<td>$(17)</td>
<td>$(819)</td>
</tr>
<tr>
<td>Interest income</td>
<td>(11)</td>
<td>(39)</td>
</tr>
<tr>
<td>Foreign currency losses – net</td>
<td>102</td>
<td>93</td>
</tr>
<tr>
<td>Bank fees</td>
<td>115</td>
<td>95</td>
</tr>
<tr>
<td>Other – net</td>
<td>(78)</td>
<td>(74)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 111</strong></td>
<td><strong>$(744)</strong></td>
</tr>
</tbody>
</table>

For 2018, gain on settlement of insurance claim represented $819 of a realized gain associated with an insurance recovery for a 3D printing machine damaged by a third party freight company while in transit. For 2018, foreign currency losses – net included $309 of foreign exchange losses associated with the settlement of an intercompany note payable with ExOne Italy S.r.l. previously identified as a long-term investment in the subsidiary and the dissolution of the related legal entity (Note 1).

**Note 23. Segment and Geographic Information**

The Company manages its business globally in a singular operating segment in which it develops, manufactures and markets 3D printing machines, 3D printed and other products, materials and services. Geographically, the Company conducts its business through wholly-owned subsidiaries in the United States, Germany, Japan and Italy (through December 2018).

Geographic information for revenue for the year ended December 31 was as follows (based on the country where the sale originated):

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$20,897</td>
<td>$29,514</td>
</tr>
<tr>
<td>Germany</td>
<td>20,966</td>
<td>27,084</td>
</tr>
<tr>
<td>Japan</td>
<td>11,413</td>
<td>8,027</td>
</tr>
<tr>
<td>Italy(a)</td>
<td>—</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$53,276</td>
<td>$64,644</td>
</tr>
</tbody>
</table>

(a) In December 2017, the Company committed to a plan to consolidate certain of its 3D printing operations from its Desenzano del Garda, Italy facility into its Gersthofen, Germany facility (Note 6). Operations at the Desenzano del Garda, Italy facility effectively ceased during the three months ended March 31, 2018 and in December 2018, the Company completed the dissolution of its ExOne Italy S.r.l. subsidiary.

Geographic information for long-lived assets at December 31 was as follows (based on the physical location of assets):

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$12,519</td>
<td>$13,603</td>
</tr>
<tr>
<td>Germany</td>
<td>21,821</td>
<td>23,249</td>
</tr>
<tr>
<td>Japan</td>
<td>4,555</td>
<td>4,650</td>
</tr>
<tr>
<td>Sweden(a)</td>
<td>—</td>
<td>205</td>
</tr>
<tr>
<td>Italy(a)</td>
<td>—</td>
<td>199</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$38,895</td>
<td>$41,906</td>
</tr>
</tbody>
</table>

(a) At December 31, 2018, for both Sweden and Italy, long-lived assets represent 3D printing machines and related equipment held by the Company under operating lease agreements with customers. For Sweden, during 2019, the Company settled this operating lease agreement in connection with the related customer committing to the purchase of an unrelated 3D printing machine and related equipment. For Italy, during 2019, the customer exercised its right to purchase the 3D printing machine and related equipment from the Company.

Refer to Note 24 for further discussion related to a sale-leaseback transaction associated with the Company’s European headquarters and operating facility in Gersthofen, Germany completed in February 2020 and the related impact expected on long-lived assets for Germany during the three months ending March 31, 2020.
Note 24. Subsequent Events

Sale-Leaseback of Gersthofen, Germany Facility

On December 10, 2019, ExOne Property GmbH and ExOne GmbH, the German subsidiaries of the Company (the “German Subsidiaries”), entered into a purchase agreement (the “Purchase Agreement”) with Solidas Immobilien und Grundbesitz GmbH, a private, unaffiliated German real estate investor (the “Buyer”), for the sale of the Company’s European headquarters and operating facility in Gersthofen, Germany (the “Facility”) for a cash price of €17,000 (approximately $18,500, of which approximately $2,200 was received prior to December 31, 2019). Concurrently with the execution of the Purchase Agreement, ExOne GmbH and the Buyer entered into a rental contract (the “Lease”) for the leaseback of the Facility for an initial aggregate annual rent totaling €1,500 (approximately $1,700), plus applicable taxes, which is fixed during the initial three-year term and is subject to adjustment on an annual basis (in accordance with the consumer price index for Germany) during the two five-year option extension periods. The sale-leaseback transaction closed on February 18, 2020.

Amendment to Related Party Revolving Credit Facility

On February 18, 2020, following completion of the sale-leaseback transaction further described above, the Loan Parties and LBM entered into a First Amendment to the LBM Credit Agreement (the “LBM Amendment”) which (i) reduced the available capacity under the revolving credit facility to $10,000, (ii) extended the term until March 31, 2024, (iii) increased the commitment fee to 100 basis points, or 1.00%, on the unused portion of the revolving credit facility, and (iv) provided a process for the replacement of the LIBOR index after 2021. In addition, the accounts receivable related to ExOne GmbH no longer serve as collateral for borrowings under the LBM Credit Agreement.

The Company does not consider the amended revolving credit facility with LBM to be indicative of a fair market value lending based on the prior determination of LBM as a related party. Prior to execution, the LBM Amendment was reviewed and approved by the Audit Committee of the Board and subsequently by a sub-committee of independent members of the Board.

Amendment to GmbH Credit Agreement

On February 24, 2020, ExOne GmbH entered into an amendment and replacement of the GmbH Credit Agreement (the “Amended GmbH Credit Agreement”). The Amended GmbH Credit Agreement eliminates the overdraft credit and short-term loan features of the credit agreement (Note 14) and replaces them with an increased capacity amount of €3,500 (approximately $3,800) for the issuance of financial guarantees and letters of credit for commercial transactions requiring security. The cash collateral requirement for the issuance of financial guarantees and letters of credit for commercial transactions requiring security has been eliminated for amounts up to €1,000 (approximately $1,000) as the amendment provides the German bank with a collateral interest in the accounts receivable of ExOne GmbH. Amounts in excess of €1,000 (approximately $1,000) continue to require cash collateral.

The Company has evaluated all of its activities and concluded that no other subsequent events have occurred that would require recognition in the consolidated financial statements or disclosure in the notes to the consolidated financial statements, except as described above.

None.

Item 9A. Controls and Procedures.

**Evaluation of Disclosure Controls and Procedures**

Our management, including our Chief Executive Officer and our Chief Financial Officer, performed an evaluation of the effectiveness of our disclosure controls and procedures. Based on that evaluation, our Chief Executive Officer and our Chief Financial Officer concluded that, as of the end of the fiscal year covered by this Annual Report on Form 10-K, as a result of certain material weaknesses in our internal control over financial reporting (further described below), that our disclosure controls and procedures were ineffective.

In connection with the preparation of our consolidated financial statements for the year ended December 31, 2019, we concluded that there are material weaknesses in the design and operating effectiveness of our internal control over financial reporting as defined in SEC Regulation S-X. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected on a timely basis.

A description of the identified material weaknesses in internal control over financial reporting is as follows:

- We did not maintain adequate control over user access rights for a significant information technology system.
- We did not maintain adequate control over application changes for a significant information technology system.
- We did not maintain adequate control over pricing and discounts associated with sales of certain of our products.

Management’s Report on our internal control over financial reporting is included in Part II Item 8 of this Annual Report on Form 10-K under the caption “Management’s Report on Internal Control Over Financial Reporting” and is incorporated herein by reference. Our independent registered public accounting firm has issued an attestation report on management’s maintenance of effective internal control over financial reporting, which is set forth in Part II Item 8 of this Annual Report on Form 10-K under the caption “Report of Independent Registered Public Accounting Firm” and is incorporated herein by reference.

Notwithstanding the identified material weaknesses further described above, management believes that the consolidated financial statements and related notes thereto included in this Annual Report on Form 10-K fairly present, in all material respects, our financial condition, results of operations and cash flows for the periods presented.

**Changes in Internal Control over Financial Reporting**

During the three months ended December 31, 2019, as a result of the identification of the material weaknesses further described above, management has initiated the development of a remediation plan in an effort to ensure that our disclosure controls and procedures are effective. Our remediation plan is expected to include a comprehensive evaluation of the people, processes and systems responsible for each of the underlying control activities. We expect to complete this evaluation in 2020 and put measures in place in an effort to remediate the identified material weaknesses. We cannot be certain that the measures we may take will ensure that we establish and maintain adequate controls over our financial processes and reporting in the future or that material weaknesses identified will be remediated.

Other than the items further described above, there were no changes in our internal control over financial reporting during 2019, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

**Item 9B. Other Information.**

None.
Item 10. Directors, Executive Officers and Corporate Governance.

The information required by Item 10 is incorporated by reference from the information under the captions “Proposal 1 — Election of Directors,” “Executive Officers of ExOne,” “Delinquent Section 16(a) Reports,” “Corporate Governance — Audit Committee” and “Corporate Governance — Code of Ethics and Business Conduct” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 13, 2020, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2019.

Item 11. Executive Compensation.

The information required by Item 11 is incorporated by reference from the information under the captions “Compensation of Named Executive Officers,” “Director Compensation,” and “Corporate Governance — Compensation Committee Interlocks and Insider Participation” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 13, 2020, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2019.


The information required by Item 12 is incorporated by reference from the information under the caption “Securities Authorized for Issuance Under Equity Compensation Plans” in Part II Item 5 of this Annual Report on Form 10-K and under the caption “Security Ownership of Certain Beneficial Owners and Management” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 13, 2020, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2019.

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

The information required by Item 13 is incorporated by reference from the information under the captions “Corporate Governance — Independence of the Board and Committees” and “Transactions with Related Persons” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 13, 2020, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2019.

Item 14. Principal Accountant Fees and Services.

The information required by Item 14 is incorporated by reference from the information under the caption “Audit Fees and Services” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 13, 2020, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2019.

(a)(1) Financial Statements

See Item 8 of Part II of this Annual Report on Form 10-K.

(a)(2) Financial Statement Schedules

Financial statement schedules have been omitted because they are not applicable, not required, or the required information is included in the consolidated financial statements or notes thereto.

All other schedules for which provision is made in the applicable accounting regulations of the SEC are not required under the related instructions or are inapplicable and therefore have been omitted.

(a)(3) Exhibits

The Exhibits listed on the accompanying Index to Exhibits are filed as part of this Annual Report on Form 10-K.
The agreements and other documents filed as exhibits to this report are not intended to provide factual information or other disclosure other than with respect to the terms of the agreements or other documents themselves, and you should not rely on them for that purpose. In particular, any representations and warranties made by us in these agreements or other documents were made solely within the specific context of the relevant agreement or document and may not describe the actual state of affairs as of the date they were made or at any other time.

<table>
<thead>
<tr>
<th>Exhibit Number</th>
<th>Description</th>
<th>Method of Filing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Certificate of Incorporation.</td>
<td>Incorporated by reference to Exhibit 3.1 to Form S-1 Registration Statement (#333-185933) filed on January 8, 2013.</td>
</tr>
<tr>
<td>3.2</td>
<td>Amended and Restated Bylaws, as amended through August 19, 2013.</td>
<td>Incorporated by reference to Exhibit 3.2 to Form 10-K (#001-35806) filed on March 22, 2016.</td>
</tr>
<tr>
<td>4.1</td>
<td>Form of Stock Certificate.</td>
<td>Incorporated by reference to Exhibit 4.1 to Amendment No. 2 to Form S-1 Registration Statement (#333-185933) filed on January 28, 2013.</td>
</tr>
<tr>
<td>4.2</td>
<td>Description of the Company's Common Stock.</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.1</td>
<td>2013 Equity Incentive Plan.*</td>
<td>Incorporated by reference to Exhibit 10.07.01 to Amendment No. 1 to Form S-1 Registration Statement (#333-185933) filed on January 24, 2013.</td>
</tr>
<tr>
<td>10.2</td>
<td>Form of Restricted Stock Award Agreement under 2013 Equity Incentive Plan.*</td>
<td>Incorporated by reference to Exhibit 10.9 to Form 10-K (#001-35806) filed on March 15, 2018.</td>
</tr>
<tr>
<td>10.3</td>
<td>Form of Award Agreements under 2013 Equity Incentive Plan.*</td>
<td>Incorporated by reference to Exhibit 10.10 to Form 10-K (#001-35806) filed on March 15, 2018.</td>
</tr>
<tr>
<td>10.4</td>
<td>Form of Stock Bonus Award Agreement under 2013 Equity Incentive Plan.*</td>
<td>Incorporated by reference to Exhibit 10.1 to Form 8-K (#001-35806) filed on March 29, 2013.</td>
</tr>
<tr>
<td>10.5</td>
<td>Credit Agreement dated March 12, 2018 among the Company, ExOne Americas LLC, ExOne GmbH and LBM Holdings LLC.</td>
<td>Incorporated by reference to Exhibit 10.1 to Form 10-Q (#001-35806) filed on November 8, 2018.</td>
</tr>
<tr>
<td>10.7</td>
<td>Form of Indemnification Agreement for Officers and Directors.</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.8</td>
<td>Change of Control Severance Plan, as amended August 8, 2018.*</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.9</td>
<td>Letter Agreement dated October 25, 2018 between the Company and John F. Hartner.*</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.10</td>
<td>Employment Agreement dated May 15, 2019 between the Company and John F. Hartner.*</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.11</td>
<td>Sales Contract dated December 10, 2019 among ExOne GmbH, ExOne Property GmbH and Solidas Immobilien und Grundbesitz GmbH.</td>
<td>Filed herewith.</td>
</tr>
<tr>
<td>10.12</td>
<td>Lease Agreement for Commercial Premises dated December 10, 2019 between ExOne GmbH and Solidas Immobilien und Grundbesitz GmbH.</td>
<td>Filed herewith.</td>
</tr>
</tbody>
</table>
Each management contract and compensatory arrangement in which any director or any named executive officer participates has been marked with an asterisk (*).

You can obtain copies of exhibits to our filings electronically at the SEC’s website at www.sec.gov or by mail from the Public Reference Section of the SEC at 100 F Street, N.E., Washington, D.C. 20549 at prescribed rates. The exhibits are also available as part of the Annual Report on Form 10-K for the year ended December 31, 2019, which is available on our corporate website at www.exone.com. Stockholders may also obtain copies of exhibits without charge by contacting our General Counsel and Corporate Secretary at (724) 863-9663.

Pursuant to the rules and regulations of the SEC, we have filed certain agreements as exhibits to this Annual Report on Form 10-K. These agreements may contain representations and warranties by the parties. These representations and warranties have been made solely for the benefit of the other party or parties to such agreements and may have been qualified by disclosures made to such other party or parties, were made only as of the date of such agreements or such other date(s) as may be specified in such agreements and are subject to more recent developments, which may not be fully reflected in our public disclosure, may reflect the allocation of risk among the parties to such agreements and may apply materiality standards that are different from what may be viewed as material to investors. Accordingly, these representations and warranties may not describe our actual state of affairs at the date hereof and should not be relied upon.
Pursuant to the requirements of Section 13 or 15(d) of the Exchange Act, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

The ExOne Company

By: /s/ John F. Hartner

John F. Hartner
Chief Executive Officer

Date: March 12, 2020

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

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>/s/ John F. Hartner</td>
<td>March 12, 2020</td>
<td>Chief Executive Officer (Principal Executive Officer)</td>
</tr>
<tr>
<td>John F. Hartner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Douglas D. Zemba</td>
<td>March 12, 2020</td>
<td>Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)</td>
</tr>
<tr>
<td>Douglas D. Zemba</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ S. Kent Rockwell</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>S. Kent Rockwell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ John Irvin</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>John Irvin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Gregory F. Pashke</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>Gregory F. Pashke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Lloyd A. Semple</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>Lloyd A. Semple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ William Strome</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>William Strome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Roger Thiltgen</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>Roger Thiltgen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Bonnie K. Wachtel</td>
<td>March 12, 2020</td>
<td>Director</td>
</tr>
<tr>
<td>Bonnie K. Wachtel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EXHIBIT 4.2
DESCRIPTION OF THE EXONE COMPANY
COMMON STOCK

The following description of our common stock, which is registered under Section 12(b) of the Securities Exchange Act of 1934, as amended, is a summary and is qualified in its entirety by reference to our certificate of incorporation and bylaws, which are incorporated by reference as exhibits to the Annual Report on Form 10-K of which this exhibit is a part. We encourage you to read our certificate of incorporation and bylaws, as well as applicable provisions of the General Corporation Law of the State of Delaware (the “DGCL”), for more information.

References herein to “we,” “our,” “us,” or the “Company” refer to The ExOne Company, a Delaware corporation.

Authorized Shares

Our authorized capital stock consists of:

- 200,000,000 shares of common stock, par value $0.01 per share, and
- 50,000,000 shares of preferred stock, par value $0.01 per share.

Listing

Our common stock is listed on The Nasdaq Stock Market under the symbol “XONE”.

Dividends

Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of common stock are entitled to receive dividends, if any, as and when declared by our Board of Directors.

Fully Paid

All outstanding shares of common stock are fully paid and non-assessable.

Voting Rights

Holders of our common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders, and do not have cumulative voting rights.
Other Rights

Holders of common stock have no preemptive, conversion or subscription rights, and there are no redemption or sinking fund provisions applicable to the common stock. In the event of any liquidation, dissolution or winding-up of our affairs, holders of common stock will be entitled to share ratably in our assets that are remaining after payment or provision for payment of all of our debts and obligations and after liquidation payments to holders of outstanding shares of preferred stock, if any.

Transfer Agent and Registrar of Common Stock

The transfer agent and registrar for our common stock is American Stock Transfer and Trust Company, LLC.

Preferred Stock

The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock, which we may designate in the future. We currently have no outstanding shares of preferred stock.

Under our certificate of incorporation, our Board of Directors is authorized to issue shares of our preferred stock from time to time, in one or more classes or series, without stockholder approval. Our Board of Directors can also determine the number of shares of each class or series and the rights, preferences and limitations of each class or series including the dividend rights, voting rights, conversion rights, redemption rights and any liquidation preferences, the number of shares constituting each class or series and the terms and conditions of issue. Prior to the issuance of shares of each class or series, our Board of Directors is required by the DGCL and our certificate of incorporation to adopt resolutions and file a certificate of designation with the Secretary of State of the State of Delaware.

Anti-Takeover Provisions

Several of the provisions in our certificate of incorporation and bylaws are intended to enhance the likelihood of continuity and stability in the composition of our Board of Directors and could make it more difficult to acquire control of us by means of a tender offer, open market purchases, a proxy contest or otherwise. In addition, Delaware law imposes certain restrictions regulating corporate takeovers. We expect that these provisions will discourage coercive takeover practices or inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our Board of Directors, which we believe may result in an improvement of the terms of any such acquisition in favor of our stockholders. However, they also give our Board of Directors the power to discourage acquisitions that some stockholders may favor.

No Cumulative Voting. The holders of our common stock are not entitled to cumulate their votes for the election of one or more directors or for any other purpose.
Removal of Directors. No director may be removed except for cause, and directors may be removed for cause only by an affirmative vote of shares representing a majority of the shares then entitled to vote at an election of directors, voting together as a single class. Any vacancy occurring on our Board of Directors and any newly created directorship may be filled only by a majority of the remaining directors in office. This provision may only be amended by the affirmative vote of holders of at least 75% of the voting power of our outstanding shares of voting stock, voting together as a single class.

Special Stockholder Meetings. Our certificate of incorporation and our bylaws provide that special meetings of our stockholders may be called only by the chairman of our Board of Directors or by a majority of the directors. Our certificate of incorporation and our bylaws specifically deny the power of any other person to call a special meeting; provided, however, that special meetings of the stockholders shall be called by our Board of Directors upon written request to the Secretary of the Company by one or more stockholders of the Company holding shares representing in the aggregate not less than 20% of the total number of votes entitled to be cast on the matter or matters to be brought before the proposed special meeting. This provision may only be amended by the affirmative vote of holders of at least 75% of the voting power of our outstanding shares of voting stock, voting together as a single class.

Stockholder Action by Written Consent. Our certificate of incorporation provides that holders of our common stock are not able to act by written consent without a meeting, unless such consent is unanimous. This provision may only be amended by the affirmative vote of holders of at least 75% of the voting power of our outstanding shares of voting stock, voting together as a single class.

Issuance of Undesignated Preferred Stock. Our certificate of incorporation provides our Board of Directors with the authority, without further action by the stockholders, to issue up to 50,000,000 shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by our Board of Directors.

Stockholder Advance Notice Provisions. Our bylaws impose procedural requirements for stockholders who wish to make nominations of candidates for election as directors or to bring other business before an annual meeting of our stockholders.

Exclusive Forum Bylaw. Our bylaws provide that a state court in the State of Delaware (or, if no state court located in Delaware has jurisdiction, the federal district court for the District of Delaware) shall be the exclusive forum for (i) any derivative action or proceeding brought on behalf of the Company, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director or officer or other employee of the Company to the Company or the Company’s stockholders, (iii) any action asserting a claim against the Company or any director or officer or other employee of the Company arising pursuant to any provision of the DGCL or the Company’s certificate of incorporation or bylaws (as either may be amended from time to time), or (iv) any action asserting a claim against the Company or any director or officer or other employee of the Company governed by the internal affairs doctrine.
Delaware Business Combination Statute. We are governed by the provisions of Section 203 of the DGCL, which regulates corporate takeovers. With limited exceptions, Section 203 prevents an “interested stockholder,” which is defined generally as a person owning 15% or more of a corporation’s outstanding voting stock, or any affiliate or associate of that person, from engaging in a broad range of “business combinations” with the corporation for three years after becoming an interested stockholder unless:

- the Board of Directors of the corporation had previously approved either the business combination or the transaction that resulted in the stockholder’s becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder’s becoming an interested stockholder, that person owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding stock owned by directors who are also officers of the corporation and stock owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or

- following the transaction in which that person became an interested stockholder, the business combination is approved by our Board of Directors of the corporation and holders of at least two-thirds of the outstanding voting stock not owned by the interested stockholder.

The provisions of the DGCL, our certificate of incorporation and our bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.
Today, December tenth, two thousand nineteen
December 10, 2019
the following persons simultaneously appeared before me,
Notary Bernhard Hille,
with a registered office in Augsburg in the business office located at
Annastrasse 4, 86150 Augsburg:

1st Mr. Eric Bader, born on 9/9/1977, residing in Monchsdeggingen, identified by an official photo ID,
with a business address at Daimlerstrasse 22, 86368 Gersthofen;
here acting not in his own name, but
a) as authorized representative and managing director who is exempt from the limitations of §181 BGB
(Bürgerliches Gesetzbuch [German Civil Code]) for
ExOne Property GmbH, with its registered office in Gersthofen
(business address: Daimlerstrasse 22 in 86368 Gersthofen), entered in the Commercial Register of the
Augsburg District Court under HRB 28119

- hereinafter referred to as “Seller 1” -

and

b) as authorized representative and managing director who is exempt from the limitations of §181 BGB for
ExOne GmbH, with its registered office in Gersthofen
(business address: Daimlerstrasse 22 in 86368 Gersthofen), entered in the Commercial Register of the
Augsburg District Court under HRB 20036
2. Mr. **Anton Kopp**, born on 11/30/1948, personally known to me, with a business address at Ludwigstrasse 13 in 86152 Augsburg, here acting not in his own name, but as an authorized managing director of the

**Solidas Immobilien und Grundbesitz GmbH**

*with its registered office in Augsburg*

(business address: Ludwigstrasse 13, 86152 Augsburg), entered in the Commercial Register of the Augsburg District Court under HRB 22290 - hereinafter referred to as "Buyer" -

Attestations to powers of representations shall be provided separately.

Seller 1 and Seller 2 are hereinafter collectively also referred to as the "Seller" and individually as the "**respective Seller**." Seller and Buyer are hereinafter also collectively referred to as the "**Parties**."

After instructions were given by the Notary about mandatory obligations pursuant to the GwG (Geldwäschegesetz [Money Laundering Act]), the Parties who appeared declare for themselves that the companies they represent are acting on their own account.

According to their information and based upon the Notary's conviction, Mr. Bader and Mr. Kopp are sufficiently proficient in the German and English languages.
Upon request, I certify the declarations as set forth in the following:

After being instructed about the legal basis for conducting the present legal transaction, all Parties declare to be acting in exercise of their commercial or independent professional activity and thus are business owners within the meaning of §14 BGB.

I. **Real Estate Property**

The property which is detailed in the following is the "**Contractual Object 1**."

The following real estate property from the district of Gersthofen is entered in the land register of the Augsburg District Court from

**Gersthofen Sheet 14979**

as follows:

| land parcel 647/2 | Daimlerstrasse 22, Building and outdoor areas | at 30,019 m². |

A *copy of the ground plan* is appended to this deed as *Addendum 1*. That copy was submitted for inspection.

Registered as the owner is:
ExOne Property GmbH, Gersthofen (Seller 1).

The following encumbrances are entered in the land register:

**Department II:**

- serial no. 1: Limited personal encumbrance - charged to land parcel 647/2 - (right to lay cables) for Lechwerke AG, Augsburg.
Department III:
no encumbrance.

The following encumbrances shall continue to exist and are assumed by Buyer as of the transfer of possession (without applying to the purchase price) who shall accept, comply with, and fulfill the encumbrance in rem, entering into all rights and duties under the law of obligations that arise from the permits, registration orders, and agreements under the law of obligations:

All encumbrances identified above and entered in Department II’s land register.

2. Facility Equipment

The facility equipment described in detail in the following is the “Contractual Object 2.”

Seller 2 sells the facility equipment located on or in Contractual Object 1 and definitively detailed in Addendum 2.

The items listed in Addendum 3 as well as other items owned by Seller 1 or 2 (e.g. installations, renovated structures, furnishings, inventory, technical systems, etc.) are explicitly not sold, even if they are currently located on or in Contractual Object 1; the Parties are in agreement that these items are installed on or in Contractual Object 1 only for a temporary purpose for the period of Seller 2’s continued use of Contractual Object 1 (cf. Section IV.) and, therefore, are not designed to serve the commercial purpose of the primary matter (Contractual Object 1). Seller 2 is authorized but not obligated to remove these items.
II.

1. **ExOne Property GmbH**
   - hereinafter referred to as “Seller 1” -
   hereby sells the contractual property described in Section I.1. (collectively “Contractual Object 1”).

