

EXONE CO

FORM 10-K (Annual Report)

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**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

WASHINGTON, DC 20549

FORM 10-K

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

For the fiscal year ended December 31, 2017

OR

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

For the transition period from _____ to _____

Commission file number 001-35806

The ExOne Company

(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

46-1684608
(I.R.S. Employer
Identification No.)

127 Industry Boulevard
North Huntingdon, PA 15642
(Address of Principal Executive Offices) (Zip Code)

(724) 863-9663

(Registrant's telephone number, including area code)

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

Title of Each Class
Common Stock, par value \$0.01 per share

Name of Each Exchange On Which Registered
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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
	(Do not check if a smaller reporting company)	Emerging growth company	<input checked="" type="checkbox"/>

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

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

The aggregate market value of common stock held by non-affiliates for the last business day of the registrant's most recently completed second fiscal quarter was approximately \$125.7 million.

As of March 15, 2018, 16,202,119 shares of common stock, par value \$0.01 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 2018 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K.

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PART I

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 undertake 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 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 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 foreign currency; the adequacy of sources of liquidity; the scope, 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 (“IT”) 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, Production Service Centers (“PSCs”) or ExOne Adoption Centers (“EACs”); the adequacy of our protection of our intellectual property; 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.

Implications of being an Emerging Growth Company

Since our initial public offering (“IPO”), we have continued to qualify as an “emerging growth company” (“EGC”) as defined in the Jumpstart Our Business Startups Act of 2012 (the “JOBS Act”). An EGC may take advantage of specified reduced reporting requirements and is relieved of certain other significant requirements that are otherwise generally applicable to public companies.

As an EGC:

- We are exempt from the requirement to obtain an attestation and report from our independent registered public accounting firm on the assessment of our internal control over financial reporting pursuant to the Sarbanes-Oxley Act of 2002 (the “Sarbanes-Oxley Act”);
- We are permitted to provide less extensive disclosure about our executive compensation arrangements;
- We are not required to give our stockholders non-binding advisory votes on executive compensation or golden parachute arrangements; and
- We have elected to use an extended transition period for complying with new or revised accounting standards.

We may choose to take advantage of some, but not all, of these reduced burdens. We will continue to operate under these provisions until December 31, 2018, or such earlier time that we are no longer an EGC. We would cease to be an EGC if we have

more than \$1.07 billion in annual revenues, qualify as a “large accelerated filer” under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), which requires us to have more than \$700 million in market value of our common stock held by non-affiliates, or issue more than \$1.0 billion of non-convertible debt over a three-year period.

Trademarks, Service Marks and Trade Names

We have registrations in the United States for the following trademarks: EXONE, X1 ExOne Digital Part Materialization (plus design), EXCAST, EXMAL, EXTEC, INNOVENT, M-FLEX, M-PRINT, S MAX, S-MAX, S-PRINT, X1, and X1-LAB. We also have an application in the United States for registration pending for the following trademark: EXERIAL. We also have registrations for EXONE in China, Europe (Community Trade Mark), Japan, and South Korea, and an application for registration pending in Canada for that trademark. We have registrations for X1 ExOne Digital Part Materialization (plus design) in Brazil, China, Europe (Community Trade Mark), Japan, and South Korea, and an application for registration pending in Canada for that mark. We have a registration for the mark X1 in Europe (Community Trade Mark). We have a registration for the mark EX-1 in Europe (Community Trade Mark). We have registrations for a stylized form of X1 in Europe (Community Trade Mark) and South Korea. We have registrations for DIGITAL PART MATERIALIZATION in Japan and South Korea. We have registrations for the trademarks EXERIAL, INNOVENT, M-FLEX, S-MAX, and S-PRINT in Europe (Community Trade Mark).

This Annual Report on Form 10-K also contains 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, or our products or services, by the owners of such third-party names and marks.

Our Business

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 PSCs and EACs. We also supply the associated materials, including consumables and replacement parts, and other services, including training and technical support that is 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 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 purchased by another company. 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 newly created Delaware corporation, which changed its name to The ExOne Company. On February 12, 2013, we completed our IPO, raising approximately \$90.4 million in unrestricted net proceeds after underwriting commissions and offering costs. Subsequent secondary offerings of our common stock have resulted in raising approximately \$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 increasingly being 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 manufacturing methodologies in a growing range of industrial applications. Our 3D printing process differs from other forms of 3D printing processes, in that we use a chemical binding agent and focus on industrial applications.

AM has 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 evolved

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 provide 3D printed and other products, materials and services primarily to industrial customers and other end-market users. We believe that we are an early entrant into the AM industrial products market and are one of the few providers of 3D printing solutions to industrial customers.

Our binder jetting technology was developed over 15 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 sand or metal powder 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 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. We 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.

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 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. In addition, we have specifically targeted fine powder printing with respect to our direct printing technologies as one of our strategic priorities as an organization.

Our Machines. Our 3D printing machines consist of a build box that includes a machine platform and a computer processor controlling the printheads for applying layers of industrial materials and binding agents. We currently build our 3D printing machines in both Germany and the United States. Our machines serve direct and indirect applications. Direct printing produces a component; indirect printing makes a tool to produce a component. Our focus is on enhancing our existing machine technologies and developing large format printers for both direct and indirect applications, with specific emphasis on fine powder printing for our direct technologies.

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 ever expect to use our technology to make simple, low-cost, mass-produced parts.

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 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.

Customers and Sales

Our Customers

Our customers are located primarily in North America, Europe and Asia. 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, as well as mid-cap and smaller public and private

companies. During 2017, 2016 and 2015, 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 2017, 2016 and 2015, our five most significant customers represented approximately 20.5%, 17.1% and 19.0% of total revenue, respectively. During 2017, 2016 and 2015, 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, with the timing of such sales dependent on the customer's capital budgeting cycle, 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 the 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 3D printing 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 PSCs and EACs. We also seek to expose key potential users to our products through our PSCs and EACs, installed machines at customers' locations, university programs, and sales and marketing efforts. Additionally, our EACs provide a greater variety of our latest binder and material sets, including cold hardening phenolic and sodium silicate production, as well as an expanded range of our machine platforms and machine options.

Production Service Centers and ExOne Adoption Centers

We have established a network of PSCs and EACs in North Huntingdon, Pennsylvania; Troy, Michigan; Houston, Texas; Gersthofen, Germany; Desenzano del Garda, Italy; and Kanagawa, Japan. Our three centers located in the United States were certified to ISO 9001:2008 as Industrial Additive Manufacturers. Through our PSCs and 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 business strategy.

For all customers, we offer the following support and services through our PSCs and EACs:

- ***Pre-production Collaboration*** . Our pre-print services include data capture using software that enables customers to translate their product vision into a digital design format that can be used as an input to our 3D printing equipment. We help our customers successfully move from the design stage to the production stage, and help customers evaluate the optimal design and industrial materials for their production needs. For example, we worked with a customer to design and manufacture parts that eliminated significant weight from a helicopter, which was possible because of the flexibility and precision of our AM process. Our 3D printing machines are also able to deliver a replacement for a product broken by the customer rapidly or often immediately because we will already have the production computer file. Using subtractive manufacturing would take significantly longer.
- ***Consumable Materials*** . We provide customers with the inputs used in our 3D printing machines, including tools, printing materials, and bonding agents. Our EACs provide a greater variety of our latest binder and material sets.
- ***Training and Technical Support*** . Our technicians train customers to use our 3D printing machines through hands-on experience at our PSC and EACs and provide field support to our customers, including design assistance, education on industrial materials, operations and printing training, instruction on cleaning, and maintenance and troubleshooting.
- ***Aftermarket*** . We generally offer a standard warranty with the sale of a 3D printing machine to a customer. Thereafter, we offer a variety of service and support plans.

Our Competitive Strengths

We believe that our competitive strengths include:

- ***Volumetric Output Rate*** . We believe that our 3D printing machines provide 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 printhead speed and 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 size of the build box area and the platform 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 build 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 cater to the varying demands of our customers.
- **Industrial Materials** . Our indirect 3D printing machines are able to manufacture sand molds and cores from specialty sands and ceramics, which are the traditional materials for these casting products. Our direct 3D printing machines are capable of printing in industrial metals and other materials, including stainless steel, bronze, iron, bonded tungsten, IN Alloy 625 and glass. 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, including fine powder capability development.
- **Chemical Binding** . We 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 cater to major international markets. We have established one or more PSCs or EACs in each of North America, Europe and Asia. 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.
- **Co-location of High Value Production** . Over the last few years, many United States industrial manufacturers have outsourced products supply or otherwise created long, relatively inflexible supply chains for their high-complexity, high-value products. We believe that over the next few years, many of these companies will need to build these products in the United States near their primary manufacturing facilities in order to be competitive domestically and internationally. We believe we are well positioned to help these manufacturers co-locate the production of products so as to optimize our customers' supply chains.

Our Business Strategy

The principal elements of our growth strategy include:

- **Increase the Efficiency and Capabilities of Our Machines to Expand the Addressable Market** . We intend to invest in further developing our machine technology so as to increase the volumetric output per unit of time that our machines can produce for both direct and indirect applications. We also intend to invest in continued advancements to the core capabilities of our equipment, these core capabilities include broadening the range of material particle sizes that can be printed in our equipment (with particular emphasis on fine powder capabilities for direct printing technologies), enhanced real-time process monitoring, improved material handling, and improvements to overall machine post-printing productivity.
- **Qualify New Industrial Materials Printable In Our Systems** . Our 3D printing machines are used for both development and commercial printing. We believe that the variety of materials printable in our printing systems is more diverse than competing 3D printing technologies. By expanding both qualified and printable materials (with particular emphasis on fine powder capabilities for direct printing technologies), we believe we can expand our market share and better serve our industrial customer base.
- **Reducing Overall Costs of Operating Our Machines** . We continue to reduce costs associated with operating our 3D printing machines. We collaborate with customers and suppliers to qualify locally based, lower cost printing materials. We seek to reduce the cost of our 3D printing machine manufacturing process and lower the cost of replacement parts for our 3D printing machines. We use a variety of means, including traditional supply chain and development projects, to reduce those costs. We believe as we lower 3D printing machine run costs we will improve adoption rate by forming more cost efficient production processes.
- **Advance Pre-Print Design and Post-Print Processing Capabilities to Accelerate the Growth of Our 3D Printing Technology** . Our next generation 3D printing machine platforms have achieved the volumetric output rate and quality necessary to serve industrial markets on a production scale. We believe that there is an opportunity to similarly advance the pre-print and post-print processing phases of product materialization to more fully exploit the transformative power of our 3D printing machines and drive growth. These opportunities relate to both direct and indirect printing. For direct printing, we believe that enhancing pre-print processes, notably design optimization tools and suitable print material availability, can greatly accelerate our capture of market share. Additionally, enhancements to post-print processing will increase the applications for printed products. In indirect printing utilizing 3D printed molds and cores, advanced performance casting technologies can be leveraged to increase yields and reduce weight of casted products. To promote this advantage to the market we have developed a suite of processes, many of which are proprietary, for producing high-quality castings.

- **Implement a Network of Production Service Centers and ExOne Adoption Centers to Increase Customer Collaboration** . Our centers provide a central location for customer collaboration and provide customers with a direct contact point to learn about our 3D printing technology, purchase products printed by us, and purchase our 3D printing machines. To facilitate faster adoption of our technology, we are refocusing certain of our PSCs located in the United States into EACs to provide a greater variety of our latest binder and material sets, as well as an expanded range of our machine platforms and machine options. We expect our EACs will create more robust, regionally-based material development services, as well as technical and training services. Each center is located in a major industrial center near existing and potential customers. We continuously monitor both customer and market trends in assessing the opportunity to further expand our global network.
- **Pursue Growth Opportunities Through Alliances and/or Strategic Investments** . We may opportunistically identify and, through alliances and/or strategic investment, integrate and advance complementary businesses, technologies and capabilities. Our goal is to expand the functionality of our products, provide access to new customers and markets, and increase our production capacity.

Our Machines and Machine Platforms

We produce a variety of 3D printing machines in order to enable designers and engineers to rapidly, efficiently, and cost-effectively design and produce industrial prototypes and production parts. The models of our 3D printing machines differ based on the materials in which they print, build box size, and production speeds, but all utilize our advanced technology and designs. The variation in the models of 3D printing machines that we produce allows for flexibility of use based on the needs of our customers.

Exerial. The Exerial is our largest format indirect 3D printing machine. It is unique compared to our other indirect 3D printing systems in that it contains multiple industrial stations that allow for continuous production and simultaneous processing. The Exerial is distinctly equipped with two build boxes, each 1.5 times larger than the single build box in our next largest model, the S-Max. Notably, the Exerial system offers a total build platform of 3,168 liters and is expected to be capable of printing output rates nearly four times faster than the S-Max. The Exerial utilizes an advanced recoater system, multiple printheads and automation controls. As part of the development of the Exerial, we have filed six patents related to machine design elements. We formally debuted this 3D printing machine at the GIFA International Foundry Trade Fair in Dusseldorf, Germany in June 2015. We are in the process of re-designing certain elements of this platform to increase its flexibility for purposes of customer integration.

S-Max/S-Max+. The S-Max machine is our most widely utilized indirect 3D printing machine. We introduced the S-Max machine in 2010 to provide improved size and speed over the predecessor model, the S-15. The S-Max has a build box size of 1,800mm x 1,000mm x 700mm. The S-Max machine is generally used by customers interested in printing complex molds and cores on an industrial scale for casting applications. Each of our global PSCs and EACs has at least one S-Max machine installed on-site. In addition to our traditional S-Max machine, during 2014 we introduced an S-Max+ configuration designed for easier post-processing of the build box for certain applications which require phenolic or sodium silicate binder for printing.

S-Print/M-Print. The S-Print (indirect) and M-Print (direct) machines are our mid-sized 3D printing machines presently available. Both the S-Print and M-Print have a build box size of 800mm x 500mm x 400mm. The S-Print machine is generally used by customers interested in printing objects made from silica sand and ceramics, with a particular focus on industrial applications for smaller casting cores that are often required for the aerospace applications. The build box size also permits the use of exotic and expensive print materials, such as ceramics, that are required for high heat/high strength applications. The M-Print machine is generally used by customers interested in direct printing of objects made from metals. We have installed both S-Print and M-Print machines in certain of our PSCs and EACs to complement our S-Max machines currently in use.

M-Flex. The M-Flex machine is our most flexible direct 3D printing machine presently available. We introduced the M-Flex machine platform in 2013 to satisfy the demand for a large range of industrial customers that are interested in directly printing metal products. The M-Flex has a build box size of 400mm x 250mm x 250mm.

Innovent. The Innovent is the smallest of our direct 3D printing machines presently available. As an industrial-grade, laboratory-sized machine, Innovent allows for testing material properties, specifically in educational institutions, research laboratories, and research and development departments at commercial organizations. Innovent is uniquely designed in that it balances a specific build box for the technical qualification of materials with a smaller overall lab machine platform size, when compared to other industrial-grade 3D printing machines. In 2016, we introduced our fine powder Innovent machine that 3D prints metal and ceramic objects that have higher printed density and achieves significant improvements in surface finish quality, ideally suited for the metal injection molding and powder metallurgy industries. We offer a fine powder Innovent machine, as well as an Innovent upgrade package for existing equipment.

Binding Agents

We use liquid chemical binding agents (including furan, phenolic and sodium silicate) during the 3D printing process. We initially introduced the availability of phenolic binding agent in July 2013, which binder is used with ceramic sands in the 3D printing of molds and cores, offering customers three primary benefits as compared with other binders:

- Casting higher heat alloys;
- Creating a higher strength mold or core; and
- Improving the quality of the casting due to reduced expansion of the mold or core.

In September 2015, we expanded our suite of 3D printing binder offerings to add a new class of phenolic binding agent, referred to as cold hardening phenolic ("CHP"). The CHP binder accelerates the 3D printing process by eliminating the infrared heating lamp that is utilized in the printing process with traditional phenolic binders. Using CHP, the polymerization of 3D printed molds and cores may occur at room temperature, further reducing both printing and curing time and eliminating the need for additional equipment such as a microwave. Alternatively, if additional drying is desired this may be achieved in a conventional air oven, equipment which is maintained by most industrial manufacturers. We have qualified CHP on our S-Print and S-Max indirect printing machine platforms and are in the process of optimizing our indirect printing machine platforms for utilization of CHP.

Sodium silicate reduces or eliminates the release of fumes and gas in the casting process, helping to reduce costs associated with air ventilation and electrical and maintenance equipment, which we believe will appeal to casting houses that are in search of cleaner environmental processes.

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.

Marketing and Sales

We market our products under the ExOne brand name in three major geographic regions — North America, Europe and Asia. 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 PSCs and 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 PSCs and EACs.

Services and Warranty

We have fully trained service technicians to perform machine installations in North America, Europe and Asia. We generally provide a standard twelve month warranty on sales of 3D printing machines. Customers can purchase additional service contracts for maintenance and service. We also sell replacement parts which we maintain in stock worldwide to assist in providing service expeditiously to our customers.

Suppliers

Our largest suppliers in 2017, based upon dollar volume of purchases, were Bauer GmbH & Co KG, Erhardt & Leimer GmbH, Fuji Film Dimatix and Astro Manufacturing & Design.

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 approximately \$9.9 million, \$7.8 million and \$7.3 million on research and development during 2017, 2016 and 2015, 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;
- Mechanics of spreading powders in a job box;
- 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 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 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 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 2023 to 2036. We are also a minority owner of patent rights of 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 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, M-FLEX, M-PRINT, S MAX, S-MAX, S-PRINT, X1, and X1-LAB. We also have an application in the United States for registration pending for the following trademark: EXERIAL. We also have registrations for EXONE in China, Europe (Community Trade Mark), Japan, and South Korea, and an application for registration pending in Canada for that trademark. We have registrations for X1 ExOne Digital Part Materialization (plus design) in Brazil, China, Europe (Community Trade Mark), Japan, and South Korea, and an application for registration pending in Canada for that mark. We have a registration for the mark X1 in Europe (Community Trade Mark). We have a registration for the mark EX-1 in Europe (Community Trade Mark). We have registrations for a stylized form of X1 in Europe (Community Trade Mark) and South Korea. We have registrations for DIGITAL PART MATERIALIZATION in Japan and South Korea. We have registrations for the trademarks EXERIAL, INNOVENT, M-FLEX, S-MAX, and S-PRINT in Europe (Community Trade Mark).

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.

Competition

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

- Direct metal deposition;
- Direct metal laser sintering;

- Electron beam melting;
- Fused deposition modeling;
- Laser consolidation;
- Laser sintering;
- Multi-jet modeling;
- Polyjet;
- Selective laser melting;
- Selective laser sintering; and
- Stereolithography.

Some of the companies that have developed and employ one or more AM technologies include: Hogan AB, Viridus3d, 3D Systems Corporation, Stratasys Inc., HP Inc., EOS GmbH, EnvisionTEC, Concept Laser, Solid Model Ltd., Voxeljet AG and General Electric Co.

Some of these processes and companies compete with some of the products and services that we provide. Despite the challenging competitive landscape, we believe that we are the only AM printing solutions provider that focuses primarily on metal industrial applications on a production scale. Our competitive advantages, including the size of our build platforms, the speed of our printheads, the variety of materials used by industrial manufacturers in which we can print, the industry qualification of many of the materials we print in, our robust market capabilities, and our suite of machine system families offering scale and flexibility, also serve to differentiate us from the other competitors in the AM market.

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 gains recognition. 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.

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, 2017, our backlog was approximately \$21.3 million, of which, approximately \$18.3 million is expected to be fulfilled during the next twelve months. At December 31, 2016, our backlog was approximately \$19.7 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 the competitive position of us and our subsidiaries. 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, 2017, we employed a total of 302 (277 full-time) employees at our seven global locations. None of these employees is a party to a collective bargaining agreement, and we believe our relations with them are good.

Product, Geographic and Other Information

Refer to Note 21 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.

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 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, 2017, 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.

Item 1A. Risk Factors.

RISK FACTORS

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 generate operating profits.

Since our inception, we have not generated operating profits, and we may be unable to 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 approximately \$34.1 million, \$28.5 million and \$29.9 million (excluding approximately \$4.4 million of a goodwill impairment charge) for 2017, 2016 and 2015, respectively. Our research and development expenses are due primarily to continued investment in our binder jetting technologies, including 3D printing machine development (including our fine powder direct printing capabilities and larger format direct and indirect 3D printing machines) and materials development (including our proprietary binders). Our selling, general and administrative expenses are due primarily to personnel costs associated with managing a public company and related professional service fees (including legal, audit and other consulting expenses). 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 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;
- Our lengthy sales cycle for 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 is constantly evolving. We may not be able to respond to customer demand as quickly as a larger competitor may be able to respond.

Generally, our business is focused on the sale of 3D printing machines for, and products manufactured using, AM. Most recently, our company has focused on developing our fine powder direct printing capabilities and larger format direct and indirect 3D printing machines.

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 machines that are capable of directly printing fine powders;
- Enhance our existing products and technologies;
- Continue to leverage advances in binder printing and other industrial printhead technology;
- Develop new products and technologies that address the increasingly sophisticated and varied needs of prospective end-users, particularly with respect to the physical properties of fine powders, binder jetting and other materials;
- 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 continuing 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 U.S. 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 customer’s facilities. These specific, customized factors are often required by the customer to be included in our commercial agreements relating to the purchase. 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.

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 (approximately 56.7%, 54.0% and 50.9% for 2017, 2016 and 2015, 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;
- 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; 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.

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 Executive Chairman, S. Kent Rockwell, beneficially owns approximately 28.5% of our outstanding shares of common stock. As a holder of 28.5% of our shares of common stock, Mr. Rockwell may have effective control over the election of our Board of Directors 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 of Mr. Rockwell.

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 meet the 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 Executive Chairman and our controlling stockholder, has previously provided capital to us through a related entity, he has no obligation to do so and our stockholders should have no expectation that he will do so in the future.

We have entered into an At Market Issuance Sales Agreement (“ ATM ”) with FBR Capital Markets & Co. (“ FBR ”) and MLV & Co. LLC (“ MLV ”) pursuant to which FBR and MLV have agreed to act as distribution agents in the sale of up to \$50.0 million in the aggregate of our common stock in “ at the market offerings ” as defined in Rule 415 under the Securities Act of 1933, as amended (the “ Securities Act ”). Our ability to raise capital through the use of our ATM may be restricted for various reasons, including our adherence with SEC regulations prohibiting the sale of our common stock for certain periods of time or other adverse market conditions.

We are currently dependent on a single supplier of certain printhead components.

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 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 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.

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.

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 recent 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 weapons in any of our service centers, 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 PSCs 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 PSCs and EACs in the United States, Germany, Italy 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, 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.

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 or non-disclosure agreements and other contractual arrangements with our employees, end-users and others to maintain 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. As we expand our operations into the United States and elsewhere, we may face similar claims with regard to our future employees in these countries.

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 will use the net proceeds that we have received or will receive 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 the perception that such sales could occur as a result of our recently announced “at the market offerings,” other utilization of our universal shelf registration statement or otherwise 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;
- 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;
- The market’s reaction to our reduced disclosure as a result of being an EGC under the JOBS Act;
- Threatened or actual litigation;
- Changes in our senior management; and
- General economic trends and other external factors.

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 commentary or ceases publishing reports about us or our business.

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. These expenses will increase after we are no longer an EGC on December 31, 2018. We 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 of Directors, our board committees or as executive officers.

Our status as an "Emerging Growth Company" will end on December 31, 2018.

Our status as an EGC will end on December 31, 2018, which means that we will no longer be able to take advantage of the reporting exemptions that are applicable to EGCs. These exemptions include, but are not limited to, not being required to comply with the auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act, less extensive disclosure obligations regarding executive compensation in our periodic reports and proxy statements, exemptions from the requirements to hold a non-binding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved and an extended transition period for complying with new or revised accounting standards. We will continue to operate under these provisions until December 31, 2018.

