
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2018

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: 001-36481

ASPEN AEROGELS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

30 Forbes Road, Building B
Northborough, Massachusetts
(Address of principal executive offices)

04-3559972
(I.R.S. Employer
Identification No.)

01532
(Zip Code)

Registrant's telephone number, including area code: (508) 691-1111

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes No

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

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

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

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

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

As of November 6, 2018, the registrant had 23,970,487 shares of common stock outstanding.

ASPEN AEROGELS, INC.

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Trademarks, Trade Names and Service Marks

We own or have rights to use “Aspen Aerogels,” “Cryogel,” “Pyrogel,” “Spaceloft,” the Aspen Aerogels logo and other trademarks, service marks and trade names of Aspen Aerogels, Inc. appearing in this Quarterly Report on Form 10-Q. Solely for convenience, the trademarks, service marks and trade names referred to in this report are presented without the ® and TM symbols, but such references are not intended to indicate, in any way, that the owner thereof will not assert, to the fullest extent under applicable law, such owner’s rights to these trademarks, service marks and trade names. This report contains additional trademarks, service marks and trade names of other companies, which, to our knowledge, are the property of their respective owners.

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements.

ASPEN AEROGELS, INC.
Consolidated Balance Sheets
(Unaudited)

	September 30, 2018	December 31, 2017
	(In thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	\$ 5,177	\$ 10,694
Accounts receivable, net of allowances of \$236 and \$93	21,461	26,764
Inventories	9,909	8,915
Prepaid expenses and other current assets	1,410	1,289
Total current assets	37,957	47,662
Property, plant and equipment, net	71,000	76,067
Other long-term assets	76	86
Total assets	<u>\$ 109,033</u>	<u>\$ 123,815</u>
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 7,884	\$ 10,653
Accrued expenses	3,529	5,862
Revolving line of credit	5,156	3,750
Deferred revenue	2,811	1,304
Total current liabilities	19,380	21,569
Deferred rent	1,207	1,303
Prepayment liability	4,053	—
Deferred revenue long-term	900	—
Total liabilities	25,540	22,872
Commitments and contingencies (Note 7)		
Stockholders' equity:		
Preferred stock, \$0.00001 par value; 5,000,000 shares authorized, no shares issued and outstanding at September 30, 2018 and December 31, 2017	—	—
Common stock, \$0.00001 par value; 125,000,000 shares authorized, 23,961,361 and 23,643,189 shares issued and outstanding at September 30, 2018 and December 31, 2017, respectively	—	—
Additional paid-in capital	540,970	538,088
Accumulated deficit	(457,477)	(437,145)
Total stockholders' equity	83,493	100,943
Total liabilities and stockholders' equity	<u>\$ 109,033</u>	<u>\$ 123,815</u>

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
Consolidated Statements of Operations
(Unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
(In thousands, except share and per share data)				
Revenue:				
Product	\$ 23,342	\$ 26,812	\$ 66,978	\$ 73,700
Research services	595	386	1,704	1,569
Total revenue	23,937	27,198	68,682	75,269
Cost of revenue:				
Product	22,154	22,115	60,853	63,706
Research services	254	135	746	700
Gross profit	1,529	4,948	7,083	10,863
Operating expenses:				
Research and development	1,384	1,468	4,627	4,753
Sales and marketing	3,061	2,745	10,281	9,271
General and administrative	3,453	3,765	12,149	14,354
Total operating expenses	7,898	7,978	27,057	28,378
Loss from operations	(6,369)	(3,030)	(19,974)	(17,515)
Interest expense, net				
Total interest expense, net	(163)	(58)	(358)	(123)
Net loss	\$ (6,532)	\$ (3,088)	\$ (20,332)	\$ (17,638)
Net loss per share:				
Basic and diluted	\$ (0.27)	\$ (0.13)	\$ (0.86)	\$ (0.76)
Weighted-average common shares outstanding:				
Basic and diluted	23,808,703	23,442,241	23,707,245	23,356,997

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
Consolidated Statements of Cash Flows
(Unaudited)

	Nine Months Ended September 30,	
	2018	2017
	(In thousands)	
Cash flows from operating activities:		
Net loss	\$ (20,332)	\$ (17,638)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	8,259	8,032
Stock-compensation expense	3,414	3,982
Lease incentives	(91)	(80)
Accretion of prepayment discount	107	—
Other	—	(1)
Changes in operating assets and liabilities:		
Accounts receivable	5,303	944
Inventories	(994)	(1,124)
Prepaid expenses and other assets	(111)	224
Accounts payable	(3,310)	(478)
Accrued expenses	(2,305)	752
Deferred revenue	1,353	565
Deferred rent	(33)	(128)
Net cash used in operating activities	<u>(8,740)</u>	<u>(4,950)</u>
Cash flows from investing activities:		
Capital expenditures	(2,651)	(5,423)
Net cash used in investing activities	<u>(2,651)</u>	<u>(5,423)</u>
Cash flows from financing activities:		
Proceeds from borrowings under line of credit	30,975	6,000
Repayment of borrowings under line of credit	(29,569)	(6,000)
Prepayment proceeds under customer supply agreement, net	5,000	—
Repayment of obligations under capital lease	—	(23)
Payments made for employee restricted stock tax withholdings	(532)	(385)
Net cash provided by (used in) financing activities	<u>5,874</u>	<u>(408)</u>
Net decrease in cash	(5,517)	(10,781)
Cash at beginning of period	10,694	18,086
Cash at end of period	<u>\$ 5,177</u>	<u>\$ 7,305</u>
Supplemental disclosures of cash flow information:		
Interest paid	\$ 237	\$ 151
Income taxes paid	\$ —	\$ —
Supplemental disclosures of non-cash activities:		
Changes in accrued capital expenditures	\$ 541	\$ (3,701)
Deferred revenue	\$ 1,009	\$ —
Capitalized interest	\$ 26	\$ —

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(UNAUDITED)

(1) Description of Business and Basis of Presentation

Nature of Business

Aspen Aerogels, Inc. (the Company) is an aerogel technology company that designs, develops and manufactures innovative, high-performance aerogel insulation used primarily in the energy infrastructure and building materials markets. The Company also conducts research and development related to aerogel technology supported by funding from several agencies of the U.S. government and other institutions in the form of research and development contracts.