   **Solidas Immobilien und Grundbesitz GmbH**
   - hereinafter referred to as “Buyer” -
   for its sole ownership,
   with all rights, obligations, essential components, and statutory equipment, provided they are not owned by Seller 1
   (the Parties again explicitly agree that the items described above in Section I.2 as Contractual Object 2, as well as
   the items listed in Addendum 3 are not deemed equipment within this sense).

   *It is clarified* that equipment owned by third parties, other movable property, as well as other movable property
   temporarily installed by third parties and/or by Seller 1 or 2 are not part of Contractual Object 1.

2. **ExOne GmbH**
   - hereinafter referred to as “Seller 2” -
   hereby sells and conveys—with effect for transfer of possession—the contractual property described in Section I.2 in
   conjunction with Addendum 2 (“Contractual Object 2”)


Solidas Immobilien und Grundbesitz GmbH

- hereinafter referred to in the following as “Buyer” -

who accepts the sale and conveyance,

for its sole ownership,
with all rights and obligations.

3. Contractual Objects 1 and 2 are collectively referred to in this Sales Contract as the “entire contractual object” or the “contractual objects” and are separately referred to as “the respective contractual object.”

III.

1. Purchase Price

The purchase price for Contractual Object 1 and Contractual Object 2 comes to a total of

€17,000,000.00

(in words: Euro seventeen million).

The purchase price consists of two parts:

Purchase Price 1

Purchase Price 1 is €15,500,000.00 for the property plus the buildings (Contractual Object 1).
Purchase Price 2
Purchase Price 2 is €1,500,000.00 for Seller 2's movable items sold with this deed (Contractual Object 2).

**VAT rule regarding Contractual Object 1**

The following applies to the VAT regarding Contractual Object 1:

1. Seller 1 and Buyer confirm that they are each business owners within the meaning of §2 UStG (Umsatzsteuergesetz [German Value Added Tax Act]). Seller 1 declares that the sale of Contractual Object 1 shall occur within the scope of its business. Buyer guarantees that it shall acquire Contractual Object 1 for its company.

2. Buyer declares that it intends to continue using Seller 1's leasing company in the future. The Parties mutually agree to assume that the sale of Contractual Object 1 does not constitute a taxable sale of an entire business pursuant to §1(1a) UStG, such that the sale is not subject to VAT.
   a) After transfer of possession, Seller 1 shall provide Buyer with all information that is available to Seller 1 and is relevant for an adjustment pursuant to §15a UStG.
   b) Seller 1 shall exempt Buyer from input tax adjustments pursuant to §15a UStG which are caused by Seller 1 because of a change in conditions that are binding on the input tax deduction until the time of transfer of possession and which are to be continued by Buyer because of §15a(10) UStG, starting from the time of transfer of possession for the then still remaining correction period. If an input tax correction entails asserting additional input tax, Buyer is required to pay the additional input tax to Seller 1; this applies independently of whether the relevant, additional input taxes are paid out to Buyer or otherwise offset.
3. As a precaution, but absolutely pursuant to §9 UStG, Seller 1 hereby waives the VAT exemption pursuant to §4(9a) UStG and opts into VAT regarding sales that fall under the GrEstG (Grunderwerbsteuergesetz [German Real Estate Transfer Tax Act]).

   a) If, in the opinion of the German Tax Office with jurisdiction for Seller 1, the sale does not constitute a sale of an entire business pursuant to §1(1a) UStG, the aforementioned Purchase Price 1 is a net purchase price that does not include any VAT. In this case, the VAT that applies to Purchase Price 1 is also owed by Buyer. If, pursuant to §13b(5) in connection with (2) no. 3 UStG, Buyer owes VAT, Buyer shall pay this directly to the German Tax Office. Buyer’s duty to report and pay the VAT that might be owed is solely geared toward the statutory regulations that are binding on Buyer.

   b) Seller 1 shall not invoice Buyer for the VAT that Buyer owes pursuant to §13b UStG. Seller 1 must issue Buyer a proper invoice pursuant to §§14, 14a UStG. The Parties clarify that this contract—alone or with other documents—does not constitute an invoice within the meaning of §§14, 14a UStG.

4. Buyer shall reimburse Seller 1 for all costs and damages that arise from the inaccuracy of the above information.

VAT rule regarding Contractual Object 2

The following applies to the VAT regarding Contractual Object 2:

In addition to Purchase Price 2, VAT is owed in the statutory amount. Accordingly, Seller 2 shall issue Buyer an invoice that meets VAT regulations.
Seller 2 and Buyer assume that the sale of Contractual Object 2 provided for under this contract does not constitute a taxable sale of an entire business pursuant to §1(1a) UStG. In the case that, contrary to the Parties’ opinion, the German Tax Office with jurisdiction assumes a sale of an entire business pursuant to §1(1a) UStG by means of a corresponding, formal, legally valid assessment, the above sections 1 and 2 of the VAT rule regarding Contractual Object 1 apply accordingly.

2. Due Dates

The purchase price for the entire contractual object is due and payable—subject to the rule in Section III.5—after Buyer receives a due date notification from the Notary by registered letter (with a duplicate for Seller) stating that

- Buyer’s notice of conveyance (cf. Section VIII. 1) is registered, wherein the rights listed in Section I of this deed as well as the rights created with the consent or in collaboration with Buyer may have priority;
- a “negative certificate” is available which states that the municipality is not exercising its right of preemption pursuant to the BauGB (Baugesetzbuch [German Construction Code]);
- a “negative certificate” on the right of preemption is available pursuant to the BayNatSchG (Bayerisches Naturschutzgesetz [Bavarian Act on the Protection of Nature]);
- the Notary has all other official permits and notices required for properly registering the transfer of title in the land register (except the clearance certificate due to real estate sales tax) without restrictions.

The purchase price is due 10 bank business days after receipt of the due date notification specified above, but not prior to 12/30/2019.
Account
Purchase Price 1 is to be paid to the following account of Seller 1:

Financial institution: Stadtsparkasse Augsburg
IBAN: DE 31 7205 0000 0250 9438 67
BIC: AUGSDE77XXX
Purpose: Payment on purchase price real estate Gersthofen, Daimlerstr. 22

Purchase Price 2 is to be paid to the following account of Seller 2:

Financial institution: Stadtsparkasse Augsburg
IBAN: DE26 7205 0000 0250 4917 43
BIC: AUGSDE77XXX
Purpose: Payment on purchase price facility equipment Gersthofen, Daimlerstr. 22

3. Default
Buyer is in default after the purchase price due date passes without a further reminder, if Buyer does not pay the purchase price, in whole or in part, to Seller within the payment period designated in Section III.2. Buyer’s receipt of the notification from the Notary about the due date of the purchase price is deemed the event preceding performance within the meaning of §286(2) no. 2 BGB. Buyer is also in default without a further reminder if and to the degree Buyer has not paid the deposit to be paid under Section III.5 to Seller 1’s account at the latest by 12/27/2019. The rule of §286(4) BGB remains unaffected.
4. Buyer’s Submission to Immediate Execution

Buyer’s Submission to Immediate Execution in Relation to Seller 1

Buyer submits all of its assets to immediate mandatory enforcement of this deed in relation to Seller 1 regarding the obligation to pay Purchase Price 1 and regarding any default interest as set forth in section 3 above. With regard to the certainty of the enforcement proceedings, Purchase Price 1 and default interest from this purchase price in the amount of 9% points above the base interest rate pursuant to §247 BGB p.a. is considered owed to Seller 1 as of 12/27/2019. An enforceable duplicate of this deed with Buyer’s above statement to submit to immediate execution can be issued at any time after the purchase price due date passes as set forth in Section III.2 without further proofs. The Notary shall notify Buyer of the issuance of an enforceable duplicate of this deed.

Buyer’s Submission to Immediate Execution in Relation to Seller 2

Buyer submits all of its assets to immediate mandatory enforcement of this deed in relation to Seller 2 regarding the obligation to pay Purchase Price 2 and regarding any default interest as set forth in section 3 above. With regard to the certainty of the enforcement proceedings, Purchase Price 2 and default interest from this purchase price in the amount of 9% points above the base interest rate pursuant to §247 BGB p.a. is considered owed to Seller 2 as of 12/27/2019. An enforceable duplicate of this deed with Buyer’s above statement to submit to immediate execution can be issued at any time after the purchase price due date passes as set forth in Section III.2 without further proofs. The Notary shall notify Buyer of the issuance of an enforceable duplicate of this deed.
Notice

Section VII.4 contains a further statement on submission to immediate mandatory enforcement.

5. Payment of Purchase Price

The parties are in agreement that a partial amount of €2,000,000.00 (in words: two million Euro) of Purchase Price 1 set forth in Section III.1 is due and payable already today, irrespective of the due date set forth in Section III.2, and is to be paid promptly by Buyer no later than 12/27/2019 as a deposit on Purchase Price 1 (also referred to in this Sales Contract as “deposit amount”) to the account of Seller 1 (cf. Section III.2). According to information from Buyer, the deposit amount is paid to the account of Seller 1 on the day of today’s certification. Seller 1 has promptly informed the Notary whether the payment of the deposit amount has been made to its account in a timely manner. The deposit amount is a part of Purchase Price 1—subject to the rule in Section VII. 4.

The Notary has notified Buyer of the fact that payment of the deposit is not a secured advance. Buyer declares that Buyer waives a surety for the deposit and does not desire any other arrangement for payment of the purchase price.

6. Financing Assistance

Seller 1 agrees to provide assistance when ordering enforceable (§800 ZPO [Zivilprozessordnung [German Code of Civil Procedure]]) liens on Contractual Object 1 in favor of German of Austrian financial institutions and insurers and to file the required registration applications with the land registry office.
For the time being, the loan amounts are exclusively to be used for payment of Purchase Price 1 (without the deposit amount set forth in Section III.5) and are to be disbursed to the authorized parties, otherwise to Seller, in accordance with this Sales Contract, when removing encumbrances. The liens initially serve only to secure the amounts actually paid on Purchase Price 1 (without the deposit amount set forth in Section III.5). Further purposes do not apply until the purchase price is paid in full. The deposit set forth in Section III.5 may not be financed by the loan. Upon rescinding this Sales Contract, the creditor must approve deletion of the lien from the land register simultaneous to repayment of the purchase price amounts paid under the contract by the creditor to Seller (if applicable, less the contractual penalty set forth in Section VII.4), considering the removal of existing encumbrances. Ownership rights and secured claims are assigned to Buyer, which are caused by transfer of ownership. Seller 1 grants to Buyer the

**POWER OF ATTORNEY**

to represent it for the purposes of conducting the above legal transactions. Buyer is authorized to grant sub-powers of attorneys. The power of attorney may be exercised only by the officiating Notary or his representative.

**Instructions on power of attorney**

The Notary is instructed to permit the power of attorney to be exercised only under the following conditions:

The documents creating a mortgage may not include a declaration of personal liability of Seller 1.

The power of attorney may be exercised only after Seller 1 has confirmed to the Notary that the deposit has been paid by Buyer (cf. Section III.5).
The Notary is further instructed to report to the creditor the disbursement instructions and the restriction of the purpose and only to register the liens ordered on the basis of the above power of attorney in the land register and to provide the creditor, Buyer and/or another third party with a duplicate as required by the land register and/or with an enforceable copy of the document creating liens on property only after the Notary has a written (text form suffices) declaration of obligation from the creditor regarding the agreed disbursement instructions and the restriction of the purpose (wherein it can be made sure that the declaration of obligation within the meaning of §328 BGB may also be used directly by Seller 1).

The enforcement instructions apply only to the internal relationship to the Notary; the power of attorney applies to the land registry office without restriction.

IV.

Transfer of Possession

(Indirect) ownership, uses, charges, fees, public safety obligations, liabilities, and risks of the respective contractual object transfer to Buyer—Independently of when the purchase price is paid—(automatically) on 12/31/2019 (midnight).

Entering into a Lease Agreement

According to information from Seller 1, Contractual Object 1 is currently completely leased—subject to VAT—to Seller 2. Seller 1 and Seller 2 hereby agree that the Lease Agreement existing between them shall be cancelled and ended, effective at the time of transfer of possession. This previous Lease Agreement between Sellers shall not explicitly be taken over by Buyer.
Buyer (as the future Landlord) and Seller 2 (as the Tenant) hereby enter into the Lease Agreement on the entire contractual object (including all Addenda to the Lease Agreement mentioned therein), appended here as **Addendum 4**, on 1/1/2020 midnight, subject to the condition precedent. Reference is made to the Lease Agreement included in Addendum 4, including all Addenda to the Lease Agreement mentioned therein. Plans and images were submitted for inspection. Additionally, Addendum 4 (including all Addenda mentioned therein) was read aloud, unless otherwise provided in the deed. For purposes of proof, copies of Addenda 7, 10a and 10b to Lease Agreement are appended as Addenda that have not been read aloud. Addendum 1 in the Lease Agreement is identical with Addendum 2 in the primary deed.

Buyer and Seller 2 are in agreement that Seller 2 is entitled in full to all earnings and other economic advantages resulting from use and operation of the solar cell systems available on Contractual Object 1, within the scope and during the term of the Lease Agreement appended as Addendum 4, as of the day of transfer of possession.

Taxes, fees, and other charges that the respective Seller has paid beyond the day of the transfer of possession are to be reimbursed when invoiced.

**Insurance**

Buyer takes over no insurance for the contractual objects from Sellers. Sellers shall keep the insurance in force in the previous scope for each contractual object until transfer of possession and shall then end insurance coverage. Buyer is required to take out the required and adequate insurance coverage of the respective contractual object as of transfer of possession, particularly building insurance against damages caused by natural forces as well as building insurance and property owner liability insurance. Proof of insurance must also be promptly furnished to Seller no later than 1 week after transfer of possession as well as at any time until the purchase price is paid in full to Seller,
upon request of Seller. If Buyer does not provide proof of insurance, Sellers are authorized (but not obligated) to take out insurance coverage as a replacement at the expense of Buyer and keep it in force until the purchase price is paid in full. The Notary has pointed out the statutory cancellation possibilities for property insurance arising out of §96 VVG (Versicherungsvertragsgesetz [German Act on Insurance Policies]); Sellers assume the duty to notify the insurer of the disposal pursuant to §97 VVG. Buyer declares that Buyer does accept any payment obligations for Seller 1 or Seller 2’s insurance going beyond 12/31/2019; the rule in the above sentence 3 half-sentence 2 and the rule of the Lease Agreement appended as Addendum 4 remain unaffected.

V.

Buyer’s Due Diligence, Defects in Title and Material Defects

Sellers have provided Buyer with documents and information on the respective contractual objects (referred to in this Sales Contract as “Due Diligence Documents”) an index of the Due Diligence Documents is appended for information purposes as Addendum 5, which was not read aloud. Buyer has also thoroughly inspected the contractual objects, calling on its own experts and advisers as well, and has conducted legal, technical, tax-related, and economic reviews. Buyer confirms with regard to the contractual objects that Buyer has full knowledge of the documents and information provided by Sellers and their respective legal and actual effects. The Due Diligence Documents as well as the facts and circumstances which are identified in this Sales Contract, including its Addenda, or which were disclosed by Sellers to Buyer in another way prior to today’s certifications, or which were determined by Buyer itself or are discernible from an expert review, are deemed to be known by Buyer. This being the case, the Parties are in agreement that all of Buyer’s claims and rights in relation to Sellers—no matter what kind they are—are excluded provided they refer to the facts or circumstances that are known
to Buyer or are deemed to be known by Buyer. Buyer must attribute to itself as its own knowledge the knowledge and grossly negligent lack of knowledge of the natural persons and employees of legal persons whom it consulted directly or indirectly for the legal, technical, tax-related, and economic review and assessment of the contractual objects for the purposes of this Sales Contract.

Sellers owe the unencumbered transfer of ownership and possession of the respective contractual object, unless agreed to otherwise in this Sales Contract (cf. Section I.1). Encumbrances and commitments that are not assumed and that are entered in the land register are promptly to be eliminated by Seller 1. Declarations that are required to clear encumbrances shall receive consent upon the filing of an application for execution. All claims and rights to which each Seller is entitled regarding the encumbrances to be eliminated are hereby transferred to Buyer, which is caused by payment of the purchase price.

The following is agreed to regarding Contractual Object 1: Buyer’s claims and rights due to other defects in title, particularly due to old legal encumbrances and minimum distances, are excluded; however, Seller 1 declares that it is not aware of any such encumbrances on Contractual Object 1. The Parties are aware of the fact that they may obtain information from the construction authorities regarding the minimum distances.

The Parties agree that the respective contractual object is purchased “as is,” i.e. in the current, used and aged condition. Any defects are not to be eliminated by the respective Seller. Buyer’s claims and rights regarding obvious or latent material defects and defects in title of any kind in the contractual objects such as, e.g. size, dimensions, quality of soil, contaminated sites, other environmental damages, potential to be exploited and developed further, as well as the condition of each contractual object, are also excluded. The respective Seller declares that it is not aware of any latent defects. Sellers do not issue any guarantees for the condition of the respective contractual object.

Exclusion
of liability for material defects shall not apply for willful negligence or malice. Buyer's claim to settlement from Seller due to contamination and other environmental damages—no matter what the legal reason, particularly from §24(2) BBodSchg (Bundes Bodenschutzgesetz [German Federal Act on Soil Conservation]), §9(2) USchadG (Umweltschadengesetz [German Act on Environmental Damage]), §89, 90 WHG (Wasserhaushaltsgesetz [German Act on Water Balance]) and/or §426 BGB—is excluded.

The liability of each Seller for future deterioration to the respective contractual object that goes beyond normal wear and tear (e.g. fire damages) as of today's certification until transfer of possession remains unaffected in accordance with this rule. Buyer bears the burden of proof for the fact that deterioration has occurred after today's certification until transfer of possession. Sellers are not liable for deterioration that constitutes only normal wear and tear or that was foreseeable based on the age and the current structural condition of the respective contractual object. If deterioration is based on an insured event, Buyer must be notified thereof; in this case, the liability of the respective Seller is limited to surrendering the insurance benefit.

Existing building papers (e.g. plans, approval notices) are to be transferred to Buyer after transfer of possession.

Liability for damages from willful negligence or gross negligence of the respective Seller, its legal representatives or assistants remains unaffected, as does the liability for damages from death, bodily injury, or harm to health that are based on the negligence of said individuals, as well as the liability for breach of essential contractual duties (these are duties which must be fulfilled merely to make it possible to properly execute this Sales Contract and compliance with which Buyer may trust).
The respective Seller declares that it is not aware of any commitments or special requirements regarding the guarantee of public funds for the contractual objects.

Additionally, the following is agreed regarding Contractual Object 2: Seller 2 guarantees that it can freely dispose of Contractual Object 2. Buyer is aware of the fact that there may be rights of recovery or preferential claims to Contractual Object 2 (e.g. third-party ownership, such as leasing, leaseback, rights to retention of title). In this regard, Seller 2 guarantees that such rights do not exist at the time of transfer of ownership to Buyer. The Parties are also in agreement that any of Buyer’s claims and rights regarding sold, movable property (also insofar as it might involve essential components or statutory equipment of Contractual Object 1) do not affect the sale of the remaining components of the entire contractual object and in no way entails rescission of the Property Sales Contract.

Should Seller be liable to Buyer under this contract or by operation of law, the relevant claims and rights of Buyer are statute-barred at the end of 12 months as of transfer of possession, provided this is legally permitted.
VI.

Development Costs

Development contributions pursuant to the BauGB (*Baugesetzbuch* [German Building Code]) and fees pursuant to the municipal revenue law for which a notice was issued by the end of yesterday shall be paid by Seller 1; Buyer shall pay the rest. Buyer is aware of the fact that these kinds of notices may be issued also for expenditures incurred previously. Seller 1 warrants that it is not aware of any unpaid notices and that it also has no knowledge of any expenditures that have not already been definitively charged. Seller 1’s advances are to be settled in Buyer’s final charges; no fee is to be paid for the advance.
Rights of Rescission, Right of Preemption

1.

Sellers are uniformly and only collectively authorized—without setting a grace period or reminder—to rescind the part of this Sales Contract governed by the law of obligations with regard to the entire contractual object, if Buyer has not paid the deposit amount (Section III.5) in full to Seller 1's account at the latest by 12/27/2019.

Furthermore, Sellers are uniformly and only collectively authorized to rescind the part of this Sales Contract governed by the law of obligations with regard to the entire contractual object if Buyer is in default, in whole or in part, with payment of the (remaining) purchase price (Section III.1 para. 1) under the rules of this Sales Contract and/or with payment of default interest incurred (Section III.3) and Sellers have set a further, unsuccessful grace period of two weeks for Buyer to settle outstanding amounts and/or Sellers are held liable for the costs to be borne by Buyer under this Sales Contract (e.g. costs of Notary and or the land register, real estate sales tax) and Buyer does not prove to Seller, at its request, payment of the respective costs within two weeks.

Sellers rights of rescission lapse if Buyer has paid the outstanding amount before the respective Seller’s declaration of rescission is received by the Notary (cf. Section VII.3).

If Sellers exercise a right of rescission arising out of this Section 1, the rule on covering costs set forth in Section X continues to apply, wherein Buyer shall also bear the costs of rescission.
2.
Reference has been made to the statutory—partially price-limited—right of preemption pursuant to the BauGB, particularly to its scope, exercise, and effect. Reference has also been made to the “negative certificate” required for properly registering the transfer of title. In the event that the right of preemption is exercised, it is agreed that there is no right to performance of the contract or compensation for damages and, in this case, Sellers are uniformly and collectively authorized to rescind the part of this Sales Contract governed by the law of obligations in relation to the entire contractual object. In the case of such rescission, Seller shall bear the costs within the meaning of Section X for the Notary and the land registry office. This does not apply if a right of preemption under public law is exercised only for secondary partial areas of Contractual Object 1 (e.g. public walkways the property areas that are not built up); in this case, only the relevant partial areas are dropped from Contractual Object 1, without this leading to an adjustment of the purchase price, wherein Seller 1 must surrender to Buyer compensation that Seller 1 actually obtains from the party with the right of preemption due to it being exercised. The above rules apply only to any right of preemption pursuant to the BayNatSchG.

Further, potential statutory rights of preemption were discussed. Indications for the existence of such rights of preemption do not exist, according to information from the Parties.

3.
Any rescission is to be declared in writing to the Notary, who is irrevocably and unconditionally authorized to receive the rescission declaration. After the Notary receives said declaration, the Notary is required promptly to forward a copy of the rescission declaration of one Party to the other Party.
4.

If Sellers exercise a right of rescission from Section VII.1, Sellers, as joint and several creditors, are also entitled to a part of the deposit amount as set forth in Section III.5 in the amount of €500,000.00 (in words: five hundred thousand Euro) as a flat-rate contractual penalty, which is applied to other costs and damages of Sellers.

Buyer's Submission to Immediate, Mandatory Enforcement

Buyer submits all of its assets to immediate mandatory enforcement of this deed in relation to Sellers, as joint and several creditors, regarding the obligation to pay the flat-rate contractual penalty in the amount of €500,000.00. With regard to the certainty of the enforcement proceedings, default interest from this flat-rate contractual penalty of €500,000.00 in the amount of 9% points above the base interest rate pursuant to §247 BGB p.a. is considered owed to Sellers as of today's date of certification. Sellers are authorized to have an enforceable copy of this deed of sale issued at any time, at their request, with Buyer’s statement to submit to immediate, mandatory enforcement, without further proofs being required for this. This is not connected with a shift in burden of proof. The Notary shall notify Buyer if an enforceable duplicate of this deed of sale is issued. It is clarified that Sellers may request only payments in accordance with the stipulations of this Sales Contract, even by way of mandatory enforcement.
1. Priority Notice of Conveyance

To secure Buyer’s acquisition claim with regard to Contractual Object 1, Seller 1 approves and requests that Buyer enter in the land register a priority notice of conveyance for the property detailed in Section I.1.

Simultaneous to execution of conveyance, deletion of the priority notice of conveyance is approved and requested, provided that no entries have been made in the interim without Buyer’s consent or collaboration.

Execution Instructions Regarding the Priority Notice of Conveyance and Execution of the Sales Contract

The Notary has been unanimously, unilaterally, and irrevocably instructed by the Parties to execute and/or arrange for the execution of this Sales Contract deed, particularly to file a request to register the priority notice of conveyance at the land register office only if Seller 1 has confirmed to the Notary in writing or, alternatively, Buyer has proven by a bank confirmation that the deposit set forth in Section III.5 has been paid in full. Until then, duplicates and certified copies of this deed of sale shall be issued only without the consent declaration set forth in the above paragraph.
Deletion of the Priority Notice of Conveyance

The priority notice of conveyance approved in this Section VIII.1 is subject to conditions precedent; this shall be noted accordingly in the land register with the priority notice of conveyance. The condition precedent is (cumulatively) the receipt (i) of the Notary's own documents (cf. Section IX) by the land register office, in which it is confirmed that the conditions stated below in letter a) to c) are fulfilled (the content of which does not need to be reviewed by the land register office), and (ii) of a request made by the Notary to the land register office to delete the priority notice of conveyance. The Notary has been unanimously, unilaterally, and irrevocably commissioned and instructed by the Parties promptly to request deletion of the priority notice of conveyance from the land register office and to arrange for it, if the following conditions are met:

a) Seller 1 has requested the Notary in writing to delete the priority notice of conveyance and has submitted to the Notary documents which conclusively show that Sellers or Buyer have withdrawn from the Sales Contract and/or Buyer's claim to execute this Sales Contract has lapsed.

b) The Notary has sent Buyer the request from Seller 1 (including the documents specified above in letter a)) and has requested in writing that Buyer make a statement within a period of 2 weeks after receipt of the request.

c) Buyer has consented in writing to the deletion or has not objected to the Notary in writing to deletion within the 2-week notice period; if Buyer objects to deletion, then the Notary may not arrange for deletion of the priority notice of conveyance only if Buyer proves to the Notary with a period of a further 2 weeks that Buyer has initiated legal proceedings (proceedings with the scope of temporary legal protection is sufficient) in which deletion of the priority notice of conveyance is allegedly prohibited.
If part of the purchase price is paid, then deletion of the priority notice of conveyance shall occur simultaneous to fulfillment of Buyer's corresponding refund claim for said purchase price amount—subject to the rule in Section VII.4.