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.

The right of stockholders to receive liquidation and dividend payments on our common stock is junior to the rights of holders of indebtedness and to any other senior securities we may issue in the future.

Shares of our common stock are equity interests and do not constitute indebtedness. This means that shares of our common stock will rank junior to all of our indebtedness and to other non-equity claims against us and our assets available to satisfy claims against us, including our liquidation. Additionally, holders of our common stock are subject to the prior dividend and liquidation rights of holders of our outstanding preferred stock, if any. Our Board of Directors is authorized to issue classes or series of preferred stock in the future without any action on the part of our common stockholders.

If we fail to maintain an effective system of internal control over financial reporting in the future, we may not be able to accurately report our financial condition, results of operations or cash flows, which may adversely affect investor confidence in us and, as a result, the value of our common stock.

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. As an EGC, we will not be required to comply with Section 404(b) until we file our Annual Report on Form 10-K for the year ended December 31, 2018, with the SEC, provided we maintain our status as an EGC through December 31, 2018.

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 or significant deficiency in our internal control over financial reporting once that firm begins its Section 404(b) attestations, 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.

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 (including our investment in fine powder capabilities for direct printing and our development efforts tied to large format direct and indirect 3D printing machines);
- 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, including through the use of our ATM, we will 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:

<u>Location</u>	<u>Nature of Facility</u>	<u>Owned or Leased</u>	<u>Approximate Square Footage</u>
<i>United States</i>			
North Huntingdon, Pennsylvania	Corporate Headquarters, Machine Manufacturing, PSC and Machine Sales Center	Owned	67,886
Troy, Michigan	EAC	Owned	19,646
Houston, Texas	EAC	Owned	12,000
St. Clairsville, Ohio	Research and Development	Owned	12,800
<i>Europe</i>			
Gersthofen, Germany	European Headquarters, Machine Manufacturing, PSC and Machine Sales Center	Owned	200,585
Desenzano del Garda, Italy*	PSC and Machine Sales Center	Leased	3,300
<i>Asia</i>			
Kanagawa, Japan	PSC and Machine Sales Center	Owned	19,639

* 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. In connection with commitment, we notified the lessor of our Desenzano del Garda, Italy facility of our intent to exit the facility effective in June 2018.

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.

PART II

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." The following table sets forth the ranges of high and low sales prices per share of our common stock as reported on the NASDAQ Stock Market for the periods indicated. Such quotations represent inter-dealer prices without retail markup, markdown or commission and may not necessarily represent actual transactions.

<u>Year Ended December 31, 2017</u>	<u>High</u>	<u>Low</u>
First quarter	\$ 11.03	\$ 9.25
Second quarter	\$ 14.43	\$ 9.29
Third quarter	\$ 11.88	\$ 6.72
Fourth quarter	\$ 12.50	\$ 8.38
<u>Year Ended December 31, 2016</u>	<u>High</u>	<u>Low</u>
First quarter	\$ 13.90	\$ 6.60
Second quarter	\$ 14.75	\$ 9.03
Third quarter	\$ 15.50	\$ 9.65
Fourth quarter	\$ 16.15	\$ 9.13

Stockholders

As of March 3, 2018, there were 37 stockholders of record, which excludes stockholders whose shares were held in nominee or street name by brokers. The actual number of common stockholders 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 of Directors and will depend on many factors, including general economic and business conditions, our strategic plans, our financial results and conditions, legal requirements, any contractual obligations or limitations, and other factors that our Board of Directors deems relevant.

Securities Authorized for Issuance Under Equity Compensation Plans

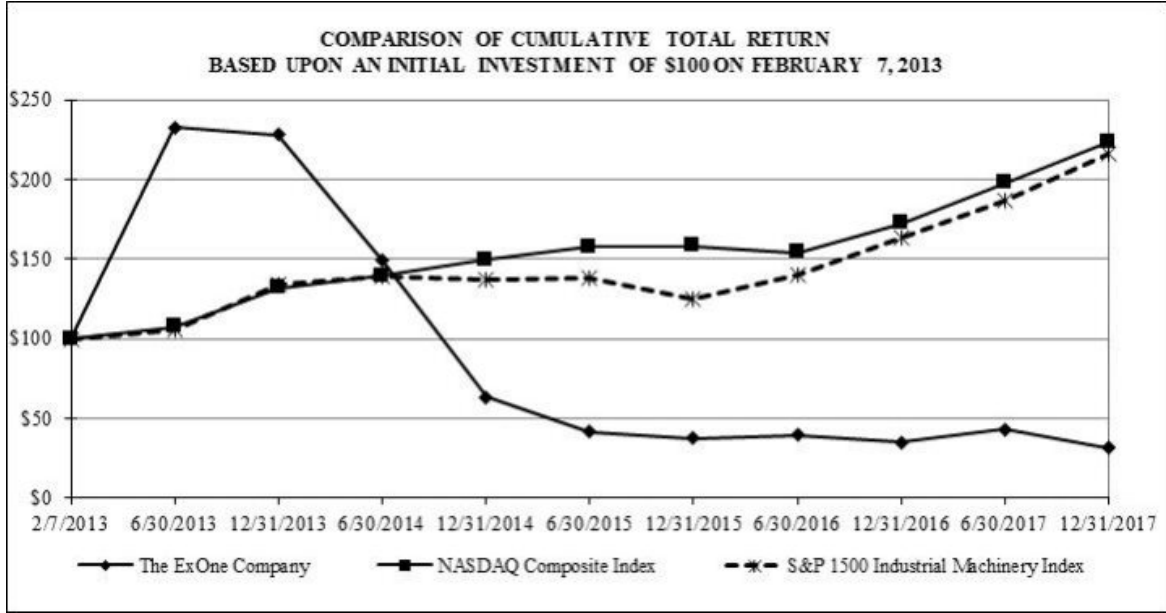
Our 2013 Equity Incentive Plan (the "Plan") was adopted on January 24, 2013, and approved by our stockholders on August 19, 2013. The table below sets forth information with regard to securities authorized for issuance under the Plan as of December 31, 2017:

<u>Plan Category</u>	<u>Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights</u>	<u>Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights</u>	<u>Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in the First Column) *</u>
Equity Compensation Plans Approved by Security Holders	674,470	\$ 11.58	1,044,017
Equity Compensation Plans Not Approved by Security Holders	N/A	N/A	N/A

* A maximum of 1,470,077 shares of common stock were reserved for issuance under the Plan for 2017, and awards of stock options and restricted stock were made in 2017 for a total of 449,000 awards. Forfeitures and expirations of awards previously issued under the Plan totaled 23,000 for 2017. The Plan provides for automatic increases in the reserve available 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 our Board of Directors, provided that the maximum number of shares authorized under the Plan will not exceed 1,992,241 shares, subject to certain adjustments. This limitation has resulted in no additional shares of common stock being reserved for issuance under the Plan for 2018.

Stock Performance Graph

The following graph compares the performance of our common stock with the NASDAQ Composite Index and the S&P 1500 Industrial Machinery Index. Such information shall not be deemed to be “filed.”



Company/Index	February 7, 2013	June 30, 2013	December 31, 2013	June 30, 2014	December 31, 2014	June 30, 2015	December 31, 2015	June 30, 2016	December 31, 2016	June 30, 2017	December 31, 2017
The ExOne Company	\$ 100	\$ 233	\$ 228	\$ 149	\$ 63	\$ 42	\$ 38	\$ 40	\$ 35	\$ 43	\$ 32
NASDAQ Composite Index	\$ 100	\$ 108	\$ 134	\$ 139	\$ 150	\$ 158	\$ 158	\$ 154	\$ 172	\$ 198	\$ 223
S&P 1500 Industrial Machinery Index	\$ 100	\$ 106	\$ 134	\$ 139	\$ 137	\$ 138	\$ 125	\$ 140	\$ 164	\$ 187	\$ 216

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Item 6. Selected Financial Data.

The data presented in the Selected Financial Data table should be read in conjunction with the information required to be provided in Part II Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the consolidated financial statements and related notes thereto in Part II Item 8 of this Annual Report on Form 10-K.

(dollars in thousands, except per share amounts and 3D printing machine unit data)	For the years ended December 31,				
	2017	2016	2015	2014	2013
Statement of consolidated operations and comprehensive loss data:					
Revenue – third parties	\$ 57,711	\$ 47,713	\$ 38,918	\$ 43,029	\$ 39,480
Revenue – related parties	33	75	1,435	871	—
Total	\$ 57,744	\$ 47,788	\$ 40,353	\$ 43,900	\$ 39,480
Net loss (a)	\$ (20,017)	\$ (14,598)	\$ (25,865)	\$ (21,843)	\$ (6,455)
Net loss per common share (a) :					
Basic	\$ (1.25)	\$ (0.92)	\$ (1.79)	\$ (1.52)	\$ (0.51)
Diluted	\$ (1.25)	\$ (0.92)	\$ (1.79)	\$ (1.52)	\$ (0.51)
Consolidated balance sheet data:					
Cash and cash equivalents	\$ 21,848	\$ 27,825	\$ 19,342	\$ 36,202	\$ 98,445
Property and equipment – net	\$ 46,797	\$ 51,134	\$ 54,382	\$ 55,298	\$ 32,772
Total assets (b)(c)	\$ 95,560	\$ 104,178	\$ 107,916	\$ 133,078	\$ 158,379
Long-term debt and capital lease obligations (c)(d)	\$ 1,696	\$ 1,858	\$ 2,071	\$ 2,543	\$ 3,177
Total stockholders' equity	\$ 75,209	\$ 87,780	\$ 89,073	\$ 118,545	\$ 146,700
Other data:					
3D printing machine units sold:					
Exerial	5	—	—	—	—
S-Max+	1	1	1	1	—
S-Max	15	12	7	11	13
S-Print	2	3	2	1	3
S-15	—	2	1	1	1
M-Print (e)	1	—	1	1	—
M-Flex	7	5	3	9	6
Innovent (e)	10	9	10	—	—
X1-Lab	—	1	1	4	5
Micromachinery (f)	—	—	—	—	1
	<u>41</u>	<u>33</u>	<u>26</u>	<u>28</u>	<u>29</u>

- (a) Amounts relating to 2013 are representative of Net loss attributable to ExOne and Net loss attributable to ExOne per common share as a result of the consolidation of certain variable interest entities ("VIEs") for which ExOne was identified as the primary beneficiary during those respective annual periods. The identified VIEs failed to meet the definition of a variable interest entity following acquisition of certain assets and assumption of certain debt of the identified VIEs in March 2013 by ExOne Americas LLC. As such, the identified VIEs were deconsolidated from the Company as of the acquisition date.
- (b) Amounts relating to 2014 and 2013 have been revised as a result of our adoption of FASB guidance relating to the presentation of deferred income taxes in November 2015. This guidance resulted in the simplification of the presentation of deferred income taxes by requiring all deferred income tax assets and liabilities to be classified as noncurrent in a classified balance sheet. This guidance was required to be applied retrospectively upon adoption, thus amounts related to the referenced years have been adjusted to conform to this adoption as compared to amounts previously reported by the Company.
- (c) Amounts relating to 2015, 2014 and 2013 have been revised as a result of our adoption of FASB guidance relating to the presentation of debt issuance costs in December 2016. This guidance resulted in the simplification of the presentation of debt issuance costs by requiring debt issuance costs in the consolidated balance sheet to be presented as a direct deduction from the related debt liability rather than as an asset, with an exception for line of credit arrangements. This guidance was required to be applied retrospectively upon adoption, thus amounts related to the referenced years have been adjusted to conform to this adoption as compared to amounts previously reported by the Company.
- (d) Amounts relating to 2014 and 2013 include certain transactions accounted for by the Company as financing leases. Such transactions were settled by the Company during 2015.
- (e) During 2015, one M-Print unit and two Innovent units were sold to related parties. During 2014, one M-Print unit was sold to a related party. There were no sales of 3D printing machine units to related parties during 2017, 2016 or 2013.
- (f) Micromachinery relates to the sale of a 3D printing machine associated with the Company's laser micromachining 3D printing machine platform which was discontinued at the end of 2014.

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

(dollars in thousands, except per-share amounts)

The following discussion and analysis should be read in conjunction with the "Selected Financial Data" in Part II Item 6 and 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 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, "Cautionary Statements Concerning Forward Looking Statements" and Item 1A, "Risk Factors".

Overview

Our Business

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 PSCs and EACs. We also supply the associated materials, including consumables and replacement parts, and other services, including training and technical support that is 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.

Outlook

Our operating priorities include the following:

- **Continue to accelerate the adoption rate of binder jetting technologies.** We plan to grow our market leading position with respect to 3D printing solutions for customers and continue advancing our innovations in direct and indirect printing, principally through an expansion of our fine powder direct printing capabilities and development activities associated with large format direct and indirect 3D printing machines. Our focus continues to be industrial markets for utilization of binder jetting technologies for non-polymer based materials. Our strength in industrial markets is rooted in our diverse material capabilities, our lower cost of adoption versus other competing technologies, our faster printing speeds and our scalability to larger product size. We expect to increase our investment in research and development by approximately \$6,000 to \$8,000 during 2018 (as compared to 2017) as a result of these and other initiatives.
- **Evaluation of our business model.** We continue to focus our efforts on optimizing our business model, including maximizing our facility utilization and our gross profit. We have consolidated certain of our operations to achieve efficiencies and we will continue to consider additional strategic decisions resulting in further consolidation, elimination or other modification to our existing machine manufacturing, PSC and other operations, including, but not limited to, converting certain of our PSCs into EACs. We are reviewing our product groups to better manage our product marketing and delivery to our customers to accelerate the adoption rate of our technologies. We are continuously reviewing the industry for developments in printing technologies, materials, methods, innovations or services that offer strategic benefits that can improve, accelerate or advance our products or services.
- **Strengthening our commercial team and reprioritizing our focus.** We have added new talent to our commercial leadership team and have added new tools and processes to improve the efficiency and effectiveness of our selling efforts. As our global installed base of 3D printing machines continues to grow, we continue to invest in our customer-centric approach to managing our operations (including talent addition and the process of converting certain of our PSCs into EACs). Our goal is to collaborate with our customers and remain the market leader and supplier of choice for binder jet technologies and products for industrial applications.

Recent Developments

In January 2017, we committed to a plan to consolidate certain of our 3D printing operations from our North Las Vegas, Nevada facility into our Troy, Michigan and Houston, Texas facilities and exit our non-core specialty machining operations in our Chesterfield, Michigan facility. These actions were taken as a result of the accelerating adoption rate of our sand printing technology in North America which has resulted in a refocus of our operational strategy.

As a result of these actions, during 2017, we recorded charges of approximately \$1,016, including approximately \$142 associated with involuntary employee terminations, approximately \$7 associated with other exit costs and approximately \$867 associated with asset impairments. Charges associated with involuntary employee terminations and other exit costs were recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss. Charges associated with asset impairments were split between cost of sales (\$598), as a component of depreciation expense, and selling, general and administrative expenses (\$269), as a component of amortization expense, in the accompanying statement of consolidated operations and comprehensive loss. There are no

additional charges expected to be incurred associated with this plan in future periods. We have settled all amounts associated with involuntary employee terminations and other exit costs.

Charges associated with asset impairments relate principally to our plan to exit our non-core specialty machining operations in our Chesterfield, Michigan facility. On April 21, 2017, we sold to a third party certain assets associated with these operations including inventories (approximately \$79), property and equipment (approximately \$2,475) and other contractual rights (approximately \$269). Total gross proceeds from the sale of these assets were approximately \$2,050. After deducting costs directly attributable to the sale of these assets (approximately \$128), we recorded an impairment loss during the quarter ended March 31, 2017, of approximately \$859 split between property and equipment (\$590) and intangible assets (\$269) based on the excess of the carrying value over the estimated fair value of the related assets at March 31, 2017 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss), and a loss on disposal during the quarter ended June 30, 2017, of approximately \$42 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss).

Separate from the transaction described above, on May 9, 2017, we sold to a third party certain property and equipment (principally land and building) associated with our North Las Vegas, Nevada facility. Total gross proceeds from the sale of these assets were approximately \$1,950. After deducting costs directly attributable to the sale of these assets (approximately \$137), we recorded a gain on disposal (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss), of approximately \$347. Additionally, we recorded an impairment loss during 2017 of approximately \$8 associated with certain property and equipment which was abandoned in connection with our exit of our North Las Vegas, Nevada facility.

The consolidation of our 3D printing operations from our North Las Vegas, Nevada facility into our Troy, Michigan and Houston, Texas facilities is not expected to have a significant impact on our revenues in future periods. We expect annualized cost savings related to this consolidation of approximately \$600, with approximately \$570 in the form of cash cost savings (principally employee-related and other operating costs) and approximately \$30 in the form of reduced depreciation expense. All cost savings associated with this consolidation are expected to benefit cost of sales. We expect to invest these cost savings into technological or process advancements that support either long-term cost benefits or revenue growth.

We expect annualized reductions in revenue related to our exit of our non-core specialty machining operations in our Chesterfield, Michigan facility of approximately \$1,400. For 2017, 2016 and 2015, revenues associated with our non-core specialty machining operations in our Chesterfield, Michigan facility were approximately \$346, \$1,403 and \$2,225, respectively. We expect annualized cost savings related to this exit of approximately \$500, with approximately \$200 in the form of cash cost savings (principally employee-related and other operating costs), approximately \$200 in the form of reduced depreciation expense and approximately \$100 in the form of reduced amortization expense. Cost savings associated with the exit of this facility are expected to benefit cost of sales by approximately \$400 and selling, general and administrative expenses by approximately \$100. We expect to invest these cost savings into technological or process advancements that support either long-term cost benefits or revenue growth.

In March 2017, we terminated our Cooperation Agreement with Swerea SWECAST AB (“Swerea”), resulting in an exit of our PSC operations in Jönköping, Sweden, effective April 1, 2017. Also in March 2017, we agreed to a leasing agreement with Beijer Industri AB, effective April 1, 2017, related to our 3D printing machine and related equipment located on the Swerea premises, previously covered under our Cooperation Agreement with Swerea. Both of these actions were taken in connection with our continuing evaluation of our business model in an effort to both streamline our existing European operations, and to take strategic advantage of our existing relationship with Beijer Industri AB in promoting indirect binder jet technologies in Scandinavia. There were no penalties or other adverse effects associated with our termination of our Cooperation Agreement with Swerea. There were no significant effects on our results of operations or financial position associated with these actions.

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. As a result of these actions, during 2017, we recorded a charge of approximately \$72 associated with involuntary employee terminations. This charge was split between cost of sales (\$19) and selling, general and administrative expense (\$53) in the accompany statement of consolidated operations and comprehensive loss. We currently estimate additional charges associated with involuntary terminations (approximately less than \$100), other exit costs (approximately less than \$50) and asset impairments (approximately \$200 to \$300) in 2018 associated with this plan. At December 31, 2017, amounts associated with involuntary employee terminations had not been settled by us. Such amounts are expected to be settled by us during 2018.

The consolidation of our 3D printing operations from our Desenzano del Garda, Italy facility into our Gersthofen, Germany facility is not expected to have a significant impact on our revenues in future periods. We expect 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 associated with the exit of this facility are expected to benefit cost of sales by approximately \$625 and selling, general and administrative expenses by approximately \$250. We expect to invest these cost savings into technological or process advancements that support either long-term cost benefits or revenue growth.

Backlog

At December 31, 2017, our backlog was approximately \$21,300 of which approximately \$18,300 is expected to be fulfilled during the next twelve months. At December 31, 2016, our backlog was approximately \$19,700.

Impairment

During the quarter ended December 31, 2017, 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.

During the quarter ended September 30, 2015, as a result of the significant decline in our market capitalization and continued operating losses and cash flow deficiencies, we identified a triggering event requiring both a test for the recoverability of long-lived assets held and used at the asset group level and a test for impairment of goodwill at the reporting unit level. Assessing the recoverability of long-lived assets held and used and goodwill requires significant judgments and estimates by management.

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.

We subsequently performed an impairment test for goodwill. For purposes of testing goodwill for impairment, we operate as a singular reporting unit. In assessing goodwill for impairment, we compared the fair value of our reporting unit to its carrying value. We determined the fair value of our reporting unit through a combination of the market approach and income approach. Our use of the market approach included consideration of our market capitalization along with consideration of other factors that could influence the use of market capitalization as a fair value estimate, including premiums or discounts to be applied based on both market and entity-specific data. Our use of the income approach included consideration of present value techniques, principally the use of a discounted cash flow model. In performing the impairment test for goodwill, we determined the carrying amount of goodwill to be in excess of the implied fair value of goodwill. As a result, we recognized an impairment loss of approximately \$4,419 associated with goodwill during the quarter ended September 30, 2015.

How We Measure Our Business

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, materials, replacement components and services (installation, training and other services, including maintenance services and/or an extended warranty). 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, among others, the overall low unit volume of 3D printing machine sales, the sales mix of machines for a given period and the customer-driven acceleration or delay of orders and shipments of machines.

3D printed and other products, materials and services. 3D printed and other products, materials and services consist of sales of products printed in our global PSC and EAC network or manufactured through our specialty machining operations (through April 2017) or castings, consumable materials and replacement parts for the network of 3D printing machines installed by our global customer base and services for maintenance and certain research and development activities. Our PSCs and EACs utilize our 3D

printing machine technology to print products to the specifications of customers. In addition, our PSCs and EACs also provide support and services such as pre-production collaboration prior to printing products for a customer. Sales of consumable materials, replacement parts and service maintenance contracts are linked to the aftermarket opportunities from our growing network of 3D printing machines installed by our global customer base. Research and development arrangements are a function of customer-specific needs in applying our additive manufacturing technologies.

Cost of Sales and Gross Profit. Our cost of sales consists primarily of labor (related to our global workforce), materials (for both the manufacture of 3D printing machines and for our PSC, 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 properties, 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.

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. 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, and 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, accounting, consulting and other professional services.

Interest Expense. Interest expense consists of the interest cost associated with outstanding long-term debt and capital lease arrangements.

Provision (Benefit) 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, Italy, Sweden (effective in July 2015 through December 2017) and Japan, are approximately 34.0%, 28.4%, 24.0%, 22.0% and 30.9%, respectively.

In December 2017, the Tax Cuts and Jobs Act (the "Tax Act") was enacted into law. The Tax Act reduces the corporate income tax rate from 34% to 21% and generally modifies certain United States income tax deductions and the United States taxation of certain foreign earnings, among other changes.

Results of Operations

Net Loss

Net loss for 2017 was \$20,017, or \$1.25 per basic and diluted share, compared with a net loss of \$14,598, or \$0.92 per basic and diluted share, for 2016. The increase in our net loss was principally due to a net decrease in our gross profit (as a percentage of sales) along with increases in research and development and selling, general and administrative expenses (all changes further described below).

Net loss for 2016 was \$14,598, or \$0.92 per basic and diluted share, compared with a net loss of \$25,865, or \$1.79 per basic and diluted share, for 2015. The decrease in our net loss was due to an increase in our revenues and gross profit principally based on an increase in volumes and favorable mix of sales of 3D printing machines, coupled with the elimination of certain production inefficiencies experienced during 2015 as a result of our global facilities transition and expansion activities and European enterprise resource planning ("ERP") system deployment (effective January 1, 2015). Net operating expenses decreased for 2016 as compared to 2015 as a result of lower selling, general and administrative spending offset by increased research and development spending (see further discussion below) and the absence of a goodwill impairment charge recorded during 2015.