The Company maintains its corporate offices in Northborough, Massachusetts. The Company has three wholly owned subsidiaries: Aspen Aerogels Rhode Island, LLC, Aspen Aerogels Germany, GmbH and Aspen Aerogels Georgia, LLC.

Liquidity

In August 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-15, Presentation of Financial Statements-Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern (ASU 2015-14). This ASU requires management to assess and evaluate whether conditions or events exist, considered in the aggregate, that raise substantial doubt about the entity's ability to continue as a going concern within one year after the financial statements issue date. The Company adopted this standard effective January 1, 2017.

At September 30, 2018, the Company had a cash and cash equivalents balance of \$5.2 million and \$5.2 million of outstanding borrowings under its revolving line of credit (see note 7). After giving effect to the outstanding borrowings and letters of credit, the additional amount available to the Company at September 30, 2018 under the revolving line of credit was \$8.0 million. The existing revolving line of credit matures on April 28, 2019.

The Company is making investments to increase capacity at its existing manufacturing facility in East Providence, Rhode Island, to expand its sales and marketing efforts, and to develop new technologies and business opportunities. The Company expects its existing cash balance and the amount anticipated to be available under the existing revolving line of credit will be sufficient to fund a portion of these investments. The Company plans to manage capital expenditures and working capital balances to maintain the cash resources required to support current operating requirements and the initial phases of the capacity expansion plan.

The Company will need to supplement its cash balance and amounts available under its revolving line of credit with anticipated cash flows from operations, local government grants, debt financings, customer prepayments, technology licensing agreements or equity financings to provide the capital required to complete the expansion of the existing manufacturing facility and to fund its strategic business initiatives.

Unaudited Interim Financial Information

The accompanying unaudited interim consolidated financial statements include the accounts of the Company and have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Certain information and disclosures normally included in the consolidated financial statements prepared in accordance with U.S. GAAP have been condensed or omitted pursuant to such rules and regulations. As such, the information included in this Quarterly Report on Form 10-Q should be read in conjunction with the audited consolidated financial statements and accompanying notes in our Annual Report on Form 10-K for the year ended December 31, 2017 (the Annual Report), filed with the Securities and Exchange Commission on March 1, 2018.

In the opinion of the Company's management, the unaudited interim consolidated financial statements have been prepared on the same basis as the audited consolidated financial statements and include all adjustments that are of a normal recurring nature and necessary for the fair statement of the Company's financial position as of September 30, 2018 and the results of its operations for the nine months ended September 30, 2018 and 2017 and the cash flows for the nine month periods then ended. The Company has evaluated events through the date of this filing.

The results of operations for the three and nine months ended September 30, 2018 are not necessarily indicative of the results to be expected for the year ending December 31, 2018 or any other period.

(2) Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements, which have been prepared in accordance with U.S. GAAP, include the accounts of the Company and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of the consolidated financial statements requires the Company to make a number of estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Significant items subject to such estimates and assumptions include allowances for doubtful accounts, sales returns and allowances, product warranty costs, inventory valuation, the carrying amount of property and equipment, stock-based compensation and deferred income taxes. The Company evaluates its estimates and assumptions on an on-going basis using historical experience and other factors, including the current economic environment, which are believed to be reasonable under the circumstances. Management adjusts such estimates and assumptions when facts and circumstances warrant. Illiquid credit markets, volatile equity markets and declines in business investment increase the uncertainty inherent in such estimates and assumptions. As future events and their effects cannot be determined with precision, actual results could differ significantly from these estimates. Changes in these estimates resulting from continuing changes in the economic environment will be reflected in the financial statements in future periods.

Cash and Cash Equivalents

Cash equivalents include short-term, highly liquid instruments, which consist of money market accounts. All cash and cash equivalents are maintained with major financial institutions in North America. Deposits with these financial institutions may exceed the amount of insurance provided on such deposits; however, these deposits typically may be redeemed upon demand and, therefore, bear minimal risk.

Revenue Recognition

On January 1, 2018, the Company adopted Accounting Standards Codification 606, Revenue from Contracts with Customers (ASC 606). See note 3 for further details.

The Company recognizes revenue from the sale of products and performance of research and development services. Revenue is recognized when a customer obtains control of promised goods or services, in an amount that reflects the consideration which the Company expects to receive in exchange from those goods or services.

Sales returns are recorded based on historical sales and return information. Products that exhibit unusual sales return patterns due to quality or other manufacturing matters are specifically investigated and analyzed as part of the sales return accrual. The sales return accrual represents a reserve for products that may be returned due to quality concerns or authorized for destruction in the field. Sales return reserves are recorded at full original sales value. The Company rarely exchanges products from inventory for returned products. Sales return and other credit reserves were \$0.2 million and \$0.1 million at September 30, 2018 and December 31, 2017, respectively.

Stock-based Compensation

Stock-based compensation expense is measured at the grant date based on the fair value of the award. Expense is recognized on a straight-line basis over the requisite service period for all awards with service conditions. For performance-based awards, the grant date fair value is recognized as expense when the condition is probable of being achieved, and then on a graded basis over the requisite service period. The Company uses the Black-Scholes option-pricing model to determine the fair value of service-based option awards, which requires a number of complex and subjective assumptions including fair value of the underlying security, the expected volatility of the underlying security, a risk-free interest rate and the expected term of the option. The fair value of restricted stock and restricted stock unit grants is determined using the closing trading price of the Company's common stock on the date of grant. The fair value of awards containing market conditions is determined using a Monte Carlo simulation model based upon the nature of the conditions, the expected volatility of the underlying security, and other relevant factors.

During the nine months ended September 30, 2018, the Company granted 58,062 shares of restricted common stock with a grant date fair value of \$0.3 million and 81,102 non-qualified options (NSOs) to purchase shares of common stock with a grant date fair value of \$0.4 million vesting over a period of one year to its non-employee directors under the 2014 Employee, Director and

Consultant Equity Incentive Plan (the 2014 Equity Plan). During the nine months ended September 30, 2018, the Company also granted 497,910 restricted common stock units (RSUs) with a grant date fair value of \$2.3 million and 493,154 NSOs to purchase shares of common stock with a grant date fair value of \$1.1 million to employees under the 2014 Equity Plan. The RSUs and NSOs granted to employees vest over a three year period.