2. Conveyance

Seller 1 and Buyer are in agreement about the transfer of ownership of Contractual Object 1 as set forth in Section II.1. Seller 1 approves and Buyer requests that the legal change be entered in the land register.

Execution Instructions Regarding Conveyance

The Parties instruct the Notary to request transfer of ownership only if full payment of the purchase price to Seller has been confirmed by one of Sellers or has been proven to the Notary. The Parties waive their right to make the request independently. Prior to the specified point in time, only certified copies and duplicates without conveyance may be issued. Sellers agree to promptly confirm in writing to the Notary that the purchase price and any default interest has been paid in full.
The Parties—each separately and alone—commission and authorize the Notary:

- to execute this Sales Contract in every respect; partial execution of this Sales Contract is permitted, provided that nothing to the contrary is stated in this Sales Contract;
- to obtain and receive declarations on releasing encumbrances as well as all official permits and notices required for executing the deed, particularly the “negative certificates” on the right of preemption;
- to apply for permits; permits without restrictions and conditions should be deemed communicated and legally effective upon receipt by the Notary.

Furthermore, the Notary is authorized to represent the Parties unreservedly in the land register procedure. The officiating Notary's powers and authorizations put down in writing in this Sales Contract apply accordingly for their partners, officially appointed representatives and successors. They must also follow the specifications on processing the Sales Contract, which are put down in writing in this Sales Contract.
Execution Instructions Regarding the Priority Notice of Conveyance and Execution of the Sales Contract
Reference is made to the Execution Instruction in Section VIII.1.

X.

All costs incurred from this contract and its execution, including any costs for permits and real estate sales tax shall be covered by Buyer, provided that nothing to the contrary is stated in this Sales Contract. However, Seller 1 shall cover any additional costs because of releasing encumbrances.

Duplicate of this deed shall be received by:
- all Parties
- the land register office (2, in excerpts)
- the German tax office - real estate tax office
- expert committees
- any of Buyer’s financial creditors
- Attorney Mr. Philip G Wiljan via email.

XI.

The Parties have been notified that
- non-certified agreements are invalid and may entail the invalidity of the contract;
- ownership of Contractual Object 1 transfers only upon entry in the land register and this may take place only if the required permits and statements on preemption rights as well as the clearance certificate from the German Tax Office have been issued and all costs have been paid;
- The contractual property and the Parties are liable for costs, taxes, public fees, charges, and development contributions;

- the Notary does not review business questions, e.g., the fairness of service and return service, the Parties’ creditworthiness, or tax effects;

- for soil contamination or contaminated sites, there are liability risks for all Parties under the BBodSchG;

- any advance performance from one side is a matter of trust; security options were mentioned in detail.

Reference was made to a possible tax obligation for the sale of company assets, as well as to other tax questions (e.g., regarding the UStG). The Notary, however, does not provide any tax advice. It was recommended that tax advice be obtained prior to entering into today’s certification. The Parties further state that they have obtained tax advice.

Furthermore, reference was made to the fact that property-related insurance normally transfers to Buyer without timely termination. Prior to transfer of possession, Buyer should clarify insurance coverage and its continuation with the insurer.

Reference was made to legal questions and questions of doubt regarding agreements in the present deed (plus Addenda), e.g., regarding the Lease Agreement. The request is nonetheless made to provide unamended certification.

Foreign law, particularly the law of the USA, might apply regarding the present deed. The Notary is not familiar with foreign law. The Parties do not desire to call in a foreign attorney or an expert opinion report from a scientific institution, but instead insist on immediate certification and release the Notary from any liability.

The contracting Parties confirm their joint understanding that German law is applicable to this contract. As a precaution, they agree to the application of German law.
XII. Consent of Shareholders of Seller 1 and 2

The consent of the shareholders of Seller 1 and Seller 2 is required for the present deed.

Party 1 who appeared declares that the required shareholders’ resolution from the shareholders of Seller 1 and of Seller 2, in which it consents to the sale of the respective contractual objects to Buyer, was drafted on 12/10/2019. A copy thereof has been provided to Buyer.

XIII. Rule for Contractual Object 1 and Contractual Object 2

The Parties are in agreement that the sale of Contractual Object 1 and of Contractual Object 2 is the subject matter of a legal and economically uniform Sales Contract. Execution, amendment, and rescission of this Sales Contract may, therefore, take place only wholly and uniformly for the entire contractual object, provided that nothing to the contrary is stated in this Sales Contract.

It is clarified that Seller’s obligations resulting from this Sales Contract basically extend only to the contractual object that the respective Seller is selling to Buyer as set forth in Section II. There is no joint and several liability of one Seller for the obligations of the other Seller in relation to Buyer arising out of and in connection with this deed of sale.
XIV.
The Parties agree to the confidentiality of the facts relating to entering into this contract, to the purchase price, as well as to the content of this Sales Contract, provided that this non-disclosure agreement is not in conflict with any legal or official obligation on disclosure and announcement (including on the basis of the U.S. Securities Laws), with enforceable court decisions, or with agreements under German company law, or disclosure is required to execute this Sales Contract or to enforce claims under this Sales Contract. This non-disclosure agreement applies even if this Sales Contract is rescinded—no matter the reason.

XV.
Should one or several provisions of this Sales Agreement be or become invalid or unenforceable, the other provisions are unaffected thereby, if in doubt. The Parties agree to replace the invalid or unenforceable provision by a provision that comes as close as possible to the actual and/or business content of the invalid or unenforceable provision in a permitted way. The same shall apply in the case of loopholes. If it is necessary to create a supplemental document for this, the Parties agree to be involved in that.

XVI.
Sellers state that the solar cell system located on contractual property 1 belongs to Seller 2 (see Addendum 2). It is a pillar-mounted system.

XVII.
Reference is made to all Addenda. Plans and images were submitted for inspection. Additionally, the Addenda were read aloud, unless otherwise provided in the deed.
Addendum 1 is submitted for inspection.

Addenda 2, 3, and 4 were read aloud. Addendum 2 in the primary deed is identical with Addendum 1 in the Lease Agreement.
Reference is made to Addendum 5; it is appended to this record. The Parties refrain from having them read aloud. The Addendum was submitted to the Parties for acknowledgement and has been signed by them on every page.

The record was read aloud in the presence of the Notary, approved by the Parties and signed by hand.
ATTERTATIONS TO POWER OF REPRESENTATION

After having inspected the Commercial Register of the Augsburg District Court on today's date, I attest to the following:

1. - **ExOne Property GmbH**, with the registered office in Gersthofen, is entered in the Commercial Register under HRB 28119;
   - Mr. Eric Bader, as the sole managing director, is authorized to represent this GmbH with the power to conduct legal transactions on behalf of the company with itself, on his own behalf or as a representative of a third party.

2. - **ExOne GmbH**, with the registered office in Gersthofen, is entered in the Commercial Register under HRB 20036;
   - Mr. Eric Bader, as the managing director with power of sole representation, is authorized to represent this GmbH with the power to conduct legal transactions on behalf of the company with itself, on his own behalf or as a representative of a third party.

3. - **Solidas Immobilien und Grundbesitz GmbH**, with the registered office in Augsburg, is entered in the Commercial Register under HRB 22290;
   - Mr. Anton Kopp, as the managing director with power of sole representation, is authorized to represent this GmbH with the power to conduct legal transactions on behalf of the company with itself, on his own behalf or as a representative of a third party.

Augsburg, on December 10, 2019

Bernhard Hille
Notary

2095_19_EN
LEASE AGREEMENT
FOR COMMERCIAL SPACES

between
Solidas Immobilien und Grundbesitz GmbH, Ludwigstr. 13, 86152 Augsburg
VAT ID DE 256334695

hereinafter referred to as “Landlord”

and
ExOne GmbH, Daimlerstr. 22, 86368 Gersthofen
represented by the Managing Director, Mr. Eric Bader

hereinafter referred to as “Tenant”

The following Lease Agreement is entered into:

Preliminary Remarks

On today’s date, Landlord has entered into a notarized Property Sales Contract with ExOne Property GmbH, Daimlerstr. 22, 86368 Gersthofen, and with Tenant. The Property Sales Contract pertains to the acquisition of the leased premises detailed in §1. Transfer of possession, use, and encumbrances on the leased premises to Landlord shall take place on 12/31/2019 at midnight.
§ 1 Leased Premises and Price of Rent

The subject matter of the Leased Agreement is the real estate property located at Daimlerstrasse 22, 86368 Gersthofen, land parcel 647/2 (Augsburg District Court, Land Register of Gersthofen, sheet 14979), with the legal components related to it, as well as the operating equipment (particularly the overhead crane systems, ventilation systems, and solar systems) as set forth in Addendum 1.

The rental areas consist of approx. 3,187 m² to be used as offices and social areas (office building, including 1st and 2nd floor storage and production hall, including approx. 628 m² of unfinished areas as archive rooms on the 2nd floor storage and production hall) and approx. 13,660 m² to be used as a storage and production hall (ground floor storage and production hall), as well as the remaining property areas of land parcel 647/2 of the district of Gersthofen with the 148 automobile parking spaces located there. All rental areas can be viewed in the ground plans set forth in Addendum 2.

At its own discretion, Tenant is at liberty to use the solar cell systems that are part of the leased property. Said use is compensated by the base rent set forth below; Tenant alone is fully entitled to income produced and any economic advantages from operating the solar cell systems within the scope of their use.

The monthly price of rent is agreed as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base rent</td>
<td>EUR 125,000.00</td>
</tr>
<tr>
<td>plus VAT in the applicable statutory amount</td>
<td>EUR 23,750.00</td>
</tr>
<tr>
<td>(currently 19 %)</td>
<td></td>
</tr>
<tr>
<td>Total rent</td>
<td>EUR 148,750.00</td>
</tr>
</tbody>
</table>

The leased areas are presented in the layout and in the ground plans (Addendum 2), which are appended to this contract as essential components thereof.
The room partitions drawn into the layout (Addendum 2) partially do not match the actual condition of the leased premises and are thus not binding. The Parties shall document the actual condition of the room partitions in the transfer report (cf. §3).

Rent is subject to the rent adjustment clause agreed to in §5.

The obligation to pay rent commences on 1/1/2020. The Parties agree, however, that the rent and operating costs set forth in §6, which are due and payable by Tenant starting 1/1/2020 through the calendar day when Landlord’s purchase price is paid in accordance with the Sales Contract on the acquisition of the leased premises (cf. Preliminary Remarks), must first be paid to Landlord (retroactively) within 10 bank work days after the purchase price is paid in full.

Subject to the rule set forth in the paragraph above, the total rent must be paid monthly in advance by the 3rd work day of each month, without deductions, to Landlord’s account.

Banking details will be provided.

§ 2 Rental Purpose, Use

The leased property is leased exclusively for use as a production location as described above with production and storage areas, research and development areas, office spaces, archive rooms (particularly unfinished areas on the 2nd floor of the storage and production hall), and social areas, as well as a factory cafeteria. The information about the area set forth in §1(2) and §2 does not entail a restriction in terms of the position and the scope of the allowed uses within the rental property. Changes to the purpose of use require the prior written consent of Landlord, who may refuse only for due cause.

However, Landlord may make consent contingent on a reasonable surcharge to the rent, if the desired new use is more demanding on the rental property.
Tenant shall obtain all required official permits and/or licenses that are associated with its operation, at its own expense and at its own risk, insofar as they are related to the person of Tenant and its companies. The above rules do not apply if the denial or cancellation of a permit/permission and/or if public restrictions and stipulations are based on the—even structural—quality and/or the location of the leased premises.

Landlord does not guarantee any protection from competition.

§ 3 Condition of Leased Premises, Transfer of Areas

Tenant is aware of the leased area in the current condition. Prior to entering into the Lease Agreement, Tenant has thoroughly inspected all rental areas and has examined them for their suitability for the rental purpose; Tenant shall be the user of the rental area after the first sale of the rental property. The Parties shall document the condition of the rental area after the start of lease in a transfer report. The rent shall also be owed to the full extent if the actual dimensions of the area differ from the areas set forth in §1 Leased Premises and Price of Rent of this Lease Agreement.

§ 4 Term of Lease, Termination, Condition Precedent, Right of Rescission

The tenancy shall commence on 1/1/2020 and has a fixed term until 12/31/2022.

Tenant has the right to renew the Lease Agreement twice by a unilateral option, each for five additional years. The exercising of the option right must have been communicated to Landlord in writing no later than 9 months prior to the end of the fixed term.

If Tenant continues to use the rental property after the end of the lease term—if renewed, then after the option period—the tenancy renews for an indefinite period of time and may be terminated by either side with a notice period of 9 months.
Landlord may terminate the Lease Agreement with immediate effect, if Tenant is culpably in arrears with payments. The statutory provisions under the BGB (Bürgerliches Gesetzbuch [German Civil Code]) apply to termination. Termination must be issued by registered letter.

The Lease Agreement is subject to the condition precedent of the effectiveness of the Sales Contract for the leased premises (cf. Preliminary Remarks) which is entered into on today’s date between ExOne Property GmbH, Daimlerstr. 22, 86368 Gersthofen, and Tenant.

In the event that the Sales Contract for the leased premises is reversed or if, for any other reason, it fails to materialize, Tenant is authorized to rescind this Lease Agreement without notice. The right of rescission is to be exercised by registered letter.

§ 5 Rent Indexing

Regarding future rent increases, the Parties adopt the following agreements:

The rent set forth in §1 is firmly agreed to for the fixed term until 12/31/2022. Should Tenant exercise the option right set forth in §4, the rent is subject to the value adjustment starting 1/1/2023. The basis for the value adjustment is the consumer price index for Germany established by the Federal Statistical Office for January 2023.

The rent is first adjusted on January 2024 and shall increase or decrease by the change in percent of the consumer price index from January 2023 to January 2024.

The rent shall then be adjusted annually on the basis of the consumer price index for January of the respective calendar year.

The rent shall be adjusted automatically each year, effective as of January 1 of the running calendar year, without requiring a notification thereof by one of the contracting Parties. The changed amount is to be paid or reimbursed, if applicable, also retroactively for the time starting January 1 of the running calendar year, as soon as the eligible Party
has accurately calculated and notified the other Party of the rent adjustment, at least in writing without a signature. The respective Party who is under a payment obligation, however, defaults on (subsequent) payment of the difference no sooner than 30 calendar days after receipt of the notice from the eligible Party of the rent adjustment.

§ 6 Operating Costs

In addition to the rent set forth in §1, Tenant shall **directly** cover all operating costs stated below that are incurred on the rental property, except for property tax and building insurance. The property tax and building insurance shall be invoiced to Tenant separately. The costs for building insurance that are to be paid by Tenant for the first rental period from 1/1/2020 until 12/31/2022 are limited to a maximum of EUR 40,000.00 gross, including insurance tax per calendar year.

The operating costs incurred on the rental property are the operating costs set forth in §§1 and 2 nos. 1-16 of the BetrKV (*Betriebskostenverordnung* [German Operating Costs Regulation]), as amended. The currently updated version is appended to the contract as **Addendum 7**.

Moreover, Tenant shall cover the following, additional operating costs (§2 no. 17 BetrKV):

- climate control system, ventilation systems
- grease separator
- fire-detection systems
- legionella inspections
- disposal of special waste
- window cleaning, facade cleaning, guttering cleaning, and flat roof cleaning
- maintenance and management of the locks
- maintenance of barricades
- fire extinguishers (this includes the costs of regular maintenance and costs of replacing the extinguishing agent)
- smoke outlet/built-in fire hydrants (this includes the costs of regular maintenance)
- solar cell systems

To this extent, Tenant shall cover all allocable operating costs that Landlord regularly incurs for the building or the rental unit and that proportionally apply to the tenancy.

Operating costs that are not recorded separately for the rental area are proportionally billed by Landlord to Tenant.

The size of the portion arises out of the relationship between:

the leasable area of the whole property to the rental area of this contract.

To determine the heating costs, Landlord shall rent electronic heat-cost meters—to the degree actually required.

If ongoing operating costs are not allocated directly to Tenant, they are divided up based on the size of the rental area in relation to the total area of the billing unit. For instance, these are costs for water, drainage, ventilation, and the climate control systems.

If possible, Tenant shall settle operating costs directly with the respective billing company.

A monthly advance payment for operating costs is not agreed to.
The operating costs not covered directly by Tenant are billed on 12/31 of each year; this bill should be issued by 12/31 of the respective subsequent year. Any back payment or late payment is due within 14 days. It is nonetheless agreed that the property tax and building insurance shall be billed to Tenant shortly after they are due.

§ 7 Insurance

Tenant agrees to take out business liability insurance with a sum insured of $2,500,000.00 and to provide proof of insurance to Landlord upon request.

§ 8 Public Safety Obligation

As of transfer of premises, Tenant shall assume the obligation to maintain public safety in the rental property as well as in the entrance area to the buildings of the rental property on the contractual property.

Tenant is also responsible for the public safety obligation outside the building of the rental property, particularly the duty to clean up trash, remove snow, and spread de-icing agents on the contractual property. The costs for this are borne by Tenant.

§ 9 Upkeep and Structural Changes

Repairs and upkeep costs to the structural parts of the rental property (“roof and building structure”) shall be charged to Landlord. Tenant is required to carry out the ongoing upkeep and repair required due to use on the inside of the rental spaces. “Roof” within the meaning of these rules is the roof structure with the roofing materials and the relevant plumbing work (gutters), including canopies, awnings, and glass roofs, as well as entrances and exits to the roof. “Building structure” within the meaning of these rules is the load-bearing parts of the building (all foundations, load-bearing walls, exterior walls, as well as the parts that are firmly connected to the property, ceilings of the different floors, the facade, including facade lining, all technical equipment laid inside the exterior wall up to the exit into the leased premises, as well as the chimney).
Tenant shall properly carry out all repair and upkeep work required due to use inside the rental space as well as use of technical equipment, including the solar cell systems which are provided exclusively to Tenant and/or are used exclusively by Tenant. Tenant shall also keep all systems in a usable condition. This also includes all cosmetic repairs and replacements.

Cost limits:

The above obligations of Tenant to carry out upkeep and repair measures, including replacements, are limited to measures whose costs (incl. VAT) per instance are no more than EUR 500.00 plus VAT in the applicable statutory amount (currently 19%) and p.a. are not more than a maximum of 4% of the annual rent (base, net). The aforementioned cost limits do not apply to the solar cell systems.

The above obligations of Tenant to carry out upkeep and repair measures, including replacements, are also excluded if the upkeep and/or repair need does not pertain to damages caused by third parties who are Tenant’s responsibility and/or does pertain to damages caused by Landlord.

Wear and tear and damages that are culpably caused and traced back to Tenant’s non-contractual use of leased property, as well as damages that are caused by the fault of Tenant, its employees, or other individuals who are connected with Tenant’s business operations, are to be corrected or reported by Tenant. Structural changes to the rental property require the prior written consent of Landlord, who may refuse only for due cause. If official permits might be required, they must be obtained by Tenant at its expense and proven to Landlord upon request.

Tenant is authorized to install equipment that appear necessary to it to use the rental property, provided that it is not detrimental to Landlord’s protectable interests and/or it does not harm other tenants of the rental property.
Official conditions that are issued in relation to the rental property after transfer of premises and are based in Tenant’s conduct, or business management, or the nature of their business are to be fulfilled by Tenant at its expense.

§ 10 Advertising

If Tenant intends to install its company signs or other outside advertising on the rental property, then the design thereof must be discussed with Landlord. Additionally, Tenant is authorized to install advertisements such as display windows, signs, billboards, flags, etc. on the exterior front of the property after receiving the prior written consent of Landlord and after receiving the official permit. Landlord may refuse consent only for due cause. An advertising system in accordance with the advertisement concept appended to this Lease Agreement in Addendum 8 is hereby approved by Landlord.

At the end of the tenancy, Tenant must remove its company signs.

§ 11 Return of Leased Premises

Tenant is required to return the rental property swept clean after the end of the tenancy, after having fulfilled its obligations to carry out cosmetic repairs and for normal wear and tear. All keys transferred to Tenant must also be returned.

Movable belongings of Tenant are to be properly removed from the rental spaces. Tenant is not required to return the leased premises to the condition set forth in the layout (Addendum 2) or to produce that condition.

Tenant must furthermore eliminate all damages that are culpably caused by Tenant, its agents, or individuals who are in the rental property with Tenant’s knowledge and volition.
§ 12  Sublease

With the approval of Landlord, Tenant is authorized to sublease the entire leased premises, in whole or in part. Landlord may refuse consent only if due cause requires this. Due cause is especially present if, for example, the subtenant does not render services in the leased premises that are subject to VAT, unless Tenant already declares to be prepared to settle with Landlord costs and financial disadvantages incurred thereby (e.g. input tax authorizations in the sense of §15a UStG (Umsatzsteuergesetz [German Value Added Tax Act])). Landlord here and now issues consent to sublease or to transfer use of partial areas of the rental property to Sandhelden GmbH & Co. KG and/or the DTS Catering and Planning/Thomas Schnörzinger. The relevant contracts are appended as Addenda 10a and 10b. The contract with DTS Catering & Planning/Thomas Schnörzinger was entered into on 6/26/2014 (a copy of which is appended in Addendum 10a for purposes of proof). The contract with Sandhelden GmbH & Co. KG was entered into on 4/12/2017 (a copy of which is appended in Addendum 10b for purposes of proof).

If Landlord issues its consent to sublease, then Tenant’s duties nonetheless continue to exist in relation to Landlord to fulfill all claims arising out of this contract.

The sublease contract ends no later than the end of this Lease Agreement. The subtenant is granted no option rights. At the end of the existing Lease Agreement, a new Lease Agreement may be entered into between Landlord and the subtenant.

§ 13  Sale of Rental Property, Transfer to Third Party with Consent of Tenant

In the event of a sale of the rental property, the statutory rules apply; in particular, §566(2) BGB and all of Landlord’s duties existing until transfer of ownership remain unaffected.

Landlord may make one or several third parties endowed with rights arising out of this Lease Agreement in such a way that they, in lieu of Landlord, may request Tenant’s payments.
The third party or third parties within the meaning of this rule in this §13 must be the owner, co-owner, or holder of equivalent land rights pertaining to the property which forms the subject matter of this Lease Agreement.

The rights and duties of Tenant arising from this Lease Agreement are not affected by such a change.

If there is a change in Tenant’s legal form or in the composition of the shareholders, then Tenant’s rights and obligations continue to exist unchanged.

The same applies in the case of a sale or another legal successor of Tenant, provided that it is not connected with a change in industry.

§ 14 Rent Security Deposit

As a security of all of Tenant’s obligations arising from this Lease Agreement during the period of the fixed term of lease as set forth in §4(1) sentence 1, Landlord shall receive a Patronage Declaration from Tenant’s parent company, The ExOne Company, in accordance with the sample in Addendum 9. This Patronage Declaration shall expire after the end of the fixed term of lease set forth in §4(1) sentence 1. After fulfilling all of Tenant’s obligations which arise out of this Lease Agreement and which are secured by the aforementioned Patronage Declaration, the original copy of the Patronage Declaration must be returned no later than the end of the fixed term of lease set forth in §4(1) sentence 1.

In the case that Tenant exercises the renewal option set forth in §4(1) sentence 2, the above rules in §14 apply; that is, Landlord shall receive a Patronage Declaration for the respective renewal period simultaneously against return to Tenant of the original Patronage Declaration for the preceding period.

For Landlord’s claims arising out of the tenancy, Landlord is not entitled to a lien against Tenant’s property brought into the premises. §562 BGB is excluded.
§ 15  Secondary Duties

Landlord and Tenant promise to coexist in a trusting community in the property both with each other and with the other tenants and, to this end, to show mutual respect.

Tenant must promptly notify Landlord of damages to the rental property as soon Tenant notices them, provided they are to be repaired by Landlord.

Even if Tenant does not intend to heat its rental spaces, then Tenant must at least adjust the temperature to make them frost-proof.

Landlord or its authorized representative is authorized to enter the rental spaces during business hours for legitimate cause to inspect the structural condition. Landlord must set up an appointment with Tenant for said inspection in advance. An inspection shall take place in the presence of an employee of Tenant.

If the tenancy is terminated, then Landlord is authorized to perform inspections during normal business hours with prospective tenants.

Landlord is not authorized to use Tenant’s name, trademarks or logo without the prior consent of Tenant.

§ 16  Right of Termination Without Notice

Each Party is authorized to terminate the tenancy without notice and to request that premises be immediately vacated, if Tenant has culpably violated essential provisions of this contract in spite of a prior written warning and a grace period of 2 months, particularly use of the rental property in breach of contract, i.e. Tenant uses the rental property contrary to the agreed purpose of use or contrary to use that is permitted under public law, provided that continuation of the tenancy cannot be reasonable for the other contracting Party, considering all circumstances of the individual case, particularly the fault of the contracting Parties, and weighing the interests of both sides.
In the case of the early end of the tenancy due to reasons for which Tenant is responsible, Tenant is liable for the following obligations:

The same rent must continue to be paid for the unexpired part of the agreed term of lease, unless this is compensated for by another lease or use of the rental property procured by Landlord.

The ongoing costs (telephone fees, electricity base fees, chimney sweep base fees, etc.) must also continue to be paid.

Assertion of further claims to compensation for damages as well as the claim to performance are hereby not excluded. This liability ends at the end of the agreed term of lease; however, with the move-in of a new tenant, liability ends at the latest one year after Tenant moves out.

Landlord is required to mitigate damages pursuant to §254 BGB. Additionally, Tenant is at liberty to prove that Landlord incurred less damages.

§ 18 Invalidity, Collateral Agreements, and Place of Performance, Written Form

If any of the provisions of this contract might be invalid, the contracting Parties are in agreement that the invalid provision shall be replaced by a valid one that comes as close as possible to its spirit and purpose.

This contract may be amended or supplemented only by written agreement. That applies to waiver of the written form requirement as well. There are no verbal side agreements. They are legally invalid and they must be executed in writing in order to be valid (written form requirement).
The place of payment and place of performance is Augsburg. For disputes arising from this contract that are asserted by means of summary proceedings for a payment order (§§688 ff. ZPO [German Code of Civil Procedure]), the respective jurisdiction for Augsburg is binding. This jurisdiction is also agreed in the case that, after entering into this contract, Tenant moves its place of residence or permanent address away from the applicability of said law or the place of residence or permanent address is not known at the time when the lawsuit is filed.