Revenue

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

	2017		2016		2015	
3D printing machines						
3D printing machines – third parties	\$ 29,980	51.9%	\$ 20,977	43.9%	\$ 14,100	34.9%
3D printing machines – related parties	—	0.0%	—	0.0%	1,364	3.4%
	<u>29,980</u>	<u>51.9%</u>	<u>20,977</u>	<u>43.9%</u>	<u>15,464</u>	<u>38.3%</u>
3D printed and other products, materials and services						
3D printed and other products, materials and services – third parties	27,731	48.0%	26,736	55.9%	24,818	61.5%
3D printed and other products, materials and services – related parties	33	0.1%	75	0.2%	71	0.2%
	<u>27,764</u>	<u>48.1%</u>	<u>26,811</u>	<u>56.1%</u>	<u>24,889</u>	<u>61.7%</u>
	<u>\$ 57,744</u>	<u>100.0%</u>	<u>\$ 47,788</u>	<u>100.0%</u>	<u>\$ 40,353</u>	<u>100.0%</u>

Revenue for 2017 was \$57,744 compared with revenue of \$47,788 for 2016, an increase of \$9,956, or 20.8%. The increase in revenue was as a result of increases in revenue attributable to both of our product groups (3D printing machines and 3D printed and other products, materials and services). The increase in revenues from 3D printing machines resulted primarily from an increase in volume of 3D printing machines sold (41 3D printing machines sold during 2017, as compared to 33 3D printing machines sold during 2016) and a favorable mix of 3D printing machines sold (as we sold 23 indirect printers during 2017, as compared to 18 indirect printers during 2016, indirect printers generally bearing a higher average selling price than direct printers). The increase in revenues from 3D printed and other products, materials and services principally resulted from an increase in revenues from our direct PSC printing operations as a result of increased customer acceptance of our binder jet technologies and an increase in aftermarket revenues (maintenance services and replacement components for 3D printing machines) based on an increased global installed base of 3D printing machines. These increases in revenues from 3D printed and other products, materials and services were offset by decreases in product sales associated with our indirect PSC and EAC printing operations and revenues associated with our former specialty machining operation located in our Chesterfield, Michigan facility (approximately \$1,057) following the sale of certain assets associated with this operation in April 2017, and the absence of the sale of remaining inventories associated with our former laser micromachining 3D printing machine platform (approximately \$475) during the quarter ended June 30, 2016.

Revenue for 2016 was \$47,788 compared with revenue of \$40,353 for 2015, an increase of \$7,435, or 18.4%. The increase in revenue was as a result of increases to both of our product groups (3D printing machines and 3D printed and other products, materials and services). The increase in revenues from 3D printing machines resulted from both an increase in volume of 3D printing machines sold (33 3D printing machines sold during 2016 as compared to 26 3D printing machines sold during 2015) and a favorable mix of 3D printing machines sold (as we sold 18 indirect printers during 2016 as compared to 11 indirect printers during 2015, indirect printers generally bearing a higher average selling price than direct printers). The increase in revenues from 3D printed and other products, materials and services resulted from an increase in consumable materials revenues associated with an increased global installed base of our 3D printing machines, the sale of the remaining inventories associated with our former laser micromachining 3D printing machine platform (approximately \$475) during the quarter ended June 30, 2016, and an increase in revenues derived from certain contractual research and development activities.

The following table summarizes 3D printing machines sold by type for each of the years ending December 31 (please refer to Part I Item 1, “Our Machines and Machine Platforms” of this Annual Report on Form 10-K for a description of 3D printing machines by type):

	2017	2016	2015
3D printing machine units sold:			
Exerial	5	—	—
S-Max+	1	1	1
S-Max	15	12	7
S-Print	2	3	2
S-15	—	2	1
M-Print*	1	—	1
M-Flex	7	5	3
Innovent*	10	9	10
X1-Lab	—	1	1
	<u>41</u>	<u>33</u>	<u>26</u>

* During 2015, one M-Print unit and two Innovent units were sold to related parties. There were no sales of 3D printing machines to related parties during 2017 or 2016. Refer to Note 20 to the consolidated financial statements and related notes thereto in Part II Item 8 of this Annual Report on Form 10-K.

Cost of Sales and Gross Profit

Cost of sales for 2017 was \$43,362 compared with cost of sales of \$33,626 for 2016, an increase of \$9,736, or 29.0%. The increase in cost of sales was primarily due to an increase in our variable cost of sales associated with our increase in revenues. In addition, we recognized a net charge associated with slow-moving, obsolete and lower of cost or net realizable value inventories of approximately \$2,056 during 2017, compared to a net recovery of approximately \$5 during 2016. The net charge recorded during 2017 was primarily attributable to certain raw material and component inventories (principally machine frames and other fabricated components) of approximately \$1,460 recorded during the quarter ended June 30, 2017 associated with our Exerial 3D printing machine platform based on decisions made by us during the period related to certain design changes to the underlying platform (rendering certain elements of the previous design obsolete). The net recovery recorded during 2016 principally relates to the sale of certain inventories associated with our former laser micromachining 3D printing machine platform (approximately \$507) during the quarter ended June 30, 2016, offset by a charge of approximately \$280 during the quarter ended December 31, 2016, associated with certain raw materials and components and work in process inventories for which cost was determined to exceed net realizable value. During 2017, we incurred costs of approximately \$747 (approximately \$142 in employee termination costs, \$7 in other exit costs and \$598 in asset impairments) associated with our consolidation of our 3D printing operations from our facility in North Las Vegas, Nevada into our Troy, Michigan and Houston, Texas facilities and our plan to exit our non-core specialty machining operations in Chesterfield, Michigan. These costs were offset by net gains on disposal of property and equipment (approximately \$291) primarily related to our sale of certain property and equipment (principally land and building) associated with our consolidation and exit of our North Las Vegas, Nevada PSC, as compared to net losses on disposal of property and equipment during 2016 (approximately \$169 primarily related to our sale and abandonment of certain property and equipment associated with our consolidation and exit of our Auburn, Washington PSC and the sale of certain machinery and equipment associated with our former specialty machining operations in Chesterfield, Michigan).

Gross profit for 2017 was \$14,382 compared with gross profit of \$14,162 for 2016. Gross profit percentage was 24.9% for 2017 compared with gross profit percentage of 29.6% for 2016. The increase in gross profit was the result of the increase in revenues net of the increase in cost of sales as further described above. This includes our recognition of five Exerial 3D printing machines during 2017 (associated revenues of approximately \$4,946), which generated lower profitability on a comparable basis to other 3D printing machine sales, such lower profitability being generally consistent with our experience related to new product or technology releases.

Cost of sales for 2016 was \$33,626 compared with cost of sales of \$32,010 for 2015, an increase of \$1,616 or 5.0%. The increase in cost of sales was primarily due to increases in our variable cost of sales associated with our increased revenues, resulting in an improved gross profit net of our fixed cost base. Offsetting this increase was a reduction in certain production inefficiencies experienced during 2015 as a result of the transition and expansion of our facilities in Germany and the United States, and the deployment of our European ERP system (effective January 1, 2015).

Gross profit for 2016 was \$14,162 compared with gross profit of \$8,343 for 2015. Gross profit percentage was 29.6% for 2016 compared with gross profit percentage of 20.7% for 2015. The increase in gross profit was the result of the increase in revenues offset by the increase in cost of sales as further cited above.

Research and Development

Research and development expenses for 2017 were \$9,909 compared with research and development expenses of \$7,814 for 2016, an increase of \$2,095, or 26.8%. The increase in research and development expenses was primarily due to increases in employee-related costs (salaries, benefits and equity-based compensation) of approximately \$474, consulting and professional fees associated with certain machine development and other organizational development activities of approximately \$1,231 and material costs of approximately \$212 (primarily associated with fine powder direct printing development activities).

We expect to increase our investment in research and development by approximately \$6,000 to \$8,000 during 2018 (as compared to 2017) in an effort to accelerate the development of our fine powder printing capabilities for direct printing, our large format direct and indirect 3D printing machines and our materials development activities for direct and indirect printing, among other initiatives.

Research and development expenses for 2016 were \$7,814 compared with research and development expenses of \$7,279 for 2015, an increase of \$535, or 7.3%. The increase in research and development expenses was primarily due to an increase in costs associated with machine development activities, principally an increase in material costs of approximately \$704 (primarily associated with sodium silicate and cold-hardening phenolic 3D printing machine and materials development).

Selling, General and Administrative

Selling, general and administrative expenses for 2017 were \$24,155 compared with selling, general and administrative expenses of \$20,722 for 2016, an increase of \$3,433, or 16.6%. The increase in selling, general and administrative expenses was principally due to increases in employee-related costs (salaries, benefits and equity-based compensation) of approximately \$1,564 associated with our investment in our commercial leadership team and executive separation costs, consulting and professional fees of approximately \$654 (principally executive consulting, legal, including costs associated with our intellectual property, and other administrative

arrangements), lower net recoveries for bad debts from customers (net recoveries of approximately \$64 during 2017, compared to net recoveries of approximately \$327 during 2016), an impairment of intangible assets of approximately \$269 during the quarter ended March 31, 2017, in connection with our plan to exit our non-core specialty machining operations at our Chesterfield, Michigan facility, and an increase in selling costs of approximately \$406 (promotional expenses, trade show activities and sales commissions on 3D printing machine sales).

Selling, general and administrative expenses for 2016 were \$20,722 compared with selling, general and administrative expenses of \$22,576 for 2015, a decrease of \$1,854 or 8.2%. The decrease in selling, general and administrative expenses was principally due to a reduction in consulting and professional fees of approximately \$1,202 (including costs associated with the deployment of our European ERP system during 2015), travel expenses of approximately \$251 and selling expenses of approximately \$354 (including the absence of costs associated with the GIFA International Foundry Trade Fair in June 2015), all of which was offset by the reversal of approximately \$193 in remaining contingent consideration associated with our acquisition of Machin-A-Mation during the quarter ended June 30, 2015, which did not recur in 2016.

Interest Expense

Interest expense for 2017 was \$94 compared with interest expense of \$298 for 2016, a decrease of \$204, or 68.5%. The decrease in interest expense was principally due to the effect of the termination of the revolving credit facility with a related party during the quarter ended March 31, 2016, which resulted in an acceleration of amortization of debt issuance costs of approximately \$204.

Interest expense for 2016 was \$298 compared with interest expense of \$152 for 2015, an increase of \$146, or 96.1%. The increase in interest expense was principally due to the effect of the termination of the revolving credit facility with a related party during the quarter ended March 31, 2016, which resulted in an acceleration of amortization of debt issuance costs of approximately \$204, partially offset by a lower average outstanding debt balance for 2016 for all other instruments as compared to 2015.

Other Expense (Income) — Net

Other expense (income) — net for 2017 was \$203 compared with other expense (income) — net of (\$141) for 2016 and other expense (income) — net of (\$45) for 2015. Amounts for all periods consist principally of net currency exchange gains on certain intercompany transactions between subsidiaries either settled or planned for settlement in the foreseeable future and interest income on cash and cash equivalent balances.

Provision (Benefit) for Income Taxes

The provision (benefit) for income taxes for 2017, 2016 and 2015 was \$38, \$67 and (\$173), respectively. The effective tax rate for 2017, 2016 and 2015 was 0.2% (provision on a loss), 0.5% (provision on a loss) and 0.7% (benefit on a loss), respectively. For 2017, 2016 and 2015, the effective tax rate differed from the United States federal statutory rate of 34.0% primarily due to net changes in valuation allowances for the respective periods.

We have provided a valuation allowance for our net deferred tax assets as a result of our inability to generate consistent net operating profits in jurisdictions in which we operate. As such, any benefit from deferred taxes in any of the periods presented in our consolidated financial statements has 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.

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 approximately \$20,017, \$14,598 and \$25,865 for 2017, 2016 and 2015, respectively. In connection with the completion of our initial public offering and subsequent secondary offerings of our common stock, we received cumulative unrestricted net proceeds from the sale of our common stock of approximately \$168,361 to fund our operations. At December 31, 2017, we had approximately \$21,848 in unrestricted cash and cash equivalents. In addition, on March 12, 2018, we entered into a three-year, \$15,000 revolving credit facility with a related party (see further discussion below).

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 saving measures to preserve capital.

Further, we may seek to raise additional capital to support our growth through additional debt, equity or other alternatives (including asset sales), or a combination thereof.

LBM Holdings LLC Revolving Credit Agreement

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 with LBM Holdings LLC (“LBM”), a related party, on 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 includes a term of three years (through March 12, 2021) and bears interest at a rate of one month LIBOR plus an applicable margin of 500 basis points (approximately 6.7% at inception). The LBM Credit Agreement requires 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% (approximately \$188), was required at closing. 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 the LBM Credit Agreement at any time without penalty. Borrowings under the LBM Credit Agreement have been collateralized by the accounts receivable, inventories and machinery and equipment of the Loan Parties. The total estimated value of collateral was in significant excess of the maximum capacity of the LBM Credit Agreement at inception.

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 our Executive Chairman. Accordingly, we do not consider the LBM Credit Agreement indicative of a fair market value lending. Prior to execution, the LBM Credit Agreement was subject to review and approval by a sub-committee of independent members of our Board of Directors (which included each of the members of the Audit Committee of the Board of Directors). At the time of execution of the LBM Credit Agreement, the \$15,000 in available loan proceeds were deposited into an escrow account with an unrelated, third party financial institution pursuant to a separate Escrow Agreement by and among the parties. Loan proceeds held in escrow will be 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 LBM Credit Agreement.

Cash Flows

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

	2017	2016	2015
Net cash used for operating activities	\$ (9,673)	\$ (2,652)	\$ (10,722)
Net cash provided by (used for) investing activities	2,719	(1,272)	(4,748)
Net cash (used for) provided by financing activities	(68)	12,822	(670)
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	1,045	(415)	(390)
Net change in cash, cash equivalents, and restricted cash	<u>\$ (5,977)</u>	<u>\$ 8,483</u>	<u>\$ (16,530)</u>
		<u>December 31,</u>	<u>December 31,</u>
		2017	2016
Cash and cash equivalents	\$ 21,848	\$ 27,825	
Restricted cash included in prepaid expenses and other current assets	330	330	
Total cash, cash equivalents, and restricted cash shown in the statement of consolidated cash flows	<u>\$ 22,178</u>	<u>\$ 28,155</u>	

Operating Activities

Net cash used for operating activities for 2017 was \$9,673 compared with net cash used for operating activities of \$2,652 for 2016. The change of \$7,021 was due to an increase in our net loss (further described above) combined with a net decrease in net cash

inflows from changes in assets and liabilities, including decreases in cash inflows from customers (principally due to the implementation of more favorable liquidity terms with customers during 2016 and the timing of certain 3D printing machine sale transactions) and cash outflows for inventories (based on our operating plans for delivery of 3D printing machines to customers). These changes were partially offset by a reduction in cash outflows to vendors (based on the terms and timing of payment).

Net cash used for operating activities for 2016 was \$2,652 compared with \$10,722 for 2015. The change of \$8,070 was due to a reduction in our net loss (further described above) combined with a net increase in net cash inflows from changes in assets and liabilities, including net inflows associated with inventories (versus a net outflow in 2015) based on improved management of inventory levels in 2016 as compared to 2015 in meeting our operating plans. This net increase was partially offset by net decreases in cash inflows associated with deferred revenue and customer prepayments (as we saw stabilization in our commercial terms with customers) and other working capital items mostly due to the timing of payments from customers and to vendors, respectively.

Investing Activities

Net cash provided by investing activities for 2017 was \$2,719 compared with net cash used for investing activities of \$1,272 for 2016 and net cash used for investing activities of \$4,748 for 2015.

Net cash provided by investing activities for 2017 included cash inflows of approximately \$3,706 in proceeds from the sale of property and equipment, mostly attributable to our sale of assets associated with our non-core specialty machining operation in Chesterfield, Michigan and our PSC in North Las Vegas, Nevada during the quarter ended June 30, 2017. Remaining activity for all periods included cash outflows for capital expenditures consistent with our operating plans. Capital expenditures for 2015 included certain facility expansions spending which did not recur in 2017 or 2016.

We expect our 2018 capital expenditures to be limited to spending associated with sustaining our existing operations and strategic asset acquisition and deployment (estimated spending of approximately \$1,000 to \$1,500).

Financing Activities

Net cash used for financing activities for 2017 was \$68 compared with net cash provided by financing activities of \$12,822 for 2016 and net cash used for financing activities of \$670 for 2015.

Uses of cash for 2017 included principal payments on outstanding debt and capital leases. Uses of cash for 2017 were offset by cash proceeds received by us as a result of employee stock option exercises during 2017.

Sources of cash for 2016, included net proceeds from the issuance of common stock of approximately \$12,447 in connection with our registered direct offering to a related party in January 2016 and approximately \$595 in connection with sales of our common stock under our ATM. Uses of cash for 2016 included principal payments on outstanding debt and capital leases.

Uses of cash for 2015 included principal payments on outstanding debt and capital and financing leases and deferred financing costs associated with our revolving credit facility with a related party (which was terminated in January 2016).

At December 31, 2017, 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 approximately \$1,675 at December 31, 2017). We requested and were granted a waiver related to compliance with this annual covenant at December 31, 2017 and through December 31, 2018. Related to our 2017 non-compliance, there were no cross default provisions or related impacts on other lending or financing agreements.

Contractual Obligations

We are required to make future payments under various contracts, including operating lease agreements, unconditional purchase arrangements, long-term debt agreements and capital lease agreements.

At December 31, 2017, a summary of our outstanding contractual obligations is as follows:

	<u>Total</u>	<u>2018</u>	<u>2019-2020</u>	<u>2021-2022</u>	<u>Thereafter</u>
Operating activities:					
Operating leases	\$ 502	\$ 303	\$ 180	\$ 12	\$ 7
Purchase obligations	6,091	3,625	2,466	—	—
Financing activities:					
Long-term debt	1,675	142	306	340	887
Capital leases	51	15	18	17	1
Interest	456	85	146	112	113
Total	<u>\$ 8,775</u>	<u>\$ 4,170</u>	<u>\$ 3,116</u>	<u>\$ 481</u>	<u>\$ 1,008</u>

Operating Leases

Operating leases consist of various lease agreements of manufacturing and office facilities, machinery and other equipment and vehicles, expiring in various years through 2026.

Purchase Obligations

Purchase obligations consist of unconditional commitments to purchase certain 3D printing machine components to support our operations.

Long-Term Debt

Long-term debt consists of the current and noncurrent portion of a note payable used to finance the acquisition of a building in the United States. Maturity of this debt instrument extends to 2027.

Capital Leases

Capital leases consist of certain lease agreements for equipment and vehicles, expiring in various years through 2023.

Interest

Interest related to long-term debt and capital leases is based on interest rates in effect at December 31, 2017, and is calculated on instruments with maturities that extend to 2027.

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, 2017, total outstanding financial guarantees and letters of credit issued by us were approximately \$1,224 (€1,021). Included in the total outstanding financial guarantees and letters of credit by us were approximately \$939 (€783) with expiration dates ranging from January 2018 through June 2022 and approximately \$285 (€238) which have no expiration date. At December 31, 2016, total outstanding guarantees and letters of credit issued by us were approximately \$400 (€380).

For further discussion related to the credit facility agreement, refer to Note 15 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 exposed to market risk from fluctuations in foreign currency exchange rates which may adversely affect our results of operations and financial condition. We seek to minimize these risks through regular operating and financing activities and, when we consider it to be appropriate, through the use of derivative financial instruments. We do not purchase, hold or sell derivative financial instruments for trading or speculative purposes.

The local currency is the functional currency for significant operations outside of the United States. The determination of the functional currency of an operation is made based on the appropriate economic and management indicators.

Foreign currency assets and liabilities are translated into their United States dollar equivalents based on year end exchange rates, and are included in stockholders' equity as a component of other comprehensive income (loss). Revenues and expenses are translated at average exchange rates. Transaction gains and losses that arise from exchange rate fluctuations are charged to operations as incurred, except for gains and losses associated with certain long-term intercompany transactions for which settlement is not planned or anticipated in the foreseeable future, which are included in accumulated other comprehensive loss in the consolidated balance sheet.

We transact business globally and are subject to risks associated with fluctuating foreign exchange rates. Approximately 56.7%, 54.0% and 50.9% of our consolidated revenue was derived from transactions outside the United States for 2017, 2016 and 2015, respectively. This revenue is generated primarily from wholly-owned subsidiaries operating in their respective countries and surrounding geographic areas. This revenue is primarily denominated in each subsidiary's local functional currency, including the euro and Japanese yen. A hypothetical change in foreign exchange rates of +/- 10.0% for 2017 would result in an increase (decrease) in revenue of approximately \$3,300. These subsidiaries incur nearly all of their expenses (other than intercompany expenses) in their local functional currencies.

At December 31, 2017, we held approximately \$22,178 in cash, cash equivalents, and restricted cash, of which approximately \$14,436 was held by certain of our subsidiaries in United States dollars.

Item 8. Financial Statements and Supplementary Data.

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Report of Independent Registered Public Accounting Firm

To the Shareholders 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, 2017 and 2016, the related statements of consolidated operations and comprehensive loss, changes in stockholders’ equity, and cash flows for the years then ended, and the related notes (collectively, the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of their operations and their cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

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 Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company’s internal control over financial reporting. Accordingly, we express no such opinion.

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.

Pittsburgh, Pennsylvania

March 15, 2018

Report of Independent Registered Public Accounting Firm

Board of Directors and Stockholders
of The ExOne Company and Subsidiaries

We have audited the accompanying statements of consolidated operations and comprehensive loss, changes in stockholders' equity, and cash flows of The ExOne Company and Subsidiaries (the "Company") for the year ended December 31, 2015. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the results of operations and cash flows of The ExOne Company and Subsidiaries for the year ended December 31, 2015, in conformity with accounting principles generally accepted in the United States of America.