Stock-based compensation is included in cost of revenue or operating expenses, as applicable, and consists of the following:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
	(In thousands)			
Cost of product revenue	\$ 158	\$ 201	\$ 474	\$ 641
Research and development expenses	124	151	355	449
Sales and marketing expenses	206	294	647	865
General and administrative expenses	640	718	1,938	2,027
Total stock-based compensation	<u>\$ 1,128</u>	<u>\$ 1,364</u>	<u>\$ 3,414</u>	<u>\$ 3,982</u>

Pursuant to the “evergreen” provisions of the 2014 Equity Plan, the number of shares of common stock authorized for issuance under the plan automatically increased by 472,863 shares to 7,009,460 shares effective January 1, 2018.

As of September 30, 2018, 3,826,217 shares of common stock were reserved for issuance upon the exercise or vesting of outstanding stock-based awards granted under the 2014 Equity Plan. In addition, as of September 30, 2018, 89,465 shares of common stock were reserved for issuance upon the exercise of outstanding stock options granted under the Company’s 2001 Equity Incentive Plan, as amended (the 2001 Equity Plan). Any cancellations or forfeitures of the options outstanding under the 2001 Equity Plan will result in the shares reserved for issuance upon exercise of such options becoming available for grant under the 2014 Equity Plan. As of September 30, 2018, there were 1,785,891 shares of common stock available for future grant under the 2014 Equity Plan.

Earnings per Share

The Company calculates net loss per common share based on the weighted-average number of common shares outstanding during each period. Potential common stock equivalents are determined using the treasury stock method. The weighted-average number of common shares included in the computation of diluted net loss gives effect to all potentially dilutive common equivalent shares, including outstanding stock options, RSUs and warrants. Common equivalent shares are excluded from the computation of diluted net loss per share if their effect is antidilutive.

Segments

Operating segments are identified as components of an enterprise about which separate, discrete financial information is available for evaluation by the chief operating decision maker in making decisions on how to allocate resources and assess performance. The Company’s chief operating decision maker is the Chief Executive Officer. The Company’s chief operating decision maker reviews consolidated operating results to make decisions about allocating resources and assessing performance for the entire Company. The Company views its operations and manages its business as one operating segment.

Information about the Company’s total revenues, based on shipment destination or services location, is presented in the following table:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
	(In thousands)			
Revenue:				
U.S.	\$ 11,485	\$ 13,555	\$ 30,677	\$ 32,816
International	12,452	13,643	38,005	42,453
Total	<u>\$ 23,937</u>	<u>\$ 27,198</u>	<u>\$ 68,682</u>	<u>\$ 75,269</u>

Warranty Costs

The Company provides warranties for its products and records the estimated cost within cost of revenue in the period that the related revenue is recorded. The Company's standard warranty period extends to one year from the date of shipment. This standard warranty provides that the Company's products will be free from defects in material and workmanship, and will, under normal use, conform to the specifications for the product.

The Company's products may be utilized in systems that involve new technical demands and new configurations. Accordingly, the Company regularly reviews and assesses whether warranty reserves should be recorded in the period that the related revenue is recorded. For an initial shipment of product for use in a system with new technical demands or new configurations and where the Company is unsure of meeting the customer's specifications, the Company will defer the recognition of product revenue and related costs until written customer acceptance is obtained.

The Company performs periodic testing of its aerogel blankets to ensure compliance with published performance specifications. From time to time, tests may indicate a product could potentially perform outside of these specifications. At that time, additional testing is initiated or the Company may conduct a root cause investigation. During the nine months ended September 30, 2018, a test result indicated that tested samples performed outside the published performance specifications for a specific attribute of a product and, as a result, the Company performed additional testing. The Company has determined that it is probable it has incurred a liability, however, a liability or range of liability is not estimable as of September 30, 2018. The Company will continue to assess the impact of the testing results on its customer base and, depending on the assessment, could be subject to material warranty charges in future periods.

The Company did not record any warranty expense during the nine months ended September 30, 2018. During the nine months ended September 30, 2017, the Company recorded warranty expense of \$0.9 million. This specific warranty charge was related to product claims for a single product application issue. As of September 30, 2018, the Company had satisfied all outstanding warranty claims.

Recently Issued Accounting Standards

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies. Recently issued standards typically do not require adoption until a future effective date. Prior to their effective date, the Company evaluates the pronouncements to determine the potential effects of adoption to its consolidated financial statements.

Standards Implemented Since December 31, 2017

In August 2015, the FASB issued a deferral of ASU 2014-09, Revenue from Contracts with Customers. The standard replaced the transaction- and industry-specific revenue recognition guidance under current U.S. GAAP with a principle based approach for determining revenue recognition. As a result of the deferral, public entities were required to apply the revised revenue recognition standard for the annual reporting period beginning on or after December 15, 2017, including interim periods within that annual reporting period. The Company adopted this standard using the modified retrospective method on January 1, 2018. The Company completed its analysis of the new revenue standard and determined that it would not materially impact the allocation and timing of recognition of previously reported revenues from the sale of products or performance of research and development services. In addition, the Company determined that there were no incremental contract costs or contract fulfillment costs to be recognized in connection with the adoption. Based on the Company's analysis, no adjustment to retained earnings was required as of the January 1, 2018 adoption date. Accordingly, the Company's application of the standard did not have a material impact on the Company's consolidated balance sheet at January 1, 2018 and did not have a material impact to its statement of operations for the nine months ended September 30, 2018 and 2017 or the twelve months ended December 31, 2017.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (ASU 2016-15). This amendment addresses eight classification issues related to the statement of cash flows. The amendments in ASU 2016-15 are effective for public business entities for annual and interim periods in fiscal years beginning after December 15, 2017. The Company adopted the provisions of the amendment on January 1, 2018. The adoption of the standard has not resulted in any material impact to the Company's consolidated financial statements or other disclosures.