The Parties are aware of the statutory written form requirements of §§550, 578 126 BGB. They hereby mutually agree, at the request of a Party at any time, to perform all actions and to submit all declarations that are required to satisfy the statutory written form requirement. This applies not only to entering into this contract, but also to all other supplements, amendments, and other contracts and addenda to this contract. The Parties agree that termination of this Lease Agreement due to noncompliance with the written form requirement constitutes a violation of good faith, unless all reasonable efforts have been made prior thereto in order to fulfill the requirement that the Lease Agreement be executed in writing. This clause on the obligation to cure violations of the written form requirement does not apply to a future buyer of the property due to the protective purpose of §550 BGB. In the case that the leased premises are sold and the tenancy transfers to the buyer as the new landlord, Tenant agrees to enter into an identical clause regarding the written form requirement in a Supplement with said buyer, if the buyer requests this. In order to protect Tenant’s interests, Landlord is required to obligate a future buyer in a Sales Contract (agreement pursuant to §328 BGB) to enter into a Supplement with Tenant that contains a clause regarding the written form requirement, if Tenant requests this.
§ 19 Confidentiality

The Parties are required not to disclose the agreements adopted in this contract and to keep them confidential. They may not provide them or make them available to third parties, in whole or in part. Third parties are deemed to be all other individuals who do not absolutely or provably have to receive the information in this contract to properly and professionally perform this contract. Third parties within the meaning of this provision do not include financial institutions participating in financing the building, as well as the accountants and legal advisors and supervisory bodies of the respective Parties as well as, in the case of an intended sale, the prospective buyers and their advisors. Furthermore, the Parties are authorized to disclose the agreements adopted in this contract to authorities and state institutions and to provide and issue all information that is required due to official inquiries and particularly due to the U.S. Securities Laws. The Parties are required to adopt appropriate measures that ensure that their employees and advisors maintain the confidentiality of the agreements adopted in this contract and that they are equally subject to this non-disclosure agreement or that they enter into a comparable confidentiality obligation.

In connection with entering into and executing this tenancy, the Parties shall properly conduct their business in the leased premises at all times, including the renovations measures they might be responsible for, and in compliance with the applicable laws and regulations, provided they apply to the respective Party.
Addenda:

Addendum 1  Operating Equipment
Addendum 2  Layout and Ground Plan for the Entire Rental Areas
Addendum 7  Operating Costs Regulation
Addendum 8  Advertisement Concept
Addendum 9  Patronage Declaration of The ExOne Company (sample)
Addendum 10a  Usage Agreement DTS
Addendum 10b  Rental Agreement Sandhelden with Addenda 1 and 2

Augsburg, on ________________

Solidas Immobilien & Grundbesitz GmbH  ExOne GmbH
- Landlord -  - Tenant -
FIRST AMENDMENT TO CREDIT AGREEMENT

This FIRST AMENDMENT TO CREDIT AGREEMENT (the “Amendment”), dated as of February 18, 2020, is made by and among THE EXONE COMPANY, a Delaware corporation (the “Borrower”), EXONE AMERICAS LLC, a Delaware limited liability company (“ExOne Americas”) and EXONE GmbH, a German company (“ExOne GmbH”; together with ExOne Americas, the “Guarantors”), and LBM HOLDINGS LLC, a Pennsylvania limited liability company (the “Lender”).

RECITALS

WHEREAS, reference is made to that certain Credit Agreement, dated as of March 12, 2018, by and between the Borrower, Guarantors, and the Lender (as heretofore and hereafter amended, the “Credit Agreement”);

WHEREAS, the parties hereto desire to amend certain terms of the Credit Agreement in such a manner that, upon giving effect to such amendments, the Credit Agreement as so amended would contain the terms, covenants, conditions and other provisions as contained in the form of Credit Agreement set forth as Annex A to this Amendment (the “Consolidated Form Credit Agreement”) as hereinafter provided.

NOW, THEREFORE, the parties hereto, in consideration of their mutual covenants and agreements hereinafter set forth, and intending to be legally bound hereby, covenant and agree as follows:

AGREEMENT

1. Definitions; Incorporation by Reference. All capitalized terms used and not defined herein shall have the meanings given them in the Credit Agreement, and the rules of construction set forth in Section 1.2 of the Credit Agreement shall apply to this Amendment. The recitals hereto are hereby incorporated by reference.

2. Amendments.

   (a) Amendments to Credit Agreement. Subject to the terms and conditions set forth herein and in reliance upon the representations and warranties set forth herein, the Credit Agreement is hereby amended so that, as amended, it shall read as set forth in, and shall have the terms, covenants, conditions and other provisions of, the Consolidated Form Credit Agreement, the terms covenants, conditions and other provisions of which Consolidated Form Credit Agreement are hereby incorporated by reference into this Amendment as if fully set forth herein. The Loan Parties and the Lender acknowledge and agree that each amendment to the Credit Agreement reflected in the Consolidated Form Credit Agreement is and shall be effective as if individually specified in this Amendment (both the Loan Parties and the Lender further acknowledge that amending the Credit Agreement by reference to the Consolidated Form Credit Agreement provides a convenience to such parties to permit the amended terms to be read in full context) and that this Amendment is not a novation of the Credit Agreement or any other Loan
Amendments to Schedules to Credit Agreement. Schedules 4.1.2, 4.1.16, 4.1.18, 4.1.24, 6.2.1, 6.2.3, and 6.2.4 of the Credit Agreement are hereby amended and restated in their entirety so that, as amended, they shall read as set forth on Annex B hereto.

3. Conditions of Effectiveness. The effectiveness of this Amendment is expressly conditioned upon satisfaction of each of the following conditions precedent (the date of such effectiveness, the “First Amendment Effective Date”):

(a) Execution and Delivery. The Loan Parties shall have executed and delivered to the Lender this Amendment and the Amendment to the Security Transfer Agreement. The Borrower shall have executed and delivered an amended and restated Note to the Lender.

(b) Representations and Warranties; No Defaults. Each Loan Party, by executing this Amendment, hereby certifies and confirms that as of the date hereof and after giving effect to this Amendment: (i) the execution, delivery and performance of this Amendment and any and all other documents executed and/or delivered in connection herewith have been authorized by all requisite corporate action on the part of such Loan Party and will not violate such Loan Party’s organizational or governing documents; (ii) the representations and warranties of such Loan Party contained in the Credit Agreement and the other Loan Documents are true and correct on the date hereof with the same effect as though such representations and warranties had been made on and as of such date (except representations and warranties which relate solely to an earlier date or time, which representations and warranties shall be true and correct on and as of the specific dates or times referred to therein); (iii) such Loan Party has performed and complied with all covenants and conditions of the Credit Agreement and the other Loan Documents and no Event of Default or Default under the Credit Agreement has occurred and is continuing or exists which will not be cured by the execution and effectiveness of this Amendment; and (iv) the Credit Agreement (as amended by this Amendment) and all other Loan Documents are and remain legal, valid, binding and enforceable obligations in accordance with the terms thereof.

4. Effect of Amendment. Except as provided in this Amendment, all of the terms and conditions of the Credit Agreement shall remain in full force and effect.

5. Counterparts. This Amendment may be executed in counterparts, each of which when so executed shall be deemed an original, but all such counterparts together shall constitute but one and the same instrument, and delivery of executed signature pages hereof by telecopy or other electronic transmission from one party to another shall constitute effective and binding execution and delivery, respectively, of this Amendment by such party.
6. **Force and Effect.** Except as expressly modified by this Amendment, the Credit Agreement and the other Loan Documents are hereby ratified and confirmed by each Loan Party and shall remain in full force and effect after the date hereof. The parties hereto do not amend or waive any provisions of the Credit Agreement or any of the other Loan Documents except as expressly set forth herein. The Lender expressly reserves any and all rights and remedies available to it under the Credit Agreement (except solely to the extent expressly waived hereby), the other Loan Documents, or any other agreement, or at law or in equity, or otherwise; and, except as expressly provided herein, no other waiver, consent, or amendment is made or implied hereby.

7. **Governing Law.** This Amendment shall be deemed to be a contract under the Laws of the Commonwealth of Pennsylvania and for all purposes shall be governed by and construed and enforced in accordance with the internal Laws of the Commonwealth of Pennsylvania without regard to its conflict of laws principles.

[SIGNATURE PAGES FOLLOW]
This Amendment is executed as of the date stated at the beginning of this Amendment.

**BORROWER:**

**THE EXONE COMPANY**

By: /s/ Douglas Zemba  
Name: Douglas Zemba  
Title: Chief Financial Officer and Treasurer

**GUARANTORS:**

**EXONE AMERICAS LLC**

By: /s/ Douglas Zemba  
Name: Douglas Zemba  
Title: Authorized Signatory

**EXONE GMBH**

By: /s/ Eric Bader  
Name: Eric Bader  
Title: Authorized Signatory  
Location: North Huntingdon, PA, U.S.A.

[First Amendment to Credit Agreement Signature Page]
This Amendment is executed as of the date stated at the beginning of this Amendment.

LENDER:

LBM HOLDINGS LLC

By: /s/ John Irvin
Name: John Irvin
Title: Authorized Signer

[First Amendment to Credit Agreement Signature Page]
ANNEX A

Consolidated Form Credit Agreement

See attached.

i
CREDIT AGREEMENT

dated as of March 12, 2018

THE EXONE COMPANY,
   as Borrower,

EXONE AMERICAS LLC and EXONE GmbH,
   as Guarantors,

and

LBM HOLDINGS LLC
   as Lender
# Table of Contents

1. DEFINITIONS AND MECHANICS  
   1.1 Certain Definitions  
   1.2 Construction  
   1.3 Accounting Principles  

2. LOANS AND INTEREST RATES  
   2.1 Revolving Credit Loans  
   2.2 Commitment Fee  
   2.3 Termination or Reduction of Revolving Credit Commitments  
   2.4 Loans and Borrowings; Loan Request  
   2.5 Evidence of Debt  
   2.6 Reserved  
   2.7 Interest Rates  
   2.8 Interest Payment  
   2.9 Interest After Default  
   2.10 Libor Sunset  

3. PAYMENTS  
   3.1 Loan Payments  
   3.2 Voluntary Prepayments  
   3.3 Mandatory Prepayments  
   3.4 Expiration Date  

4. REPRESENTATIONS AND WARRANTIES  
   4.1 Representations and Warranties  
   4.2 Updates to Schedules  

5. CONDITIONS OF LENDING  
   5.1 Conditions Precedent  
   5.2 Conditions Precedent to Any Loan  

6. COVENANTS  
   6.1 Affirmative Covenants  
   6.2 Negative Covenants  
   6.3 Reporting Requirements
7. DEFAULT
   7.1 Events of Default
   7.2 Consequences of Event of Default
   7.3 Set-off
   7.4 Notice of Sale

8. MISCELLANEOUS
   8.1 Modifications, Amendments or Waivers
   8.2 No Implied Waivers; Cumulative Remedies; Writing Required
   8.3 Reimbursement, Indemnification and Waiver by the Loan Parties
   8.4 Holidays
   8.5 Notices
   8.6 Severability
   8.7 Governing Law
   8.8 Prior Understanding
   8.9 Duration; Survival
   8.10 Successors and Assigns
   8.11 Confidentiality
   8.12 Counterparts
   8.13 Lender’s Consent
   8.14 Exceptions
   8.15 CONSENT TO FORUM; WAIVER OF JURY TRIAL
   8.16 Payments Set Aside
   8.17 Taxes
## Schedules

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1(a)</td>
<td>Excluded Collateral</td>
</tr>
<tr>
<td>1.1(b)</td>
<td>Permitted Liens</td>
</tr>
<tr>
<td>4.1.2</td>
<td>Capitalization and Ownership</td>
</tr>
<tr>
<td>4.1.6</td>
<td>Litigation</td>
</tr>
<tr>
<td>4.1.8</td>
<td>Liabilities</td>
</tr>
<tr>
<td>4.1.16</td>
<td>Insurance</td>
</tr>
<tr>
<td>4.1.18</td>
<td>Material Contracts</td>
</tr>
<tr>
<td>4.1.21</td>
<td>Labor Contracts</td>
</tr>
<tr>
<td>4.1.24</td>
<td>Collateral Locations</td>
</tr>
<tr>
<td>6.1.16</td>
<td>Post-Closing Matters</td>
</tr>
<tr>
<td>6.2.1</td>
<td>Indebtedness</td>
</tr>
<tr>
<td>6.2.3</td>
<td>Guaranties</td>
</tr>
<tr>
<td>6.2.4</td>
<td>Loans and Advances</td>
</tr>
<tr>
<td>6.2.8</td>
<td>Affiliate Transactions</td>
</tr>
</tbody>
</table>

## Exhibits

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Form of Collateral Assignment of Contract Rights</td>
</tr>
<tr>
<td>B</td>
<td>Form of Guaranty Agreement</td>
</tr>
<tr>
<td>C</td>
<td>Form of Intercompany Subordination Agreement</td>
</tr>
<tr>
<td>D</td>
<td>Form of Note</td>
</tr>
<tr>
<td>E</td>
<td>Form of U.S. Security Agreement</td>
</tr>
<tr>
<td>F</td>
<td>Form of Security Transfer Agreement</td>
</tr>
<tr>
<td>2.4</td>
<td>Form of Loan Request</td>
</tr>
</tbody>
</table>
CREDIT AGREEMENT

THIS CREDIT AGREEMENT (this “Agreement”) is dated as of March 12, 2018, and is made by and among THE EXONE COMPANY, a Delaware corporation, having a principal address at 127 Industry Boulevard, North Huntingdon, PA 15642 (the “Borrower”), EXONE AMERICAS LLC, a Delaware limited liability company, having a principal address at 127 Industry Boulevard, North Huntingdon, PA 15642 (“ExOne Americas”) and EXONE GmbH, a German company having a principal address at Daimlerstrasse 22, 86368 Gersthofen Germany (“ExOne GmbH”; together with ExOne Americas, the “Guarantors”) and LBM HOLDINGS LLC, a Pennsylvania limited liability company, having a principal address at 960 Penn Avenue, Suite 400, Pittsburgh, PA 15222 (the “Lender”).

RECITALS

WHEREAS, the Borrower and its Subsidiaries (collectively, “ExOne”) manufacture, sell, distribute and service 3-D printing machines and related equipment (“Machines”) to customers on a worldwide basis; and

WHEREAS, the Borrower has requested the Lender to provide a $15,000,000 revolving credit facility, the proceeds of which will be used for working capital and other general corporate purposes.

AGREEMENT

In consideration of the foregoing, of their mutual covenants and agreements hereinafter set forth, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and intending to be legally bound hereby, the Loan Parties (as defined herein) and the Lender covenant and agree as follows:

1. DEFINITIONS AND MECHANICS

1.1 Certain Definitions.

In addition to words and terms defined elsewhere in this Agreement, the following words and terms shall have the following meanings, respectively, unless the context clearly requires otherwise:

“Adjusted LIBOR Rate” shall have the meaning specified in Section 2.7.

“Affiliate” as to any Person, means any other Person: (a) which directly or indirectly controls, is controlled by, or is under common control with such Person, (b) which beneficially owns or holds more than fifty percent (50%) of any class of the voting or other equity interests of such Person, or (c) more than fifty percent (50%) of any class of voting interests or other equity interests of which is beneficially owned or held, directly or indirectly, by such Person. Control, as used in this definition, means the possession, directly or indirectly, of the power to direct or cause the direction of the management or policies of a Person, whether through the ownership of voting securities, by contract or otherwise, including the power to elect a majority of the directors or trustees of a corporation or trust, as the case may be.
“Anti-Terrorism Laws” means any Law relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering or bribery, and any regulation, order, or directive promulgated, issued or enforced pursuant to such Law, all as amended, supplemented or replaced from time to time.

“Applicable Margin” means 500 basis points 5.00%.

“Asset Sale” means any disposition or series of dispositions by any Loan Party or any Subsidiary of a Loan Party after the date hereof of the type described in Section 6.2.7.

“Assigned Collateral” means all of the contract rights described in the Collateral Assignment of Contract Rights.

“Authorized Officer” means those individuals, designated by written notice to the Lender from each Loan Party, authorized to execute notices, reports and other documents on behalf of such Loan Party required hereunder. Each Loan Party may amend such list of individuals from time to time by giving written notice of such amendment to the Lender.

“Benefit Arrangement” means at any time an “employee benefit plan”, within the meaning of Section 3(3) of ERISA, which is not a Plan, sponsored or otherwise contributed to by any member of the ERISA Group.

“Borrowing Date” means the date for the making of any Loan, which shall be a Business Day.

“Business Day” means any day which is neither a Saturday or Sunday nor a legal holiday on which commercial banks are authorized or required to be closed in Pittsburgh, Pennsylvania.

“Capital Impairments” has the meaning assigned to that term in Section 7.2.5.

“Change of Control” means, with respect to the Borrower, an event or series of events by which any “person” or “group” (as such terms are used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, but excluding any employee benefit plan of such person or its subsidiaries, and any person or entity acting in its capacity as trustee, agent or other fiduciary or administrator of any such plan) becomes the “beneficial owner” (as defined in Rules 13d-3 and 13d-5 under the Securities Exchange Act of 1934, except that a person or group shall be deemed to have “beneficial ownership” of all securities that such person or group has the right to acquire (such right, an “option right”), whether such right is exercisable immediately or only after the passage of time), directly or indirectly, of 25% or more of the equity securities of the Borrower entitled to vote for members of the board of directors or equivalent governing body of such Person on a fully-diluted basis (and taking into account all such securities that such person or group has the right to acquire pursuant to any option right); provided, however, that the determination of the percentage above shall exclude any shares of common stock beneficially owned directly or indirectly by S. Kent Rockwell or the Lender that are transferred to the acquiring “person” or “group” above.

“Closing Date” means March 12, 2018.
“Collateral Assignment of Contract Rights” means the Collateral Assignment of Contract Rights made by and between the Loan Parties and the Lender in substantially the form attached as Exhibit A, dated as of the Closing Date, as the same may be amended, restated, or modified from time to time.

“Collateral” means the UCC Collateral, the Assigned Collateral and the German Collateral; excluding any (a) Excluded Collateral and (b) any contract or agreement which by virtue of its terms does not allow for its pledge or assignment to the Lender, but including, any proceeds from any such contract or agreement.

“Collateral Assignment of Contract Rights” means the Collateral Assignment of Contract Rights made by and between the Loan Parties and the Lender in substantially the form attached as Exhibit A, dated as of the Closing Date, as the same may be amended, restated, or modified from time to time.

“Commitment Fee” has the meaning assigned to that term in Section 2.2.

“Commodity Exchange Act” means the Commodity Exchange Act (7 U.S.C. § 1 et seq.), as amended from time to time, and any successor statute.

“Covered Entity” means the Borrower, each of the Borrower’s Subsidiaries and all Guarantors.

“Default Rate” means a rate per annum equal to two percent (2%) in excess of the Adjusted LIBOR Rate.

“Delaware Divided LLC” means any Delaware LLC which has been formed upon consummation of a Delaware LLC Division.

“Delaware LLC” means any limited liability company organized or formed under the laws of the State of Delaware.

“Delaware LLC Division” means the statutory division of any Delaware LLC into two or more Delaware LLCs pursuant to Section 18-217 of the Delaware Limited Liability Company Act.

“Distributions” means, for the applicable period, the aggregate of all amounts paid or payable (without duplication) as dividends or distributions on or in respect of any shares of any class of capital stock of or other equity interests of a Person, and includes any purchase, redemption or other retirement of any ownership interests directly or indirectly through a subsidiary or otherwise and includes return of capital to members.

“Dollar, Dollars, U.S. Dollars” and the symbol $ means lawful money of the United States of America.

“ECP” means an “eligible contract participant” as defined in Section 1(a)(18) of the Commodity Exchange Act or any regulations promulgated thereunder and the applicable rules issued by the Commodity Futures Trading Commission and/or the SEC.
“ERISA” means the Employee Retirement Income Security Act of 1974, as the same may be amended or supplemented from time to time, and any successor statute of similar import, and the rules and regulations thereunder, as from time to time in effect.

“ERISA Group” means, at any time, the Loan Parties and all members of a controlled group of corporations and all trades or businesses (whether or not incorporated) under common control and all other entities which, together with the Borrower, are treated as a single employer under Section 414 of the Internal Revenue Code.

“Escrow Agent” means The Huntington National Bank.

“Escrow Agreement” means that certain Escrow Agreement, dated as of the Closing Date, made by and among the Borrower, the Lender, the Escrow Agent, as the same may be amended, restated, supplemented, modified or extended from time to time.

“Event of Default” means any of the events described in Section 7.1 and referred to therein as an “Event of Default”.

“Excluded Collateral” means (a) all real property owned by the Borrower and the Guarantors, and (b) other collateral owned by the Borrower or the Guarantors or other lease agreements listed on Schedule 1.1(a).

“Excluded Subsidiary” means, (a) collectively, (i) ExOne Property GmbH, (ii) ExOne KK, (iii) ExOne Italy S.r.l, (iv) any other Subsidiary created or acquired after the Closing Date, and (b) in the case of any obligation under any Excluded Swap Obligation, any Subsidiary of the Borrower that is a non-qualifying party with respect thereto; provided that the Subsidiaries described in this clause (b) shall only be Excluded Subsidiaries to the extent that, and for so long as, any guaranty by such Subsidiary would have adverse tax consequences for the Borrower or any other Loan Party or result in a violation of applicable Laws.

“Excluded Swap Obligations” means, with respect to any Guarantor, any Swap Obligation if, and to the extent that, all or a portion of the Guaranty of such Guarantor of, or the grant by such Guarantor of a security interest to secure, such Swap Obligation (or any Guaranty thereof) is or becomes illegal under the Commodity Exchange Act or any rule, regulation or order of the Commodity Futures Trading Commission (or the application or official interpretation of any thereof) by virtue of such Guarantor’s failure for any reason to constitute an ECP at the time the Guaranty of such Guarantor or the grant of such security interest becomes or would become effective with respect to such Swap Obligation. If a Swap Obligation arises under a master agreement governing more than one swap, such exclusion shall apply only to the portion of such Swap Obligation that is attributable to swaps for which such Guaranty or security interest is or becomes illegal.

“ExOne” has the meaning assigned to that term in the Recitals.

“ExOne Americas” has the meaning assigned to that term in the Preamble.

“ExOne GmbH” has the meaning assigned to that term in the Preamble.
“Expiration Date” means March 31, 2024, however the Borrower and Lender may mutually agree in writing to modify the Expiration Date to a date earlier than March 31, 2024.

“First Amendment Effective Date” means February 17, 2020.

“GAAP” means accounting principles generally accepted in the United States of America, subject to the provisions of Section 1.3, and applied on a consistent basis both as to classification of items and amounts.

“German Collateral” means all of the property of ExOne GmbH in which security interests in favor of the Lender have been granted by ExOne GmbH under the Security Transfer Agreement.

“Guarantors” means each of ExOne Americas and ExOne GmbH.

“Guaranty” of any Person means any obligation of such Person guaranteeing or in effect guaranteeing any liability or obligation of any other Person in any manner, whether directly or indirectly, including any agreement to indemnify or hold harmless any other Person, any performance bond or other suretyship arrangement and any other form of assurance against loss, except endorsement of negotiable or other instruments for deposit or collection in the ordinary course of business.

“Guaranty Agreement” means the Continuing Agreement of Guaranty and Suretyship in substantially the form attached as Exhibit B, dated as of the Closing Date, executed and delivered to the Lender by each Guarantor.

“Indebtedness” means, as to any Person at any time, any and all indebtedness, obligations or liabilities (whether matured or unmatured, liquidated or unliquidated, direct or indirect, absolute or contingent, or joint or several) of such Person for or in respect of: (a) borrowed money, seller notes or seller holdbacks, (b) amounts raised under or liabilities in respect of any note purchase or acceptance credit facility in the ordinary course of business, (c) reimbursement obligations (contingent or otherwise) under any letter of credit, currency swap agreement, interest rate swap, cap, collar or floor agreement or other interest rate management device, (d) any other transaction (including forward sale or purchase agreements, capitalized leases and conditional sales agreements) having the commercial effect of a borrowing of money entered into by such Person to finance its operations or capital requirements (but not including trade payables and accrued expenses incurred in the ordinary course of the business which are not represented by a promissory note or other evidence of indebtedness and which are not more than ninety (90) days past due), or (e) any Guaranty of Indebtedness for borrowed money.

“Indemnified Taxes” means (a) Taxes imposed on or with respect to any payment made by or on account of any obligation of the Borrower under any Loan Document and (b) to the extent not otherwise described in Other Taxes.

“Indemnitee” has the meaning assigned to that term in Section 8.3.2.

“Intercompany Subordination Agreement” means the Intercompany Subordination Agreement in substantially the form attached as Exhibit C, dated as of the Closing Date, made by and among the Loan Parties, in form and substance satisfactory to the Lender.
“Interest Payment Date” means the fifteenth (15th) day of each calendar month after the date hereof and on the Expiration Date or upon acceleration of the Note.

“Internal Revenue Code” means the Internal Revenue Code of 1986, as the same may be amended or supplemented from time to time, and any successor statute of similar import, and the rules and regulations thereunder, as from time to time in effect.

“Labor Contracts” means all employment agreements, employment contracts, collective bargaining agreements and other agreements between a Loan Party and its employees.

“Law” means any law (including common law), constitution, statute, treaty, regulation, rule, ordinance, opinion, release, ruling, order, injunction, writ, decree, bond, judgment, authorization, approval, lien, award by or settlement agreement with any Official Body, including any of the foregoing Laws relating to any do-not-call regulations, as any of the foregoing Laws from time to time may be amended, renewed, extended or replaced.

“Lien” means any mortgage, deed of trust, pledge, lien, security interest, charge or other encumbrance or security arrangement of any nature whatsoever, whether voluntarily or involuntarily given, including any conditional sale or title retention arrangement, and any assignment, deposit arrangement or lease intended as, or having the effect of, security and any filed financing statement or other notice of any of the foregoing (whether or not a lien or other encumbrance is created or exists at the time of the filing).