/s/ Baker Tilly Virchow Krause, LLP

Pittsburgh, Pennsylvania
March 22, 2016

The ExOne Company and Subsidiaries
Statement of Consolidated Operations and Comprehensive Loss
(in thousands, except per-share amounts)

For the years ended December 31,	2017	2016	2015
Revenue			
Revenue – third parties	\$ 57,711	\$ 47,713	\$ 38,918
Revenue – related parties	33	75	1,435
	57,744	47,788	40,353
Cost of sales	43,362	33,626	32,010
Gross profit	14,382	14,162	8,343
Operating expenses			
Research and development	9,909	7,814	7,279
Selling, general and administrative	24,155	20,722	22,576
Goodwill impairment	—	—	4,419
	34,064	28,536	34,274
Loss from operations	(19,682)	(14,374)	(25,931)
Other expense			
Interest expense	94	298	152
Other expense (income) – net	203	(141)	(45)
	297	157	107
Loss before income taxes	(19,979)	(14,531)	(26,038)
Provision (benefit) for income taxes	38	67	(173)
Net loss	\$ (20,017)	\$ (14,598)	\$ (25,865)
Net loss per common share:			
Basic	\$ (1.25)	\$ (0.92)	\$ (1.79)
Diluted	\$ (1.25)	\$ (0.92)	\$ (1.79)
Comprehensive loss:			
Net loss	\$ (20,017)	\$ (14,598)	\$ (25,865)
Other comprehensive income (loss):			
Foreign currency translation adjustments	5,251	(1,200)	(5,332)
Comprehensive loss	\$ (14,766)	\$ (15,798)	\$ (31,197)

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)

	2017	2016
Assets		
Current assets:		
Cash and cash equivalents	\$ 21,848	\$ 27,825
Restricted cash	330	330
Accounts receivable – net	8,647	6,447
Inventories – net	15,430	15,838
Prepaid expenses and other current assets	1,710	1,159
Total current assets	47,965	51,599
Property and equipment – net	46,797	51,134
Intangible assets – net	62	668
Other noncurrent assets	736	777
Total assets	\$ 95,560	\$ 104,178
Liabilities		
Current liabilities:		
Current portion of long-term debt	\$ 137	\$ 132
Current portion of capital leases	15	72
Accounts payable	4,291	2,036
Accrued expenses and other current liabilities	6,081	5,124
Deferred revenue and customer prepayments	8,282	7,371
Total current liabilities	18,806	14,735
Long-term debt – net of current portion	1,508	1,644
Capital leases – net of current portion	36	10
Other noncurrent liabilities	1	9
Total liabilities	20,351	16,398
Contingencies and commitments		
Stockholders' equity		
Common stock, \$0.01 par value, 200,000,000 shares authorized, 16,124,617 (2017) and 16,017,115 (2016) shares issued and outstanding	161	160
Additional paid-in capital	173,718	171,116
Accumulated deficit	(89,186)	(68,761)
Accumulated other comprehensive loss	(9,484)	(14,735)
Total stockholders' equity	75,209	87,780
Total liabilities and stockholders' equity	\$ 95,560	\$ 104,178

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

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

For the years ended December 31,	2017	2016	2015
Operating activities			
Net loss	\$ (20,017)	\$ (14,598)	\$ (25,865)
Adjustments to reconcile net loss to net cash used for operations:			
Depreciation and amortization	6,278	5,659	5,227
Equity-based compensation	2,456	1,463	1,725
Amortization of debt issuance costs	6	210	18
Deferred income taxes	1	(29)	(268)
Recoveries for bad debts – net	(64)	(327)	(254)
Provision (recoveries) for slow-moving, obsolete and lower of cost or net realizable value inventories – net	2,056	(5)	553
(Gain) loss from disposal of property and equipment – net	(325)	186	87
Changes in fair value of contingent consideration	—	—	(193)
Goodwill impairment	—	—	4,419
Changes in assets and liabilities, excluding effects of foreign currency translation adjustments:			
(Increase) decrease in accounts receivable	(1,733)	3,316	4,567
Decrease (increase) in inventories	357	2,502	(8,574)
(Increase) decrease in prepaid expenses and other assets	(856)	1,024	685
Increase (decrease) in accounts payable	2,017	(1,281)	1,654
Increase (decrease) in accrued expenses and other liabilities	445	(1,211)	(823)
(Decrease) increase in deferred revenue and customer prepayments	(294)	439	6,320
Net cash used for operating activities	(9,673)	(2,652)	(10,722)
Investing activities			
Capital expenditures	(987)	(1,347)	(4,938)
Proceeds from sale of property and equipment	3,706	75	190
Net cash provided by (used for) investing activities	2,719	(1,272)	(4,748)
Financing activities			
Net proceeds from issuance of common stock – registered direct offering to a related party	—	12,447	—
Net proceeds from issuance of common stock – at the market offerings	—	595	—
Payments on long-term debt	(137)	(138)	(132)
Payments on capital and financing leases	(78)	(82)	(323)
Proceeds from exercise of employee stock options	147	—	—
Deferred financing costs	—	—	(215)
Net cash (used for) provided by financing activities	(68)	12,822	(670)
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	1,045	(415)	(390)
Net change in cash, cash equivalents, and restricted cash	(5,977)	8,483	(16,530)
Cash, cash equivalents, and restricted cash at beginning of period	28,155	19,672	36,202
Cash, cash equivalents, and restricted cash at end of period	<u>\$ 22,178</u>	<u>\$ 28,155</u>	<u>\$ 19,672</u>
Supplemental disclosure of cash flow information			
Cash paid for interest	\$ 87	\$ 88	\$ 122
Cash paid for income taxes	\$ 5	\$ —	\$ —
Supplemental disclosure of noncash investing and financing activities			
Transfer of internally developed 3D printing machines from inventories to property and equipment for internal use or leasing activities	\$ 2,868	\$ 2,829	\$ 4,749
Transfer of internally developed 3D printing machines from property and equipment to inventories for sale	\$ 3,042	\$ 1,737	\$ 956
Property and equipment included in accounts payable	\$ 64	\$ 117	\$ —
Property and equipment included in accrued expenses and other current liabilities	\$ 108	\$ —	\$ —
Property and equipment acquired through financing arrangements	\$ 48	\$ —	\$ —

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)

	Common stock		Additional paid-in capital	Accumulated deficit	Accumulated other comprehensive loss	Total stockholders' equity
	Shares	\$				
Balance at December 31, 2014	14,417	\$ 144	\$ 154,902	\$ (28,298)	\$ (8,203)	\$ 118,545
Net loss	—	—	—	(25,865)	—	(25,865)
Other comprehensive loss	—	—	—	—	(5,332)	(5,332)
Equity-based compensation	—	—	1,725	—	—	1,725
Common stock issued from equity incentive plan	30	—	—	—	—	—
Balance at December 31, 2015	14,447	144	156,627	(54,163)	(13,535)	89,073
Registered direct offering of common stock to a related party, net of issuance costs	1,424	15	12,432	—	—	12,447
At the market offerings of common stock, net of issuance costs	92	1	594	—	—	595
Net loss	—	—	—	(14,598)	—	(14,598)
Other comprehensive loss	—	—	—	—	(1,200)	(1,200)
Equity-based compensation	—	—	1,463	—	—	1,463
Common stock issued from equity incentive plan	54	—	—	—	—	—
Balance at December 31, 2016	16,017	160	171,116	(68,761)	(14,735)	87,780
Cumulative-effect adjustment due to the adoption of Financial Accounting Standards Board Accounting Standards Update 2016-16	—	—	—	(408)	—	(408)
Net loss	—	—	—	(20,017)	—	(20,017)
Other comprehensive income	—	—	—	—	5,251	5,251
Equity-based compensation	—	1	2,455	—	—	2,456
Common stock issued from equity incentive plan	108	—	147	—	—	147
Balance at December 31, 2017	16,125	\$ 161	\$ 173,718	\$ (89,186)	\$ (9,484)	\$ 75,209

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

The ExOne Company and Subsidiaries
Notes to the Consolidated Financial Statements
(dollars in thousands, except per-share, share and unit amounts)

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, its wholly-owned subsidiaries, ExOne Americas LLC (United States); ExOne GmbH (Germany); ExOne Property GmbH (Germany); ExOne KK (Japan); ExOne Italy S.r.l (Italy); effective in March 2014 and through September 2016, MWT — Gesellschaft für Industrielle Mikrowellentechnik mbH (Germany); and effective in July 2015 and through December 2017, ExOne Sweden AB (Sweden). Collectively, the consolidated group is referred to as the “Company”.

On September 15, 2016, the Company completed a transaction merging its MWT—Gesellschaft für Industrielle Mikrowellentechnik mbH (Germany) subsidiary with and into its ExOne GmbH (Germany) subsidiary. The purpose of this transaction was to further simplify the Company’s legal structure. There were no significant accounting or tax related impacts associated with the merger of these wholly-owned subsidiaries.

On December 31, 2017, the Company completed a dissolution of its ExOne Sweden AB (Sweden) subsidiary. The purpose of this dissolution was to further simplify the Company’s legal structure. There were no significant accounting or tax related impacts associated with the dissolution of this subsidiary.

The Company filed a registration statement on Form S-3 (No. 333-203353) with the Securities and Exchange Commission (“SEC”) on April 10, 2015. The purpose of the Form S-3 was to register, among other securities, debt securities. Certain subsidiaries of the Company (other than any minor subsidiary) 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.

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.

Certain amounts relating to restricted cash (\$330) and intangible assets – net (\$668) in the accompanying consolidated balance sheet at December 31, 2016, have been reclassified from prepaid expenses and other current assets and other noncurrent assets, respectively, to conform to current period presentation. Certain amounts relating to provision (recoveries) for slow-moving, obsolete and lower of cost or net realizable value inventories – net, for 2016 (\$5) and 2015 (\$553) in the accompanying statement of consolidated cash flows have been reclassified from decrease (increase) in inventories, to conform to current period presentation.

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 business combinations (including fair value estimates of contingent consideration) and testing for impairment of goodwill and long-lived assets (including the identification of reporting units and/or asset groups by management, estimates of future cash flows of identified reporting units and/or asset groups and fair value estimates used in connection with assessing the valuation of identified reporting units and/or 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 forms 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.

Foreign Currency

The local currency is the functional currency for significant operations outside of the United States. The determination of the functional currency of an operation is made based upon the appropriate economic and management indicators.

Foreign currency assets and liabilities are translated into their United States dollar equivalents based upon year end exchange rates, and are included in stockholders' equity as a component of other comprehensive income (loss). Revenues and expenses are translated at average exchange rates. Transaction gains and losses that arise from exchange rate fluctuations are charged to operations as incurred, except for gains and losses associated with certain long-term intercompany transactions between subsidiaries for which settlement is not planned or anticipated in the foreseeable future, which are included in other comprehensive income (loss) in the accompanying statement of consolidated operations and comprehensive loss.

The Company transacts business globally and is subject to risks associated with fluctuating foreign exchange rates. Approximately 56.7%, 54.0% and 50.9% of the consolidated revenue of the Company was derived from transactions outside the United States for 2017, 2016 and 2015, respectively. This revenue is generated primarily from wholly-owned subsidiaries operating in their respective countries and surrounding geographic areas. This revenue is primarily denominated in each subsidiary's local functional currency, including the euro and Japanese yen.

Revenue Recognition

The Company derives revenue from the sale of 3D printing machines and 3D printed and other products, materials and services. Revenue is recognized by the Company when persuasive evidence of an arrangement exists, delivery has occurred (generally when title and risk and rewards of ownership have transferred to the customer) or services have been rendered, selling price is fixed or determinable and collectability is reasonably assured.

The Company enters into arrangements that may provide for multiple deliverables to a customer. 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). The Company identifies all products and services that are to be delivered separately under an arrangement and allocates revenue to each based on their relative fair value. Fair values are generally established based on the prices charged when sold separately by the Company (vendor specific objective evidence). The allocated revenue for each deliverable is then recognized ratably based on relative fair values of the components of the sale. In the absence of vendor specific objective evidence or third party evidence in leading to a relative fair value for a sale component, the Company's best estimate of selling price is used. The Company also evaluates the impact of undelivered items on the functionality of delivered items for each sales transaction and, where appropriate, defers revenue on delivered items when that functionality has been affected. Functionality is determined to be met if the delivered products or services represent a separate earnings process.

Certain of the Company's arrangements for 3D printing machines contain acceptance provisions for which the Company must determine whether it can objectively demonstrate that either company-specific or customer-specific criteria identified in such provisions have been met prior to recognizing revenue on the transaction. To the extent that the Company is able to effectively demonstrate that specific criteria are met, revenue is recognized at the time of delivery, otherwise revenue is deferred until formal acceptance is provided from the customer.

The Company generally provides customers with a standard twelve month warranty on its 3D printing machines. The standard warranty is not treated as a separate service because the standard warranty is an integral part of the sale of the 3D printing machine. 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. Following the standard warranty period, the Company offers its customers optional maintenance service contracts or extended warranties. Deferred maintenance service revenues are generally recognized on a straight-line basis over the related contract period, except where sufficient historical evidence indicates that the costs of performing maintenance services under the contract are not incurred on a straight-line basis, with such revenues recognized in proportion to the costs expected to be incurred.

The Company sells equipment with embedded software to its customers. The embedded software is not sold separately and it is not a significant focus of the Company's marketing effort. The Company does not provide post-contract customer support specific to the software or incur significant costs that are within the scope of Financial Accounting Standards Board ("FASB") guidance on accounting for software to be leased or sold. Additionally, the functionality that the software provides is marketed as part of the overall product. The software embedded in the equipment is incidental to the equipment as a whole such that the FASB guidance referenced above is not applicable. Sales of these products are recognized in accordance with FASB guidance on accounting for multiple-element arrangements.

Shipping and handling costs billed to customers are included in revenue in the accompanying statement of consolidated operations and comprehensive loss. Costs incurred by the Company associated with shipping and handling are included in cost of sales in the accompanying statement of consolidated operations and comprehensive loss.

In assessing collectability as part of the revenue recognition process, the Company considers a number of factors in its evaluation of the creditworthiness of the customer, including past due amounts, past payment history, and current economic conditions. If it is determined that collectability cannot be reasonably assured, the Company will defer recognition of revenue until collectability is assured. 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). Prepayments received from customers are reported as deferred revenue and customer prepayments in the accompanying consolidated balance sheet. 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.

The Company has entered into certain contracts for the sale of its products and services with the federal government under fixed-fee, cost reimbursable and time and materials arrangements. With respect to cost reimbursable arrangements with the federal government, the Company generally bills for products and services in accordance with provisional rates as determined by the Company. To the extent that provisional rates billed under these contracts differ from actual experience, a billing adjustment (through revenue) is made in the period in which the difference is identified (generally upon completion of its annual Incurred Cost Submission filing as required by the federal government). For 2017, 2016 and 2015, revenues and any adjustments related to these contracts were not significant.

Cash and Cash Equivalents

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, Italy, Sweden 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.

Accounts Receivable

Accounts receivable are reported at their net realizable value. The Company's estimate of the allowance for doubtful accounts related to trade receivables is based on the Company's evaluation of customer accounts with past-due outstanding balances or specific accounts for which it has information that the customer may be unable to meet its financial obligations. Based upon review of these accounts, and management's analysis and judgment, the Company records a specific allowance for that customer's accounts receivable balance to reduce the outstanding receivable balance to the amount expected to be collected. The allowance is re-evaluated and adjusted periodically as additional information is received that impacts the allowance amount reserved. At December 31, 2017 and 2016, the allowance for doubtful accounts was approximately \$1,193 and \$1,566, respectively. During 2017, 2016 and 2015 the Company recorded net recoveries for bad debts of approximately \$64, \$327 and \$254, respectively, as reversals of previously recorded allowances (based on collections of the related accounts receivable) exceeded provisions recorded.

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 2017, 2016 or 2015.

Goodwill

Goodwill represents the excess of purchase price over the fair value of identifiable net assets of acquired entities. Goodwill is not amortized; instead, it is reviewed for impairment annually or more frequently if indicators of impairment exist (a triggering event) or if a decision is made to sell or exit a business. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include deterioration in general economic conditions, negative developments in equity and credit markets, including a significant decline in an entity's market capitalization, adverse changes in the markets in which an entity operates, increases in input costs that have a negative effect on earnings and cash flows or a trend of negative or declining cash flows, among others.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment (an operating segment component). Based on an evaluation of its operational management and reporting structure, the Company has determined that it operates as a single operating segment, operating segment component and reporting unit.

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

Under the qualitative assessment, various events and circumstances (or factors) that would affect the estimated fair value of a reporting unit are identified (similar to impairment indicators above). These factors are then classified by the type of impact they would have on the estimated fair value using positive, neutral and adverse categories based on current business conditions. Additionally, an assessment of the level of impact that a particular factor would have on the estimated fair value is determined using high, medium and low weighting.

Under the two-step quantitative impairment test, the evaluation of impairment involves comparing the current fair value of a reporting unit to its carrying value, including goodwill (step 1). The Company determines fair value through a combination of the market approach and income approach. The market approach includes consideration of the Company's market capitalization (as a single reporting unit entity) along with consideration of other factors that could influence the use of market capitalization as a fair value estimate, including premiums or discounts to be applied based on both market and entity-specific data. The income approach includes consideration of present value techniques, principally the use of a discounted cash flow model. The development of fair value under both approaches requires the use of significant assumptions and estimates by management.

In the event the estimated fair value of a reporting unit is less than the carrying value (step 1), additional analysis would be required (step 2). The additional analysis (step 2) would compare the carrying amount of the reporting unit's goodwill with the implied fair value of that goodwill, which may involve the use of valuation experts. The implied fair value of goodwill is the excess of the fair value of the reporting unit over the fair value amounts assigned to all of the assets and liabilities of that unit as if the reporting unit was acquired in a business combination and the fair value of the reporting unit represented the purchase price. If the carrying value of goodwill exceeds its implied fair value, an impairment loss equal to such excess would be recognized, which could significantly and adversely impact reported results of operations.

During the quarter ended September 30, 2015, as a result of the significant decline in market capitalization of the Company and continued operating losses and cash flow deficiencies, the Company identified a triggering event requiring an interim test for impairment of goodwill at the reporting unit level. In performing the impairment test for goodwill, the Company determined the carrying amount of goodwill to be in excess of the implied fair value of goodwill. As a result, the Company recognized an impairment loss of approximately \$4,419.

Contingent Consideration

The Company records contingent consideration resulting from a business combination at its fair value on the date of acquisition. Each reporting period thereafter, the Company revalues these obligations and records increases or decreases in their fair value as a charge (credit) to selling, general and administrative costs. Changes in the fair value of contingent consideration obligations can result from adjustments to forecast revenues, profitability or a combination thereto or discount rates. These fair value measurements represent Level 3 measurements, as they are based on significant unobservable inputs.

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.

Income Taxes

The provision (benefit) for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision (benefit) for income taxes represents income taxes paid or payable (or received or receivable) 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 (benefit) for income taxes related to these foreign jurisdictions. Any undistributed earnings are intended to be permanently reinvested in the respective subsidiaries.

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 (benefit) 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.

In December 2017, the Tax Cuts and Jobs Act (the "Tax Act") was enacted into law. The Tax Act reduces the corporate income tax rate from 34% to 21% and generally modifies certain United States income tax deductions and the United States taxation of certain foreign earnings, among other changes. The Company is required to recognize the effect of tax law changes in the period of enactment. As a result of the Tax Act, the Company has re-measured its United States deferred tax assets and liabilities as well as its valuation allowance against its net United States deferred tax assets. In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118: Income Tax Accounting Implications of the 2017 Tax Cuts and Jobs Act ("SAB 118"), which allows the Company to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. Since the Tax Act was passed late in the quarter ended December 31, 2017, and ongoing guidance and accounting interpretation are expected over the next 12 months, the Company considers the accounting of the deferred tax re-measurements and other items to be incomplete due to the forthcoming guidance and its ongoing analysis of final December 31, 2017 data and tax positions. At December 31, 2017, no provisional amounts have been recorded by the Company. The Company expects to complete its analysis within the measurement period in accordance with SAB 118.

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 2017, 2016 or 2015.

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 2017, 2016 and 2015 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 2017, 2016 and 2015 were approximately \$303, \$264 and \$365, 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, 2017, the Company adopted FASB Accounting Standards Update (“ASU”) 2016-16, “Income Taxes: Intra-Entity Transfers of Assets Other Than Inventory.” This ASU modifies existing guidance and is intended to reduce diversity in practice with respect to the accounting for the income tax consequences of intra-entity transfers of assets. The ASU indicates that the former exception to income tax accounting that requires companies to defer the income tax effects of certain intercompany transactions would apply only to intercompany inventory transactions. That is, the exception no longer applies to intercompany sales and transfers of other assets (e.g. , property and equipment or intangible assets). Under the former exception, income tax expense associated with intra-entity profits in an intercompany sale or transfer of assets was eliminated from earnings. Instead, that cost was deferred and recorded on the balance sheet (e.g. , as a prepaid asset) until the assets left the consolidated group. Similarly, the entity was prohibited from recognizing deferred tax assets for the increases in tax bases due to the intercompany sale or transfer. A modified retrospective basis of adoption was required for this ASU. As a result, a cumulative-effect adjustment of approximately \$408 has been recorded to accumulated deficit on January 1, 2017, in connection with this adoption. This cumulative-effect adjustment relates to the prepaid expense associated with intra-entity transfers of property and equipment included in prepaid expenses and other current assets in the accompanying consolidated balance sheet at December 31, 2016.

On January 1, 2017, the Company adopted FASB ASU 2016-17, “Consolidation: Interests Held through Related Parties That Are under Common Control.” This ASU modifies former guidance with respect to how a decision maker that holds an indirect interest in a variable interest entity (“VIE”) through a common control party determines whether it is the primary beneficiary of the VIE as part of the analysis of whether the VIE would need to be consolidated. Under the ASU, a decision maker needs to consider only its proportionate indirect interest in the VIE held through a common control party. Previous guidance had required the decision maker to treat the common control party’s interest in the VIE as if the decision maker held the interest itself. The Company does not have significant involvement with entities subject to consolidation considerations impacted by VIE model factors addressed by this ASU. Management has determined that the adoption of this ASU did not have an impact on the consolidated financial statements of the Company.

On January 1, 2017, the Company adopted FASB ASU 2015-11, “Inventory: Simplifying the Measurement of Inventory.” This ASU requires inventories to be measured at the lower of cost and net realizable value, with net realizable value defined as the estimated selling price in the normal course of business, less reasonably predictable costs of completion, disposal and transportation. Management has determined that the adoption of this ASU did not have an impact on the consolidated financial statements of the Company.

On December 31, 2016, the Company adopted FASB ASU 2016-09, “Compensation – Stock Compensation: Improvements to Employee Share-Based Payment Accounting.” This ASU simplifies certain aspects of accounting for equity-based compensation, including accounting for income taxes, accounting for pre-vesting forfeitures and certain classification and disclosure elements. In connection with the adoption of this ASU, the Company modified its policy for accounting for pre-vesting forfeitures from estimating an amount of equity-based grants expected to vest to recording the effect of pre-vesting forfeitures in the period in which they occur. The application of this policy change did not impact equity-based compensation expense recognized by the Company during 2016. Management has determined that the adoption of other elements of this ASU did not have an impact on the consolidated financial statements of the Company.

On December 31, 2016, the Company adopted FASB ASU 2016-18, “Statement of Cash Flows: Restricted Cash.” This ASU requires restricted cash and restricted cash equivalents to be included within the cash and cash equivalents line on the statement of cash flows with a corresponding reconciliation prepared to the statement of financial position for cash and cash equivalents and restricted cash balances. Transfers between restricted cash and restricted cash equivalents and cash and cash equivalents will no longer be presented as cash flow activities in the statement of cash flows and material balances of restricted cash and restricted cash equivalents must disclose information regarding the nature of the restrictions. This ASU has been applied retrospectively to each of the periods presented in the accompanying statement of consolidated cash flows with a corresponding reconciliation prepared to amounts reflected in the accompanying consolidated balance sheet at December 31, 2016, for cash and cash equivalents and restricted cash balances . The retrospective adoption of this ASU has resulted in a decrease to cash used for investing activities in the accompanying statement of consolidated cash flows of approximately \$330 for 2015 as compared to amounts previously reported by the Company in addition to the other presentation changes associated with this ASU.

Recently Issued Accounting Guidance

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

In May 2017, the FASB issued ASU 2017-09, “Compensation – Stock Compensation: Scope of Modification Accounting.” This ASU requires registrants to apply modification accounting unless three specific criteria are met. The three criteria are: the fair value of the award is the same before and after the modification, the vesting conditions are the same before and after the modification and the classification as a debt or equity award is the same before and after the modification. This ASU becomes effective for the Company on January 1, 2018, and is to be applied prospectively to new awards granted after adoption. Early adoption is permitted. Management has determined that the adoption of this ASU will not have an impact on the consolidated financial statements of the Company .

In August 2016, the FASB issued 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 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. This ASU becomes effective for the Company on January 1, 2019. Early adoption is permitted. Management is currently evaluating the potential impact of this ASU on the consolidated financial statements of the Company.

In February 2016, the FASB issued ASU 2016-02, "Leases." As a result of this ASU, lessees will be required to recognize the following for all leases (with the exception of short-term leases) 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. As a result of this ASU, lessor accounting is largely unchanged and lessees will no longer be provided with a source of off-balance sheet financing. This ASU becomes effective for the Company on January 1, 2019. Early adoption is permitted. Lessees (for capital and operating leases) and lessors (for sales-type, direct financing, and operating leases) must apply a modified retrospective transition approach for leases existing at, or entered into after, the beginning of the earliest comparative period presented in the consolidated financial statements. The modified retrospective approach would not require any transition accounting for leases that expired before the earliest comparative period presented. Lessees and lessors may not apply a full retrospective transition approach. Management is currently evaluating the potential impact of this ASU on the consolidated financial statements of the Company.

In May 2014, the FASB issued 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. In August 2015, the FASB issued ASU 2015-14, "Revenue from Contracts with Customers: Deferral of the Effective Date," which deferred the effective date of this guidance for the Company until January 1, 2019. Management is currently evaluating the potential impact of these collective changes on the consolidated financial statements of the Company. The Company plans to utilize the modified retrospective method in connection with its future adoption of this ASU, as amended.