Standards to be Implemented

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). FASB ASU 2016-02 modifies the accounting for leases and requires that all leases be recorded on the consolidated balance sheets as assets and liabilities. This standard is effective for fiscal years beginning after December 15, 2018. Early application is permitted. The Company expects to adopt the new standard on January

1, 2019, to apply a modified retrospective transition approach and to use the effective date as the date of initial application. As a result, the Company will not update financial information and will not provide the disclosures required under the new standard for dates and periods before January 1, 2019. The Company expects to elect the package of practical expedients under the new standard, which permits the Company to not reassess prior conclusions about lease identification, lease classification, and initial direct costs. The Company expects that this standard will have a material effect on the Company's consolidated financial statements. The most significant effects relate to the recognition of new right-of-use (ROU) assets and lease liabilities on the consolidated balance sheets and the provision of significant new disclosures about the Company's leasing activities. The Company currently expects to elect the short-term lease recognition exemption for all leases that qualify. For leases that qualify for this exemption, the Company will not recognize ROU assets or lease liabilities. The Company also currently expects to elect the practical expedient to not separate lease and non-lease components for all of the Company's leases.

The Company is in the process of updating its systems, controls and procedures for lease portfolio accounting to comply with the new standard. The Company does not expect a significant change in leasing activities prior to the expected adoption of the new standard on January 1, 2019.

(3) Revenue from Contracts with Customers

On January 1, 2018, the Company adopted Accounting Standards Codification 606, Revenue from Contracts with Customers (ASC 606) using the modified retrospective method for all contracts not completed as of the date of adoption. The adoption of ASC 606 did not have a material impact on the allocation and timing of the recognition of previously reported revenues from the sale of products, subsea projects or performance of research and development services. In addition, the Company determined that there are no incremental contract costs or contract fulfillment costs associated with the adoption. The reported results for 2018 reflect the application of ASC 606 guidance while the reported results for 2017 were prepared under the guidance of ASC 605. The adoption of ASC 606 represents a change in accounting principle that more closely aligns revenue recognition with the delivery of the Company's product or research services and will provide financial statement readers with enhanced disclosures.

Revenue Recognition

Revenue is recognized when a customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange from those goods or services. To determine revenue recognition for arrangements within the scope of ASC 606, the Company performs the following five steps: (i) identification of the contract with a customer; (ii) identification of the performance obligations in the contract; (iii) determination of the transaction price; (iv) allocation of the transaction price to the separate performance obligations in the contract; and (v) recognition of the revenue associated with performance obligation as they are satisfied. The Company applies the five-step model to contracts when it is probable that the Company will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations, and assesses whether each promised good or service is distinct. If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price based on the estimated relative standalone selling prices of the promised products or services underlying each performance obligation. The Company determines standalone selling prices based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, the Company estimates the standalone selling price taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

When determining the transaction price of a contract, an adjustment is made if payment from a customer occurs either significantly before or significantly after performance, resulting in a significant financing component. Applying the practical expedient in paragraph ASC 606-10-32-18, the Company does not assess whether a significant financing component exists if the period between when the Company performs its obligations under the contract and when the customer pays is one year or less. The Company did not have any contracts outstanding at January 1, 2018 and did not enter into any contracts during the nine months ended September 30, 2018 that contained a significant financing component.

The Company records deferred revenue for product sales when the Company has delivered products but other performance obligations have not been satisfied or control has not been transferred to the customer.

Shipping and Handling Costs

Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as fulfillment costs and are included in the cost of product revenue. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled to receive in exchange for these products or research services.

Product Revenue

The Company generally enters into contracts containing one type of performance obligation. The Company recognizes product revenue when the performance obligation is satisfied, which is generally upon delivery according to contractual shipping terms within customer purchase orders.

The Company also enters into rebate agreements with certain customers. These agreements may be considered an additional performance obligation of the Company or variable consideration within a contract. Rebates are recorded as a reduction of revenue in the period the related product revenue is recognized. A corresponding liability is recorded as a component of deferred revenue on the consolidated balance sheets. These arrangements are primarily based on the customer attaining contractually specified sales volumes.

The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product return liabilities using historical rates of return, current quarter credit sales, and specific items of exposure on a contract by contract basis.

Subsea Projects

The Company manufactures and sells subsea products that are designed for pipe-in-pipe applications in offshore oil production and are typically customized to meet customer specifications. Subsea products typically have no alternative use and contain an enforceable right to payment. Customer invoicing terms for subsea products are typically based on certain milestones within the production and delivery schedule. Under the provisions of ASC 606, the Company recognizes revenue at a point in time when transfer of control of the products is passed to the customer, or over time utilizing the input/cost-to-cost method. The timing of revenue recognition is assessed on a contract by contract basis. During the nine months ended September 30, 2018, the Company recognized \$2.4 million in connection with subsea projects.

Other Revenue

The Company is party to an amended and restated supply agreement with BASF Polyurethanes GmbH (BASF) (the Supply Agreement) and a joint development agreement with BASF SE (the JDA) (see note 7). Pursuant to the Supply Agreement, the Company will sell exclusively to BASF the Company's Spaceloft A2 product at annual volumes to be specified by BASF, subject to certain volume limits. The Company has determined that the exclusivity component of the Supply Agreement represents a performance obligation to BASF that will be satisfied over time. The Company will calculate the value of the exclusivity component upon receipt of prepayments from BASF. Revenue associated with this performance obligation will be recognized over the term of the agreement which expires on December 31, 2027.

During the nine months ended September 30, 2018, BASF made two prepayments of \$2.5 million each. At the time of the receipt of the prepayments, the Company calculated and accounted for the value associated with exclusivity component as deferred revenue. The value associated with the exclusivity component was approximately \$0.5 million for each prepayment.

During the nine months ended September 30, 2018, the Company recognized less than \$0.1 million in revenue associated with the exclusive right to sell Spaceloft A2 which is recorded as a component of product revenue in the Company's consolidated statement of operations. At September 30, 2018, deferred revenue related to the exclusivity component of the Supply Agreement totaled \$1.0 million. There was no deferred revenue related to the Supply Agreement at December 31, 2017.