“Loan Documents” means this Agreement, the Guaranty Agreement, the U.S. Security Agreement, the Collateral Assignment of Contract Rights, the Note, the Intercompany Subordination Agreement, the Security Transfer Agreement, the Escrow Agreement, any deposit account control agreement or similar instrument and any other instruments, certificates or documents delivered or contemplated to be delivered hereunder or thereunder or in connection herewith or therewith, as the same may be supplemented or amended from time to time in accordance herewith or therewith, and “Loan Document” means any of the Loan Documents.

“Loan Party” means the Borrower and the Guarantors.

“Loan Request” has the meaning assigned to such term in Section 2.4.

“Loans” has the meaning assigned to that term in Section 2.1.

“Machines” has the meaning assigned to that term in the Recitals.

“Material Adverse Change” means any set of circumstances or events which: (a) has or could reasonably be expected to have any material adverse effect whatsoever upon the validity or enforceability of any Loan Document or the Collateral, (b) is or could reasonably be expected to be material and adverse to the business, properties, assets, financial condition or results of operations of the Borrower and its Subsidiaries, taken as a whole, (c) impairs materially or could reasonably be expected to impair materially the ability of the Borrower to duly and punctually pay or perform its Indebtedness owing to Lender or any Loan Party to perform its Obligations, or (d) impairs materially or could reasonably be expected to impair materially the ability of the Lender, to the extent permitted, to enforce its legal remedies pursuant to any Loan Document.
“Net Assets” has the meaning assigned to that term in Section 7.2.5.

“Net Cash Proceeds” means in connection with any Asset Sale or any Recovery Event, the proceeds thereof in the form of cash and cash equivalents (including any such proceeds received by way of deferred payment of principal pursuant to a note or installment receivable or purchase price adjustment receivable or otherwise, but only as and when received), net of attorneys’ fees, accountants’ fees, investment banking and other customary advisor fees, amounts required to be applied to the repayment of Indebtedness secured by a Lien and other customary fees and expenses actually incurred in connection therewith and net of taxes paid or reasonably estimated to be payable as a result thereof (after taking into account any available tax credits or deductions and any tax sharing arrangements).

“Note” means the Note in substantially the form attached as Exhibit D, dated as of the Closing Date, made by the Borrower payable to the order of the Lender in the original principal amount of $15,000,000, as the same may be amended, restated, modified, or extended from time to time.

“Notices” has the meaning assigned to that term in Section 8.5.

“Obligation” means any obligation or liability of Loan Parties to the Lender, howsoever created, arising or evidenced, whether direct or indirect, absolute or contingent, now or hereafter existing, or due or to become due, under or in connection with this Agreement, the Note or any other Loan Document. Notwithstanding anything to the contrary contained in the foregoing, the Obligations shall not include any Excluded Swap Obligations.

“Official Body” means any national, federal, state, local or other government or political subdivision or any agency, authority, board, bureau, central bank, commission, department or instrumentality of either, or any court, tribunal, grand jury or arbitrator, in each case whether foreign or domestic.

“One Month LIBOR Rate” means the rate of interest published on the first Business day of each month in the Wall Street Journal “Money Rates” listing under the caption “London Interbank Offered Rates” for a one period (or, if no such rate is published therein for any reason, then the One Month LIBOR Rate shall be the Eurodollar rate for a one month period as published in another publication selected by the Lender). If the Eurodollar rate, for any reason, no longer exists, the One Month LIBOR Rate shall mean a comparable replacement rate determined by the Lender at such time, in consultation with the Borrower (which determination shall be conclusive absent manifest error).

“Organizational Documents” means: (a) with respect to any corporation, its certificate or articles of incorporation or organization, as amended, and its by-laws, as amended, (b) with respect to any limited partnership, its certificate of limited partnership, as amended, and its partnership agreement, as amended, (c) with respect to any general partnership, its partnership agreement, as amended, and (d) with respect to any limited liability company, its articles of organization, as amended, and its operating agreement, as amended. In the event any term or condition of this Agreement or any other Loan Document requires any Organizational Document to be certified by a secretary of state or similar governmental official, the reference to any such “Organizational Document” shall only be to a document of a type customarily certified by such governmental official.
“Other Connection Taxes” means, Taxes imposed as a result of a present or former connection between the Lender and the jurisdiction imposing such Tax (other than connections arising from the Lender having executed, delivered, become a party to, performed its obligations under, received payments under, received or perfected a security interest under, engaged in any other transaction pursuant to or enforced any Loan Document, or sold or assigned an interest in any Loan or Loan Document).

“Other Taxes” means all present or future stamp, court or documentary, intangible, recording, filing or similar Taxes that arise from any payment made under, from the execution, delivery, performance, enforcement or registration of, from the receipt or perfection of a security interest under, or otherwise with respect to, any Loan Document, except any such Taxes that are Other Connection Taxes imposed with respect to an assignment (other than an assignment made pursuant to Section 8.17(e)(e)).

“PBGC” means the Pension Benefit Guaranty Corporation established pursuant to Subtitle A of Title IV of ERISA or any successor.

“Permitted Investments” means U.S. Treasury securities, money market mutual funds of nationally-recognized sponsors, and debt securities of up to 18 months in maturity of U.S. companies carrying a rating of at least BBB with Standard & Poor’s Financial Services, LLC or rating of Baa2 with Moody’s Investors Service, Inc.

“Permitted Liens” means:

(a) Liens for taxes, assessments, or similar charges, incurred in the ordinary course of business and which are not yet due and payable;

(b) Pledges or deposits made in the ordinary course of business to secure payment of workmen’s compensation, or to participate in any fund in connection with workmen’s compensation, unemployment insurance, old-age pensions or other social security programs;

(c) Liens of mechanics, materialmen, warehousemen, carriers, or other like Liens, securing obligations incurred in the ordinary course of business that are not yet due and payable and Liens of landlords securing obligations to pay lease payments that are not yet due and payable or in default;

(d) Good-faith pledges or deposits made in the ordinary course of business to secure performance of bids, tenders, contracts (other than for the repayment of borrowed money) or leases, not in excess of the aggregate amount due thereunder, or to secure statutory obligations, or surety, appeal, indemnity, performance or other similar bonds required in the ordinary course of business;

(e) Encumbrances consisting of zoning restrictions, easements or other restrictions on the use of real property, or minor irregularities in title thereto and other immaterial liens that do not secure the payment of money, none of which materially impairs the use of such property or the value thereof, and none of which is violated in any material respect by existing or proposed structures or land use;
(f) Any Lien existing on the date of this Agreement and described on Schedule 1.1(b), and any extension, replacement or renewal thereof, provided that the principal amount secured thereby is not hereafter increased, and no additional assets become subject to such Lien;

(g) Purchase Money Security Interests, capitalized leases and Liens on tangible property (excluding inventory) to the extent that the Indebtedness secured thereby is permitted under Section 6.2.1, provided that such Liens shall be limited to the assets acquired with such purchase money financing or leased pursuant to such capitalized lease;

(h) The following, (A) if the validity or amount thereof is being contested in good faith by appropriate and lawful proceedings diligently conducted so long as levy and execution thereon have been stayed and continue to be stayed or (B) if a final judgment is entered and such judgment is discharged within thirty (30) days of entry, and in either case they do not affect the Collateral or, in the aggregate, materially impair the ability of any Loan Party to perform its Obligations hereunder or under the other Loan Documents:

   (1) Claims or Liens for taxes, assessments or charges due and payable and subject to interest or penalty, provided that the applicable Loan Party maintains such reserves or other appropriate provisions as shall be required by GAAP and pays all such taxes, assessments or charges forthwith upon the commencement of proceedings to foreclose any such Lien;

   (2) Claims, Liens or encumbrances upon, and defects of title to, real or personal property other than the Collateral, including any attachment of personal or real property or other legal process prior to adjudication of a dispute on the merits;

   (3) Claims or Liens of mechanics, materialmen, warehousemen, carriers, or other statutory nonconsensual Liens; or

   (4) Liens resulting from final judgments or orders described in Section 7.1.5;

(i) Any other Liens not already covered in clauses (a) through (h) of this definition above securing Indebtedness permitted under Section 6.2.1 so long as such Liens are secured by assets other the Collateral.

“Person” means any individual, corporation, partnership, limited liability company, association, joint-stock company, trust, unincorporated organization, joint venture, Official Body, or any other entity.

“Plan” means at any time an employee pension benefit plan (including a “multiemployer plan” within the meaning of Section 4001(a)(3) of ERISA) which is covered by Title IV of ERISA or is subject to the minimum funding standards under Sections 412, 430 and 436 of the Internal Revenue Code and either (i) is maintained by any member of the ERISA Group for employees of any member of the ERISA Group or (ii) has at any time within the preceding five years been maintained by any entity which was at such time a member of the ERISA Group for employees of any entity which was at such time a member of the ERISA Group.
“Potential Default” means any event or condition which with notice, passage of time, or any combination of the foregoing and such event or condition not being cured to the Lender’s satisfaction, would constitute an Event of Default.

“Prime Rate” means the rate publicly quoted from time to time by The Wall Street Journal as the U.S. Prime Rate.

“Principal Office” means the main office of the Lender at 960 Penn Avenue, Suite 400, Pittsburgh, PA 15222 or such other office as the Lender shall designate to the Borrower from time to time in writing as being the Principal Office of the Lender.

“Prior Security Interest” means a valid and enforceable perfected first-priority security interest under the Uniform Commercial Code in the UCC Collateral which is subject only to Liens (a) which are given priority by statute for taxes not yet due and payable or (b) for Purchase Money Security Interests, in each case as permitted hereunder.

“Purchase Money Security Interest” means Liens upon tangible personal property securing loans to the Borrower or deferred payments by the Borrower for the purchase of such tangible personal property.

“Recovery Event” means any settlement of or payment in respect of any property or casualty insurance claim or any condemnation proceeding relating to any asset of the Borrower or any of its Subsidiaries.

“Revolving Credit Commitment” means Fifteen Million Dollars ($15,000,000), as such amount may be adjusted from time to time in accordance with this Agreement.

“Sanctioned Person” means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person, group, regime, entity or thing, or subject to any limitations or prohibitions (including the blocking of property or rejection of transactions), under any Anti-Terrorism Law.

“Security Transfer Agreement” means the Security Transfer Agreement in substantially the form attached as Exhibit F, dated as of the Closing Date, by and between ExOne GmbH and the Lender, as may be amended, restated, supplemented, modified, or extended from time to time.

“Solvent” means, with respect to any Person on a particular date, that on such date: (a) the fair value of the property of such Person is greater than the total amount of liabilities, including contingent liabilities, of such Person, (b) the present fair market value of the assets of such Person is not less than the amount that will be required to pay the probable liability of such Person on its debts as they become absolute and matured, (c) such Person is able to realize upon its assets and pay its debts and other liabilities, including contingent liabilities, and other commitments as they mature in the normal course of business, and (d) such Person does not intend to, and does not believe that it will, incur debts or liabilities beyond such Person’s ability to pay such debts and liabilities as they mature.
“Subsidiary” of any Person at any time means: (a) any corporation or trust of which 50% or more (by number of shares or number of votes) of the outstanding capital stock or shares of beneficial interest normally entitled to vote for the election of one or more directors or trustees (regardless of any contingency which does or may suspend or dilute the voting rights) is at such time owned directly or indirectly by such Person or one or more of such Person’s Subsidiaries, (b) any partnership of which such Person is a general partner or of which fifty percent (50%) or more of the partnership interests is at the time directly or indirectly owned by such Person or one or more of such Person’s Subsidiaries, (c) any limited liability company of which such Person is a member or of which fifty percent (50%) or more of the limited liability company interests is at the time directly or indirectly owned by such Person or one or more of such Person’s Subsidiaries or (d) any corporation, trust, partnership, limited liability company or other entity which is controlled or capable of being controlled by such Person or one or more of such Person’s Subsidiaries.

“Swap Obligation” means, with respect to any Guarantor, any obligation to pay or perform under any agreement, contract or transaction that constitutes a “swap” within the meaning of section 1a(47) of the Commodity Exchange Act or any rules or regulations promulgated thereunder.

“Taxes” means all present or future taxes, levies, imposts, duties, deductions, withholdings (including backup withholding), assessments, fees or other charges imposed by any Official Body, including any interest, additions to tax or penalties applicable thereto.

“UCC Collateral” means the property of the Borrower and ExOne Americas in which security interests in favor of the Lender have been granted by the Borrower and ExOne Americas under the U.S. Security Agreement and where the manner of creation and perfection of such security interests are governed by the Uniform Commercial Code.

“Uniform Commercial Code” shall have the meaning assigned to that term in Section 4.1.15.

“U.S. Security Agreement” means the U.S. Security Agreement in substantially the form attached as Exhibit E, dated as of the Closing Date, by and between the Borrower and ExOne Americas and the Lender, as the same may be amended, restated, supplemented, modified, or extended from time to time.

1.2 Construction.

Unless the context otherwise clearly requires, the following rules of construction shall apply to each Loan Document:

1.2.1 Number; Inclusion.

References to the plural include the singular, the plural, the part and the whole; “or” has the inclusive meaning represented by the phrase “and/or,” and “including” has the meaning represented by the phrase “including without limitation”;
1.2.2 Determination.

References to “determination” of or by the Lender shall be deemed to include good-faith estimates by the Lender (in the case of quantitative determinations) and good-faith beliefs by the Lender (in the case of qualitative determinations) and such determination shall be conclusive absent manifest error;

1.2.3 Discretion and Consent.

Whenever the Lender is granted the right herein to act in its sole discretion or to grant or withhold consent, such right shall be exercised in good faith;

1.2.4 Documents Taken as a Whole.

The words “hereof,” “herein,” “hereunder,” “hereto” and similar terms in any Loan Document refer to such Loan Document as a whole and not to any particular provision of such Loan Document;

1.2.5 Headings.

Section and other headings contained in any Loan Document and the Table of Contents (if any) preceding any Loan Document are for reference purposes only and shall not control or affect the construction of any Loan Document or the interpretation in any respect;

1.2.6 Implied References.

Article, section, subsection, clause, schedule and exhibit references in any Loan Document, are to that Loan Document, unless otherwise specified;

1.2.7 Persons.

Reference to any Person includes such Person’s successors and assigns, but, if applicable, only if such successors and assigns are permitted by such Loan Document, and reference to a Person in a particular capacity excludes such Person in any other capacity;

1.2.8 Modifications to Documents, Notes and Laws.

Reference to any agreement (including any Loan Document together with the schedules and exhibits thereto), document or instrument means such agreement, document or instrument as amended, modified, replaced, substituted, superseded or restated; reference to any notes (including the Note) means such notes together with all amendments, extensions, renewals, replacements, re-financings or re-fundings thereof in whole or in part; and reference to any Law means such Law as the same has been, or shall hereafter be, amended, renewed, extended or replaced;

1.2.9 From, To and Through.

Relative to the determination of any period of time, “from” means “from and including,” “to” means “to but excluding,” and “through” means “through and including”; and

1.2.10 Shall; Will.

References to “shall” and “will” have the same meaning.
1.3  **Accounting Principles.**

Except as otherwise provided in this Agreement, all computations and determinations as to accounting or financial matters and all financial statements to be delivered pursuant to this Agreement shall be made and prepared in accordance with GAAP (including principles of consolidation where appropriate), and all accounting or financial terms shall have the meanings ascribed to such terms by GAAP.

2.  **LOANS AND INTEREST RATES**

2.1  **Revolving Credit Loans.**

Subject to the terms and conditions hereof and relying upon the representations and warranties herein set forth, the Lender agrees to make revolving credit loans (each such loan, a “Loan”) in Dollars to the Borrower at any time or from time to time on any Business Day on or after the Closing Date to the Expiration Date, provided that after giving effect to any Loan, the aggregate principal amount of all Loans issued hereunder at any time shall not exceed the Revolving Credit Commitment. Within such limits of time and amount and subject to the other provisions of this Agreement, the Borrower may borrow under this Section 2.1, repay under Section 3.2 and reborrow Loans under this Section 2.1.

2.2  **Commitment Fee.** Accruing at all times from the Closing Date until the Expiration Date (and without regard to whether the conditions to make Loans are then met), the Borrower agrees to pay to the Lender a nonrefundable commitment fee (the “Commitment Fee”) equal to seventy-five one hundred (75/100) basis points (computed on the basis of a year of 365 or 366 days, as the case may be, and actual days elapsed) multiplied by the average daily difference between the amount of (a) the Revolving Credit Commitment and (b) the total amount of the outstanding Loans. All Commitment Fees shall be payable in arrears on each Interest Payment Date.

2.3  **Termination or Reduction of Revolving Credit Commitments.** The Borrower shall have the right, upon not less than five (5) Business Days’ notice to the Lender, to terminate the Revolving Credit Commitment or, from time to time, to permanently reduce the aggregate amount of the Revolving Credit Commitment; provided that no such termination or reduction of Revolving Credit Commitment shall be permitted if, after giving effect thereto and to any prepayments of the Revolving Credit Loans made on the effective date thereof, the principal amount of the Loans would exceed the aggregate Revolving Credit Commitment. Any such reduction or termination shall be accompanied by prepayment of the Loans (together with all outstanding Commitment Fees) and the full amount of interest accrued on the principal sum to be prepaid to the extent necessary to cause the aggregate principal amount of the Loans after giving effect to such prepayments to be equal to or less than the Revolving Credit Commitment as so reduced or terminated. Any notice to reduce the Revolving Credit Commitments under this Section 2.3 shall be irrevocable.
2.4 Loans and Borrowings; Loan Request.

(a) The Borrower may from time to time request a borrowing of a Loan by providing the Escrow Agent, on or before 10:00 a.m., Pittsburgh time, on a Business Day, (i) a completed request for a Loan (in writing by letter, facsimile or .pdf) substantially in the form of Exhibit 2.4 (each, a “Loan Request”) or (ii) a request by telephone immediately confirmed by a Loan Request, it being understood that the Escrow Agent may rely on the authority of any individual making such a telephonic request without the necessity of receipt of such written confirmation. Each Loan Request shall be irrevocable and shall specify: (A) the proposed Borrowing Date (which shall be at a minimum seven (7) Business Days following the date of the making of the Loan Request); (B) the amount of the proposed Loan, which amount shall be in (x) integral multiples of $1,000,000 and not less than $1,000,000 for each borrowing (C) the intended use of proceeds of such Loan, and (D) the account of the Borrower to which the Loan should be deposited. On the terms and subject to the conditions of the Escrow Agreement, the Escrow Agent shall make such Loan available to the Borrower by wire transfer in immediately available funds to the account of the Borrower as shall have been specified in its Loan Request.

(b) Prior to indefeasible payment in full of the Obligations, (1) the Lender acknowledges and agrees that it cannot and will not direct, authorize or request the Escrow Agent to make a payment or transfer monies of any amount at any time from the Escrow Account and (2) under the terms and conditions of the Escrow Agreement, the Borrower is the only party permitted to take any of the aforementioned actions.

2.5 Evidence of Debt.

The Loans made by the Lender shall be evidenced by one or more accounts or records maintained by the Lender in the ordinary course of business. The accounts or records maintained by the Lender shall be conclusive absent manifest error of the amount of the Loans made by the Lender to the Borrower and the interest and payments thereon. Any failure to so record or any error in doing so shall not, however, limit or otherwise affect the obligation of the Borrower hereunder to pay any amount owing with respect to the Obligations. The Borrower shall execute and deliver to the Lender a Note, which shall evidence the respective Loans in addition to such accounts or records. The Lender may attach schedules to the Note and endorse thereon the date, amount and maturity of the Loans and payments with respect thereto.

2.6 Reserved.

2.7 Interest Rates.

Interest on each Loan shall bear interest at a rate per annum (based upon the actual number of days that the principal is outstanding over a year of 360 days) which shall be equal to the One Month LIBOR Rate, plus the Applicable Margin (the “Adjusted LIBOR Rate”). The rate of interest will be adjusted automatically as of the first Business Day of each calendar month. On or about the first Business Day of each calendar month, the Lender shall make available to the Borrower in writing the One Month LIBOR Rate for the preceding calendar month.
2.8 Interest Payment.

Interest on each Loan shall be due and payable in arrears on each Interest Payment Date. Interest hereunder shall be due and payable in accordance with the terms hereof before and after judgment, and before and after the commencement of any proceeding under any bankruptcy, insolvency, reorganization or other similar Law. Interest on mandatory prepayments of principal under this Agreement shall be due on the date such mandatory prepayment is due. Interest on the principal amount of each Loan or other monetary Obligation shall be due and payable on demand after such principal amount or other monetary Obligation becomes due and payable (whether on the stated Expiration Date, upon acceleration or otherwise).

2.9 Interest After Default.

(a) Interest Rate. If any amount of principal of any Loan is not paid when due (without regard to any applicable grace periods), whether at stated maturity, by acceleration or otherwise, such amount shall thereafter bear interest at a rate per annum equal to the Default Rate to the fullest extent permitted by applicable Laws. If any amount (other than principal of any Loan) payable by the Borrower under any Loan Document is not paid when due (without regard to any applicable grace periods), whether at stated maturity, by acceleration or otherwise, such amount shall thereafter bear interest at a rate per annum at all times equal to the Default Rate to the fullest extent permitted by applicable Laws. While any Event of Default exists, outstanding Obligations shall accrue at a rate per annum at all times equal to the Default Rate to the fullest extent permitted by applicable Laws.

(b) Acknowledgement. The Borrower acknowledges that the increase in rates referred to in this Section reflects, among other things, the fact that the Loans or other amounts have become a substantially greater risk given their default status and that the Lender is entitled to additional compensation for such risk; and all such interest shall be payable by the Borrower upon demand by the Lender.

2.10 Libor Sunset.

If for any reason the Lender shall determine (such determination to be made in the Lender’s sole discretion and be conclusive absent manifest error) that the One Month LIBOR Rate is unavailable or the continued availability or marketability thereof is at risk, due to any circumstances, including, without limitation, because (i) the One Month LIBOR Rate no longer exists, substantively, or is otherwise unavailable (or expected to be unavailable) for an extended period of time; (ii) dollar deposits are not being offered to banks in the London interbank Eurodollar market for the applicable amount and interest period of the applicable loan contemplated herein, and such circumstances are unlikely to be temporary, (iii) reasonable and adequate means do not exist for the ascertaining the One Month LIBOR Rate for the applicable interest period of the applicable loan contemplated herein, and such circumstances are unlikely to be temporary, (iv) the One Month LIBOR Rate is no longer a widely recognized benchmark rate for newly originated loans in the United States syndicated loan market in the applicable currency; or (v) the applicable supervisor or administrator (if any) of the One Month LIBOR Rate or any governmental authority having, or purporting to have, jurisdiction over the Lender has made a public statement identifying a specific date after which the One Month LIBOR Rate shall no longer be used for determining interest rates for loans in the United States syndicated loan market in the
applicable currency, then, the Lender may select in its sole but reasonable discretion and in consultation with the Borrower, an alternative benchmark rate to replace the One Month LIBOR Rate, and modify the applicable margins and make other related amendments, in each case giving due consideration to any evolving or then existing convention for similar U.S. dollar denominated credit facilities, or any selection, endorsement or recommendation by a relevant governmental body with respect to such facilities. The Lender shall provide notice to the Borrower of an amendment of this Agreement to reflect the replacement index, adjusted margins and such other related amendments as may be appropriate, in the sole but reasonable discretion of the Lender, for the implementation and administration of the replacement index-based rate. Notwithstanding anything to the contrary in this Agreement or the other Loan Documents, such amendment shall become effective without any further action or consent of any other party to this Agreement upon delivery of notice to the Borrower. For the avoidance of doubt, following the date when a determination is made pursuant to the above and until a replacement index has been selected and implemented in accordance with the terms and conditions above, at the Lender’s election all Loans shall accrue interest at, and the interest rate shall be, the Prime Rate. Notwithstanding anything to the contrary contained herein, if at any time the replacement index is less than zero, then at such times, such index shall be deemed to be zero for purposes of this Agreement.

3. **PAYMENTS**

3.1 **Loan Payments.**

All payments and prepayments to be made in respect of principal, interest, or other amounts due from the Borrower hereunder shall be payable prior to 11:00 a.m., Pittsburgh time, on the date when due without presentment, demand, protest or notice of any kind, all of which are hereby expressly waived by the Borrower, and without set-off, counterclaim or other deduction of any nature, and an action therefor shall immediately accrue. Such payments (a) of interest or fees owing to the Lender shall be made to the Lender at the Principal Office and (b) of principal or other amounts due shall be made to the Escrow Agent pursuant to the terms of the Escrow Agreement, in each case, in Dollars and in immediately available funds.

3.2 **Voluntary Prepayments.**

The Borrower shall have the right at its option from time to time to prepay any Loan, without premium or penalty. All prepayments of a Loan shall include the principal amount specified by the Borrower together with all accrued interest thereon.

3.3 **Mandatory Prepayments.**

(a) **Asset Sales or Recovery Events.** If any Loan Party receives Net Cash Proceeds from any Asset Sales or Recovery Events, the Borrower shall make a mandatory prepayment of principal on the Loans to the extent that the Borrower or such Loan Party has not reinvested the proceeds from such Asset Sales or Recovery Events, within one hundred eighty (180) days of the date of receipt by the Borrower or such Loan Party of such Net Cash Proceeds.
(b) **Sale of Business.** In the event that Net Cash Proceeds are received by the Borrower in respect of the sale of all or substantially all of the equity interests of the Borrower, the Borrower shall immediately prepay the Obligations in full to the Lender or the Escrow Agent, as applicable, and this Agreement shall be terminated.

(c) **Event of Default.** The Borrower shall be required to prepay the Loans in the event of an acceleration of the Loans under Section 7.2.1(a) following an Event of Default.

3.4 **Expiration Date.**

The Borrower shall pay (a) to the Escrow Agent the aggregate principal amount of the Loans outstanding and (b) all outstanding interest thereon to the Lender on the Expiration Date or upon such earlier date as may be required by the Lender under Section 7.2 after the occurrence of an Event of Default which has not been waived in writing by the Lender.

4. **REPRESENTATIONS AND WARRANTIES**

4.1 **Representations and Warranties.**

The Loan Parties jointly and severally represent and warrant to the Lender as follows:

4.1.1 **Organization and Qualification.**

Each Loan Party and each Subsidiary of each Loan Party is a corporation, partnership or limited liability company duly organized, validly existing and in good standing under the laws of its jurisdiction of organization. Each Loan Party and each Subsidiary of each Loan Party has the lawful power to own or lease its properties and to engage in the business it presently conducts or proposes to conduct. Each Loan Party and each Subsidiary of each Loan Party is duly licensed or qualified and in good standing in each jurisdiction where the property owned or leased by it or the nature of the business transacted by it or both makes such licensing or qualification necessary, except to the extent that any failure to be so qualified and in good standing would not constitute a Material Adverse Change.