Note 2. Liquidity

On February 6, 2013, the Company commenced an initial public offering of 6,095,000 shares of its common stock at a price to the public of \$18.00 per share, of which 5,483,333 shares of common stock were sold by the Company and 611,667 shares of common stock were sold by a selling stockholder (including consideration of the exercise of the underwriters' over-allotment option). The Company received approximately \$90,371 in unrestricted net proceeds in connection with this offering (net of underwriting commissions and offering costs).

On September 9, 2013, the Company commenced a secondary public offering of 3,054,400 shares of its common stock at a price to the public of \$62.00 per share, of which 1,106,000 shares of common stock were sold by the Company and 1,948,400 shares of common stock were sold by selling stockholders (including consideration of the exercise of the underwriters' over-allotment option). The Company received approximately \$64,948 in unrestricted net proceeds in connection with this offering (net of underwriting commissions and offering costs).

On January 8, 2016, the Company announced that it had entered into an At Market Issuance Sales Agreement ("ATM") with FBR Capital Markets & Co. ("FBR") and MLV & Co. LLC ("MLV") pursuant to which FBR and MLV agreed to act as distribution agents in the sale of up to \$50,000 in the aggregate of ExOne common stock in "at the market offerings" as defined in Rule 415 under the Securities Act of 1933, as amended (the "Securities Act"). Both FBR and MLV were identified as related parties to the Company on the basis of significant influence in that a member of the Board of Directors of the Company also served as a member of the Board of Directors of FBR (which controlled MLV). The terms of the ATM were reviewed and approved by a sub-committee of the Board of Directors of the Company (which included each of the members of the Audit Committee of the Board of Directors except for the identified director who also held a position on the Board of Directors of FBR). This related party determination ended on June 1, 2017, when the identified director ceased serving as a member of the Board of Directors of FBR. Terms of the ATM require a 3.0% commission on the sale of common stock under the ATM and an initial reimbursement of certain legal expenses of \$25. During the quarter ended March 31, 2016, the Company sold 91,940 shares of common stock under the ATM at a weighted average selling price of approximately \$9.17 per share resulting in gross proceeds to the Company of approximately \$843. Unrestricted net proceeds to the Company from the sale of common stock under the ATM during the quarter ended March 31, 2016 were approximately \$595 (after deducting offering costs of approximately \$248, including certain legal, accounting and administrative costs associated with the ATM, of which approximately \$50 was paid to FBR or MLV relating to the aforementioned initial reimbursement of certain legal expenses).

and commissions on the sale of common stock under the ATM). There have been no sales of shares of common stock under the ATM during any periods subsequent to the quarter ended March 31, 2016.

On January 11, 2016, the Company announced that it had entered into a subscription agreement with Rockwell Forest Products, Inc. and S. Kent Rockwell for the registered direct offering and sale of 1,423,877 shares of ExOne common stock at a per share price of \$9.13 (a \$0.50 premium from the closing price on the close of business on January 8, 2016). Both Rockwell Forest Products, Inc. and S. Kent Rockwell were identified as related parties to the Company as S. Kent Rockwell served as Chairman and CEO of the Company and was the controlling stockholder of Rockwell Forest Products, Inc. at the time of the transaction. The terms of this transaction were reviewed and approved by a sub-committee of independent members of the Board of Directors of the Company (which included each of the members of the Audit Committee of the Board of Directors). The sub-committee of independent members of the Board of Directors of the Company were advised on the transaction by an independent financial advisor and independent legal counsel. Concurrent with the approval of this sale of common stock under the terms identified, a separate sub-committee of independent members of the Board of Directors of the Company approved the termination of the Company's revolving credit facility with RHI Investments, LLC. Following completion of the registered direct offering on January 13, 2016, the Company received gross proceeds of approximately \$13,000. Unrestricted net proceeds to the Company from the sale of common stock in the registered direct offering were approximately \$12,447 (after deducting offering costs of approximately \$553).

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 has incurred net losses of approximately \$20,017, \$14,598 and \$25,865 for 2017, 2016 and 2015, respectively. As noted above, the Company has received cumulative unrestricted net proceeds from the sale of its common stock of approximately \$168,361 to fund its operations. At December 31, 2017, the Company had approximately \$21,848 in unrestricted cash and cash equivalents. In addition, on March 12, 2018, the Company entered into a three-year, \$15,000 revolving credit facility with a related party (Note 22).

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. Further, the Company may 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:

<u>For the years ended December 31,</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>
Foreign currency translation adjustments			
Balance at beginning of period	\$ (14,735)	\$ (13,535)	\$ (8,203)
Other comprehensive income (loss)	5,251	(1,200)	(5,332)
Balance at end of period	<u>\$ (9,484)</u>	<u>\$ (14,735)</u>	<u>\$ (13,535)</u>

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.

There were no tax impacts related to income tax rate changes and no amounts were reclassified to earnings 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 2017, 2016 and 2015, 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 (674,470 — 2017, 314,303 — 2016 and 210,970 — 2015) and unvested restricted stock issued (52,502 — 2017, 94,171 — 2016 and 77,670 — 2015), was anti-dilutive.

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

For the years ended December 31,	2017	2016	2015
Net loss	\$ (20,017)	\$ (14,598)	\$ (25,865)
Weighted average shares outstanding (basic and diluted)	16,062,424	15,934,935	14,427,956
Net loss per common share:			
Basic	\$ (1.25)	\$ (0.92)	\$ (1.79)
Diluted	\$ (1.25)	\$ (0.92)	\$ (1.79)

Note 5. Restructuring

2017

In December 2017, the Company committed to a plan to consolidate certain of its three-dimensional (“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. As a result of these actions, during 2017, the Company recorded a charge of approximately \$72 associated with involuntary employee terminations. This charge was split between cost of sales (\$19) and selling, general and administrative expense (\$53) in the accompanying statement of consolidated operations and comprehensive loss. The Company currently estimates additional charges associated with involuntary terminations (approximately less than \$100), other exit costs (approximately less than \$50) and asset impairments (approximately \$200 to \$300) in 2018 associated with this plan. At December 31, 2017, amounts associated with involuntary employee terminations had not been settled by the Company. Such amounts are expected to be settled by the Company during 2018.

In January 2017, the Company committed to a plan to consolidate certain of its 3D printing operations from its North Las Vegas, Nevada facility into its Troy, Michigan and Houston, Texas facilities and exit its non-core specialty machining operations in its Chesterfield, Michigan facility. These actions were taken as a result of the accelerating adoption rate of the Company’s sand printing technology in North America which has resulted in a refocus of the Company’s operational strategy.

As a result of these actions, during 2017, the Company recorded charges of approximately \$1,016, including approximately \$142 associated with involuntary employee terminations, approximately \$7 associated with other exit costs and approximately \$867 associated with asset impairments. Charges associated with involuntary employee terminations and other exit costs were recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss. Charges associated with asset impairments were split between cost of sales (\$598), as a component of depreciation expense, and selling, general and administrative expenses (\$269), as a component of amortization expense, in the accompanying statement of consolidated operations and comprehensive loss. There are no additional charges expected to be incurred associated with this plan in future periods. The Company has settled all amounts associated with involuntary employee terminations and other exit costs.

Charges associated with asset impairments relate principally to the Company’s plan to exit its non-core specialty machining operations in its Chesterfield, Michigan facility. On April 21, 2017, the Company sold to a third party certain assets associated with these operations including inventories (approximately \$79), property and equipment (approximately \$2,475) and other contractual rights (approximately \$269). Total gross proceeds from the sale of these assets were approximately \$2,050. After deducting costs directly attributable to the sale of these assets (approximately \$128), the Company recorded an impairment loss during the quarter ended March 31, 2017, of approximately \$859 split between property and equipment (\$590) and intangible assets (\$269) based on the excess of the carrying value over the estimated fair value of the related assets at March 31, 2017 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss), and a loss on disposal during the quarter ended June 30, 2017, of approximately \$42 (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss).

Separate from the transaction described above, on May 9, 2017, the Company sold to a third party certain property and equipment (principally land and building) associated with its North Las Vegas, Nevada facility. Total gross proceeds from the sale of these assets were approximately \$1,950. After deducting costs directly attributable to the sale of these assets (approximately \$137), the Company recorded a gain on disposal (recorded to cost of sales in the accompanying statement of consolidated operations and comprehensive loss), of approximately \$347. Additionally, the Company recorded an impairment loss during 2017 of approximately \$8 associated with certain property and equipment which was abandoned in connection with the Company’s exit of its North Las Vegas, Nevada facility.

2016

In April 2016, the Company committed to a plan to consolidate certain of its 3D printing operations in its Auburn, Washington facility into its North Las Vegas, Nevada facility and reorganize certain of its corporate departments as part of its 2016 operating plan. As a result of these actions, during 2016, the Company incurred a net charge of approximately \$170 including, \$57 associated with involuntary employee terminations and \$113 associated with the disposal of certain property and equipment related to the Auburn, Washington facility which was either sold or abandoned. This net charge was split between cost of sales (\$129), research and development (\$2) and selling, general and administrative expenses (\$39) in the accompanying statement of consolidated operations and comprehensive loss. In addition to the net charge incurred by the Company in connection with this plan, the Company also has an

operating lease commitment for the Auburn, Washington facility with a lease term through December 2018. At the time of closure of this facility, the Company was able to secure a firmly committed sublease arrangement with a third party which fully offsets its remaining contractual operating lease liability. There have been no additional charges recorded associated with this plan in subsequent periods. There are no additional charges expected to be incurred associated with this plan in future periods. The Company has settled all amounts associated with involuntary employee terminations.

Note 6. Impairment

During the quarter ended December 31, 2017, 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.

During the quarter ended September 30, 2015, as a result of the significant decline in the market capitalization of the Company and continued operating losses and cash flow deficiencies, the Company identified a triggering event requiring both a test for the recoverability of long-lived assets held and used at the asset group level and a test for impairment of goodwill at the reporting unit level. Assessing the recoverability of long-lived assets held and used and goodwill requires significant judgments and estimates by management.

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.

The Company subsequently performed an impairment test for goodwill. For purposes of testing goodwill for impairment, the Company operates as a singular reporting unit. In assessing goodwill for impairment, the Company compared the fair value of its reporting unit to its carrying value. The Company determined the fair value of its reporting unit through a combination of the market approach and income approach. The Company's use of the market approach included consideration of the Company's market capitalization along with consideration of other factors that could influence the use of market capitalization as a fair value estimate, including premiums or discounts to be applied based on both market and entity-specific data. The Company's use of the income approach included consideration of present value techniques, principally the use of a discounted cash flow model. In performing the impairment test for goodwill, the Company determined the carrying amount of goodwill to be in excess of the implied fair value of goodwill. As a result, the Company recognized an impairment loss of approximately \$4,419 associated with goodwill during the quarter ended September 30, 2015.

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

For the years ended December 31,	2017	2016	2015
Balance at beginning of period	\$ —	\$ —	\$ 4,665
Foreign currency translation adjustments	—	—	(246)
Impairment	—	—	(4,419)
Balance at end of period	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>

Note 7. 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:

	2017	2016
Cash and cash equivalents	\$ 21,848	\$ 27,825
Restricted cash included in prepaid expenses and other current assets	330	330
Total cash, cash equivalents, and restricted cash shown in the statement of consolidated cash flows	<u>\$ 22,178</u>	<u>\$ 28,155</u>

The Company is required to maintain a cash collateral balance to offset certain short-term, unsecured lending commitments from a financial institution associated with the Company's corporate credit card program. This balance is considered legally restricted by the Company.

Note 8. Inventories

Inventories consist of the following at December 31:

	2017	2016
Raw materials and components	\$ 7,171	\$ 7,429
Work in process	4,630	5,166
Finished goods	3,629	3,243
	<u>\$ 15,430</u>	<u>\$ 15,838</u>

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, 2017 and 2016, the allowance for slow-moving and obsolete inventories was approximately \$3,437 and \$1,517, respectively, and has been reflected as a reduction to inventories (principally raw materials and components). Included in the allowance for slow-moving and obsolete inventories at December 31, 2017, is approximately \$1,650 related to certain raw material and component inventories associated with the Company's Exerial 3D printing machine platform (see further discussion below).

During the quarter ended June 30, 2017, the Company recorded a charge of approximately \$1,460 to cost of sales in the accompanying statement of consolidated operations and comprehensive loss attributable to certain raw material and component inventories (principally machine frames and other fabricated components) associated with the Company's Exerial 3D printing machine platform based on decisions made by the Company during the period related to certain design changes to the underlying platform (rendering certain elements of the previous design obsolete).

During the quarter ended June 30, 2016, the Company recorded a credit of approximately \$507 to cost of sales in the accompanying statement of consolidated operations and comprehensive loss attributable to the reversal of a previously recorded reserve for certain inventories associated with the Company's laser micromachining 3D printing machine platform which was discontinued at the end of 2014, based on the sale of such laser micromachining inventories during the period.

During 2017 and 2016, the Company recorded charges of approximately \$271 and \$280, respectively, 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 charges recorded by the Company during 2015.

Note 9. Property and Equipment

Property and equipment consist of the following at December 31:

	2017	2016	Economic Life (in years)
Land	\$ 7,205	\$ 6,902	N/A
Buildings and related improvements	27,785	27,913	5 - 40
Machinery and equipment	22,034	23,419	3 - 20
Other	6,772	5,876	3 - 20
	63,796	64,110	
Less: Accumulated depreciation	(17,739)	(13,908)	
	46,057	50,202	
Construction-in-progress	740	932	
Property and equipment - net	<u>\$ 46,797</u>	<u>\$ 51,134</u>	

Machinery and equipment includes assets leased by the Company of approximately \$85 and \$365 at December 31, 2017 and 2016, respectively.

Machinery and equipment includes assets leased to customers (principally 3D printing machines and related equipment) under operating lease arrangements of approximately \$2,254 and \$2,610 at December 31, 2017 and 2016, respectively. The carrying value of these assets was approximately \$1,620 and \$2,100 at December 31, 2017 and 2016, respectively.

Minimum future rentals of machinery and equipment under non-cancellable arrangements at December 31, 2017, are as follows:

2018	\$ 768
2019	291
2020	79
2021	—
2022	—
Thereafter	—
	<u>\$ 1,138</u>

Depreciation expense was approximately \$5,637, \$5,241 and \$4,809 for 2017, 2016 and 2015, respectively. Depreciation expense for 2017 includes approximately \$598 in accelerated depreciation (impairment) associated with the Company's consolidation of its 3D printing operations from its North Las Vegas, Nevada facility into its Troy, Michigan and Houston, Texas facilities and exit of its specialty machining operations in Chesterfield, Michigan (Note 5).

Note 10. Intangible Assets

Intangible assets, which are included in other noncurrent assets on the accompanying consolidated balance sheet, were as follows:

December 31, 2017	Gross Carrying Amount	Accumulated Amortization	Net
Unpatented technology	\$ 1,453	\$ (1,392)	\$ 61
Trade names	31	(30)	1
	<u>\$ 1,484</u>	<u>\$ (1,422)</u>	<u>\$ 62</u>

December 31, 2016	Gross Carrying Amount	Accumulated Amortization	Net
Unpatented technology	\$ 1,276	\$ (904)	\$ 372
Customer relationships	464	(188)	276
Trade names	52	(33)	19
Noncompetition agreement	15	(14)	1
	<u>\$ 1,807</u>	<u>\$ (1,139)</u>	<u>\$ 668</u>

Amortization expense related to the intangible assets was approximately \$641, \$418 and \$418 for 2017, 2016 and 2015, respectively. Amortization expense related to the intangible assets for 2017 includes approximately \$269 in accelerated amortization (impairment) associated with the Company's exit of its specialty machining operations in Chesterfield, Michigan (Note 5). This exit (and subsequent sale of assets) also resulted in the disposition of customer relationship and trade name intangible assets associated with these operations. The noncompetition agreement associated with these operations expired prior to the exit in March 2017.

Future estimated amortization expense related to the intangible assets at December 31, 2017, is approximately as follows:

2018	\$	62
2019		—
2020		—
2021		—
2022		—
Thereafter		—
	<u>\$</u>	<u>62</u>

Note 11. Long-Term Debt

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

	2017			2016		
	Principal	Unamortized Debt Issuance Costs	Net	Principal	Unamortized Debt Issuance Costs	Net
Building note payable	\$ 1,675	\$ (30)	\$ 1,645	\$ 1,812	\$ (36)	\$ 1,776
Less: amount due within one year	(142)	5	(137)	(138)	6	(132)
	<u>\$ 1,533</u>	<u>\$ (25)</u>	<u>\$ 1,508</u>	<u>\$ 1,674</u>	<u>\$ (30)</u>	<u>\$ 1,644</u>

Terms of the building note payable include monthly payments of approximately \$18 including interest at 4.00% through May 2017, and subsequently, monthly payments of approximately \$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 approximately \$5,347 at December 31, 2017.

At December 31, 2017, 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, 2017 and through December 31, 2018. Related to the 2017 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, 2017, are approximately as follows:

2018	\$	142
2019		149
2020		157
2021		166
2022		174
Thereafter		887
	<u>\$</u>	<u>1,675</u>

Note 12. Leases

Capital

The Company leases certain equipment and vehicles under capital lease arrangements, expiring in various years through 2023.

Future maturities of capital leases at December 31, 2017, are approximately as follows:

2018	\$	15
2019		10
2020		8
2021		8
2022		9
Thereafter		1
	<u>\$</u>	<u>51</u>

Operating

The Company leases various manufacturing and office facilities, machinery and other equipment and vehicles under operating lease arrangements (with initial terms greater than twelve months), expiring in various years through 2026.

Future minimum lease payments of operating lease arrangements (with initial terms greater than twelve months) at December 31, 2017, are approximately as follows:

2018	\$	303
2019		142
2020		38
2021		10
2022		2
Thereafter		7
	\$	<u>502</u>

Rent expense under operating lease arrangements was approximately \$358, \$335 and \$421 for 2017, 2016 and 2015, respectively.

Note 13. Accrued Expenses and Other Current Liabilities

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

	2017	2016
Accrued payroll and related costs	\$ 2,044	\$ 1,661
Product warranty reserves	1,300	1,115
Liability for uncertain tax positions	858	754
Accrued license fees	397	409
Accrued sales commissions	307	223
Accrued professional fees	223	119
Value-added taxes payable	28	224
Other	924	619
	\$ 6,081	\$ 5,124

Note 14. Product Warranty Reserves

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 years ended December 31,	2017	2016	2015
Balance at beginning of period	\$ 1,115	\$ 1,308	\$ 1,543
Provisions for new issuances	1,288	1,064	947
Payments	(701)	(867)	(546)
Reserve adjustments	(500)	(374)	(562)
Foreign currency translation adjustments	98	(16)	(74)
Balance at end of period	\$ 1,300	\$ 1,115	\$ 1,308

Note 15. Contingencies and Commitments

Contingencies

On July 1, 2017, the Company (through its ExOne GmbH subsidiary) entered into a Settlement Agreement with Kocel Foundry Limited (also known as Kocel CSR Casting Company, Limited) and Kocel Group (Hong Kong) Limited (collectively, "Kocel") relating to settlement of the arbitration case (no. 100019-2017) administered by the Swiss Chambers' Arbitration Institution Notice of Arbitration, as filed by the Company on January 25, 2017. Among other things, the Settlement Agreement provided for a cash payment from ExOne GmbH to Kocel of approximately \$811 and a settlement and release of claims related to a sales agreement between the parties for certain 3D printing machines and related equipment (the "Sales Agreement"). Based on the terms of the Settlement Agreement, including the final acceptance by Kocel of the 3D printing machines and related equipment, and relief from further obligation, liability or warranty for both parties (excluding certain intellectual property considerations), the Company recorded revenue of approximately \$2,762 associated with the Sales Agreement (net of the cash payment made by ExOne GmbH to Kocel, such payment made on July 5, 2017) and the related cost of sales, during the quarter ending September 30, 2017.

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 and its subsidiaries 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 the financial position, results of operations or cash flows of the Company.

Commitments

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 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 \$1,500 (€1,300). In addition, ExOne GmbH may use the credit facility 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 credit facility 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 credit facility agreement. There are no negative covenants associated with the credit facility agreement. The credit facility agreement has been guaranteed by the Company. At December 31, 2017 and 2016, there were no outstanding borrowings in the form of overdraft credit or short-term loans under the credit facility agreement. At December 31, 2017, total outstanding financial guarantees and letters of credit issued by ExOne GmbH under the credit facility agreement were approximately \$1,128 (€941). Included in the total outstanding financial guarantees and letters of credit issued by ExOne GmbH are approximately \$843 (€703) with expiration dates ranging from January 2018 through July 2018 and approximately \$285 (€238) which have no expiration date. At December 31, 2016, total outstanding guarantees and letters of credit issued by ExOne GmbH under the credit facility agreement were approximately \$400 (€380).

In addition to amounts issued by ExOne GmbH under the credit facility agreement, during 2017, ExOne GmbH entered 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 existing credit security agreement except that the German bank required cash collateral to be posted by ExOne GmbH in connection with any related issuance. At December 31, 2017, total outstanding financial guarantees and letters of credit issued by ExOne GmbH under these separate agreements were approximately \$96 (€80) with an expiration date of June 2022. Related to this specific financial guarantee, the requirement for cash collateral was waived by the German bank as it also represents the counterparty in the related transaction.

Note 16. Equity-Based Compensation

On January 24, 2013, the Board of Directors of the Company 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 (i) 3.0% of the total outstanding shares of common stock as of December 31 of the immediately preceding year or (ii) a number of shares of common stock determined by the Board of Directors, provided that the maximum number of shares authorized under the Plan will not exceed 1,992,241 shares, subject to certain adjustments.

Stock options and restricted stock issued by the Company 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 vest immediately upon issuance. Stock options issued by the Company have a contractual life which expires 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.

The following table summarizes the total equity-based compensation expense recognized for awards issued under the Plan:

	2017	2016	2015
Equity-based compensation expense recognized:			
Stock options	\$ 1,503	\$ 614	\$ 807
Restricted stock	953	849	918
Total equity-based compensation expense before income taxes	2,456	1,463	1,725
Benefit for income taxes *	—	—	—
Total equity-based compensation expense net of income taxes	\$ 2,456	\$ 1,463	\$ 1,725

* 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, 2017, total future compensation expense related to unvested awards yet to be recognized by the Company was approximately \$848 for stock options and \$285 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 approximately 1.2 years.

During 2017, the fair value of stock options was estimated on the date of grant using the Black-Scholes option pricing model with the following assumptions:

	<u>August 14, 2017</u>	<u>February 10, 2017</u>
Weighted average fair value per stock option	\$3.28 - \$4.38	\$5.46 - \$5.75
Volatility	61.68% - 67.92%	62.89% - 63.75%
Average risk-free interest rate	1.40% - 1.82%	1.89% - 1.94%
Dividend yield	0.00%	0.00%
Expected term (years)	2.5 - 5.5	5.0 - 5.5

During 2016, the fair value of stock options was estimated on the date of grant using the Black-Scholes option pricing model with the following assumptions:

	<u>August 19, 2016</u>	<u>August 12, 2016</u>
Weighted average fair value per stock option	\$ 7.97	\$ 8.07
Volatility	66.24%	66.43%
Average risk-free interest rate	1.20%	1.18%
Dividend yield	0.00%	0.00%
Expected term (years)	5.5	6.0

During 2015, there were no stock options issued by the Company.