Research Services

The Company performs research services under contracts with various government agencies and other institutions. These contracts generally have one type of performance obligation associated with the provision of research services including functional licenses to any resulting intellectual property. The Company records revenue using the percentage-of-completion method in two ways: (1) for firm-fixed-price contracts, the Company accrues that portion of the total contract price that is allocable on the basis of the Company's estimates of costs incurred to date to total contract costs; and (2) for cost-plus-fixed-fee contracts, the Company records revenue that is equal to total payroll cost incurred times a stated factor plus reimbursable expenses, to a stated upper limit. The primary cost under the Company's research service contracts is the labor effort expended in completing the research, and the only

deliverable, other than the labor hours expended, is the reporting of research results to the customer. Because the input measure of labor hours expended is also reflective of the output measure, it is a reliable means to measure the extent of progress toward completion. Revisions in cost estimates and fees during the course of the contract are reflected in the accounting period in which the facts that require the revisions become known. Contract costs and rates used to allocate overhead to contracts are subject to audit by the respective contracting government agency. Adjustments to revenue as a result of audit are recorded within the period they become known. To date, adjustments to revenue as a result of contracting agency audits have been insignificant.

Disaggregation of Revenue

In the following table, revenue is disaggregated by primary geographical region and source of revenue:

	Three Months ended September 30, 2018			Nine Months Ended September 30, 2018		
	U.S.	International	Total	U.S.	International	Total
	(In thousands)			(In thousands)		
Geographical region						
Asia	\$ —	\$ 7,814	\$ 7,814	\$ —	\$ 23,715	\$ 23,715
Canada	—	186	186	—	2,457	2,457
Europe	—	3,881	3,881	—	9,747	9,747
Latin America	—	571	571	—	2,086	2,086
U.S.	11,485	—	11,485	30,677	—	30,677
Total revenue	<u>\$ 11,485</u>	<u>\$ 12,452</u>	<u>\$ 23,937</u>	<u>\$ 30,677</u>	<u>\$ 38,005</u>	<u>\$ 68,682</u>
Source of revenue						
Product revenue	\$ 10,890	\$ 10,833	\$ 21,723	\$ 28,968	\$ 35,529	\$ 64,497
Subsea projects	—	1,591	1,591	5	2,430	2,435
Other revenue	—	28	28	—	46	46
Research services	595	—	595	1,704	—	1,704
Total revenue	<u>\$ 11,485</u>	<u>\$ 12,452</u>	<u>\$ 23,937</u>	<u>\$ 30,677</u>	<u>\$ 38,005</u>	<u>\$ 68,682</u>

Contract Balances

The following table presents changes in the Company's contract assets and contract liabilities during the nine months ended September 30, 2018:

	Balance at December 31, 2017	Additions	Deductions	Balance at September 30, 2018
	(In thousands)			
Contract assets				
Subsea projects	\$ 2,463	\$ 3,924	\$ (4,826)	\$ 1,561
Research services	425	1,706	(1,809)	322
Total contract assets	<u>\$ 2,888</u>	<u>\$ 5,630</u>	<u>\$ (6,635)</u>	<u>\$ 1,883</u>
Contract liabilities				
Deferred revenue				
Product revenue	\$ 1,178	\$ 2,070	\$ (2,492)	\$ 756
Subsea projects	126	3,363	(1,624)	1,865
Research services	—	82	—	82
Other revenue	—	1,054	(46)	1,008
Total contract liabilities	<u>\$ 1,304</u>	<u>\$ 6,569</u>	<u>\$ (4,162)</u>	<u>\$ 3,711</u>

During the nine months ended September 30, 2018, the Company recognized \$1.3 million of revenue that was included in deferred revenue at the beginning of the period.

A contract asset is recorded when the Company satisfies a performance obligation by transferring a promised good or service and has earned the right to consideration from its customer. These assets may represent a conditional or unconditional right to consideration and are included within accounts receivable on the consolidated balance sheets.

A contract liability is recorded when consideration is received, or such consideration is unconditionally due, from a customer prior to transferring goods or services under the terms of the contract. Contract liabilities are recognized as revenue after control of the products or services is transferred to the customer and all revenue recognition criteria have been met.

Transition Disclosures

The following tables summarize the impacts of adopting ASC 606 on certain components of the Company's consolidated financial statements as of and for the three and nine months ended September 30, 2018:

Consolidated Balance Sheets

	As of September 30, 2018	
	As reported under ASC 606	Pro forma as if ASC 605 was in effect
	(In thousands)	
Inventories	\$ 9,909	\$ 10,445
Total current assets	37,957	38,493
Total assets	109,033	109,569
Deferred revenue	2,811	3,313
Total current liabilities	19,380	19,882
Total liabilities	25,540	26,042
Accumulated deficit	(457,477)	(457,443)
Total stockholders' equity	83,493	83,527
Total liabilities and stockholders' equity	109,033	109,569

Total reported assets and liabilities were each approximately \$0.5 million less than the pro forma consolidated balance sheet which assumes ASC 605 guidance remained in effect as of September 30, 2018. Reported inventories and deferred revenue reflect the impact of revenue recognized over time utilizing the input/cost-to-cost method for subsea projects during the nine months ended September 30, 2018.

Consolidated Statements of Operations

	Three Months Ended September 30, 2018		Nine Months Ended September 30, 2018	
	As reported under ASC 606	Pro forma as if ASC 605 was in effect	As reported under ASC 606	Pro forma as if ASC 605 was in effect
	(In thousands)			
Product revenue	\$ 23,342	\$ 22,840	\$ 66,978	\$ 66,476
Total revenue	23,937	23,435	68,682	68,180
Product cost of revenue	22,154	21,618	60,853	60,317
Gross profit	1,529	1,563	7,083	7,117
Loss from operations	(6,369)	(6,335)	(19,974)	(19,940)
Net loss	(6,532)	(6,498)	(20,332)	(20,298)

Total reported product revenue and product cost of revenue were each approximately \$0.5 million greater than the pro forma consolidated statement of operations for the three and nine months ended September 30, 2018 under ASC 606. Reported revenue and cost of revenue reflect the impact of revenue recognized over time utilizing the input/cost-to-cost method for subsea projects during the nine months ended September 30, 2018. Under ASC 605 subsea projects revenue was recognized at a point in time when transfer of control of the product passed to the customer.