4.1.2 **Capitalization and Ownership.**

Schedule 4.1.2 states as of the Closing Date the name of each Loan Party’s and each Subsidiary’s jurisdiction of organization. Each Loan Party and each Subsidiary of a Loan Party has good and marketable title to all of the ownership interests it purports to own, free and clear in each case of any Lien. All ownership interests have been validly issued, and all ownership interests are fully paid and nonassessable. All capital contributions and other consideration required to be made or paid in connection with the issuance of the ownership interests have been made or paid, as the case may be. As of the Closing Date, there are no options, warrants or other rights outstanding to purchase any such ownership interests except as indicated on Schedule 4.1.2.

4.1.3 **Power and Authority.**

Each Loan Party has full power to enter into, execute, deliver and carry out the Loan Documents to which it is a party, to incur the Indebtedness contemplated by the Loan Documents and to perform its Obligations under the Loan Documents to which it is a party, and all such actions have been duly authorized by all necessary proceedings on its part.
4.1.4  **Validity and Binding Effect.**

This Agreement has been duly and validly executed and delivered by each Loan Party, and each other Loan Document which any Loan Party is required to execute and deliver on or after the date hereof will have been duly executed and delivered by such Loan Party on the required date of delivery of such Loan Document. This Agreement and each other Loan Document constitutes, or will constitute, legal, valid and binding obligations of each Loan Party which is or will be a party thereto on and after its date of delivery thereof, enforceable against such Loan Party in accordance with its terms, except to the extent that enforceability of any of such Loan Document may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws affecting the enforceability of creditors’ rights generally or limiting the right of specific performance.

4.1.5  **No Conflict.**

Neither the execution and delivery of this Agreement nor any other Loan Document by any Loan Party nor the consummation of the transactions herein or therein contemplated or compliance with the terms and provisions hereof or thereof by any of them will conflict with, constitute a default under or result in any breach of (i) the terms and conditions of Organizational Document of any Loan Party or (ii) any Law or any material agreement or instrument or order, writ, judgment, injunction or decree to which any Loan Party or any of its Subsidiaries is a party or by which it or any of its Subsidiaries is bound or to which it is subject, or result in the creation or enforcement of any Lien, charge or encumbrance whatsoever upon any property (now or hereafter acquired) of any Loan Party or any of its Subsidiaries (other than Liens granted under the Loan Documents).

4.1.6  **Litigation.**

Except as set forth on Schedule 4.1.6, there are no actions, suits, proceedings or investigations pending or, to the knowledge of any Loan Party, threatened against such Loan Party or any Subsidiary of such Loan Party at law or equity before any Official Body as to which there is a reasonable probability of such actions, suits, proceedings or investigations being adversely decided and, if adversely decided, which would reasonably be expected to have a Material Adverse Change. None of the Loan Parties or any Subsidiaries of any Loan Party is in violation of any order, writ, injunction or any decree of any Official Body which may result in any Material Adverse Change.

4.1.7  **Title to Properties.**

The real property owned or leased by each Loan Party and each Subsidiary of each Loan Party as of the Closing Date is described on Schedule 4.1.24. Each Loan Party and each Subsidiary of each Loan Party has good and marketable title to or valid leasehold interest in all material properties, assets and other rights which it purports to own or lease or which are reflected as owned or leased on its books and records, free and clear of all Liens and encumbrances except Permitted Liens, and subject to the terms and conditions of the applicable leases. All material leases of property are in full force and effect without the necessity for any consent which has not previously been obtained upon consummation of the transactions contemplated hereby.
4.1.8 Financial Statements; Liabilities.

(a) All quarterly and annual financial statements of the Borrower were compiled from the books and records maintained by the Borrower and its Subsidiaries and are correct and complete in all material respects and fairly represent in all material respects the consolidated financial condition of the Borrower and its Subsidiaries as of their dates and the results of operations for the fiscal periods then ended and have been prepared in accordance with GAAP consistently applied.

(b) No Loan Party had, as of the date of the last delivery of the financial statements described in clause (a) above, any material liabilities, contingent or otherwise, or forward or long-term commitments that are not disclosed therein or in the notes thereto, which would cause a Material Adverse Change. Except as disclosed on Schedule 4.1.8, since June 30, 2015, no Material Adverse Change has occurred.

4.1.9 Use of Proceeds.

The Borrower intends to use the proceeds of the Loans in accordance with Section 6.1.12.

4.1.10 Full Disclosure.

No Loan Document, nor any certificate, statement, agreement or other documents furnished to the Lender in connection herewith or therewith, contains any untrue statement of a material fact or omits to state a material fact necessary in order to make the statements contained herein and therein, in light of the circumstances under which they were made, not misleading. There is no fact known to any Loan Party which materially adversely affects the business, property, assets, financial condition, results of operations or prospects of any Loan Party which has not been set forth in this Agreement or in the certificates, statements, agreements or other documents furnished in writing to the Lender prior to or at the date hereof in connection with the transactions contemplated hereby.

4.1.11 Taxes.

All federal, state, local and other tax returns required to have been filed with respect to each Loan Party and its Subsidiaries have been filed, and payment or adequate provision has been made for the payment of all taxes, fees, assessments and other governmental charges which have or may become due pursuant to said returns or to assessments received, except to the extent that such taxes, fees, assessments and other charges are being contested in good faith by appropriate proceedings diligently conducted and for which such reserves or other appropriate provisions, if any, as shall be required by GAAP shall have been made. There are no agreements or waivers extending the statutory period of limitations applicable to any federal income tax return of the Borrower for any period.

4.1.12 Consents and Approvals.

Except for the filing of financing statements in the required filing offices, no consent, approval, exemption, order or authorization of, or a registration or filing with, any Official Body or any other Person is required by any Law or any agreement in connection with the execution, delivery and carrying out of the Loan Documents by each Loan Party.
4.1.13 No Event of Default; Compliance with Instruments.

No event has occurred and is continuing and no condition exists or will exist after giving effect to the borrowings or other extensions of credit to be made on the Closing Date under or pursuant to the Loan Documents which constitutes an Event of Default or Potential Default. No Loan Party is in violation of: (a) any term of its Organizational Documents or (b) any material agreement or instrument to which it is a party or by which it or any of its properties or assets may be subject or bound where such violation would constitute a Material Adverse Change.

4.1.14 Patents, Trademarks, Copyrights, Licenses, Etc.

Each Loan Party and its Subsidiaries owns or has the right to use all material patents, trademarks, service marks, trade names, copyrights, licenses, registrations, franchises, permits, know-how and other intellectual property rights necessary to own and lease the Machines.

4.1.15 Security Interests.

The Liens granted to the Lender pursuant to the Loan Documents in the Collateral constitute and will continue to constitute Prior Security Interests under the Uniform Commercial Code as in effect in each applicable jurisdiction (the “Uniform Commercial Code”) or other applicable Law entitled to all the rights, benefits and priorities provided by the Uniform Commercial Code or such Law. Each Loan Party hereby grants to the Lender a security interest with respect to all of the Collateral and any proceeds from the sale of the Collateral. Upon the occurrence of any Event of Default or event which, with giving of notice or lapse of time or both, could become an Event of Default, the Lender may exercise all rights and remedies of a secured party under the Uniform Commercial Code with respect thereto. Upon the filing and recording of financing statements relating to said security interests in each office and in each jurisdiction where required in order to perfect the security interests described above, all such action as is necessary or advisable to establish such rights of the Lender will have been taken, and there will be upon execution and delivery of the Loan Documents and the filing of such financing statements, no necessity for any further action in order to preserve, protect and continue such rights, except the filing of continuation statements with respect to such financing statements within six (6) months prior to each five (5) year anniversary of the filing of such financing statements. All filing fees and other expenses in connection with each such action have been or will be paid by the Loan Parties.

4.1.16 Insurance.

Schedule 4.1.16 lists all insurance policies and other bonds to which each Loan Party is a party, all of which are valid and in full force and effect. No notice has been given or claim made and no grounds exist to cancel or avoid any of such policies or bonds or to reduce the coverage provided thereby. Such policies and bonds provide adequate coverage from reputable and financially sound insurers in amounts sufficient to insure the assets and risks of each Loan Party in accordance with prudent business practices.
4.1.17 **Compliance with Laws.**

Each Loan Party is in compliance in all material respects with all applicable Laws in all jurisdictions in which such Loan Party is presently or will be doing business, except where the failure to do so would not constitute a Material Adverse Change.

4.1.18 **Material Contracts.**

Schedule 4.1.18 lists as of the Closing Date all contracts relating to the business operations of each Loan Party and each Subsidiary of any Loan Party required to be filed by Item 601 of Regulation S-K of the Securities Act of 1933, as amended. All such material contracts are valid, binding and enforceable upon such Loan Party or Subsidiary and each of the other parties thereto in accordance with their respective terms. The Loan Parties and their Subsidiaries are not in material default with respect to any such material contracts, nor do the Loan Parties have knowledge of any material default with respect to the other parties to such material contracts.

4.1.19 **Investment Companies; Regulated Entities.**

No Loan Party is an “investment company” registered or required to be registered under the Investment Company Act of 1940 or under the “control” of an “investment company” as such terms are defined in the Investment Company Act of 1940 and shall not become such an “investment company” or under such “control”. No Loan Party is subject to any other Federal or state statute or regulation limiting its ability to incur Indebtedness for borrowed money.

4.1.20 **Employment Matters and Benefits.**

(a) Each Loan Party and its Subsidiaries are in compliance in all material respects with any applicable provisions of ERISA with respect to all of its Benefit Arrangements and Plans. No Loan Party nor any Subsidiary of a Loan Party is subject to any multiemployer plans as defined in ERISA. There has been no prohibited transaction with respect to any Benefit Arrangement or any Plan, which could result in any material liability of any Loan Party or any other member of the ERISA Group. With respect to each Plan, each Loan Party and each other member of the ERISA Group (i) have fulfilled in all material respects their obligations under the minimum funding standards of ERISA, (ii) have not incurred any liability to the PBGC, and (iii) have not had asserted against them any penalty for failure to fulfill the minimum funding requirements of ERISA. No Loan Party nor any other member of the ERISA Group has instituted or intends to institute proceedings to terminate any Plan under Section 4041 of ERISA.

(b) No event requiring notice to the PBGC under Section 302(f)(4)(A) of ERISA has occurred or is reasonably expected to occur with respect to any Plan, and no amendment has been made or is reasonably expected to be made to any Plan in violation of 436(c) of the Internal Revenue Code.

(c) To the extent that any Benefit Arrangement is insured, each Loan Party and all other members of the ERISA Group have paid when due all premiums required to be paid for all periods through the Closing Date. To the extent that any Benefit Arrangement is funded other than with insurance, each Loan Party and all other members of the ERISA Group have made when due all contributions required to be paid for all periods through the Closing Date.

(d) All Plans and Benefit Arrangements have been administered in accordance with their terms and applicable Law in all material respects.
4.1.21  **Employment Matters.**

Except as disclosed on **Schedule 4.1.21**, each Loan Party is in compliance with all Labor Contracts and all applicable Laws including those related to equal employment opportunity and affirmative action, labor relations, minimum wage, overtime, child labor, medical insurance continuation, worker adjustment and relocation notices, immigration controls and worker and unemployment compensation, where the failure to comply would constitute a Material Adverse Change. There are no outstanding grievances, arbitration awards or appeals therefrom arising out of the Labor Contracts or, to the knowledge of any Loan Party, current or threatened strikes, picketing, hand-billing or other work stoppages or slowdowns at facilities of any Loan Party which in any case would constitute a Material Adverse Change.

4.1.22  **Solvency.**

The Borrower is Solvent.

4.1.23  **Margin Stock.**

None of the Loan Parties or any Subsidiaries of any Loan Party engages or intends to engage principally, or as one of its important activities, in the business of extending credit for the purpose, immediately, incidentally or ultimately, of purchasing or carrying margin stock (within the meaning of Regulation U, T or X as promulgated by the Board of Governors of the Federal Reserve System). No part of the proceeds of any Loan has been or will be used, immediately, incidentally or ultimately, to purchase or carry any margin stock or to extend credit to others for the purpose of purchasing or carrying any margin stock or which is inconsistent with the provisions of the regulations of the Board of Governors of the Federal Reserve System. None of the Loan Parties or any Subsidiary of any Loan Party holds or intends to hold margin stock in such amounts that more than 25% of the reasonable value of the assets of any Loan Party or Subsidiary of any Loan Party are or will be represented by margin stock.

4.1.24  **Collateral Locations.**

**Schedule 4.1.24** lists all real property owned or leased by any Loan Party (and designates whether such real property is owned or leased, and if owned, whether such real property is subject to a mortgage). **Schedule 4.1.24** provides each location at which any Collateral is located, whether or not such location is owned or leased by such Loan Party. To the extent that any such location is leased and upon request of the Lender, **Schedule 4.1.24** lists the applicable Loan Party party to the lease and a good faith estimate of the market value of the Collateral held at such location, and, if reasonably requested by the Lender, the name and address of the landlord. Except as disclosed on **Schedule 4.1.24**, none of the Collateral is in the possession of any bailee, warehouseman, processor or consignee. To the extent that any of the Collateral is in the possession of any bailee, warehouseman, processor or consignee, **Schedule 4.1.24** provides a good faith estimate of the market value of the Collateral held by each Loan Party at each location.
4.1.25 **Anti-Terrorism Laws.**

(a) No Covered Entity is a Sanctioned Person; (b) each of the Covered Entities is in compliance in all material respects with any applicable Anti-Terrorism Laws; and (c) the Borrower has implemented and maintains in effect policies and procedures that the Borrower reasonably believes are designed to ensure compliance by the Covered Entities with Anti-Terrorism Laws in all material respects.

4.2 **Updates to Schedules.**

Should any of the representations and warranties, or information or disclosures provided on any of the Schedules, become outdated or incorrect in any material respect, the Borrower shall provide the Lender in writing with such revisions or updates in an appropriate Schedule as may be necessary or appropriate to update or correct same no less frequently than on January 15 and July 15 of each calendar year; provided, however, that no Schedule shall be deemed to have been amended, modified or superseded by any such correction or update, nor shall any breach of warranty or representation be deemed to have been cured thereby, unless and until the Lender, in its sole and absolute discretion, shall have accepted in writing such revisions or updates to such Schedule.

5. **CONDITIONS OF LENDING**

The obligation of the Lender to make any Loan hereunder is subject to the performance by each of the Loan Parties of its Obligations to be performed hereunder at or prior to the making of any such Loans and to the satisfaction of the following further conditions:

5.1 **Conditions Precedent.**

On the Closing Date:

5.1.1 **Officer’s Certificate.**

The representations and warranties of the Loan Parties contained in Section 4 and in each of the other Loan Documents shall be true and accurate on and as of the Closing Date with the same effect as though such representations and warranties had been made on and as of such date (except representations and warranties which relate solely to an earlier date or time, which representations and warranties shall be true and correct on and as of the specific dates or times referred to therein), and each Loan Party shall have performed and complied with all covenants and conditions hereof and thereof, no Event of Default or Potential Default shall have occurred which has not have been waived in writing by the Lender; and there shall be delivered to the Lender a certificate, dated as of the Closing Date and signed by the Chief Executive Officer, President or Chief Financial Officer of each Loan Party to each such effect.
5.1.2  **Secretary’s Certificates.**

There shall be delivered to the Lender a certificate dated as of the Closing Date and signed by the Secretary or an Assistant Secretary of each Loan Party, certifying as appropriate as to:

(a) all action taken by such Loan Party in connection with the Loan Documents;

(b) the names of the officers authorized to sign the Loan Documents and the true signatures of such officers and specifying the Authorized Officers permitted to act on behalf of such Loan Party for purposes of the Loan Documents and the true signatures of such officers, on which the Lender may conclusively rely; and

(c) copies of its Organizational Documents as in effect on the Closing Date certified by the appropriate government official where such documents are filed in such jurisdiction together with recent certificates from the appropriate government officials in such jurisdiction as to the continued existence and good standing of each Loan Party in each jurisdiction where organized.

5.1.3  **Delivery of Loan Documents.**

This Agreement and, except as set forth on Schedule 6.1.16, all other Loan Documents shall have been duly executed and delivered to the Lender, together with all appropriate financing statements.

5.1.4  **Reserved.**

5.1.5  **Legal Details.**

All legal details and proceedings in connection with the transactions contemplated by the Loan Documents shall be in form and substance satisfactory to the Lender, and the Lender shall have received all such other counterpart originals or certified or other copies of such documents and proceedings in connection with such transactions, in form and substance satisfactory to the Lender, as the Lender may reasonably request.

5.1.6  **Consents.**

All material consents, licenses and approvals required for the delivery and performance by each Loan Party of any Loan Document and the enforceability of any Loan Document against such Loan Party, certified by an Authorized Officer of such Loan Party that each is in full force and effect and none other is so required or necessary.

5.1.7  **No Violation of Laws.**

The making of the Loans shall not contravene any Law applicable to any Loan Party or the Lender.
5.1.8 **No Actions or Proceedings.**

No action, proceeding, investigation, regulation or legislation shall have been instituted, threatened or proposed before any Official Body to enjoin, restrain or prohibit, or to obtain damages in respect of, the Loan Documents or the consummation of the transactions contemplated hereby or thereby or which, in the Lender’s sole discretion, would make it inadvisable to consummate the transactions contemplated by the Loan Documents.

5.1.9 **Insurance Policies; Certificates of Insurance; Endorsements.**

The Loan Parties shall have delivered evidence acceptable to the Lender that adequate insurance in compliance with Section 6.1.3 is in full force and effect and that all premiums then due thereon have been paid, together with a certified copy of the Loan Parties’ casualty insurance policy or policies evidencing coverage satisfactory to the Lender, with additional insured and lender loss payable special endorsements attached thereto in form and substance satisfactory to the Lender naming the Lender as a loss payee and an additional insured.

5.1.10 **Lien searches.**

The Lender shall have received lien searches for the Loan Parties in scope acceptable to the Lender and with results acceptable to the Lender.

5.1.11 **Opinions of Counsel.**

The Lender shall have received written opinions of counsel for the Loan Parties, dated the Closing Date, in form and substance satisfactory to the Lender and its counsel.

5.1.12 **Payment of Fees.**

The Borrower shall have paid to the Lender (a) an upfront fee equal to $187,500 (which amount equals one hundred and twenty-five (125) basis points multiplied by the amount of the Revolving Credit Commitment); which fee shall be fully earned on the date hereof, and (b) all other fees and expenses payable on the Closing Date as required by this Agreement or any other Loan Document.

5.2 **Conditions Precedent to Any Loan.**

The Lender’s obligation to make any Loan under this Agreement is also conditioned upon the following:

5.2.1 **Representations and Warranties.**

The representations and warranties of the Loan Parties contained in Section 4 and in the other Loan Documents shall be true on and as of the date of each Loan with the same effect as though such representations and warranties had been made on and as of such date (except representations and warranties which expressly relate solely to an earlier date or time, which representations and warranties shall be true and correct on and as of the specific dates or times referred to therein) and the Loan Parties shall have performed and complied with all covenants and conditions hereof.
5.2.2 Default.

No Event of Default or Potential Default shall have occurred which has not been waived in writing by the Lender.

5.2.3 Loan Request.

The Borrower shall have delivered to the Escrow Agent a duly executed and completed Loan Request.

6. COVENANTS

6.1 Affirmative Covenants.

The Loan Parties jointly and severally covenant and agree that until indefeasible payment in full of the Loans and interest thereon and satisfaction of the Loan Parties’ other Obligations to the Lender under the Loan Documents, each Loan Party shall comply at all times with the following affirmative covenants:

6.1.1 Preservation of Existence.

Each Loan Party shall, and cause its Subsidiaries to, maintain its legal existence as a corporation, limited partnership or limited liability company and its license or qualification and good standing in each jurisdiction in which its ownership or lease of property or the nature of its business makes such license or qualification necessary except to the extent that any failure to be so licensed or qualified and in good standing will not constitute a Material Adverse Change.

6.1.2 Payment of Liabilities, Including Taxes, Etc.

Each Loan Party shall, and cause its Subsidiaries to, duly pay, discharge, or otherwise satisfy in the ordinary course of its business all liabilities (including trade payables) to which it is subject or which are asserted against it, promptly as and when the same shall become due and payable, including all taxes, assessments and governmental charges upon it or any of its properties, assets, income or profits, prior to the date on which penalties attach thereto, except to the extent that such liabilities, including taxes, assessments or charges, are being contested in good faith and by appropriate and lawful proceedings diligently conducted and for which such reserve or other appropriate provisions, if any, as shall be required by GAAP, shall have been made, but only to the extent that failure to discharge any such liabilities would not result in any additional liability which would have a Material Adverse Change, provided that each Loan Party will pay all such liabilities forthwith upon the commencement of proceedings to foreclose any Lien which may have attached as security therefor.
6.1.3 **Maintenance of Insurance.**

Each Loan Party shall insure its and its Subsidiaries’ properties and assets against loss or damage by fire and such other insurable hazards as such assets are commonly insured (including fire, extended coverage, property damage, workers’ compensation, and public liability insurance) and against other risks (including errors and omissions) in such amounts as similar properties and assets are insured by prudent companies in similar circumstances carrying on similar businesses, and with reputable and financially sound insurers, all as reasonably determined by the Lender. At the request of the Lender, the Loan Parties shall deliver to the Lender on the Closing Date and annually thereafter, a certificate of insurance signed by the Loan Parties’ independent insurance broker(s) and certifying as to the existence of the insurance required to be maintained by the Loan Documents, together with all reasonably requested endorsements thereto, and a summary schedule indicating all insurance then in force with respect to the Loan Parties and their Subsidiaries.

6.1.4 **Maintenance of Properties and Leases.**

Each Loan Party shall, and shall cause each of its Subsidiaries to, maintain in good repair, working order and condition (ordinary wear and tear excepted) in accordance with the general practice of other businesses of similar character and size, all of those properties useful or necessary to its business, and from time to time, such Loan Party will make or cause to be made all appropriate repairs, renewals or replacements thereof, except to the extent that the failure to so maintain, repair, renew or replace such properties would not constitute a Material Adverse Change.

6.1.5 **Maintenance of Licenses, Permits, Patents, Trademarks, Etc.**

Each Loan Party shall, and cause its Subsidiaries to, maintain in full force and effect all patents, trademarks, service marks, trade names, copyrights, licenses, certificates, franchises, permits and other authorizations necessary for the ownership and lease of their properties and assets.

6.1.6 **Visitation Rights and Field Visits.**

Each Loan Party shall, and shall cause each of its Subsidiaries to, permit any of the officers or authorized employees, representatives or agents of the Lender to visit and inspect any of its properties and to examine and make excerpts from its books and records and discuss its business affairs, finances and accounts with its officers, all in such detail and at such times and as often as the Lender may reasonably request, provided that so long as an Event of Default has not occurred, the Lender shall provide the Borrower with reasonable notice prior to any visit or inspection.

6.1.7 **Keeping of Records and Books of Account.**

Each Loan Party shall and shall cause each of its Subsidiaries to maintain and keep proper books of record and account which enable such Loan Party and its Subsidiaries to issue financial statements in accordance with GAAP and as otherwise required by applicable Laws of any Official Body having jurisdiction over such Loan Party and any Subsidiary thereof, and in which full, true and correct entries shall be made in all material respects of all its dealings and business and financial affairs.
6.1.8 Customer Leasing Documents.

Whenever the Borrower uses Loan proceeds to finance the lease of a Machine, the Borrower shall promptly deliver a fully executed original of the lease agreement in connection therewith to the Lender and update Schedule A to the U.S. Security Agreement to include the Machine(s) being financed.

6.1.9 Collateral.

The Borrower shall, and shall cause each Subsidiary of the Borrower to, from time to time and upon written notice from the Lender to the Borrower, execute and deliver to the Lender, solely for the Lender’s convenience in maintaining a record of the Collateral, such written statements and schedules as the Lender may reasonably require, designating, identifying or describing the Collateral.

6.1.10 Plans and Benefit Arrangements.

The Loan Parties shall, and shall cause each other member of the ERISA Group to, comply with ERISA, the Internal Revenue Code and other applicable Laws applicable to Plans and Benefit Arrangements except where such failure, alone or in conjunction with any other failure, would not result in a Material Adverse Change. Without limiting the generality of the foregoing, the Loan Parties shall cause all of its Plans and all Plans maintained by any member of the ERISA Group to be funded in accordance with the minimum funding requirements of ERISA and shall make, and cause each member of the ERISA Group to make, in a timely manner, all contributions due to Plans and Benefit Arrangements.

6.1.11 Compliance with Laws.

Each Loan Party shall, and cause its Subsidiaries to, comply with all applicable Laws, provided that it shall not be deemed to be a violation of this Section 6.1.11 if any failure to comply with any Law would not result in fines, penalties, remediation costs, other similar liabilities or injunctive relief which in the aggregate would constitute a Material Adverse Change.

6.1.12 Use of Proceeds.

The Borrower will use the proceeds of the Loans provide working capital to the Loan Parties and for general corporate purposes of the Loan Parties.

6.1.13 Further Assurances.

Each Loan Party shall, from time to time, at its expense, faithfully preserve and protect the Lender’s Lien on and Prior Security Interest in the Collateral as a continuing first priority perfected Lien, subject only to Permitted Liens, and shall do such other acts and things as the Lender in its sole discretion may deem necessary or advisable from time to time in order to preserve, perfect and protect the Liens granted under the Loan Documents and to exercise and enforce the Lender’s rights and remedies thereunder with respect to the Collateral.
6.1.14  **Reserved.**

6.1.15  **Anti-Terrorism Laws; International Trade Law Compliance.**

(a)  No Covered Entity will become a Sanctioned Person; (b) the Borrower will maintain in force and effect policies and procedures that the Borrower reasonably believes are designed to ensure compliance by the Covered Entities with Anti-Terrorism Laws in all material respects; and (c) no Covered Entity will use the proceeds of the Loans in violation of any Anti-Terrorism Laws.