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:

	Number of Stock Options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
For the year ended December 31, 2015			
Outstanding at beginning of period	215,137	\$ 17.35	\$ 10.62
Stock options granted	—	\$ —	\$ —
Stock options exercised	—	\$ —	\$ —
Stock options forfeited	(3,334)	\$ 16.31	\$ 9.96
Stock options expired	(833)	\$ 18.00	\$ 11.03
Outstanding at end of period	<u>210,970</u>	<u>\$ 17.43</u>	<u>\$ 10.67</u>
Stock options exercisable at end of period	115,472	\$ 17.61	\$ 10.78
Stock options expected to vest at end of period	90,898	\$ 17.09	\$ 10.45

	Number of Stock Options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
For the year ended December 31, 2016			
Outstanding at beginning of period	210,970	\$ 17.43	\$ 10.67
Stock options granted	139,000	\$ 13.72	\$ 8.00
Stock options exercised	—	\$ —	\$ —
Stock options forfeited	(9,335)	\$ 15.25	\$ 9.27
Stock options expired	(26,332)	\$ 17.74	\$ 10.87
Outstanding at end of period	<u>314,303</u>	<u>\$ 15.62</u>	<u>\$ 9.38</u>
Stock options exercisable at end of period	194,471	\$ 16.90	\$ 10.26
Stock options expected to vest at end of period	119,832	\$ 13.97	\$ 8.22

	Number of Stock Options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
For the year ended December 31, 2017			
Outstanding at beginning of period	314,303	\$ 15.62	\$ 9.38
Stock options granted	389,000	\$ 8.16	\$ 3.89
Stock options exercised	(18,500)	\$ 7.91	\$ 3.40
Stock options forfeited	(1,167)	\$ 15.74	\$ 9.60
Stock options expired	(9,166)	\$ 17.59	\$ 10.77
Outstanding at end of period	<u>674,470</u>	<u>\$ 11.58</u>	<u>\$ 6.41</u>
Stock options exercisable at end of period	421,960	\$ 12.95	\$ 7.39
Stock options expected to vest at end of period	252,510	\$ 9.28	\$ 4.78

At December 31, 2017, intrinsic value associated with stock options exercisable was approximately \$67. At December 31, 2017, intrinsic value associated with stock options expected to vest was approximately \$93. The weighted average remaining contractual term of stock options exercisable and stock options expected to vest at December 31, 2017, was approximately 6.6 and 7.0 years, respectively. Stock options with an aggregate intrinsic value of approximately \$218 were exercised by employees during 2017, resulting in proceeds to the Company from the exercise of stock options of approximately \$147. The Company received no income tax benefit related to these exercises. There were no exercises during 2016 or 2015.

The activity for restricted stock was as follows:

	Shares of Restricted Stock	Weighted Average Grant Date Fair Value
For the year ended December 31, 2015		
Outstanding at beginning of period	80,834	\$ 22.78
Restricted stock granted	26,000	\$ 13.23
Restricted stock vested	(29,164)	\$ 22.82
Restricted stock forfeited	—	\$ —
Outstanding at end of period	77,670	\$ 19.57
Restricted stock expected to vest at end of period	77,670	\$ 19.57
For the year ended December 31, 2016		
Outstanding at beginning of period	77,670	\$ 19.57
Restricted stock granted	74,500	\$ 11.78
Restricted stock vested	(54,331)	\$ 18.06
Restricted stock forfeited	(3,668)	\$ 19.46
Outstanding at end of period	94,171	\$ 14.29
Restricted stock expected to vest at end of period	94,171	\$ 14.29
For the year ended December 31, 2017		
Outstanding at beginning of period	94,171	\$ 14.29
Restricted stock granted	60,000	\$ 9.01
Restricted stock vested	(89,002)	\$ 12.67
Restricted stock forfeited	(12,667)	\$ 13.95
Outstanding at end of period	52,502	\$ 11.07
Restricted stock expected to vest at end of period	52,502	\$ 11.07

Restricted stock vesting during 2017, 2016 and 2015 had a fair value of approximately \$801, \$536 and \$356, respectively.

Note 17. Income Taxes

The components of loss before taxes were as follows:

	2017	2016	2015
United States	\$ (18,064)	\$ (15,585)	\$ (13,138)
Foreign	(1,915)	1,054	(12,900)
Loss before income taxes	\$ (19,979)	\$ (14,531)	\$ (26,038)

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

	2017			2016			2015		
	Current	Deferred	Total	Current	Deferred	Total	Current	Deferred	Total
United States	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ (20)	\$ (20)
Foreign	37	1	38	96	(29)	67	95	(248)	(153)
Provision (benefit) for income taxes	\$ 37	\$ 1	\$ 38	\$ 96	\$ (29)	\$ 67	\$ 95	\$ (268)	\$ (173)

The net benefit for deferred income taxes for 2016 and 2015 includes approximately \$3 and \$116, respectively, associated with net operating loss carryforwards.

A reconciliation of the provision (benefit) for income taxes at the United States statutory rate of 34.0% to the effective rate of the Company for the years ended December 31 is as follows:

	2017	2016	2015
United States statutory rate (34.0%)	\$ (6,793)	\$ (4,941)	\$ (8,853)
Effect of foreign disregarded entity	(199)	269	(2,599)
Effect of intercompany asset transfers	(182)	(756)	(53)
Taxes on foreign operations	35	(97)	648
Net change in valuation allowances	8,017	5,300	9,173
Indebtedness income not subject to income tax	(1,208)	—	—
Goodwill impairment	—	—	1,031
Permanent differences and other	368	292	480
Provision (benefit) for income taxes	<u>\$ 38</u>	<u>\$ 67</u>	<u>\$ (173)</u>
Effective tax rate	(0.2)%	(0.5)%	0.7%

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

	2017	2016
Deferred tax assets		
Accounts receivable	\$ 311	\$ 554
Inventories	1,024	705
Accrued expenses and other current liabilities	549	234
Net operating loss carryforwards	22,864	23,516
Tax credit carryforwards	676	676
Other	1,495	1,305
Valuation allowance	(25,690)	(25,177)
Total deferred tax assets	<u>1,229</u>	<u>1,813</u>
Deferred tax liabilities		
Property and equipment	689	1,243
Other	541	570
Total deferred tax liabilities	<u>1,230</u>	<u>1,813</u>
Net deferred tax liabilities *	<u>\$ 1</u>	<u>\$ —</u>

* At December 31, 2017, net deferred tax liabilities were reflected in other noncurrent liabilities in the consolidated balance sheet.

The Tax Act reduces the federal statutory corporate tax rate from 34.0% to 21.0% for the Company's tax years beginning in 2018, which resulted in the re-measurement of the federal portion of its deferred tax assets and liabilities, and its related valuation allowance against net deferred tax assets, at December 31, 2017, from 34.0% to the new 21.0% tax rate. Refer to Note 1 for further discussion related to the impact of the Tax Act on the Company's accounting for income taxes at December 31, 2017. On a gross basis, the Tax Act resulted in a reduction to the Company's deferred tax assets, deferred tax liabilities and valuation allowance of approximately \$8,130, \$460 and \$7,670, respectively.

The Company has provided a valuation allowance for its net deferred tax assets as a result of the Company not generating consistent net operating profits in jurisdictions in which it operates. As such, any benefit from deferred taxes in any of the periods presented has 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:

	2017	2016
Balance at beginning of period	\$ 25,177	\$ 20,089
Net increases in allowances	8,017	5,300
Tax Act rate change adjustment	(7,670)	—
Foreign currency translation and other adjustments	166	(212)
Balance at end of period	<u>\$ 25,690</u>	<u>\$ 25,177</u>

As a result of the Tax Act, the Company's accumulated foreign earnings are subject to a one-time deemed repatriation tax in the United States at a rate of either 8.0% or 15.5%. Due to the history of losses associated with the Company's foreign subsidiaries, the Company does not expect to be liable for any tax associated with the deemed repatriation provisions of the Tax Act, nor has any such tax been recorded at December 31, 2017.

At December 31, 2017, the Company had approximately \$73,644 in net operating loss carryforwards, subject to certain limitations, 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, 2017, the Company had approximately \$3,832 in net operating loss carryforwards which expire from 2018 through 2026, to offset the future taxable income of its Japanese subsidiary. At December 31, 2017, the Company had approximately \$21,487 in net operating loss carryforwards, which do not expire, to offset the future taxable income of its collective German and Italian subsidiaries.

The Company has a liability for uncertain tax positions related to certain capitalized expenses and intercompany transactions. At December 31, 2017 and 2016, the liability for uncertain tax positions was approximately \$858 and \$754, respectively, and is included in accrued expenses and other current liabilities in the accompanying consolidated balance sheet. At December 31, 2017 and 2016, the Company had an additional liability for uncertain tax positions related to its ExOne GmbH (Germany) subsidiary of approximately \$323 and \$232, respectively, which was fully offset against net operating loss carryforwards. At December 31, 2017 and 2016, the Company had an additional liability for uncertain tax positions related to its ExOne KK (Japan) subsidiary of approximately \$594 and \$416, respectively, which were fully offset against net operating loss carryforwards.

A reconciliation of the beginning and ending amount of unrecognized tax benefits at December 31 was as follows:

	2017	2016	2015
Balance at beginning of period	\$ 754	\$ 781	\$ 871
Increases related to current year tax positions	—	—	—
Foreign currency translation adjustments	104	(27)	(90)
Balance at end of period	<u>\$ 858</u>	<u>\$ 754</u>	<u>\$ 781</u>

The Company includes interest and penalties related to income taxes as a component of the provision (benefit) for income taxes in the accompanying statement of consolidated operations and comprehensive loss.

The Company files income tax returns in the United States, Germany, Italy, Sweden and Japan. The following table summarizes tax years remaining subject to examination for each of the Company's subsidiaries at December 31, 2017:

<u>Jurisdiction</u>	<u>Tax Years Remaining Subject to Examination</u>
United States	2013-2017
Germany	2010-2017
Italy	2014-2017
Sweden	2015-2017
Japan	2017

In July 2017, local taxing authorities in Japan completed their examination of the Company's ExOne KK subsidiary for the years ended December 31, 2014 through December 31, 2016, resulting in an income tax obligation of approximately \$5, which was reflected in the provision (benefit) for income taxes in the accompanying statement of consolidated operations and comprehensive loss. This amount has been settled by the Company with local taxing authorities in Japan.

At December 31, 2017, the Company's ExOne GmbH (2010-2013) and ExOne Property GmbH (2013) subsidiaries were under examination by local taxing authorities. The Company is unable to reasonably predict an outcome related to this examination, the result of which may be material in a future period to the financial position, results from operations and cash flows of the Company.

Note 18. 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;

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.

During the quarter ended March 31, 2017, the Company entered into two separate foreign exchange forward contracts with a German bank in an effort to hedge the variability of certain foreign exchange risks between the euro (the functional currency of the Company's ExOne GmbH subsidiary) and British pound sterling (the currency basis for cash flows resulting from a commercial sales arrangement with a customer). The first of the two foreign exchange forward contracts was entered into and settled (in connection with cash received from the customer) during the quarter ended March 31, 2017, resulting in a realized gain on settlement of approximately \$16 (€15). The second of the two foreign exchange forward contracts was settled on August 31, 2017, resulting in a realized gain on settlement of approximately \$14 (€12). Neither of the contracts was designated as a hedging instrument and accordingly, realized and unrealized gains (losses) for all periods have been recorded to other (income) expense – net in the accompanying statement of consolidated operations and comprehensive loss. The Company has classified both contracts as Level 2 fair value measurements.

In connection with the Company's acquisition of certain assets associated with its former specialty machining operations in Chesterfield, Michigan, during the quarter ended March 31, 2014, the Company issued contingent consideration subject to certain forecasts of future profitability (revenues and adjusted gross profit) of the associated operations for the years ended December 31, 2015 and 2014 (an unobservable input). The valuation technique utilized by the Company with respect to this instrument was a discounted cash flow model, principally based on the assumption of achievement of the profitability targets stipulated in the earn-out provision per the associated Asset Purchase Agreement. Expected payments were discounted using a market interest rate assumption. During 2015, the Company recorded net changes in the fair value of contingent consideration of approximately (\$193), with a corresponding amount (a net benefit) recorded to selling, general and administrative expenses. Changes in contingent consideration recorded by the Company during 2015 were based on revisions of estimates of revenues and adjusted gross profit of the operations for 2015 and the impact of discounting future cash payments on the associated liabilities.

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

	December 31, 2017		December 31, 2016	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Cash and cash equivalents	\$ 21,848	\$ 21,848	\$ 27,825	\$ 27,825
Restricted cash	\$ 330	\$ 330	\$ 330	\$ 330
Current portion of long-term debt *	\$ 137	\$ 142	\$ 132	\$ 138
Current portion of capital leases	\$ 15	\$ 15	\$ 72	\$ 72
Long-term debt - net of current portion *	\$ 1,508	\$ 1,533	\$ 1,644	\$ 1,674
Capital leases - net of current portion	\$ 36	\$ 36	\$ 10	\$ 10

* Carrying values at December 31, 2017 and 2016 are net of unamortized debt issuance costs of approximately \$30 and \$36, respectively.

The carrying amounts of cash and cash equivalents, restricted cash, current portion of long-term debt and current portion of capital leases approximate fair value due to their short-term maturities. The fair value of long-term debt – net of current portion and capital leases – net of current portion have been estimated by management based on the consideration of applicable interest rates (including certain instruments at variable or floating rates) and other available information (including quoted prices of similar instruments available to the Company). Cash and cash equivalents and restricted cash are classified in Level 1; current portion of long-term debt, current portion of capital leases, long-term debt – net of current portion and capital leases – net of current portion are classified in Level 2.

Note 19. Customer Concentrations

During 2017, 2016 and 2015, 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 2017, 2016 and 2015 the Company's five most significant customers represented approximately 20.5%, 17.1% and 19.0% of total revenue, respectively. At December 31, 2017 and 2016, accounts receivable from the Company's five most significant customers were approximately \$4,199 and \$1,867, respectively.

Note 20. Related Party Transactions**Revenues**

During 2017, 2016, and 2015 sales of products and/or services to related parties were approximately \$33, \$75 and \$1,435, respectively. Included in sales of products and/or services to related parties during the respective years are the following transactions which required approval by the Audit Committee of the Board of Directors in accordance with Company policy:

In December 2015, the Company entered into a sale agreement for a 3D printing machine with a multi-national, diversified metals company determined to be a related party on the basis that a member of the Board of Directors of the Company also receives his principal compensation from the related party. Total consideration for the 3D printing machine (approximately \$120) was determined to represent a fair market value selling price (based on comparable 3D printing machine sales to third parties) and was approved prior to execution by the Audit Committee of the Board of Directors of the Company. During 2015, the Company recorded revenue of approximately \$120 based on the delivery of products and/or services. All of the proceeds associated with this transaction were received by the Company at December 31, 2016.

In June 2015, the Company entered into a separate sale agreement for a 3D printing machine with the same multi-national, diversified metals company described above. Total consideration for the 3D printing machine (approximately \$146) was determined to represent a fair market value selling price (based on comparable 3D printing machine sales to third parties) and was approved prior to execution by the Audit Committee of the Board of Directors of the Company. During 2015, the Company recorded revenue of approximately \$146 based on the delivery of products and/or services. All of the proceeds associated with this transaction were received by the Company at December 31, 2015.

In March 2015, the Company entered into a sale agreement for a 3D printing machine with a powdered metal company with proprietary powders determined to be a related party based on common control by the former Chairman and CEO of the Company (the Executive Chairman of the Company effective August 19, 2016). Total consideration for the 3D printing machine (approximately \$950) was determined to represent a fair market value selling price (based on comparable 3D printing machine sales to third parties) and was approved prior to execution by the Audit Committee of the Board of Directors of the Company. During 2016 and 2015, the Company recorded revenue of approximately \$37 and \$913, respectively, based on the delivery of products and/or services. All of the proceeds associated with this transaction were received by the Company at December 31, 2015.

In December 2014, the Company entered into a separate sale agreement for a 3D printing machine with the same powdered metal company with proprietary powders described above. Total consideration for the 3D printing machine (approximately \$1,000) was determined to represent a fair market value selling price (based on comparable 3D printing machine sales to third parties) and was approved prior to execution by the Audit Committee of the Board of Directors of the Company. During 2015, the Company recorded revenue of approximately \$185 (the remaining \$815 having been recognized by the Company during 2014), based on the delivery of products and/or services. All of the proceeds associated with this transaction were received by the Company at December 31, 2015.

There were no amounts due from related parties at December 31, 2017. Amounts due from related parties at December 31, 2016 were approximately \$1, and are reflected in accounts receivable – net, in the accompanying consolidated balance sheet.

Expenses

During 2017, 2016, and 2015, purchases of products and/or services from related parties were approximately \$14, \$28 and \$77, respectively. Products and/or services purchased by the Company during 2017, 2016, and 2015 principally include certain website design services and leased office space from certain related parties under common control by the Executive Chairman of the Company (formerly the Chairman and CEO of the Company through August 19, 2016). Included in purchases of products and/or services from related parties during the respective years is the following transaction which required approval by the Audit Committee of the Board of Directors in accordance with Company policy:

In December 2014, the Company entered into a consulting arrangement with Hans J. Sack who was subsequently appointed to the Board of Directors of the Company on December 17, 2014. Total consideration under the consulting arrangement was approximately \$75, of which approximately \$50 was included in selling, general and administrative expenses in the accompanying statement of consolidated operations and comprehensive loss during 2015 based on the services rendered (the remaining amount having been recorded by the Company during 2014). This arrangement was approved by the Audit Committee of the Board of Directors of the Company in connection with the appointment of Hans J. Sack to the Board of Directors of the Company.

The Company also receives the benefit of the corporate use of an airplane from a related party under common control by the Executive Chairman of the Company (formerly the Chairman and CEO of the Company through August 19, 2016) for no consideration. The Company estimates the fair market value of the benefits received during 2016 and 2015 were approximately \$22 and \$38, respectively. There were no such benefits received during 2017.

Amounts due to related parties at December 31, 2017 and 2016 were approximately \$1 and \$4, respectively, and are reflected in accounts payable in the accompanying consolidated balance sheet.

RHI Investments, LLC Revolving Credit Agreement

On October 23, 2015, ExOne and its ExOne Americas LLC and ExOne GmbH subsidiaries, as guarantors, entered into a Credit Agreement with RHI Investments, LLC (“RHI”), a related party, on a \$15,000 revolving credit facility (the “RHI Credit Agreement”) to assist the Company in its efforts to finance customer acquisition of its 3D printing machines and 3D printed and other products and services and provide additional funding for working capital and general corporate purposes. RHI was determined to be a related party based on common control by the former Chairman and CEO of the Company (the Executive Chairman of the Company effective August 19, 2016). Prior to execution, the RHI Credit Agreement was subject to review and approval by a sub-committee of independent members of the Board of Directors of the Company (which included each of the members of the Audit Committee of the Board of Directors). The Company incurred approximately \$215 in debt issuance costs associated with the RHI Credit Agreement.

On January 10, 2016, the Company delivered notice to RHI of its intent to terminate the RHI Credit Agreement in connection with the closing of a registered direct offering of common stock to an entity under common control by the former Chairman and CEO of the Company (the Executive Chairman of the Company effective August 19, 2016). There were no borrowings under the RHI Credit Agreement from its inception through the effective date of its termination, January 13, 2016. In connection with the termination, the Company settled its remaining accrued interest under the RHI Credit Agreement of approximately \$5 relating to the commitment fee on the unused portion of the revolving credit facility (100 basis points, or 1.0% on the unused portion of the revolving credit facility). In addition, during the quarter ended March 31, 2016, the Company recorded approximately \$204 to interest expense related to the accelerated amortization of debt issuance costs. During 2015, the Company recorded interest expense relating to the RHI Credit Agreement of approximately \$39, of which approximately \$28 was related to the commitment fee on the unused portion of the revolving credit facility and \$11 was related to the amortization of debt issuance costs. Upon termination of the RHI Credit Agreement, all liens and guaranties in respect thereof were released.

Other

Refer to Note 2 for further discussion relating to two separate common equity offerings during the quarter ended March 31, 2016, certain elements of which qualify as related party transactions.

Refer to Note 22 for further discussion relating to a revolving credit facility with a related party entered into in March 2018.

Note 21. Segment, Product 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, Italy, Sweden (effective in July 2015 through December 2017) and Japan.

Revenue by product group for the year ended December 31 was as follows:

	2017	2016	2015
3D printing machines	\$ 29,980	\$ 20,977	\$ 15,464
3D printed and other products, materials and services	27,764	26,811	24,889
	<u>\$ 57,744</u>	<u>\$ 47,788</u>	<u>\$ 40,353</u>

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

	2017	2016	2015
United States	\$ 25,008	\$ 21,992	\$ 19,817
Germany	27,497	15,990	14,174
Japan	4,115	8,647	5,613
Italy	917	729	684
Sweden (a)	207	430	65
	<u>\$ 57,744</u>	<u>\$ 47,788</u>	<u>\$ 40,353</u>

(a) In March 2017, the Company terminated its Cooperation Agreement with Swerea SWECAST AB (“Swerea”), resulting in an exit of its PSC operations in Jönköping, Sweden, effective April 1, 2017. Also in March 2017, the Company agreed to an operating lease agreement with Beijer Industri AB, effective April 1, 2017, related to the 3D printing machine and related equipment located on the Swerea premises, previously covered under the Cooperation Agreement with Swerea. For 2017, revenues considered to be originated from Sweden are limited to the PSC operations which ceased on April 1, 2017. Revenues associated the operating lease agreement with Beijer Industri AB subsequent to April 1, 2017, are considered to be originated from Germany.

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

	<u>2017</u>	<u>2016</u>
United States	\$ 14,873	\$ 19,691
Germany	25,748	25,068
Japan	4,996	4,996
Italy	796	939
Sweden (a)	273	303
United Kingdom (b)	111	137
	<u>\$ 46,797</u>	<u>\$ 51,134</u>

(a) In March 2017, the Company terminated its Cooperation Agreement with Swerea SWECAS AB (“Swerea”), resulting in an exit of its PSC operations in Jönköping, Sweden, effective April 1, 2017. Also in March 2017, the Company agreed to an operating lease agreement with Beijer Industri AB, effective April 1, 2017, related to the 3D printing machine and related equipment located on the Swerea premises, previously covered under the Cooperation Agreement with Swerea. At December 31, 2017, long-lived assets represent the 3D printing machine and related equipment held by the Company under the operating lease agreement with Beijer Industri AB. At December 31, 2016, long-lived assets represent the 3D printing machine and related equipment associated with the former PSC operations.

(b) Represents a 3D printing machine and related equipment held by the Company under an operating lease agreement with a customer.

Note 22. Subsequent Events

LBM Holdings LLC Revolving Credit Agreement

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 with LBM Holdings LLC (“LBM”), a related party, on 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 includes a term of three years (through March 12, 2021) and bears interest at a rate of one month LIBOR plus an applicable margin of 500 basis points (approximately 6.7% at inception). The LBM Credit Agreement requires 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% (approximately \$188), was required at closing. 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 the LBM Credit Agreement at any time without penalty. Borrowings under the LBM Credit Agreement have been collateralized by the accounts receivable, inventories and machinery and equipment of the Loan Parties. The total estimated value of collateral was in significant excess of the maximum capacity of the LBM Credit Agreement at inception.

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 the Executive Chairman of the Company. 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 subject to review and approval by a sub-committee of independent members of the Board of Directors of the Company (which included each of the members of the Audit Committee of the Board of Directors). At the time of execution of the LBM Credit Agreement, the \$15,000 in available loan proceeds were deposited into an escrow account with an unrelated, third party financial institution pursuant to a separate Escrow Agreement by and among the parties. Loan proceeds held in escrow will be 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 LBM Credit Agreement.

Other

Refer to Note 15 for further discussion relating to a contingency matter, which qualifies as a reportable subsequent event.

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.