The impact of the adoption of ASC 606 on the consolidated statement of cash flows for the nine months ended September 30, 2018 was not material and had no impact on net cash used in operating activities.

(4) Inventories

Inventories consist of the following:

	September 30, 2018	December 31, 2017
	(In thousands)	
Raw materials	\$ 3,045	\$ 2,543
Finished goods	6,864	6,372
Total	<u>\$ 9,909</u>	<u>\$ 8,915</u>

(5) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	September 30, 2018	December 31, 2017	Useful life
	(In thousands)		
Construction in progress	\$ 9,541	\$ 7,699	—
Buildings	24,016	24,013	30 years
Machinery and equipment	119,361	118,786	3-10 years
Computer equipment and software	8,249	8,099	3 years
Total	<u>161,167</u>	<u>158,597</u>	
Accumulated depreciation	(90,167)	(82,530)	
Property, plant and equipment, net	<u>\$ 71,000</u>	<u>\$ 76,067</u>	

Depreciation expense was \$8.3 million and \$8.0 million for the nine months ended September 30, 2018 and 2017, respectively.

Construction in progress included engineering designs and other pre-construction costs for the planned manufacturing facility in Statesboro, Georgia of \$7.2 million at both September 30, 2018 and December 31, 2017. The Company has delayed the project to construct the Statesboro, Georgia manufacturing facility to better align the timing of this capacity expansion with the Company's assessment of future demand. In addition, construction in progress included \$2.3 million and less than \$0.1 million at September 30, 2018 and December 31, 2017, respectively, related to projects associated with the Company's plan to expand the capacity of the East Providence, Rhode Island facility.

(6) Accrued Expenses

Accrued expenses consist of the following:

	September 30, 2018	December 31, 2017
	(In thousands)	
Employee compensation	\$ 2,163	\$ 4,633
Other accrued expenses	1,366	1,229
Total	<u>\$ 3,529</u>	<u>\$ 5,862</u>

(7) Commitments and Contingencies

Customer Supply Agreement

The Company is party to the Supply Agreement with BASF and the JDA with BASF SE. Pursuant to the Supply Agreement, the Company will sell exclusively to BASF the Company's Spaceloft A2 product at annual volumes to be specified by BASF, subject to certain volume limits. The Supply Agreement will terminate on December 31, 2027. Upon expiration of the Supply Agreement, the Company will be subject to a post-termination supply commitment for an additional two years. The JDA is designed to facilitate the collaboration between the parties on the development and commercialization of new products.

In addition, BASF, in its sole discretion, may make prepayments to the Company in the aggregate amount of up to \$22.0 million during the term of the Supply Agreement. BASF agreed to make a prepayment in the amount of \$5.0 million to the Company in two equal installments in 2018 (the 2018 Prepayment). The amounts and terms of additional prepayment installments, if any, are subject to negotiation between the Company and BASF.

After January 1, 2019, the Company will, at BASF's instruction, credit up to 25.3% of any amounts invoiced by the Company for Spaceloft A2 product sold to BASF against the prepayment balance. However, BASF has no obligation to purchase products under the Supply Agreement. If any of the 2018 Prepayment remains uncredited as of December 31, 2021, BASF may request that the Company repay the uncredited amount to BASF. The prepayment obligation is secured by a security interest in real estate, plant and equipment at the Company's Rhode Island facility and a license to certain intellectual property.

As of September 30, 2018, the Company had received \$5.0 million of the 2018 Prepayment from BASF, which is recorded on the balance sheet as a prepayment liability, net of discount of \$0.9 million. The discount will be amortized into interest expense through December 31, 2021, or until the prepayment liability is fully credited by purchases from BASF.

Prepayment liability consists of the following:

	September 30, 2018	December 31, 2017
	(In thousands)	
Prepayment liability	\$ 5,000	\$ —
Discount on prepayment liability	(1,054)	—
Accretion of discount expense, net	107	—
Prepayment liability, less current maturities	<u>\$ 4,053</u>	<u>\$ —</u>

The deferred revenue associated with the prepayment liability represents a grant to BASF of the exclusive right to sell Spaceloft A2 over the term of the Supply Agreement. Deferred revenue will be amortized into revenue on a straight-line basis over the term of the Supply Agreement. At September 30, 2018, \$1.0 million was recorded as deferred revenue of which \$0.1 million was recorded as a component of short term deferred revenue. During the nine months ended September 30, 2018, the Company recognized less than \$0.1 million in revenue associated with the grant to BASF of the exclusive right to sell Spaceloft A2, which is recorded as a component of product revenue in the consolidated statement of operations.

Deferred revenue consists of the following:

	September 30, 2018	December 31, 2017
	(In thousands)	
Total deferred revenue	\$ 3,711	\$ 1,304
Current maturities of deferred revenue - product revenue	(2,702)	(1,304)
Current maturities of deferred revenue - Supply Agreement	(109)	—
Deferred revenue, less current maturities	<u>\$ 900</u>	<u>\$ —</u>

Revolving Line of Credit

The Company entered into an Amended and Restated Loan and Security Agreement (the Loan Agreement) with Silicon Valley Bank (the Bank), on August 31, 2014, which has been subsequently amended from time to time. On January 25, 2018, the Loan Agreement was amended to extend the maturity date of the facility to April 28, 2018. On April 25, 2018, the Loan Agreement was further amended to extend the maturity date of the facility to April 28, 2019. Under the Loan Agreement, the Company may borrow up to \$20.0 million subject to compliance with certain covenants and borrowing base limitations. At the Company's election, the interest rate applicable to borrowings may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, the Company is required to pay a monthly fee of 0.5% per annum of the average unused portion of the facility. Obligations under the Loan Agreement are secured by a security interest in all assets of the Company, including those at the East Providence facility, except for certain exclusions. The revolving credit facility matures on April 28, 2019.