6.1.16  **Post-Closing Matters.**

The Loan Parties shall satisfy such conditions within the applicable time periods set forth on Schedule 6.1.16, as such time periods may be extended by the Lender, in its sole discretion.

6.1.17  **Collateral.**

After the occurrence and during the continuation of a Potential Default or Event of Default, or if there occurs a Material Adverse Change relating to the type, quantity or quality of the Collateral or Lien granted thereon, and if reasonably requested by the Lender, as security for the Obligations hereunder and under the other Loan Documents, the Loan Parties shall pledge, within a reasonable time frame agreed upon by the parties hereto, at the Loan Parties’ expense, such additional assets as Collateral as may be reasonably required by the Lender, and shall cause such Collateral to become subject to the Lender’s Lien on and Prior Security Interest in such Collateral as a continuing first priority perfected Lien, subject only to Permitted Liens.

6.2  **Negative Covenants.**

The Loan Parties jointly and severally covenant and agree that until indefeasible payment in full of the Loans and interest thereon, and satisfaction of the Loan Parties’ other Obligations to the Lender under the Loan Documents, the Loan Parties shall comply at all times with the following negative covenants:

6.2.1  **Indebtedness.**

No Loan Party shall, at any time create, incur, assume or suffer to exist any Indebtedness without the prior written consent of the Lender, except:

(a)  Indebtedness to the Lender;

(b)  Existing Indebtedness as set forth on Schedule 6.2.1 (including any extensions or renewals thereof), provided there is no increase in the amount thereof or other significant change in the terms thereof unless otherwise specified on Schedule 6.2.1;

(c)  Capital leases and Indebtedness secured by Purchase Money Security Interests in the aggregate principal amount not to exceed $500,000 at any time outstanding;
(d) Indebtedness of any Loan Party to an Excluded Subsidiary in an aggregate principal amount not to exceed $3,500,000 at any one time outstanding so long as in each instance no Potential Default or Event of Default exists or would result therefrom; and

(e) Indebtedness of a Loan Party to another Loan Party so long as such Indebtedness is subordinated to the Obligations pursuant to the Intercompany Subordination Agreement or in a manner otherwise satisfactory to the Lender.

6.2.2 Liens.

The Loan Parties shall not, at any time create, incur, assume or suffer to exist any Lien on any of its property or assets, tangible or intangible, now owned or hereafter acquired, or agree or become liable to do so, except Liens in favor of the Lender and Permitted Liens. No Loan Party shall, directly or indirectly, enter into any agreement with any Person other than the Lender pursuant to a Loan Document which prohibits or limits the ability of a Loan Party to create, incur, assume, or suffer to exist any Lien upon any of its property, assets, or revenues, whether now owned or hereafter acquired.

6.2.3 Guaranties.

Except as permitted under Section 6.2.1 and under Schedule 6.2.3, no Loan Party shall, at any time, directly or indirectly, become or be liable in respect of any Guaranty, or assume, guarantee, become surety for, endorse or otherwise agree, become or remain directly or contingently liable upon or with respect to any obligation or liability of any other Person.

6.2.4 Loans and Investments.

No Loan Party shall, at any time, make or allow to remain outstanding any loan or advance to, or purchase, acquire or own any stock, bonds, notes or securities of, or any partnership interest (whether general or limited) or limited liability company interest in, or any other investment or interest in, or make any capital contribution to, any other Person, or agree, become or remain liable to do any of the foregoing, except:

(a) trade credit, including operating and/or capital leasing arrangements, extended on usual and customary terms in the ordinary course of business;

(b) advances to employees to meet expenses incurred by such employees in the ordinary course of business;

(c) Permitted Investments;

(d) Loans or advances to Excluded Subsidiaries of any Loan Party in an aggregate principal amount not to exceed $3,500,000 at any time, so long as in each instance no Potential Default or Event of Default exists or would result therefrom; or

(e) Loans or advances to Subsidiaries of any Loan Party existing on the Closing Date and described on Schedule 6.2.4.
6.2.5 Dividends and Related Distributions; Restricted Payments.

The Borrower may not make or pay, or agree to become or remain liable to make or pay, Distributions of any nature on account of or in respect of its common shares except pursuant to the terms and conditions of any equity incentive plans approved by the Borrower’s stockholders. Each other Loan Party and each Subsidiary of the Borrower or a Loan Party may make or pay, or agree to become or remain liable to make or pay, Distributions of any nature (whether in cash, property, securities or otherwise) on account of or in respect of its shares or interests to a Loan Party, so long as in each instance no Potential Default or Event of Default exists or would result therefrom.

6.2.6 Liquidations, Mergers, Consolidations, Acquisitions.

No Loan Party nor any Subsidiary of any Loan Party shall dissolve, liquidate or wind-up its affairs, or become a party to any merger or consolidation (including, in each case, pursuant to a Delaware LLC Division), or acquire by purchase, lease or otherwise all or substantially all of the assets or capital stock or membership interests of any other Person, except:

(a) any Guarantor or Subsidiary of a Loan Party may consolidate or merge into the Borrower or into another Loan Party in a transaction in which the Borrower or such other Loan Party is the surviving entity;

(b) any Subsidiary of a Loan Party that is not a Loan Party may be liquidated or dissolved if it is inactive or if all of the assets of such Subsidiary have been sold or disposed of in compliance with the terms of this Agreement;

(c) any Subsidiary of a Loan Party that is not a Loan Party may be merged into any Person or may be liquidated and dissolved, in each case in connection with the sale or disposition of such Subsidiary, if the sale or disposition of all of the assets of such Subsidiary would have been otherwise permitted hereunder, and any Subsidiary of the Borrower which is not a Loan Party may be merged into any other Subsidiary of the Borrower which is not a Loan Party.

6.2.7 Dispositions of Assets or Subsidiaries.

The Loan Parties shall not, and shall not permit any of their Subsidiaries to, sell, convey, assign, lease, abandon or otherwise transfer or dispose of, voluntarily or involuntarily, any of its properties or assets, tangible or intangible (including sale, assignment, discount or other disposition of accounts, contract rights, chattel paper, equipment or general intangibles with or without recourse or of capital stock), except:

(a) transactions involving the sale or lease of inventory in the ordinary course of business;

(b) any sale, transfer, lease or other disposition of assets in the ordinary course of business which are no longer necessary or required in the conduct of any Loan Party’s business provided that the fair market value of all assets sold, transferred or otherwise disposed of in reliance upon this clause (b) shall not exceed $7,500,000 in the aggregate; or

(c) any sale, transfer or lease of assets in the ordinary course of business which are replaced by substitute assets acquired or leased, provided such substitute assets are subject to the Lender’s Prior Security Interest.
6.2.8 **Affiliate Transactions.**

The Loan Parties shall not enter into or carry out any transaction with an Affiliate of a Loan Party (including purchasing property or services from or selling property or services to any Affiliate of a Loan Party or other Person) unless such transaction is: (a)(1) not otherwise prohibited by this Agreement, (2) entered into in the ordinary course of business upon fair and reasonable arm’s-length terms and conditions which are fully disclosed to the Lender, (3) in accordance with all applicable Laws or otherwise, or (b) described on Schedule 6.2.8.

6.2.9 **Subsidiaries, Partnerships and Joint Ventures.**

No Loan Party shall own or create directly or indirectly any Subsidiaries (including without limitation, the formation of any Subsidiary that is a Delaware Divided LLC), other than those existing on the date of this Agreement, those created to own service centers or those consented to by the Lender. No Loan Party shall become or agree to: (i) become a general or limited partner in any general or limited partnership, (ii) become a member or manager of, or hold a limited liability company interest in, a limited liability company, or (iii) become a joint venturer or hold a joint venture interest in any joint venture.

6.2.10 **Continuation of or Change in Business.**

No Loan Party shall engage in any business other than the business of such Loan Party as substantially in effect as of the date of this Agreement and will not permit any material change in the operation of the Borrower’s business.

6.2.11 **Fiscal Year; Accounting.**

The Borrower shall not (a) change its fiscal year from the twelve-month period beginning January 1st and ending December 31st or (b) make any change in its accounting policies or reporting practices, except as required by GAAP.

6.2.12 **Changes in Documents.**

No Loan Party shall amend in any respect any of its Organizational Documents without providing at least thirty (30) days’ prior written notice to the Lender and, in the event such change would be adverse to the Lender, as determined by the Lender in its sole discretion, obtaining the prior written consent of the Lender.

6.2.13 **Cancellation of Indebtedness.**

No Loan Party shall cancel any material claim or Indebtedness owing to it, except for reasonable consideration and in the ordinary course of its business.

6.2.14 **Burdensome Agreements.**

No Loan Party shall enter into, or permit to exist, any contractual obligation (except for this Agreement and the other Loan Documents) that (a) encumbers or restricts the ability of a Loan Party to act as a Loan Party, (b) creates any Lien upon any of its properties or assets, whether now owned or hereafter acquired, or (c) requires the grant of any Lien on property for any obligation if a Lien on such property is given as security for the Obligations.
6.2.15 Change in Collateral Location.

No Loan Party shall change the location of any Collateral with an aggregate book value in excess of $3,000,000 to a location other than the locations owned or leased by a Loan Party as set forth on Schedule 4.1.24, without the prior written consent of the Lender.

6.2.16 Negative Pledges.

No Loan Party shall enter into or suffer to exist or become effective any agreement that prohibits or limits the ability of such Loan Party or any of its Subsidiaries to create, incur, assume or suffer to exist any Lien upon any of its property or revenues of the type included as Collateral under the Loan Documents, whether now owned or hereafter acquired, to secure the Obligations, other than (a) this Agreement and the other Loan Documents (b) any agreements governing any purchase money Liens or capital lease obligations otherwise permitted hereby (in which case, any prohibition or limitation shall only be effective against the assets financed thereby), (c) customary provisions restricting assignment of any licensing agreement (in which a Loan Party or its Subsidiaries are the licensee) with respect to a contract entered into by a Loan Party or its Subsidiaries in the ordinary course of business, and (d) customary provisions restricting subletting, sublicensing or assignment of any intellectual property license or any lease governing any leasehold interests of a Loan Party and its Subsidiaries. Except as set forth on Schedule 4.1.24, no Loan Party shall enter into or suffer to exist any Lien upon any of its real property, whether now owned or hereafter acquired.

6.3 Reporting Requirements.

Each Loan Party covenants and agrees that until indefeasible payment in full of the Loans and interest thereon and satisfaction of such Loan Party’s other Obligations to the Lender under the Loan Documents, each Loan Party will furnish or cause to be furnished, as applicable, to the Lender:

6.3.1 Quarterly Financial Statements.

As soon as available and in any event within forty-five (45) calendar days after the end of each of the first three fiscal quarters in each fiscal year, financial statements of ExOne, consisting of a consolidated balance sheet as of the end of such fiscal quarter and related consolidated statements of operations and cash flows for the fiscal quarter then ended and the fiscal year through that date, all in reasonable detail and certified by the Chief Executive Officer and Chief Financial Officer of the Borrower as having been prepared in accordance with GAAP, consistently applied, and setting forth in comparative form the respective financial statements for the corresponding date and period in the previous fiscal year. This obligation will be satisfied when the Borrower files such financial statements with the Securities and Exchange Commission through the EDGAR database.

6.3.2 Annual Financial Statements.

As soon as available and in any event within seventy-five (75) calendar days after the end of each fiscal year of the Borrower, financial statements of ExOne consisting of a consolidated balance sheet as of the end of such fiscal year, and related consolidated statements of operations, stockholders’ equity and cash flows for the fiscal year then ended, all in reasonable detail and setting forth in comparative form the financial statements as of the end of and for the preceding fiscal year, and certified by independent certified public accountants of nationally recognized standing satisfactory to the Lender. This obligation will be satisfied when the Borrower files such financial statements with the Securities and Exchange Commission through the EDGAR database.
6.3.3 Notice of Default.

Promptly after any officer of any Loan Party has learned of the occurrence of an Event of Default or Potential Default, a certificate signed by the President or Chief Financial Officer of such Loan Party setting forth the details of such Event of Default or Potential Default and the action which such Loan Party proposes to take with respect thereto.

6.3.4 Notice of Litigation.

Promptly after the commencement thereof, notice of all actions, suits, proceedings or investigations before or by any Official Body or any other Person against a Loan Party which relate to the Collateral, involve a claim or series of claims in excess of $750,000 or which if adversely determined would constitute a Material Adverse Change.

6.3.5 Certain Events.

Written notice to the Lender:

(a) within the time limits set forth in Section 6.2.12, any amendment to any Organizational Documents of any Loan Party;

(b) promptly if there occurs any material adverse change relating to the type, quantity or quality of the Collateral or Lien granted thereon; and

(c) promptly after the enactment or adoption of any Law which may result in a Material Adverse Change, notice thereof.

6.3.6 Other Reports and Information.

Promptly upon their becoming available to the Borrower:

(a) a copy of any material order in any proceeding to which any Loan Party is a party issued by any Official Body; and

(b) such other reports and information as the Lender may from time to time reasonably request.

7. DEFAULT

7.1 Events of Default.

An Event of Default shall mean the occurrence or existence of any one or more of the following events or conditions (whatever the reason therefor and whether voluntary, involuntary or effected by operation of Law):

7.1.1 Payments Under Loan Documents.

The Borrower shall fail to pay (i) any principal or accrued interest of any principal of any Loan (including scheduled installments, mandatory prepayments or the payment due at maturity) when due, or (ii) any other amount owing under any Loan Documents within three (3) days after such other amount becomes due in accordance with the terms hereof or thereof;
7.1.2 Breach of Warranty.

Any representation or warranty made at any time by any Loan Party in any Loan Document, or in any certificate, other instrument or statement furnished pursuant to the provisions hereof or thereof, shall prove to have been false or misleading in any material respect (other than to the extent such representation or warranty is already modified by “materiality” or “Material Adverse Change” in which case, shall prove to have been false or misleading in any respect) as of the time it was made or furnished; or any representation or warranty made by any Loan Party in connection with the execution and delivery of this Agreement or any other instrument, document, certificate or statement executed and delivered in connection with any Loan shall at any time prove to have been incorrect in any material respect when made;

7.1.3 Breach of Covenants.

A Loan Party shall default in the observance or performance of any covenant contained in Section 6.1.6, 6.1.15 or Section 6.2. A Loan Party shall default in the observance or performance of (a) any provision contained in Section 6.3.2 and such default shall continue unremedied for a period of forty-five (45) days after any officer of such Loan Party becomes aware of the occurrence thereof, and (b) any other covenant, condition or provision of any Loan Document and such default shall continue unremedied for a period of thirty (30) days after any officer of such Loan Party becomes aware of the occurrence thereof (in each case such grace period to be applicable only in the event such default can be remedied by corrective action of such Loan Party as determined by the Lender in its sole discretion);

7.1.4 Defaults in Other Agreements or Indebtedness.

A default or event of default shall occur at any time under the terms of any other agreement involving borrowed money or the extension of credit or any other Indebtedness under which a Loan Party may be obligated as a borrower or guarantor in excess of $1,000,000 in the aggregate, and such breach, default or event of default consists of the failure to pay (beyond any period of grace permitted with respect thereto, whether waived or not) any Indebtedness when due (whether at stated maturity, by acceleration or otherwise) or if such breach or default permits or causes the acceleration of any Indebtedness (whether or not such right shall have been waived) or the termination of any commitment to lend;

7.1.5 Final Judgments or Orders.

Any final judgments or orders (after the expiration of all times to appeal therefrom) shall be entered against a Loan Party by a court having jurisdiction in the premises: (a) for the payment of money in excess of $1,000,000 in the aggregate, not covered by insurance, or (b) which judgment or order would constitute a Material Adverse Change, in each instance which judgment is not discharged, vacated, bonded or stayed pending appeal within a period of ten (10) days from the date of entry;
7.1.6 **Loan Document Unenforceable.**

Any of the Loan Documents shall cease to be legal, valid and binding agreements enforceable against the party executing the same or such party’s successors and assigns (as permitted under the Loan Documents) in accordance with the respective terms thereof or shall in any way be terminated (except in accordance with its terms) or become or be declared ineffective or inoperative or shall in any way be challenged or contested or cease to give or provide the respective Liens, rights, titles, interests, remedies, powers or privileges intended to be created thereby;

7.1.7 **Uninsured Losses; Proceedings Against Assets.**

There shall occur any material uninsured damage to or loss, theft or destruction of any of the Collateral in excess of $1,000,000; or any material portion of the Collateral or any other assets of a Loan Party are attached, seized, levied upon or subjected to a writ or distress warrant; or any material portion of the Collateral or any other assets of a Loan Party come within the possession of any receiver, trustee, custodian or assignee for the benefit of creditors and the same is not cured within twenty (20) days thereafter;

7.1.8 **Notice of Lien or Assessment.**

A notice of Lien or assessment in excess of $1,000,000 which is not a Permitted Lien is filed of record with respect to all or any part of any assets of a Loan Party by any Official Body or any taxes or debts owing at any time or times hereafter to any Official Body, become payable and the same: (a) is not paid or bonded over within twenty (20) days after the same becomes payable, (b) is not being contested in good faith by appropriate proceedings, with appropriate reserves or accruals in the books and records of the Borrower;

7.1.9 **Insolvency.**

The Borrower ceases to be Solvent or admits in writing its inability to pay its debts as they mature;

7.1.10 **Involuntary Proceedings.**

A proceeding shall have been instituted in a court having jurisdiction in the premises seeking a decree or order for relief in respect of a Loan Party in an involuntary case under any applicable bankruptcy, insolvency, reorganization or other similar law now or hereafter in effect, or for the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator, conservator or similar official of a Loan Party for any substantial part of its property, or for the winding-up or liquidation of its affairs, and such proceeding shall remain undischarged or unstayed and in effect for a period of forty-five (45) consecutive days or such court shall enter a decree or order granting any of the relief sought in such proceeding;
7.1.11 **Voluntary Proceedings.**

A Loan Party shall: (a) commence a voluntary case under any applicable bankruptcy, insolvency, reorganization or other similar law now or hereafter in effect, (b) consent to the entry of an order for relief in an involuntary case under any such law, (c) consent to the appointment or taking possession by a receiver, liquidator, assignee, custodian, trustee, sequestrator, conservator or other similar official of itself or for any substantial part of its property, (d) make a general assignment for the benefit of creditors, (e) fail generally to pay its debts as they become due, or (f) take any action in furtherance of any of the foregoing, and such proceeding shall remain undismissed or unstayed and in effect for a period of forty-five (45) consecutive days or such court shall enter a decree or order granting any of the relief sought in such proceeding;

7.1.12 **Change of Control.**

A Change of Control shall have occurred; or

7.1.13 **Material Adverse Change.**

A Loan Party shall suffer any Material Adverse Change or shall suffer substantial loss, theft, taking, damage or destruction to or of any of its property, not covered by insurance, which would have a material adverse effect upon the business, prospects, operations or financial condition of the Loan Party.

For purposes of this Section 7.1, a loss or liability shall not be deemed to be “not covered by insurance”, notwithstanding that the insurer has not paid the claim, if a claim has been submitted in writing and any Loan Party reasonably believes that it is covered by the relevant insurance, provided that any claim not paid or agreed to be covered by the insurer within sixty (60) days after it is submitted shall be deemed to be not covered by insurance.

7.2 **Consequences of Event of Default.**

7.2.1 **Events of Default Other Than Bankruptcy, Insolvency or Reorganization Proceedings.**

If an Event of Default shall occur and which has not been waived in writing by the Lender, the Lender (a) may cancel the Revolving Credit Commitment and shall be under no further obligation to make any additional Loans and (b) may, by written notice to the Borrower, declare (i) the commitment to make any partial Loans terminated and (ii) the unpaid principal amount of the outstanding Loans and all interest accrued thereon, any unpaid fees and all other Indebtedness of the Borrower to the Lender hereunder and thereunder to be forthwith due and payable, and the same shall thereupon become and be immediately due and payable to the Lender without presentment, demand, protest or any other notice of any kind, all of which are hereby expressly waived, and (c) exercise all rights and remedies available to it under the Loan Documents or applicable Law or equity.
7.2.2 **Suits, Actions, Proceedings.**

If an Event of Default shall occur which has not been waived in writing by the Lender, and whether or not the Lender shall have accelerated the maturity of the Loans pursuant to any of the foregoing provisions of this Section 7.2, the Lender, if owed any amount with respect to the Loans, may proceed to protect and enforce its rights by suit in equity, action at law and/or other appropriate proceeding, whether for the specific performance of any covenant or agreement contained in any Loan Document, including as permitted by applicable Law the obtaining of the ex parte appointment of a receiver, and, if such amount shall have become due, by declaration or otherwise, proceed to enforce the payment thereof or any other legal or equitable right of the Lender; and

7.2.3 **Application of Proceeds.**

From and after the date on which the Lender has taken any action pursuant to this Section 7.2 and until all Obligations of the Loan Parties to the Lender have been indefeasibly paid in full, any and all proceeds received by the Lender from any sale or other disposition of the Collateral, or any part thereof, or the exercise of any other remedy by the Lender, shall be applied as follows:

(a) first, to reimburse the Lender for out-of-pocket costs, expenses and disbursements, including reasonable attorneys’ and paralegals’ fees and legal expenses, incurred by the Lender in connection with realizing on the Collateral or collection of any Obligations of the Loan Parties to the Lender under any of the Loan Documents, including advances made by the Lender for the reasonable maintenance, preservation, protection or enforcement of, or realization upon, the Collateral, including advances for taxes, insurance, repairs and the like and reasonable expenses incurred to sell or otherwise realize on, or prepare for sale or other realization on, any of the Collateral;

(b) second, to past due fees and past due interest with respect to the Loans;

(c) third, to past due principal of the Loans;

(d) fourth, to other fees and interest with respect to the Loans;

(e) fifth, to other principal of the Loans;

(f) sixth, to other Obligations due to the Lender hereunder or under the other Loan Documents; and

(g) seventh, the balance, if any, as required by Law.

7.2.4 **Other Rights and Remedies.**

In addition to all of the rights and remedies contained in any of the Loan Documents, the Lender shall have all of the rights and remedies of a secured party under the Uniform Commercial Code or other applicable Law, all of which rights and remedies shall be cumulative and non-exclusive, to the extent permitted by Law. The Lender may exercise all post-default rights granted to the Lender under the Loan Documents or applicable Law.
7.2.5 Limitation of Enforcement.

(1) With respect to any of the security created under this Agreement or any other Loan Document, the following shall apply:

(a) the Lender shall not be entitled to enforce such security against ExOne GmbH if and to the extent the enforcement would at the time of such enforcement:

(i) reduce the Borrower’s net assets as determined in accordance with paragraph (b) below (the “Net Assets”) to an amount less than its stated share capital; or

(ii) (if the Net Assets are already an amount less than the stated share capital) cause such amount to be further reduced,

and thereby affect the assets required for the obligatory preservation of its stated share capital according to sections 30 and 31 of the German Liability Company Act (taking into account applicable case law) (a “Capital Impairment”).

(b) The Net Assets shall be determined in accordance with the accounting principles consistently applied by ExOne GmbH in preparing its unconsolidated balance sheets (according to section 42 of the German Liability Company Act, sections 242 and 264 of the German Commercial Code) in the previous years.

(2) The limitation on enforcement pursuant to clause (1) above does not apply if and to the extent ExOne GmbH is legally and commercially in a position to take measures (including, set-off claims, provided that the claim of ExOne GmbH against the counterparty of such set-off is valuable) to avoid the occurrence of a Capital Impairment.

(3) If ExOne GmbH intends to demonstrate that the enforcement of such security has led or will lead to a Capital Impairment, then ExOne GmbH shall, to the extent required to discharge the amounts demanded, promptly realize any and all of its assets that are shown in its balance sheet with a book value that, in the reasonable opinion of the Lender, is significantly lower than the market value of the asset(s) if such asset(s) is/are not necessary for the ExOne GmbH’s business.

(4) The limitation on enforcement pursuant to clause (1) above does not affect the right of the Lender to take any enforcement action at a later point in time if and to the extent that this Section would allow this at that later point.

7.3 Set-off.

If an Event of Default shall have occurred and be continuing, the Lender is hereby authorized at any time and from time to time, to the fullest extent permitted by applicable Law, to set off and apply any and all deposits (general or special, time or demand, provisional or final, in whatever currency) at any time held and other obligations (in whatever currency) at any time owing by the Lender to or for the credit or the account of any Loan Party against any and all of the Obligations of such Loan Party now or hereafter existing under this Agreement or any other Loan
Document to the Lender, irrespective of whether or not the Lender shall have made any demand under this Agreement or any other Loan Document and although such Obligations of the such Loan Party may be contingent or unmatured. The rights of the Lender under this Section are in addition to other rights and remedies that the Lender may have. The Lender agrees to notify the Loan Parties promptly after any such setoff and application, provided that the failure to give such notice shall not affect the validity of such setoff and application.

7.4 Notice of Sale.

Any notice required to be given by the Lender of a sale, lease or other disposition of the Collateral or any other intended action by the Lender, if given ten (10) days prior to such proposed action, shall constitute commercially reasonable and fair notice thereof to the Loan Parties.

8. MISCELLANEOUS

8.1 Modifications, Amendments or Waivers.

The Lender and the Loan Parties may from time to time enter into written agreements amending or changing any provision of any Loan Document or the rights of the Lender or the Loan Parties hereunder or thereunder, or may grant written waivers or consents to a departure from the due performance of the Obligations of the Loan Parties hereunder or thereunder. Any such agreement, waiver or consent shall be effective to bind the Lender and the Loan Parties.

8.2 No Implied Waivers; Cumulative Remedies; Writing Required.

No course of dealing and no delay or failure of the Lender in exercising any right, power, remedy or privilege under any Loan Document shall affect any other or future exercise thereof or operate as a waiver thereof, nor shall any single or partial exercise thereof or any abandonment or discontinuance of steps to enforce such a right, power, remedy or privilege preclude any further exercise thereof or of any other right, power, remedy or privilege. The rights and remedies of the Lender under any Loan Document are cumulative and not exclusive of any rights or remedies which they would otherwise have. Any waiver, permit, consent or approval of any kind or character on the part of the Lender of any breach or default under this Agreement or any such waiver of any provision or condition of this Agreement must be in writing and shall be effective only to the extent specifically set forth in such writing.