The ExOne Company and Subsidiaries
Supplemental Quarterly Financial Information (Unaudited)
(in thousands, except per-share amounts)

	For the Quarter Ended			
	December 31, 2017	September 30, 2017	June 30, 2017	March 31, 2017
Revenue – third parties	\$ 20,181	\$ 15,879	\$ 10,790	\$ 10,861
Revenue – related parties	8	8	9	8
	<u>\$ 20,189</u>	<u>\$ 15,887</u>	<u>\$ 10,799</u>	<u>\$ 10,869</u>
Gross profit	\$ 6,656	\$ 4,097	\$ 2,026	\$ 1,603
Net loss	\$ (1,960)	\$ (4,863)	\$ (6,403)	\$ (6,791)
Net loss per common share * :				
Basic	\$ (0.12)	\$ (0.30)	\$ (0.40)	\$ (0.42)
Diluted	\$ (0.12)	\$ (0.30)	\$ (0.40)	\$ (0.42)

	For the Quarter Ended			
	December 31, 2016	September 30, 2016	June 30, 2016	March 31, 2016
Revenue – third parties	\$ 14,629	\$ 12,987	\$ 11,718	\$ 8,379
Revenue – related parties	2	1	37	35
	<u>\$ 14,631</u>	<u>\$ 12,988</u>	<u>\$ 11,755</u>	<u>\$ 8,414</u>
Gross profit	\$ 5,220	\$ 3,560	\$ 3,506	\$ 1,876
Net loss	\$ (2,568)	\$ (3,611)	\$ (2,942)	\$ (5,477)
Net loss per common share * :				
Basic	\$ (0.16)	\$ (0.23)	\$ (0.18)	\$ (0.35)
Diluted	\$ (0.16)	\$ (0.23)	\$ (0.18)	\$ (0.35)

* Per-share amounts are calculated independently for each quarter presented; therefore the sum of the quarterly per-share amounts may not equal the per-share amounts for the year.

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

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act), are controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, in a manner to allow timely decisions regarding required disclosures.

As of December 31, 2017, we carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act). These controls and procedures were designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, in a manner to allow timely decisions regarding required disclosures.

Based on this evaluation, including an evaluation of the rules referred to above in this Item 9A, management has concluded that our disclosure controls and procedures were effective as of December 31, 2017, to provide reasonable assurance that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, in a manner to allow timely decisions regarding required disclosures.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Internal control over financial reporting is a process designed under the supervision of our principal executive and principal financial officers to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

Our internal control over financial reporting is supported by written policies and procedures that pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets, provide reasonable assurance that transactions are recorded as necessary to permit the preparation of financial statements in accordance with GAAP and that our receipts and expenditures are being made and recorded only in accordance with authorizations of our management and provide reasonable assurance regarding the prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

In connection with the preparation of this Annual Report on Form 10-K, with the participation of our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2017, based on the criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Our assessment included an evaluation of the design of our internal control over financial reporting and testing of the operational effectiveness of our internal control over financial reporting. Based on this evaluation, our management has concluded that our internal control over financial reporting was effective as of December 31, 2017.

Because of its inherent limitations, a system of internal control over financial reporting can provide only reasonable assurance and may not prevent or detect misstatements. In addition, projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions and that the degree of compliance with the policies or procedures may deteriorate.

As an EGC, we are exempt from the requirement to obtain an attestation report from our independent registered public accounting firm on the assessment of our internal controls pursuant to the Sarbanes-Oxley Act until December 31, 2018, or such time that we no longer qualify as an EGC in accordance with the JOBS Act.

Changes in Internal Control over Financial Reporting

During 2017, with oversight from our executive management and Audit Committee of our Board of Directors, we completed an evaluation of certain of our control activities in addressing a previously reported material weakness in internal control over financial reporting associated with our information technology system platform specific to our ExOne GmbH subsidiary, in particular, how this information technology system platform impacts our accounting for inventories specific to ExOne GmbH. Our approach included the identification and remediation of known errors in the original implementation of, and subsequent changes to, this information technology system platform and an assessment of certain manual processes and controls necessary to ensure accurate and timely

reporting of operating results associated with this subsidiary. As a result of these collective efforts, management was able to conclude at December 31, 2017, that the previously reported material weakness in internal control over financial reporting was remediated.

Item 9B. Other Information.

LBM Holdings LLC Revolving Credit Agreement

On March 12, 2018, the Company and its ExOne Americas LLC and ExOne GmbH subsidiaries, as guarantors (collectively, the “Loan Parties”), entered into a Credit Agreement with LBM Holdings LLC (“LBM”), a related party, on a \$15,000,000 revolving credit facility (the “LBM Credit Agreement”) to provide additional funding for working capital and general corporate purposes. The LBM Credit Agreement includes a term of three years (through March 12, 2021) and bears interest at a rate of one month LIBOR plus an applicable margin of 500 basis points (approximately 6.7% at inception). The LBM Credit Agreement requires 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% (approximately \$187,500), was required at closing. Borrowings under the LBM Credit Agreement are required to be in minimum increments of \$1,000,000. 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 the LBM Credit Agreement at any time without penalty. Borrowings under the LBM Credit Agreement have been collateralized by the accounts receivable, inventories and machinery and equipment of the Loan Parties. The total estimated value of collateral was in significant excess of the maximum capacity of the LBM Credit Agreement at inception.

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 the Executive Chairman of the Company. 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 subject to review and approval by a sub-committee of independent members of the Board of Directors of the Company (which included each of the members of the Audit Committee of the Board of Directors). At the time of execution of the LBM Credit Agreement, the \$15,000,000 in available loan proceeds were deposited into an escrow account with an unrelated, third party financial institution pursuant to a separate Escrow Agreement by and among the parties. Loan proceeds held in escrow will be 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 LBM Credit Agreement.

Copies of the LBM Credit Agreement and Escrow Agreement are filed as Exhibits to this Annual Report on Form 10-K. The descriptions set forth above regarding the LBM Credit Agreement and Escrow Agreement are not complete and are subject to and qualified in their entirety by reference to the complete text of the LBM Credit Agreement and Escrow Agreement, respectively.

PART III

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,” “Section 16(a) Beneficial Ownership Reporting Compliance,” “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 16, 2018, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2017.

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 16, 2018, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2017.

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

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 16, 2018, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2017.

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 “Independence of the Board of Directors and Committees” and “Transactions with Related Persons” in our definitive proxy statement for the Annual Meeting of Stockholders to be held on May 16, 2018, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2017.

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 16, 2018, which will be filed with the SEC within 120 days of the end of the fiscal year ended December 31, 2017.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(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.

EXHIBIT INDEX

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.

Exhibit Number	Description	Method of Filing
2.1	Asset Purchase Agreement dated March 3, 2014 by and among ExOne Americas LLC, Machin-A-Mation Corporation, Metal Links, LLC and William R. Dega.	Incorporated by reference to Exhibit 2.1 to Form 8-K (#001-35806) filed on March 7, 2014.
3.1	Certificate of Incorporation.	Incorporated by reference to Exhibit 3.1 to Form S-1 Registration Statement (#333-185933) filed on January 8, 2013.
3.2	Amended and Restated Bylaws, as amended through August 19, 2013.	Incorporated by reference to Exhibit 3.2 to Form 10-K (#001-35806) filed on March 22, 2016.
4.1	Form of Stock Certificate.	Incorporated by reference to Exhibit 4.1 to Amendment No. 2 to Form S-1 Registration Statement (#333-185933) filed on January 28, 2013.
10.1	Employment Agreement dated June 1, 2012 between the Company and S. Kent Rockwell.*	Incorporated by reference to Exhibit 10.2 to Form S-1 Registration Statement (#333-185933) filed on January 8, 2013.
10.2	Employment Agreement dated March 7, 2013 between the Company and JoEllen Lyons Dillon.*	Incorporated by reference to Exhibit 10.17 to Form 10-K (#001-35806) filed on March 29, 2013.
10.3	Executive At-Will Employment Agreement dated August 4, 2017 between the Company and JoEllen Lyons Dillon.*	Incorporated by reference to Exhibit 10.1 to Form 10-Q (#001-35806) filed on November 9, 2017.
10.4	2013 Equity Incentive Plan.*	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.
10.5	Form of Restricted Stock Award Agreement under 2013 Equity Incentive Plan.*	Incorporated by reference to Exhibit 99.2 to the Registration Statement on Form S-8 (No. 333-187053) filed on March 5, 2013.
10.6	Form of Award Agreements under 2013 Equity Incentive Plan.*	Incorporated by reference to Exhibit 10.07.02 to Amendment No. 1 to Form S-1 Registration Statement (#333-185933) filed on January 24, 2013.
10.7	Form of Stock Bonus Award Agreement under 2013 Equity Incentive Plan.*	Incorporated by reference to Exhibit 10.26 to Form 10-K (#001-35806) filed on March 20, 2014.
10.8	Overdraft Facility dated September 18, 2015 between Sparkasse and ExOne GmbH.	Incorporated by reference to Exhibit 10.2 to Form 8-K (#001-35806) filed on October 27, 2015.
10.9	Credit Agreement dated March 12, 2018 among the Company, ExOne Americas LLC, ExOne GmbH and LBM Holdings LLC.	Filed herewith.
10.10	Escrow Agreement dated March 12, 2018 among the Company, LBM Holdings LLC and Huntington National Bank.	Filed herewith.
10.11	Form of Indemnification Agreement for Officers and Directors.	Incorporated by reference to Exhibit 10.1 to Form 8-K (#001-35806) filed on March 29, 2013.

10.12	<u>At Market Issuance Sales Agreement dated January 8, 2016 among the Company, FBR Capital Markets & Co. and MLV & Co. LLC.</u>	Incorporated by reference to Exhibit 10.1 to Form 8-K (#001-35806) filed on January 11, 2016.
10.13	<u>Subscription Agreement dated January 10, 2016 among the Company, Rockwell Forest Products, Inc. and S. Kent Rockwell (solely for purposes of being bound by Section 4.5 thereof).</u>	Incorporated by reference to Exhibit 10.1 to Form 8-K (#001-35806) filed on January 11, 2016.
10.14	<u>Employment Agreement dated August 19, 2016 between the Company and James L. McCarley.*</u>	Incorporated by reference to Exhibit 10.1 to Form 8-K (#001-35806) filed on August 23, 2016.
10.15	<u>Change of Control Severance Plan.</u>	Incorporated by reference to Exhibit 10.2 to Form 10-Q (#001-35806) filed on November 9, 2017.
16.1	<u>Changes in the Company's Certifying Accountant.</u>	Incorporated by reference to Exhibit 16.1 to Form 8-K (#001-35806) filed on March 25, 2016.
21.1	<u>Subsidiaries of the Registrant.</u>	Filed herewith.
23.1	<u>Consent of Schneider Downs & Co., Inc.</u>	Filed herewith.
23.2	<u>Consent of Baker Tilly Virchow Krause, LLP.</u>	Filed herewith.
31.1	<u>Rule 13(a)-14(a) Certification of Principal Executive Officer.</u>	Filed herewith.
31.2	<u>Rule 13(a)-14(a) Certification of Principal Financial Officer.</u>	Filed herewith.
32	<u>Section 1350 Certification of Principal Executive Officer and Principal Financial Officer.</u>	Filed herewith.
101	Interactive Data File.	Filed herewith.

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 these exhibits electronically at the SEC 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 this Annual Report on Form 10-K 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. The Interactive Data File (“XBRL”) exhibit is only available electronically.

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.

Signatures

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/ James L. McCarley
James L. McCarley
Chief Executive Officer

Date: March 15, 2018

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.

<u>Signature</u>	<u>Date</u>	<u>Title</u>
<u>/s/ James L. McCarley</u> James L. McCarley	March 15, 2018	Chief Executive Officer (Principal Executive Officer)
<u>/s/ Brian W. Smith</u> Brian W. Smith	March 15, 2018	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)
<u>/s/ S. Kent Rockwell</u> S. Kent Rockwell	March 15, 2018	Executive Chairman and Director
<u>/s/ John Irvin</u> John Irvin	March 15, 2018	Director
<u>/s/ Gregory F. Pashke</u> Gregory F. Pashke	March 15, 2018	Director
<u>/s/ Lloyd A. Semple</u> Lloyd A. Semple	March 15, 2018	Director
<u>/s/ William Strome</u> William Strome	March 15, 2018	Director
<u>/s/ Bonnie K. Wachtel</u> Bonnie K. Wachtel	March 15, 2018	Director

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

[Schedules and Exhibits identified in the Table of Contents to the Credit Agreement are not being filed but will be furnished supplementally to the Securities and Exchange Commission upon request.]

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Exhibits

Exhibit A	Form of Collateral Assignment of Contract Rights
Exhibit B	Form of Guaranty Agreement
Exhibit C	Form of Intercompany Subordination Agreement
Exhibit D	Form of Note
Exhibit E	Form of U.S. Security Agreement
Exhibit F	Form of Security Transfer Agreement
Exhibit 2.4	Form of Loan Request

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.

“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.

“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 12, 2021.

“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 (a) (a)).

“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 than 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.

“ 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 (75) 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.

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(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 not 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 D istributions; 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, 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 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 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 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;

7.1.11 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 therefrom, (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
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

With a copy to:

McGuireWoods LLP
260 Forbes Avenue, 18 th Floor
Pittsburgh, PA 15222
Attention: Penny E. Zacharias
Email: pzacharias@mcguirewoods.com
Facsimile: (412) 667-7954
Telephone: (412) 667-7937

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.

8.17 Taxes.

(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 In demnifications.

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 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]

IN WITNESS WHEREOF, the parties hereto, by their officers thereunto duly authorized, have caused this Agreement to be executed as of the day and year first above written.

BORROWER:

THE EXONE COMPANY

By: /s/ Brian W. Smith
Name: Brian W. Smith
Title: Chief Financial Officer

GUARANTORS:

EXONE AMERICAS LLC

By: /s/ Brian W. Smith
Name: Brian W. Smith
Title: Authorized Signatory

EXONE GMBH

By: /s/ Brian W. Smith
Name: Brian W. Smith
Title: Authorized Signatory

LENDER:

LBM HOLDINGS LLC

By: /s/ Mark V. Deluzio
Name: Mark V. Deluzio
Title: Authorized Representative

ESCROW AGREEMENT

ESCROW AGREEMENT (the “Agreement”) executed this 12th day of March, 2018 (“Effective Date”) by and among LBM HOLDINGS LLC, a Pennsylvania limited liability company (“Secured Party”), THE EXONE COMPANY, a Delaware corporation (“ExOne”), and THE HUNTINGTON NATIONAL BANK, a national banking association, as escrow agent (“Escrow Agent”). Secured Party, Depositor and Escrow Agent are sometimes collectively referred to herein as, the “Parties.”

WHEREAS, Secured Party and ExOne seek to appoint Escrow Agent to receive and hold certain funds to be loaned by the Secured Party to ExOne pursuant to that certain Credit Agreement dated March 12, 2018 by and between Secured Party and ExOne (the “Credit Agreement”); and

WHEREAS, Escrow Agent has agreed to accept, hold and disburse, as applicable, the funds deposited with it and the earnings thereon, if any, in accordance with the terms of this Agreement.

NOW THEREFORE, in consideration of the promises and of the mutual covenants contained herein, the Parties hereby agree as follows:

1. **APPOINTMENT OF ESCROW AGENT.** Secured Party and ExOne do hereby appoint Escrow Agent as escrow agent for the purposes described herein, and Escrow Agent does hereby accept the appointment as escrow agent and agrees to act in accordance with the terms and conditions described herein. Escrow Agent shall have all of the rights, powers, duties and obligations provided herein.

2. **ESCROW FUND.** Simultaneously with the execution and delivery of this Agreement, Secured Party shall deliver and deposit with Escrow Agent, and Escrow Agent hereby acknowledges receipt of, the sum of \$15,000,000 (the “Escrow Funds”) to be held in escrow by Escrow Agent and distributed pursuant to and strictly in accordance with the terms and conditions of this Agreement. Escrow Agent shall promptly deposit, invest and reinvest, as applicable, the Escrow Funds and the proceeds thereof into an account (the “Escrow Account”) as provided in Section 3 herein below. Escrow Agent shall release and disburse Escrow Funds only in accordance with the written instructions as set forth in “Exhibit A” hereto delivered by ExOne to the Escrow Agent (each, a “Loan Request”), or as otherwise expressly set forth in this Agreement. Notwithstanding anything in this Agreement to the contrary, Escrow Agent will only release and disburse Escrow Funds which are Collected Funds (as defined below). For purposes of this Agreement, the term “Collected Funds” shall mean all funds received by Escrow Agent which have cleared normal banking channels and are considered to be good funds. ExOne agrees to deliver a copy of each Loan Request to the Secured Party simultaneously with the delivery of such Loan Request to the Escrow Agent. Any payments of principal made pursuant to Article 3 [Payments] of the Credit Agreement shall be made to the Escrow Agent as set forth in Section 3.1 of the Credit Agreement. Upon receipt of any payments from the Borrower, the Escrow Agent shall deposit such principal amount into the Escrow Account and such amounts shall be deemed to be Escrow Funds. With respect to any such payments received by Escrow Agent after ten

o'clock, a.m., Columbus, Ohio, time, Escrow Agent shall not be required to deposit such funds until the next day upon which banks in Columbus, Ohio are open for business.

3. INVESTMENT AND MAINTENANCE OF ESCROW FUND. Escrow Agent shall invest and reinvest the Escrow Funds in the Federated Treasury Obligations Fund (Cusip # 60934N872) until such time an authorized representative of the Secured Party shall instruct the Escrow Agent in writing, to have the Escrow Funds deposited in another Qualified Investment. During the term of this Agreement Escrow Agent shall provide Secured Party with written monthly statements containing the beginning balance of the Escrow Funds, as well as all principal and income transactions for the statement period. Escrow Agent is authorized and directed to liquidate any and all investments in whole or in part making up the Escrow Funds as it deems necessary to make any and all payments or distributions required under this Agreement. The investment earnings shall not become part of the Escrow Funds, but shall instead be paid by wire transfer directly to the Secured Party in arrears on the 2nd business day of each month during the term of this Agreement. All amounts transferred to the Secured Party pursuant to this Section 3 shall be wired to the Secured Lender using the wiring instructions provided in writing to the Escrow Agent by the Secured Party. All investment losses shall be charged against the Escrow Funds. Escrow Agent shall not be liable or responsible for loss in the value of any investment made pursuant to this Agreement, or for any loss, cost or penalty resulting from any sale or liquidation of the Escrow Funds. With respect to any Escrow Funds received by Escrow Agent after ten o'clock, a.m., Columbus, Ohio, time, Escrow Agent shall not be required to invest such funds or to effect any investment instruction until the next day upon which banks in Columbus, Ohio are open for business. In the event that any or all of the Escrow Funds is of the type which cannot be invested, or Secured Party expressly request in writing that the Escrow Funds not be invested, Escrow Agent shall hold and maintain the Escrow Funds in the Escrow Account.

4. " **QUALIFIED INVESTMENTS** ", to the extent permitted by law, means: (i) direct general obligations of the United States of America; (ii) obligations the timely payment of the principal of and interest on which is fully and unconditionally guaranteed by the United States of America; (iii) general obligations of the agencies and instrumentalities of the United States of America; (iv) certificates of deposit, time deposits or demand deposits with any bank or savings institution, including the Escrow Agent or any affiliate thereof, provided that such certificates of deposit, time deposits or demand deposits, if not insured by the Federal Deposit Insurance Corporation or the Federal Savings and Loan Insurance Corporation, are fully secured by obligations described in clauses (i), (ii) , or (iii) above; or (v) repurchase agreements with any state or national bank or trust company, including the Escrow Agent or any affiliate thereof, that are secured by obligations of the type described in clauses (i), (ii) or (iii) above; provided that such collateral is free and clear of claims of third parties, that the Escrow Agent or a third party acting solely as agent for the Escrow Agent has possession of such collateral and a perfected first priority security interest in such collateral.

5. LIABILITY OF ESCROW AGENT. Escrow Agent shall not be liable for any action taken or omitted by it in good faith, including, but not the Escrow Funds resulting from the investment(s) or any loss resulting from the liquidation of any investment(s) prior to such investment's maturity date for the purpose of making required disbursements under this Agreement, except to the extent that a court of competent jurisdiction determines that Escrow Agent's gross negligence or willful misconduct directly caused any loss to ExOne or Secured Party. Escrow Agent may rely upon any notice, instruction, request or other

instrument delivered by ExOne or Secured Party, not only as to its due execution, validity and effectiveness, but also as to the truth and accuracy of any information contained therein, which Escrow Agent shall believe to be genuine and to have been signed or presented by the person or parties purporting to sign the same. Escrow Agent shall have no implied duties or obligations and shall not be charged with knowledge or notice of any fact or circumstance not specifically set forth herein. In no event shall Escrow Agent be liable for incidental, indirect, special, consequential or punitive damages (including, but not limited to lost profits), even if Escrow Agent has been advised of the likelihood of such loss or damage and regardless of the form of action. Escrow Agent shall not be obligated to take any legal action or commence any proceeding in connection with the Escrow Funds, any account in which Escrow Funds are deposited, this Agreement or the Credit Agreement, or to appear in, prosecute or defend any such legal action or proceeding.

Escrow Agent is authorized, in its sole discretion, to comply with orders issued or process entered by any court with respect to the Escrow Funds, without determination by Escrow Agent of such court's jurisdiction in the matter. If any portion of the Escrow Funds is at any time attached, garnished or levied upon under any court order, or in case the payment, assignment, transfer, conveyance or delivery of any such property shall be stayed or enjoined by any court order, or in case any order, judgment or decree shall be made or entered by any court affecting such Escrow Fund or any part thereof, then and in any such event, Escrow Agent is authorized, in its sole discretion, to rely upon and comply with any such order, writ, judgment or decree which it is advised by legal counsel selected by it is binding upon it without the need for appeal or other action; and if Escrow Agent complies with any such order, writ, judgment or decree, it shall not be liable to any of the Parties or to any other person or entity by reason of such compliance even though such order, writ, judgment or decree may be subsequently reversed, modified, annulled, set aside or vacated.

6. RIGHTS AND DUTIES OF ESCROW AGENT. This Agreement shall represent the entire understanding of the Parties, and Escrow Agent shall only be required to perform the duties expressly described herein, and no further duties shall be implied from this Agreement or any other written or oral agreement by and between Escrow Agent, ExOne and Secured Party made previous or subsequent to this Agreement, unless such written amendment to this Agreement is executed by all Parties hereto and makes specific reference to this Agreement. Escrow Agent's sole responsibility shall be for the safekeeping and disbursement of the Escrow Funds in accordance with the terms of this Agreement. Escrow Agent may rely upon any written instructions believed in good faith to be genuine when signed and presented by the requesting party and shall not have a duty to inquire or investigate the validity, truth and/or accuracy of any such written instruction. Escrow Agent shall not be required to solicit funds from either ExOne or Secured Party in connection with this Agreement. Escrow Agent shall be permitted to execute any and all powers under this Agreement directly or through its agents and/or attorneys, and shall be allowed to seek counsel from any professional regarding the construction or performance of this Agreement, or relating to any dispute involving any party hereto, which professionals shall be selected at the sole discretion of Escrow Agent. Escrow Agent shall incur no liability and shall be fully indemnified from any liability whatsoever in acting in accordance with the opinion or instruction of such professionals. ExOne shall promptly pay, upon demand, the reasonable fees and expenses of any such professionals. Notwithstanding the foregoing, should Escrow Agent become uncertain as to its duties under this Agreement, it shall be permitted to (a) immediately suspend the performance of any obligations (including without limitation any disbursement obligations) under this Agreement until such uncertainty shall be resolved to the sole satisfaction

of Escrow Agent or until such duties are expressly defined in a joint writing by the Parties, and shall only be required to protect and keep the Escrow Funds in their current investment(s) until such time as a written agreement among the Parties is executed or a court of competent jurisdiction shall render an order directing further action, or (b) petition (by means of an interpleader action or any other appropriate method) any court of competent jurisdiction in any venue convenient to Escrow Agent, for instructions with respect to such dispute or uncertainty, and to the extent required or permitted by law, pay into such court, for holding and disposition in accordance with the instructions of such court, all Escrow Funds, after deduction and payment to Escrow Agent of all fees and expenses (including court costs and reasonable attorneys' fees) payable to, incurred by, or expected to be incurred by Escrow Agent in connection with the performance of its duties and the exercise of its rights hereunder. Escrow Agent shall have no liability to ExOne, Secured Party, their respective shareholders or members, as applicable, or any other person with respect to any such suspension of performance or disbursement into court, specifically including any liability or claimed liability that may arise, or be alleged to have arisen, out of or as a result of any delay in the disbursement of the Escrow Funds or any delay in or with respect to any other action required or requested of Escrow Agent. Upon release and disbursement of the Escrow Funds as set forth in "Exhibit A," hereto, Escrow Agent shall be fully released from any and all further obligations, except for the provision of written notice to each of the other Parties, setting forth in such notice the date of release of the Escrow Funds, the party to whom the Escrow Funds were disbursed and the amount disbursed, such notification to be in the form of Escrow Agent's final monthly statement. Upon the release and disbursement of the Escrow Funds and the delivery of the above referenced notification, Escrow Agent shall be released from any and all duties and obligations with respect to this Agreement and each of the Parties hereto.