At September 30, 2018 and December 31, 2017, the Company had \$5.2 million and \$3.8 million, respectively, drawn on the revolving credit facility. Under the Loan Agreement, the Company is required to comply with both non-financial and financial covenants, including minimum Adjusted EBITDA and minimum Adjusted Quick Ratio covenants, each as defined in the Loan Agreement. During 2018, the Company obtained a waiver on two occasions from the Bank with respect to compliance with the Adjusted Quick Ratio covenant. At September 30, 2018, the Company was in compliance with all such covenants. The Company has been required to provide letters of credit to secure obligations under certain commercial contracts. The Company had outstanding

letters of credit backed by the revolving credit facility of \$2.0 million and \$2.3 million at September 30, 2018 and December 31, 2017, respectively, which reduce the funds otherwise available to the Company under the facility.

At September 30, 2018, the effective amount available to the Company under the revolving credit facility was \$8.0 million after giving effect to the \$5.2 million in outstanding borrowings and \$2.0 million of outstanding letters of credit.

Litigation

The Company is, from time to time, a party to litigation that arises in the normal course of its business operations. See Part II, Item 1 “Legal Proceedings” of this Quarterly Report on Form 10-Q for a description of certain of the Company’s current legal proceedings. The Company is not presently a party to any litigation for which it believes a loss is probable requiring an amount to be accrued or a possible loss contingency requiring disclosure.

(8) Deferred Rent

The Company leases office and warehouse space in Northborough, Massachusetts and East Providence, Rhode Island.

For leases that contain fixed increases in the minimum annual lease payments during the term of the lease, the Company recognizes rental expense on a straight-line basis over the lease term, and records the difference between rent expense and the amount currently payable as deferred rent.

Deferred rent consists of the following:

	<u>September 30,</u> <u>2018</u>	<u>December 31,</u> <u>2017</u>
	(In thousands)	
Deferred rent	\$ 1,387	\$ 1,511
Current maturities of deferred rent	(180)	(208)
Deferred rent, less current maturities	<u>\$ 1,207</u>	<u>\$ 1,303</u>

(9) Net Loss Per Share

The computation of basic and diluted net loss per share consists of the following:

	<u>Three Months Ended</u> <u>September 30,</u>		<u>Nine Months Ended</u> <u>September 30,</u>	
	<u>2018</u>	<u>2017</u>	<u>2018</u>	<u>2017</u>
	(In thousands, except share and per share data)			
Numerator:				
Net loss	<u>\$ (6,532)</u>	<u>\$ (3,088)</u>	<u>\$ (20,332)</u>	<u>\$ (17,638)</u>
Denominator:				
Weighted average shares outstanding, basic and diluted	<u>23,808,703</u>	<u>23,442,241</u>	<u>23,707,245</u>	<u>23,356,997</u>
Net loss per share, basic and diluted	<u>\$ (0.27)</u>	<u>\$ (0.13)</u>	<u>\$ (0.86)</u>	<u>\$ (0.76)</u>

Potentially dilutive common shares that were excluded from the computation of diluted net loss per share because they were anti-dilutive consist of the following:

	Three Months Ended		Nine Months Ended	
	September 30,		September 30,	
	2018	2017	2018	2017
Common stock options	2,994,452	2,476,829	2,994,452	2,476,829
Restricted common stock units	921,227	834,859	921,227	834,859
Common stock warrants	—	120	—	120
Restricted common stock awards	136,187	151,859	136,187	151,859
Total	4,051,866	3,463,667	4,051,866	3,463,667

In the table above, anti-dilutive shares consist of those common stock equivalents that have (i) an exercise price above the average stock price for the period or (ii) related average unrecognized stock compensation expense sufficient to buy back the entire amount of shares. The Company excludes the shares issued in connection with restricted stock awards from the calculation of basic weighted average common shares outstanding until the restrictions lapse.

(10) Income Taxes

The Company incurred net operating losses and recorded a full valuation allowance against net deferred tax assets for all periods presented. Accordingly, the Company has not recorded a provision for federal or state income taxes.

The Securities and Exchange Commission staff issued Staff Accounting Bulletin No. 118 (SAB 118) to address the tax reform legislation enacted in the United States in 2017. In accordance with SAB 118, the Company has recognized the provisional tax impacts, related to the re-measurement of its deferred income tax assets and liabilities associated with the one-time mandatory transition tax on deemed repatriation as of December 31, 2017. Although the Company does not believe there will be any material adjustments in subsequent reporting periods, the ultimate impact may differ from the provisional amounts, due to, among other things, the significant complexity of the 2017 Tax Cuts and Jobs Act and anticipated additional regulatory guidance that may be issued by the Internal Revenue Service, changes in analysis, interpretations and assumptions the Company has made and actions the Company may take as a result of the 2017 Tax Cuts and Jobs Act.

(11) Subsequent Events

The Company has evaluated subsequent events through November 7, 2018, the date of issuance of the consolidated financial statements for the three and nine months ended September 30, 2018.

Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations.

The following information should be read in conjunction with the unaudited financial information and the notes thereto included in this Quarterly Report on Form 10-Q and the audited financial information and the notes thereto included in the Annual Report on Form 10-K for the year ended December 31, 2017, filed with the Securities and Exchange Commission (“SEC”) on March 1, 2018, which we refer to as the Annual Report.

Certain matters discussed in this Quarterly Report on Form 10-Q may be deemed to be forward-looking statements that involve risks and uncertainties. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. In this Quarterly Report on Form 10-Q, words such as “may,” “will,” “anticipate,” “estimate,” “expects,” “projects,” “intends,” “plans,” “believes” and similar expressions (as well as other words or expressions referencing future events, conditions or circumstances) are intended to identify forward-looking statements.

Our actual results and the timing of certain events may differ materially from the results discussed, projected, anticipated, or indicated in any forward-looking statements. We caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this Quarterly Report on Form 10-Q. In addition, even if our results of operations, financial condition and liquidity, and the development of the industry in which we operate are consistent with the forward-looking statements contained in this Quarterly Report on Form 10-Q, they may not be predictive of results or developments in future periods.

The following information and any forward-looking statements should be considered in light of factors discussed elsewhere in this Quarterly Report on Form 10-Q and under “Risk Factors” in Item 1A of the Annual Report.