8.3 Reimbursement, Indemnification and Waiver by the Loan Parties.

8.3.1 Reimbursement.

Each Loan Party agrees unconditionally upon demand to pay or reimburse to the Lender and to save the Lender harmless against liability for the payment of all reasonable out-of-pocket costs, expenses and disbursements (including reasonable fees and expenses of counsel), incurred by the Lender: (a) in connection with development, negotiation, preparation, printing, execution, administration, interpretation and performance of this Agreement and the other Loan Documents, whether incurred before or after the date of this Agreement, (b) relating to any amendments, waivers or consents pursuant to the provisions hereof, (c) in connection with the enforcement of any Loan Document, or collection of amounts due hereunder or thereunder or the proof and allowability of any claim arising under any Loan Document, whether in bankruptcy or receivership proceedings or otherwise, and (d) in any workout or restructuring or in connection with the protection, preservation, exercise or enforcement of any of the terms hereof or of any rights hereunder or under any other Loan Document or in connection with any foreclosure, collection or bankruptcy proceedings.
8.3.2 **Indemnification.**

Each Loan Party shall indemnify the Lender (in such context, the "Indemnitee") against, and hold the Indemnitee harmless from, any and all losses, claims, damages, liabilities and related expenses (including the fees, charges and disbursements of any counsel for the Indemnitee), and shall indemnify and hold harmless the Indemnitee from all fees and time charges and disbursements for attorneys who may be employees of the Indemnitee, incurred by the Indemnitee or asserted against the Indemnitee by any third party or by the Borrower or any other Loan Party arising out of, in connection with, or as a result of (a) the execution or delivery of this Agreement, any other Loan Document or any agreement or instrument contemplated hereby or thereby, the performance or nonperformance by the parties hereto of their respective obligations hereunder or thereunder or the consummation of the transactions contemplated hereby or thereby, (b) any Loan or the use or proposed use of the proceeds thereof, (c) breach of representations, warranties or covenants of any Loan Party under the Loan Documents, or (d) any actual or prospective claim, litigation, investigation or proceeding relating to any of the foregoing, whether based on contract, tort or any other theory, whether brought by a third party or by the Borrower or any other Loan Party, and regardless of whether the Indemnitee is a party thereto, provided that no Loan Party shall indemnify the Indemnitee if the same results from the Lender’s gross negligence or willful misconduct as determined by a court of competent jurisdiction by final and non-appealable judgment. The Borrower agrees unconditionally to pay all stamp, document, transfer, recording or filing taxes or fees and similar impositions now or hereafter determined by the Lender to be payable in connection with any Loan Document, and the Borrower agrees unconditionally to save the Lender harmless from and against any and all present or future claims, liabilities or losses with respect to or resulting from any omission to pay or delay in paying any such taxes, fees or impositions.

8.3.3 **Waiver of Consequential Damages.**

To the fullest extent permitted by applicable Law, no Loan Party shall assert, and hereby waives, any claim against any Indemnitee, on any theory of liability, for special, indirect, consequential or punitive damages (as opposed to direct or actual damages) arising out of, in connection with, or as a result of, this Agreement, any other Loan Document or any agreement or instrument contemplated hereby, the transactions contemplated hereby or thereby, any Loan or the use of the proceeds thereof. The Indemnitee referred to in Section 8.3.2 shall not be liable for any damages arising from the use by unintended recipients of any information or other materials distributed by it through telecommunications, electronic or other information transmission systems in connection with this Agreement or the other Loan Documents or the transactions contemplated hereby or thereby.

8.4 **Holidays.**

Whenever payment of a Loan to be made or taken hereunder shall be due on a day which is not a Business Day such payment shall be due on the next Business Day and such extension of time shall be included in computing interest and fees, except that the outstanding principal balance of the Loans (together with the outstanding interest accrued thereon) shall be due on the Business Day preceding the Expiration Date if the Expiration Date is not a Business Day. Whenever any payment or action to be made or taken hereunder (other than payment of the Loans) shall be stated to be due on a day which is not a Business Day, such payment or action shall be made or taken on the next following Business Day, and such extension of time shall not be included in computing interest or fees, if any, in connection with such payment or action.
8.5 Notices.

Any notice, request, demand, direction or other communication (for purposes of this Section 8.5 only, a “Notice”) to be given to or made upon any party hereto under any provision of this Agreement shall be given or made by telephone or in writing (which includes means of electronic transmission (i.e., “e-mail”) or facsimile transmission in accordance with this Section 8.5 as follows:

To the Lender:

LBM Holdings LLC
980 Penn Avenue, Suite 400
Pittsburgh, PA 15222
Attention: Mark Deluzio, John Irvin
Email: mdeluzio@rockwellvc.com
Facsimile: (412) 434-8909
Telephone: (878) 999-2705

With a copy to:

Clark Hill PLC
One Oxford Centre
301 Grant Street, 14th Floor
Pittsburgh, PA 15219-1410
Attention: Lori Rooney
Email: lrooney@clarkhill.com
Facsimile: 412-394-2555
Telephone: 412-394-2503

To the Borrower:

The ExOne Company
127 Industry Boulevard
North Huntingdon, PA 15642
Attention: Loretta Benec
General Counsel and Corporate Secretary
Email: Loretta.benec@exone.com
Facsimile: (724) 765-1382
Telephone: (724) 765-1380
Any Notice shall be effective:

(a) In the case of hand-delivery, when delivered;

(b) If given by mail, three (3) days after such Notice is deposited with the United States Postal Service, with first-class postage prepaid, return receipt requested;

(c) In the case of a telephonic Notice, when a party is contacted by telephone, if delivery of such telephonic Notice is confirmed no later than the next Business Day by hand delivery, a facsimile or electronic transmission or overnight courier delivery of a confirmatory notice (received at or before noon on such next Business Day);

(d) In the case of a facsimile transmission, when sent to the applicable party’s facsimile machine’s telephone number if the party sending such Notice receives confirmation of the delivery thereof from its own facsimile machine;

(e) In the case of electronic transmission, when actually received; and

(f) If given by any other means (including by overnight courier based on records of such courier), when actually received.

8.6 **Severability.**

The provisions of this Agreement are intended to be severable. If any provision of this Agreement shall be held invalid or unenforceable in whole or in part in any jurisdiction, such provision shall, as to such jurisdiction, be ineffective to the extent of such invalidity or unenforceability without in any manner affecting the validity or enforceability thereof in any other jurisdiction or the remaining provisions hereof in any jurisdiction.

8.7 **Governing Law.**

This Agreement shall be deemed to be a contract under the Laws of the Commonwealth of Pennsylvania without regard to its conflict of laws principles, and shall for all purposes be governed by and construed and enforced in accordance with the Laws of the Commonwealth of Pennsylvania.
8.8 **Prior Understanding.**

This Agreement and the other Loan Documents supersede all prior understandings and agreements, whether written or oral, among the parties hereto and thereto relating to the transactions provided for herein and therein, including any prior confidentiality agreements, proposals, term sheets and commitments.

8.9 **Duration; Survival.**

All representations and warranties of the Loan Parties contained herein or made in connection herewith shall survive the making of the Loans and shall not be waived by the execution and delivery of this Agreement, any investigation by the Lender, the making of the Loans or payment in full of the Loans. All covenants and agreements of the Loan Parties contained in Sections 6.1, 6.2 and 6.3 shall continue in full force and effect from and after the date hereof so long as the Loan Parties may borrow and until termination of the Revolving Credit Commitment and payment in full of the Loans. All covenants and agreements of the Loan Parties contained herein relating to expenses and indemnification, including those set forth in Section 8.3, shall survive payment in full of the Loans and termination of the Revolving Credit Commitment.

8.10 **Successors and Assigns.**

(a) This Agreement shall be binding upon and shall inure to the benefit of the Lender, the Loan Parties and their respective successors and assigns, except that the Loan Parties may not assign or transfer any of their respective rights and obligations hereunder or any interest herein. The Lender may, at its own cost, make assignments of or sell participations in all or any part of the Loans made by it to one or more banks or other entities.

(b) Any assignee or participant which is not incorporated under the Laws of the United States of America or a state thereof shall deliver to the Borrower and the Lender the form of certificate as may be required by the Lender relating to federal income tax withholding. The Lender may furnish any publicly available information concerning the Borrower or its Subsidiaries and any other information concerning the Borrower or its Subsidiaries in the possession of the Lender from time to time to assignees and participants (including prospective assignees or participants), provided that such assignees and participants agree to be bound by the provisions of Section 8.11.

8.11 **Confidentiality.**

The Lender agrees to keep confidential all information obtained from the Borrower which is nonpublic and confidential or proprietary in nature (including any information the Borrower specifically designates as confidential), except as provided below, and to use such information only in connection with its capacity under this Agreement and for the purposes contemplated hereby. The Lender shall be permitted to disclose such information: (a) to outside legal counsel, accountants and other professional advisors who need to know such information in connection with the administration and enforcement of this Agreement, subject to agreement of such Persons to maintain confidentiality, (b) to assignees and participants as contemplated by Section 8.10, and prospective assignees and participants, (c) to the extent requested by any Official Body or, with notice to the Borrower, as otherwise required by applicable Law or by any subpoena or similar legal process, or in connection with any investigation or proceeding arising out of the transactions contemplated by this Agreement, (d) if it becomes publicly available other than as a result of a breach of this Agreement or becomes available from a source not known to be subject to confidentiality restrictions, (e) in connection with the exercise of any remedies hereunder or under any other Loan Document, or (f) if the Borrower shall have consented to such disclosure.
8.12 Counterparts.

This Agreement may be executed by different parties hereto on any number of separate counterparts, each of which, when so executed and delivered, shall be an original, and all such counterparts shall together constitute one and the same instrument.

8.13 Lender’s Consent.

Whenever the Lender’s consent is required to be obtained under any Loan Document as a condition to any action, inaction, condition or event, the Lender shall be authorized to give or withhold such consent in its sole and absolute discretion and to condition its consent upon the giving of additional collateral, the payment of money or any other matter.

8.14 Exceptions.

The representations, warranties and covenants contained herein shall be independent of each other, and no exception to any representation, warranty or covenant shall be deemed to be an exception to any other representation, warranty or covenant contained herein unless expressly provided, nor shall any such exceptions be deemed to permit any action or omission that would be in contravention of applicable Law.

8.15 CONSENT TO FORUM; WAIVER OF JURY TRIAL.

THE BORROWER HEREBY IRREVOCABLY CONSENTS TO THE NONEXCLUSIVE JURISDICTION OF ANY PENNSYLVANIA STATE OR FEDERAL COURT SITTING IN PITTSBURGH, PENNSYLVANIA, AND WAIVES PERSONAL SERVICE OF ANY AND ALL PROCESS UPON IT AND CONSENTS THAT ALL SUCH SERVICE OF PROCESS BE MADE BY CERTIFIED OR REGISTERED MAIL DIRECTED TO THE BORROWER AT THE ADDRESSES PROVIDED FOR IN SECTION 8.5 AND SERVICE SO MADE SHALL BE DEEMED TO BE COMPLETED UPON ACTUAL RECEIPT THEREOF. THE BORROWER WAIVES ANY OBJECTION TO JURISDICTION AND VENUE OF ANY ACTION INSTITUTED AGAINST IT AS PROVIDED HEREIN AND AGREES NOT TO ASSERT ANY DEFENSE BASED ON LACK OF JURISDICTION OR VENUE. THE BORROWER AND THE LENDER HEREBY WAIVE TRIAL BY JURY IN ANY ACTION, SUIT, PROCEEDING OR COUNTERCLAIM OF ANY KIND ARISING OUT OF OR RELATED TO THIS AGREEMENT, ANY OTHER LOAN DOCUMENT OR THE COLLATERAL TO THE FULL EXTENT PERMITTED BY LAW.

8.16 Payments Set Aside.

To the extent that any payment by or on behalf of the Borrower is made to the Lender and such payment or any part thereof is subsequently invalidated, declared to be fraudulent or preferential, set aside or required (including pursuant to any settlement entered into by the Lender in its discretion) to be repaid to a trustee, receiver or any other party, in connection with any proceeding under any bankruptcy, insolvency, reorganization or other similar Law or otherwise, then to the extent of such recovery, the obligation or part thereof originally intended to be satisfied shall be revived and continued in full force and effect as if such payment had not been made or such setoff had not occurred.
(a) **Payments Free of Taxes; Obligation to Withhold; Payments on Account of Taxes.**

Any and all payments by or on account of any obligation of the Borrower under any Loan Document shall be made without deduction or withholding for any Taxes, except as required by applicable Laws. If the Borrower shall be required by the Internal Revenue Code or any other applicable Laws to withhold or deduct any Taxes from any payment (as determined in its good faith discretion), then (i) the Borrower shall withhold or make such deductions as are determined by it to be required, (ii) the Borrower shall timely pay the full amount withheld or deducted to the relevant Official Body in accordance with the Internal Revenue Code or such Laws, and (iii) to the extent that the withholding or deduction is made on account of Indemnified Taxes, the sum payable by the Borrower shall be increased as necessary so that after any required withholding or the making of all required deductions (including deductions applicable to additional sums payable under this **Section 8.17** the Lender receives an amount equal to the sum it would have received had no such withholding or deduction been made.

(b) **Payment of Other Taxes by the Borrower.**

Without limiting the provisions of **Section 8.17(a)**, the Borrower shall timely pay to the relevant Official Body in accordance with applicable Laws, or at the option of the Lender timely reimburse it for the payment of, any Other Taxes.

(c) **Tax Indemnifications.**

The Borrower shall, and does hereby indemnify the Lender, and shall make payment in respect thereof within ten days after demand therefor, for the full amount of any Indemnified Taxes (including Indemnified Taxes imposed or asserted on or attributable to amounts payable under this **Section 8.17** payable or paid by the Lender or required to be withheld or deducted from a payment to the Lender, and any penalties, interest and reasonable expenses arising therefrom or with respect thereto, whether or not such Indemnified Taxes were correctly or legally imposed or asserted by the relevant Official Body. A certificate as to the amount of such payment or liability delivered to the Borrower by the Lender shall be conclusive absent manifest error.

(d) **Evidence of Payments.**

Upon request by the Lender after any payment of Taxes by the Borrower to an Official Body as provided in this **Section 8.17**, the Borrower shall deliver to the Lender the original or a certified copy of a receipt issued by such Official Body evidencing such payment, a copy of any return required by Laws to report such payment or other evidence of such payment reasonably satisfactory to the Lender.

(e) **Survival.**

Each party’s obligations under this **Section 8.17** shall survive any assignment of rights by the Lender and the repayment, satisfaction or discharge of all other Obligations.

[SIGNATURE PAGES FOLLOW]
ANNEX B

Updated Schedules

[Purposefully Omitted]
Guarantee Credit Framework Agreement

☐ Credit Guarantee

ExOne GmbH
Daimlerstr. 22, 86368 Gersthofen

- hereinafter referred to as the Borrower - agrees with the German Savings Bank on the assumption of guarantees in the form of documents or in the form of an electronic liability declaration in favor of the Borrower up to a total amount of EUR 3,500,000.00

The following conditions apply to the framework agreement in addition to the attached terms and conditions for the guarantee transaction:

1 Guarantee Account
A guarantee account of the Borrower shall be charged for the guarantees assumed by the Savings Bank 7000068853.

2 Guarantee Commission
For the guarantees provided under this Agreement, the Savings Bank charges the commission rates it sets for guarantees of this type, currently a one-off percentage of the guarantee amount, with a minimum of EUR 2,500.00.

☐ the commission rates it sets for guarantees of this type,

☐ per month of the guarantee amount,

☒ per year of the guarantee amount,

with a minimum of EUR 15.00 per quarter.

The price for issuing a domestic deed of suretyship is currently EUR 20.00 when using the Saving Bank's own forms and wording. If forms and wording from other savings banks are used, the price increases to currently EUR 40.00 per deed.

The conditions for guarantees in foreign transactions, letters of credit and exchange rate hedging transactions are agreed separately.

The Borrower receives the debit note separately. The Borrower shall be notified of changes to the guarantee commission. Debit agreement:

☒ The debit is made to the account 250491743 in our company.

☐ The debit is made according to the SEPA Direct Debit Mandate.

Customer reference no.: ____________________________
Creditor ID: ____________________________

If no value-added tax is invoiced, this is a financial service exempt from value-added tax. Unless the Borrower objects in writing within four weeks after booking the value-added tax, stating his or her legitimate interests (in particular no right to deduct input tax), the Savings Bank will continue to charge the loan costs plus VAT at the statutory rate. The Borrower also has the right to object if his or her right to deduct input tax changes at a later date.

3 Amount of the Obligation
The Borrower will receive separate information on the amount of the obligation under this Framework Agreement each time a guarantee is assumed. In the event that the guarantee is given in documentary form, notification shall be made by post; for electronic declaration of liability, by posting it in the electronic mailbox. The Savings Bank is authorized to obtain information from the creditors on the respective amount of the guaranteed liabilities.

4 Special Agreements
This credit can be used as a guarantee credit, for guarantees in foreign business, letters of credit and exchange rate hedging transactions.

In the case of use in foreign currency, the credit line is charged with the amount of the foreign currency amount (converted into euros) plus 20% currency change buffer. For the conversion of the foreign currency amount into euros, the respective mean exchange rate on the first day of use in foreign currency shall apply. The mean exchange rate is the average between the purchase and sale rate. These rates are published on the BayernLB’s (Bavarian Central Bank) exchange rate sheet on its website. The mean exchange rate is derived by the Bavarian Central Bank from the so-called “Daily Foreign Exchange Settlement Rate of BayernLB”, which it calculates at around 1 p.m. The forms of use in foreign currency available to the Borrower are to be specified separately in writing, unless otherwise agreed herein. The sum of all claims, including conditional claims, arising from individual transactions issued under this Framework Agreement may not exceed the above-mentioned threshold. In the case of claims in foreign currency, the foreign currency amount shall be converted into euros on the basis of the current mean rate of exchange. If the maximum threshold is exceeded on three consecutive banking days at any one time and if this results in a change in the risk situation, the Savings Bank may demand that the Borrower provide or increase collateral to secure its claim in accordance with No. 22 (a) of the General Terms and Conditions. This shall also apply to a loan initially granted without collateral.
The Savings Bank will maintain separate guarantee accounts for domestic and foreign guarantees and for guarantees in various foreign currencies. The existing guarantee accounts no. 7000116637 (for EUR guarantees abroad) and no. 7000132410 (for USD guarantees) are included in the credit contracted herein.

For the purpose of the individual examination of guarantee orders, the Savings Bank may request from the Borrower the documents it deems necessary with regards to the main debt relationship to be secured. In relation to the Borrower, the Savings Bank shall be entitled to reject guarantee orders in justified individual cases.

The Borrower may request separate information on the current drawdown under this Framework Agreement in individual cases.

5 Securities
The Savings Bank is entitled to accept guarantees only after all requirements have been met to fully and irrevocably provide the Savings Bank with the agreed securities, the Savings Bank having received confirmation thereof, if applicable. The following securities are/have been provided/assigned to the Savings Bank - in separate contracts that regulate the details:
- Assignment of claims of ExOne GmbH according to separate contract.
- for drawdowns of over EUR 1,000,000.00; Pledging of credit balances number 250923562 at the Augsburg Municipal Savings Bank according to separate declaration.

The liability of any other existing or future securities within the scope of the respective agreed security purpose shall remain unaffected.

6 Multiple Borrowers
Multiple borrowers shall be jointly and severally liable for the obligations under this Agreement.
If one Borrower met the Savings Bank’s requirement, it does not check whether the Borrower is entitled to claims to collateral no longer required by the Savings Bank. As a matter of principle, it will return such collateral to the collateral provider unless the Borrower providing the collateral proves that the collateral provider has given its consent to transfer it to the Borrower.

7 Utilization of the Guarantee
If the Savings Bank is invoked under a Guarantee, the Borrower is obliged to immediately reimburse the Savings Bank for the amounts paid under the Guarantee. The Savings Bank is entitled to place its claim for reimbursement in its current account.

8 Term of the Agreement
The Agreement is concluded for an indefinite period and may be terminated by either party at any time without notice. The provisions of this Agreement shall continue to apply to guarantees already assumed at the time of termination. However, the Savings Bank may - without prejudice to the claim for exemption under Sec. 775 of the German Civil Code (BGB) - demand exemption from these guarantee obligations from the Borrower.

9 Disclosure and Information Obligation
Throughout the entire term of this loan, the Borrower is obliged to provide the Savings Bank or an institution commissioned by the Savings Bank with an insight into the current financial situation, to submit relevant documents (e.g. balance sheets/annual financial statements, income tax assessments and declarations, statements of assets, etc.), to provide the necessary information and to allow the Borrower’s business to be inspected. The Savings Bank is also required by law and supervisory regulations to inspect or have inspected the Borrower’s financial conditions.

The Savings Bank may request the necessary documents directly from the Borrower’s advisors in accounting and tax matters, unless the Borrower submits them to the Savings Bank within a reasonable period of at least one month after the Savings Bank’s request. If the aforementioned documents are stored on data carriers, the Borrower is obliged to make them legible within a reasonable period of time.

In the event that the Borrower fails to meet these obligations, the Savings Bank is entitled to terminate the loan relationship, requiring immediate repayment.

The Savings Bank is entitled to inspect the public registers as well as the land register and the real estate files if there is a justified reason for doing so, and to request simple or certified copies and extracts for the account of the Borrower, as well as to obtain information from insurance companies, authorities and other bodies, especially credit institutions, that is necessary to assess the credit relationship.

10 Agreement Costs
The Borrower shall bear the costs of providing collateral. The reimbursement of expenses incurred by the Savings Bank is based on the statutory provisions.

11 Place of Jurisdiction
Insofar as the jurisdiction of the Savings Bank’s general place of jurisdiction has not already been defined in Sec. 29 ZPO (German Code of Civil Procedure), the Savings Bank can pursue its claims through legal action at its general place of jurisdiction if the Borrower to be targeted in legal action is a merchant or a legal entity within the meaning of No. 6 of the General Terms and Conditions or has no general place of jurisdiction in Germany at the time of the conclusion of the Agreement or later moves his or her place of residence or habitual abode out of the Federal Republic of Germany or his or her place of residence or habitual abode is unknown at the time the action is filed.

12 Legal Obligation to Cooperate
In accordance with the Money Laundering Act, the Borrower is obliged to notify the Savings Bank immediately of any changes to the information provided to the Savings Bank in the course of the business relationship.
13 Information on the beneficial owner under the Money Laundering Act

The Borrower acts in his or her own economic interest and not at the behest of a third party (in particular a trustor):
☒ Yes ☐ No

Beneficial owner: The Borrower acts in the economic interest and at the behest of the person(s) listed below
(Name, surname, date of birth, place of birth, nationality, address, tax/economic identification number*)

*Domestic taxable persons: Tax ID for individuals, economic ID for other tax residents (if no economic ID has yet been assigned, the tax number applicable to the income)

14 General Terms and Conditions

The Savings Bank expressly points out that its General Terms and Conditions of Business (GTC) are a supplementary part of the Agreement. The General Terms and Conditions can be inspected on the business premises of the Savings Bank and will be made available on request.¹

¹ Each contractual partner of the Savings Bank receives a copy of the General Terms and Conditions, provided that no business relationship exists yet and the Agreement is concluded outside the Savings Bank.

Place, date
[handwritten:] Gersthofen, 02/24/2020

Signature(s) Borrower

ExOne GmbH
Daimlerstr. 22
86 368 Gersthofen
Tel.: +49(0)821/65063-0
Fax: +49(0)821/65063-111
e-mail: europe@exone.com

represented by:
[handwritten:] Eric Baden

Augsburg Municipal Savings Bank
[signature]
[signature]
Jürgen Lang Martin Schürfer

The Agreement and further copies must be signed by all Borrowers named on page 1!

Annex: Conditions for Guarantee Transactions

Authenticity check/identification:

First name, surname, date of birth, place of birth, nationality, address, type of legitimation (type of ID card, ID card number, issued by) or reference to authenticity/identification check carried out:

ExOne GmbH, 07/07/2003, German, Daimlerstr. 22, 86368 Gersthofen / Commercial Register, HRB 20036, Augsburg District Court

The information has been verified and the accuracy of the signatures attested.

on:
LIST OF SUBSIDIARIES

As of March 12, 2020, the following entities are subsidiaries of The ExOne Company:

<table>
<thead>
<tr>
<th>Name</th>
<th>Jurisdiction of Incorporation or Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExOne Americas LLC</td>
<td>United States (Delaware)</td>
</tr>
<tr>
<td>ExOne GmbH</td>
<td>Germany</td>
</tr>
<tr>
<td>ExOne Property GmbH</td>
<td>Germany</td>
</tr>
<tr>
<td>ExOne KK</td>
<td>Japan</td>
</tr>
</tbody>
</table>
CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-223690) and Form S-8 (No. 333-187053) of The ExOne Company and Subsidiaries of our reports dated March 12, 2020, relating to the consolidated financial statements of The ExOne Company and Subsidiaries as of December 31, 2019 and 2018 and for each of the years in the two-year period then ended and the effectiveness of internal control over financial reporting as of December 31, 2019, which appear in this Annual Report on Form 10-K.

/s/ Schneider Downs & Co., Inc.

Pittsburgh, Pennsylvania
March 12, 2020
CERTIFICATIONS

I, John F. Hartner, certify that:

1. I have reviewed this Annual Report on Form 10-K of The ExOne Company;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   c. Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   d. Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

March 12, 2020

/s/ John F. Hartner  
John F. Hartner  
(Principal Executive Officer)
CERTIFICATIONS

I, Douglas D. Zemba, certify that:

1. I have reviewed this Annual Report on Form 10-K of The ExOne Company;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   c. Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   d. Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):
   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

March 12, 2020

/s/ Douglas D. Zemba
Douglas D. Zemba
Chief Financial Officer
(Principal Financial Officer and
Principal Accounting Officer)
CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED
PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the filing of this Annual Report on Form 10-K of The ExOne Company (the “Company”) for the fiscal year ended December 31, 2019, with the Securities and Exchange Commission on the date hereof (the “Report”), the undersigned certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

March 12, 2020

/s/ John F. Hartner
John F. Hartner
Chief Executive Officer
(Principal Executive Officer)

March 12, 2020

/s/ Douglas D. Zemba
Douglas D. Zemba
Chief Financial Officer
(Principal Financial Officer and
Principal Accounting Officer)