7. TERM OF ESCROW AGREEMENT. The Agreement shall terminate on the termination or expiration of the Credit Agreement (the "Termination"), provided that any claims by Escrow Agent against Secured Party or ExOne shall survive the termination hereof. Upon the Termination, the Escrow Agent will deliver all Escrow Funds in the Escrow Account to the Secured Party.

8. RESIGNATION AND SUCCESSION OF ESCROW AGENT. Escrow Agent may resign and be discharged of all duties and obligations under this Agreement by providing thirty (30) days written notice of such resignation to both ExOne and Secured Party. If no successor escrow agent shall have been named upon the expiration of the thirty (30) days notice period, Escrow Agent shall have no further obligations hereunder except to hold the Escrow Funds as a depository. Upon written notification by Secured Party of the appointment of a successor escrow agent, Escrow Agent shall promptly deliver the Escrow Funds and all materials and instruments in its possession which relate to the Escrow Funds to such successor, and the duties of the resigning Escrow Agent shall terminate in all respects, and Escrow Agent shall be released and discharged from all further obligations set forth herein or otherwise created hereby. Escrow Agent shall have the right to withhold an amount equal to any amount due and owing to Escrow Agent, plus any costs and fees incurred by, or expected to be incurred by, Escrow Agent in connection with the formation, maintenance or termination of this Agreement. Any merger, consolidation or the purchase of all or substantially all of Escrow Agent's corporate assets resulting in a new corporate entity shall not be considered a successor for the purposes of this Agreement, and the Escrow Funds shall be transferred to such entity without written consent or further action under this Agreement.

9. **TERMINATION OF ESC ROW AGENT.** Escrow Agent may be discharged from its duties under this Agreement upon thirty (30) days joint written notice from ExOne and Secured Party and upon the payment of any and all costs and fees due to Escrow Agent. In such event, Escrow Agent shall be entitled to rely upon each Loan Request as to the disposition and delivery of the Escrow Funds. Upon thirty (30) days after receipt of such written notice of termination, if no successor has been named, Escrow Agent shall immediately cease further a ction under this Agreement and shall have no further obligations hereunder except to hold the Escrow Funds as a depository and to deliver the same to a successor escrow agent upon written notification by ExOne and Secured Party of the appointment of a succ essor escrow agent or in accordance of a court order .

10. The Escrow Agent agrees to accept and act upon instructions or directions pursuant to this Agreement sent by unsecured e-mail, facsimile transmission or other similar unsecured electronic met hods, provided, however, that the instructions or directions shall be signed by a person as may be designated and authorized to sign for the parties to the Escrow, by an authorized representative of the Corporations, and they shall provide to the Escrow Agent an incumbency certificate listing such designated persons, which incumbency certificate shall be amended whenever a person is to be added or deleted from the listing. If Corporations elects to give the Escrow Agent e-mail or facsimile instructions (or instructions by a similar electronic method) and the Escrow Agent in its discretion elects to act upon such instructions, the Escrow Agent's understanding of such instructions shall be deemed controlling. The Escrow Agent shall not be liable for any losses, costs or expenses arising directly or indirectly from the Escrow Agent's reliance upon and compliance with such instructions notwithstanding such instructions conflict or are inconsistent with a subsequent written instruction. The Corporations agree to assume all risks arising out of the use of such electronic methods to submit instructions and directions to the Escrow Agent, including without limitation the risk of the Escrow Agent acting on unauthorized instructions, and the risk or interception and misuse by third parties.

11. **FEES.** ExOne shall also agree to pay compensation for the services rendered by Escrow Agent under this Agreement. Compensation for services rendered by Escrow Agent shall be paid in accordance with the instructions set forth on "Exhibit B." and ExOne agrees to pay or reimburse Escrow Agent for any and all costs and expenses, including reasonable attorney's fees and expenses, incurred in connection with the preparation, execution, performance, delivery, modification or termination of this Agreement. Prior to any final distribution of the Escrow Funds, Escrow Agent shall be entitled to set-off and deduct from the Escrow Funds, any of its fees and expenses which are then due and owing.

12. **INDEMNIFICATION OF ESCROW AGENT.** From and at all times after the date of this Agreement, ExOne shall, to the fullest extent permitted by law, defend, indemnify and hold harmless Escrow Agent and each director, officer, employee, attorney, agent and affiliate of Escrow Agent (collectively, the "Indemnified Parties") from and against any and all actions, claims (whether or not valid), losses, damages, liabilities, costs and expenses of any kind or nature whatsoever (including without limitation reasonable attorneys' fees, costs and expenses) incurred by or asserted against any of the Indemnified Parties from and after the date hereof, whether direct, indirect or consequential, as a result of or arising from or in any way relating to any claim, demand, suit, action or proceeding (including any inquiry or investigation) by any person, including without limitation ExOne or Secured Party, whether threatened or initiated, asserting a claim for any legal or equitable remedy against any person under any statute or regulation, including, but not limited

to, any federal or state securities laws, or under any common law or equitable cause or otherwise, arising from or in connection with the negotiation, preparation, execution, performance or failure of performance of this Escrow Agreement or any trans actions contemplated herein, whether or not any such Indemnified Party is a party to any such action, proceeding, suit or the target of any such inquiry or investigation; *provided, however*, that no Indemnified Party shall have the right to be indemnified hereunder for any liability finally determined by a court of competent jurisdiction, subject to no further appeal, to have resulted solely from the gross negligence or willful misconduct of such Indemnified Party. Each Indemnified Party shall, in its sole discretion, have the right to select and employ separate counsel with respect to any action or claim brought or asserted against it, and the reasonable fees of such counsel shall be paid upon demand by ExOne. The obligations of ExOne under this Section 11 shall survive any termination of this Agreement and the resignation or removal of Escrow Agent..

13. REPRESENTATIONS and WARRANTIES. Each of ExOne and Secured Party hereby makes the following representations and warranties to Escrow Agent, each as to itself, himself or herself:

(a) It is duly organized, validly existing, and in good standing under the laws of the state of its incorporation or organization, and has full power and authority to execute and deliver this Agreement and to perform its obligations hereunder.

(b) This Agreement has been duly approved by all necessary action, including any necessary shareholder or membership approval, has been executed by its duly authorized officers, and constitutes its valid and binding agreement enforceable in accordance with its terms.

(c) The execution, delivery, and performance of this Agreement will not violate, conflict with, or cause a default under its articles of incorporation, articles of organization, bylaws, management agreement or other organizational document, as applicable, any applicable law or regulation, any court order or administrative ruling or decree to which it is a party or any of its property is subject, or any agreement, contract, indenture, or other binding arrangement to which it is a party or any of its property is subject.

(d) The applicable persons designated on the Incumbency for the ExOne and Secured Party hereto have been duly appointed to act as its representatives hereunder and have full power and authority to execute and deliver any written directions, to amend, modify or waive any provision of this Agreement and to take any and all other actions on behalf of ExOne and Secured Party under this Agreement, all without further consent or direction from, or notice to, it or any other party.

(e) No party other than the Parties has, or shall have, any lien, claim or security interest in the Escrow Funds or any portion thereof. No financing statement under the Uniform Commercial Code (other than any financing statement in favor of the Secured Party) is on file in any jurisdiction claiming a security interest in or describing (whether specifically or generally) the Escrow Funds or any part thereof.

(f) All of its representations and warranties contained herein are true and complete as of the date hereof and will be true and complete at the time of any disbursement of the Escrow Funds.

14. **USA PATRIOT ACT.** None of Secured Party or ExOne is (or will be) a person with whom Escrow Agent is restricted from doing business with under regulations of the Office of Foreign Asset Control (“OFAC”) of the Department of the Treasury of the United States of America (including, those persons named on OFAC’s Specially Designated and Blocked Persons list) or under any statute, executive order (including, the September 24, 2001 Executive Order Blocking Property and Prohibiting Transactions With Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action and is not and shall not engage in any dealings or transactions or otherwise be associated with such persons. In addition, Secured Party and ExOne hereby agree to provide Escrow Agent with any additional information that Escrow Agent deems necessary from time to time in order to ensure compliance with all applicable laws concerning money laundering and similar activities. The following notification is provided to Secured Party and ExOne pursuant to Section 326 of the USA Patriot Act of 2001, 31 U.S.C. Section 5318 (“Patriot Act”): **IMPORTANT INFORMATION ABOUT PROCEDURES FOR OPENING A NEW ACCOUNT.** To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify, and record information that identifies each person or entity that opens an account, including any deposit account, treasury management account, loan, other extension of credit, or other financial services product. What this means for depositors: When a depositor opens an account, if such depositor is an individual, a lender (including Escrow Agent) will ask for such depositor’s name, taxpayer identification number, residential address, date of birth, and other information that will allow the lender to identify such depositor, and, if such depositor is not an individual, Escrow Agent will ask for such depositor’s name, taxpayer identification number, business address, and other information that will allow the lender to identify such depositor. Escrow Agent may also ask, if such depositor is an individual, to see depositor’s driver’s license or other identifying documents, and, if such depositor is not an individual, to see such depositor’s legal organizational documents or other identifying documents. In the event Secured Party or ExOne violates any of the provisions of the USA Patriot Act and the regulations thereunder, such event shall constitute a default hereunder and shall entitle Escrow Agent to exercise all of its rights and remedies at law or in equity, including but not limited to terminating this Agreement.

15. **ILLEGAL ACTIVITIES .** Escrow Agent shall have the right in its sole discretion to not accept appointment as escrow agent and reject any funds and collateral from ExOne or Secured Party in the event that Escrow Agent has reasonable belief to believe that such funds or collateral violate applicable banking practices or applicable laws or regulations, including but not limited to the Patriot Act. In the event of suspicious or illegal activity and pursuant to all applicable laws, regulations and practices, each of the other Parties to this Agreement will assist Escrow Agent and comply with any reviews, investigations and examinations directed against the Escrow Funds.

16. **NOTICES.** All communications, notices and instructions required herein shall be in writing and shall be deemed to have been duly given if delivered by (a) hand or first class, registered or certified mail, return receipt requested, postage prepaid, (b) facsimile or electronic transmission if followed by letter and affirmative confirmation of receipt is received (such facsimile or electronically transmitted notice to be effective on the date such affirmative confirmation of receipt is received), or (c) overnight courier (such notice to be effective the following business day if instructions to deliver such notice on the next business day are given) and addressed as follows:

If to Escrow Agent:

The Huntington National Bank
310 Grant Street, 4 th Floor
Pittsburgh, PA 15219
Attention: John C. Hoffman
Email: John.C.Hoffmann@huntington.com
Facsimile: (877) 259-7291
Telephone: (412) 227-4839

If to Secured Party:

LBM Holdings LLC

960 Penn Avenue, Suite 400
Pittsburgh, PA 15222-1300
Attn: Mark V. Deluzio, Senior Investment Advisor

If to ExOne: The ExOne Company

127 Industry Boulevard
North Huntingdon, PA 15642
Attn: Loretta Benec, General Counsel and Corporate Secretary

In the event Escrow Agent shall receive such written instructions and shall determine pursuant to its sole discretion that verification of such instructions shall be required, then Escrow Agent shall be permitted to seek confirmation of such instructions by way of telephone contact to the author of such written instructions. Verification of the instructions by the purported author of the instructions called at the telephone number placed on the instructions shall serve to verify such instructions.

17. **ASSIGNMENT.** This Agreement shall not be assignable absent written consent of the Parties. Any assignment absent written consent shall be deemed void *ab initio*, except that the merger or acquisition of all or substantially all the assets of any of the Parties shall not require written consent, but shall require written notice to each of the Parties. Notwithstanding the foregoing, all covenants contained in this Agreement by or on behalf of the Parties shall bind and inure to the benefit of such Parties and their respective heirs, administrators, legal representatives, successors and assigns.

18. **MODIFICATION OF AGREEMENT.** This Agreement (including the Exhibits hereto) shall constitute the complete and entire understanding of the Parties, and shall supersede any and all prior agreements between or among them. The provisions of this Agreement shall not be waived, modified, amended, altered or supplemented, in whole or in part, except by a writing signed by all the Parties, which makes specific reference to this Agreement.

19. **CHOICE OF LAW; WAIVER OF JURY TRIAL; JURISDICTION.** THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE COMMONWEALTH OF PENNSYLVANIA, WITHOUT REGARD TO ITS PRINCIPLES OF CONFLICT OF LAWS. EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES, AND THEREFORE IT HEREBY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO TRIAL BY JURY IN RESPECT OF ANY

LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY. IT IS THE INTENTION OF THE PARTIES THAT THE SITUS OF THE ESCROW ACCOUNT SHALL BE ADMINISTERED IN OHIO.

Each party irrevocably submits to the jurisdiction of (a) the state courts located in the Commonwealth of Pennsylvania and (b) the United States District Courts located in the Commonwealth of Pennsylvania, for the purposes of any action arising out of this Agreement or any transaction contemplated hereby. Each party agrees to commence any such Action either in a United States District Court located in the Commonwealth of Pennsylvania, or if such action may not be brought in such court for jurisdictional reasons, in a state court located in the Commonwealth of Pennsylvania. Each party further agrees that service of any process, summons, notice or document by U.S. registered mail to such party's respective address set forth in Section 15 shall be effective service of process for any action in the Commonwealth of Pennsylvania with respect to any matters to which it has submitted to jurisdiction in this Section 18. Each party irrevocably and unconditionally waives any objection to the laying of venue of any action arising out of this Agreement or the transactions contemplated hereby in (i) a state court located in the Commonwealth of Pennsylvania, or (ii) a United States District Court located in the Commonwealth of Pennsylvania, and hereby and thereby further irrevocably and unconditionally waives and agrees not to plead or claim in any such court that any such action brought in any such court has been brought in an inconvenient forum.

20. FORCE MAJEURE. No party to this Agreement shall be liable to any other party for losses arising out of, or the inability to perform its obligations under the terms of this Agreement, due to acts of God, which shall include, but shall not be limited to, fire, floods, strikes, mechanical failure, war, riot, nuclear accident, earthquake, terrorist attack, computer piracy, cyber-terrorism, fire, epidemics, delays of common carriers or other acts beyond the control of the Parties; it being understood that Escrow Agent shall use commercially reasonable efforts which are consistent with accepted practices in the banking industry to resume performance as soon as reasonably practicable under the circumstances.

21. USE OF THE HUNTINGTON NATIONAL BANK NAME. No party to this Agreement shall, without the prior written consent of Escrow Agent, publish or print or cause to be published or printed any printed or other material in any language, including prospectuses, notices, reports, internet web sites and promotional material, which mentions "The Huntington National Bank" by name or logo or the rights, powers, or duties of Escrow Agent under this Agreement. Notwithstanding the foregoing, ExOne shall be permitted to use the name of the Escrow Agent for purposes of all reports, including Forms 10-K, 10-Q and 8-K, registration statements and prospectuses and other shareholder communications, filed by ExOne with the Securities and Exchange Commission.

22. EXECUTION. This Agreement may be executed in several counterparts, including by electronic delivery, each of which shall be deemed an original, but such counterparts together shall constitute one and the same instrument. The effective date of this Agreement shall be the date it is executed by the last party to do so.

23. DISPUTE RESOLUTION. In the event of a dispute under this Agreement, at Escrow Agent's sole option, Escrow Agent may take either of the following actions:

(a) Filing an interpleader or other action with a court of competent jurisdiction;

(b) Upon notice by Escrow Agent to ExOne and Secured Party, all and any dispute and claim relating to any provision hereof or relating to or arising out of this Agreement shall be settled by arbitration, in accordance with the United States Arbitration Act (9 USC § 1 et seq.) and the commercial arbitration rules of the American Arbitration Association. Judgment upon the award of the arbitrator may be entered in any court having jurisdiction thereof. The arbitration shall take place at a time noticed by the American Arbitration Association regardless of whether one of the Parties fails or refuses to participate.

24. **SEVERABILITY.** Any term or provision of this Agreement that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability (i) of the offending term or provision in any other situation or in any other jurisdiction or (ii) of any other term or provision of this Agreement.

25. **DEALINGS .** Escrow Agent and any stockholder, director, officer or employee of Escrow Agent may buy, sell, and deal in any of the securities of ExOne or Secured Party and become peculiarly interested in any transaction in which ExOne or Secured Party may be interested, and contract and lend money to ExOne or Secured Party and otherwise act as fully and freely as though it were not Escrow Agent under this Agreement. Nothing herein shall preclude Escrow Agent from acting in any other capacity for ExOne or Secured Party or for any other entity.

26. **SECURITY PROCEDURES.** In the event any fund release, disbursement, or transfer instructions are given (other than in writing at the time of execution of this Agreement or any related or underlying agreement), whether in writing, by telecopier, electronic transmission, or otherwise, Escrow Agent is authorized to seek confirmation of such instructions by telephone call-back to the person or persons designated on “ Exhibit D ” hereto, and Escrow Agent may rely upon the confirmation of anyone purporting to be the person or persons so designated. The persons and telephone numbers for call-backs may be changed only in a writing actually received and acknowledged by Escrow Agent.

27. **ESCHEAT .** The Parties are aware that under applicable state law, property which is presumed abandoned may under certain circumstances escheat to the applicable state. Escrow Agent shall have no liability to the Parties, their respective heirs, legal representatives, successors and assigns, or any other party, should any or all of the Escrow Funds and any proceeds thereof escheat by operation of law.

IN WITN ESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

THE HUNTINGTON NATIONAL BANK, as Escrow Agent

By: /s/ John C. Hoffman

Its: Vice President

Date: March 12, 2018

**LBM HOLDINGS LLC,
a Pennsylvania limited liability company**

By: /s/ Mark V. Deluzio

Its: Authorized Representative

Date: March 12, 2018

**THE EXONE COMPANY,
a Delaware corporation**

By: /s/ Brian W. Smith

Its: Chief Financial Officer and Treasurer

Date: March 12, 2018

Exhibit A

LOAN REQUEST

TO: The Huntington National Bank
310 Grant Street, 4th Floor
Pittsburgh, PA 15219
Attention: John C. Hoffman
Email: John.C.Hoffmann@huntington.com
Facsimile: (877) 259-7291
Telephone: (412) 227-4839

FROM: THE EXONE COMPANY, a Delaware corporation (the “Borrower”).

RE: Credit Agreement (as it may be amended, restated, amended and restated, modified or supplemented, the “Credit Agreement”), dated as of March 12, 2018, by and among the Borrower, the Guarantors (as defined therein) party thereto, and LBM Holdings LLC, a Pennsylvania limited liability company (the “Lender”).

Capitalized terms not otherwise defined herein shall have the respective meanings ascribed to them by the Credit Agreement.

1. Pursuant to Section 2.4 of the Credit Agreement and Section 2 of the Escrow Agreement, the undersigned Borrower irrevocably requests a new Loan. Such Loan shall bear interest as provided under Section 2.7 of the Credit Agreement.
 2. Such Loan is in the principal amount of U.S. \$ _____.
 3. The proposed Borrowing Date of such Loan is _____.
 4. The intended use of the proceeds of such Loan is _____.
 5. As of the date hereof and the date of making the above-requested Loan (and after giving effect thereto: all of the representations and warranties contained in Section 4 of the Credit Agreement and in the other Loan Documents are true and correct in all material respects (unless any such representation or warranty is qualified to materiality, in which case such representation or warranty is true and correct in all respects), except for representations and warranties made as of a specified date (which were true and correct as of such date in all material respects (unless any such representation or warranty is qualified to materiality, in which case such representation or warranty is true and correct in all respects)); no Event of Default or Potential Default has occurred and is continuing or exists; the making of such Loan shall not contravene any Law applicable to the Borrower, any other Loan Party, any Subsidiary of the Borrower or of any other Loan Party or any other Guarantor, or any Lender.
 4. Each of the undersigned hereby irrevocably requests:
 - Funds to be wired per the following wire instructions:
 - U.S. \$ _____ Amount of Wire Transfer
 - Bank Name:
 - ABA Number:
 - Account Number:
 - Account Name:
 - Reference:
-

Exhibit B

Fee Schedule

These fees are based upon our current understanding of our duties under of the above-referenced agreement. The Huntington National Bank reserves the rights to adjust its fees should its duties change under the agreement.

ACCEPTANCE FEE: None

ADVANCE ANNUAL ADMINISTRATION FEE \$10,000

TRANSACTION FEES:

Wire Fee: None

Check Disbursement: None

LEGAL FEES: If any, at cost

INVESTMENT: An additional \$500.00 fee will be added to the Annual Administration Fee of any account not using one of the investment vehicles used by The Huntington National Bank for its short-term investments.

The Acceptance Fee and the Advance Annual Administration Fee are payable upon execution of the escrow documents. In the event the escrow is not funded, the Acceptance Fee and all related expenses, including attorneys' fees remain due and payable, and if paid, will not be refunded. Annual fees cover a full year in advance, or any part thereof, and thus are not pro-rated in the year of termination. All other fees, if any, will be billed to the client in arrears.

LIST OF SUBSIDIARIES

As of March 15, 2018, the following entities are subsidiaries of The ExOne Company:

Name	Jurisdiction of Incorporation or Organization
ExOne KK	Japan
ExOne GmbH	Germany
ExOne Italy S.r.l	Italy
ExOne Americas LLC	United States (Delaware)
ExOne Property GmbH	Germany

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-203353), as amended, and Form S-8 (No. 333-187053) of The ExOne Company and Subsidiaries of our report dated March 15, 2018, relating to the consolidated financial statements of The ExOne Company and Subsidiaries, which appears in this Annual Report on Form 10-K.

/s/ Schneider Downs & Co., Inc.

Pittsburgh, Pennsylvania

March 15, 2018

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-203353), as amended, and Form S-8 (No. 333-187053) of The ExOne Company and Subsidiaries of our report dated March 22, 2016, relating to the consolidated financial statements of The ExOne Company and Subsidiaries, which appears in this Annual Report on Form 10-K.

/s/ Baker Tilly Virchow Krause, LLP

Pittsburgh, Pennsylvania

March 15, 2018

CERTIFICATIONS

I, James L. McCarley, 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 15, 2018

/s/ James L. McCarley
James L. McCarley
Chief Executive Officer
(Principal Executive Officer)

CERTIFICATIONS

I, Brian W. Smith, 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 15, 2018

/s/ Brian W. Smith

Brian W. Smith
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, 2017, 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 15, 2018

/s/ James L. McCarley
James L. McCarley
Chief Executive Officer
(Principal Executive Officer)

March 15, 2018

/s/ Brian W. Smith
Brian W. Smith
Chief Financial Officer
(Principal Financial Officer and
Principal Accounting Officer)