We caution readers not to place undue reliance on any forward-looking statements made by us, which speak only as of the date they are made. We disclaim any obligation, except as specifically required by law and the rules of the SEC, to publicly update or revise any such statements to reflect any change in our expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward-looking statements.

You should read the following discussion and analysis of financial condition and results of operations together with Part I Item 1 “Financial Statements,” which includes our financial statements and related notes, elsewhere in this Quarterly Report on Form 10-Q.

Overview

We design, develop and manufacture innovative, high-performance aerogel insulation used primarily in the energy infrastructure and building materials markets. We believe our aerogel blankets deliver the best thermal performance of any widely used insulation product available on the market today and provide a combination of performance attributes unmatched by traditional insulation materials. Our end-use customers select our products where thermal performance is critical and to save money, improve resource efficiency, enhance sustainability, preserve operating assets and protect workers.

Our insulation is used by oil producers and the owners and operators of refineries, petrochemical plants, liquefied natural gas facilities, power generating assets and other energy infrastructure. Our Pyrogel and Cryogel product lines have undergone rigorous technical validation by industry leading end-users and achieved significant market adoption. We also derive product revenue from the building materials and other end markets. Customers in these markets use our products for applications as diverse as wall systems, military and commercial aircraft, trains, buses, appliances, apparel, footwear and outdoor gear.

We generate product revenue through the sale of our line of aerogel blankets. We market and sell our products primarily through a sales force based in North America, Europe and Asia. The efforts of our sales force are supported by a small number of sales consultants with extensive knowledge of a particular market or region. Our sales force is responsible for establishing and maintaining customer and partner relationships, delivering highly technical information and ensuring high-quality customer service.

Our salespeople work directly with end-use customers and engineering firms to promote the qualification, specification and acceptance of our products. We also rely on an existing and well-established channel of qualified insulation distributors and contractors in more than 40 countries around the world to ensure rapid delivery of our products and strong end-user support. Our salespeople also work to educate insulation contractors about the technical and operating cost advantages of our aerogel blankets.

We perform research services under contracts with various agencies of the U.S. government, including the Department of Defense and the Department of Energy, and other institutions. Research performed under contract with government agencies and other institutions enables us to develop and leverage technologies into broader commercial applications.

We manufacture our products using our proprietary technology at our facility in East Providence, Rhode Island. We have operated the East Providence facility since 2008 and have increased our annual nameplate capacity since that date to 50 million square feet of aerogel blankets. During 2018, we initiated a series of projects designed to increase this nameplate capacity to 60 million square feet of aerogel blankets by the end of 2020. We have also completed the design and engineering of a first line in a planned second manufacturing facility to be located in Statesboro, Georgia supported by a package of incentives from the State of Georgia and local governmental authorities. We have elected to delay construction of the Statesboro facility to better align the timing of this capacity expansion with our assessment of future demand. In the likely event that we do not commence construction of the Statesboro manufacturing facility by February 15, 2019, the governmental authorities may terminate the agreements that provide the package of incentives.

We have entered into a strategic partnership with BASF Polyurethanes GmbH (“BASF”) to develop and commercialize products for the building materials and other markets. The strategic partnership includes an amended and restated supply agreement (the “BASF Supply Agreement”) governing the sale of our Spaceloft A2 product to BASF and a joint development agreement targeting innovative products and technologies. Pursuant to the BASF Supply Agreement, BASF may, in its sole discretion, make a series of prepayments to us in the aggregate amount of up to \$22.0 million in support of our capacity expansion plans, our process improvement initiatives and our new business development efforts. BASF has made prepayments to us in the aggregate amount of \$5.0 million during the nine months ended September 30, 2018. These 2018 prepayments will be credited against amounts invoiced to BASF for Spaceloft A2 or repaid by us to BASF on or after December 31, 2021.

Our revenue for the nine months ended September 30, 2018 was \$68.7 million, which represented a decrease of \$6.6 million from the nine months ended September 30, 2017. Net loss for the nine months ended September 30, 2018 was \$20.3 million and net loss per diluted share was \$0.86. Net loss for the nine months ended September 30, 2017 was \$17.6 million and net loss per diluted share was \$0.76.

Key Metrics and Non-GAAP Financial Measures

We regularly review a number of metrics, including the following key metrics, to evaluate our business, measure our performance, identify trends affecting our business, formulate financial projections and make strategic decisions.

Square Foot Operating Metric

We price our product and measure our product shipments in square feet. We estimate our annual nameplate capacity was 50 million square feet of aerogel blankets at September 30, 2018. We believe the square foot operating metric allows us and our investors to measure our manufacturing capacity and product shipments on a uniform and consistent basis. The following chart sets forth product shipments associated with recognized revenue in square feet for the periods presented:

	<u>Three Months Ended</u> <u>September 30,</u>		<u>Nine Months Ended</u> <u>September 30,</u>	
	<u>2018</u>	<u>2017</u>	<u>2018</u>	<u>2017</u>
	(In thousands)			
Product shipments in square feet	7,791	8,649	22,685	25,629

Adjusted EBITDA

We use Adjusted EBITDA, a non-GAAP financial measure, as a means to assess our operating performance. We define Adjusted EBITDA as net income (loss) before interest expense, taxes, depreciation, amortization, stock-based compensation expense and other items, which occur from time to time that we do not believe are indicative of our core operating performance. Adjusted EBITDA is a supplemental measure of our performance that is not presented in accordance with U.S. GAAP. Adjusted EBITDA should not be considered as an alternative to net income (loss) or any other measure of financial performance calculated and presented in accordance with U.S. GAAP. In addition, our definition and presentation of Adjusted EBITDA may not be comparable to similarly titled measures presented by other companies.

We use Adjusted EBITDA:

- as a measure of operating performance because it does not include the impact of items that we do not consider indicative of our core operating performance;
- for planning purposes, including the preparation of our annual operating budget,
- to allocate resources to enhance the financial performance of our business; and
- as a performance measure under our bonus plan.

We also believe that the presentation of Adjusted EBITDA provides useful information to investors with respect to our results of operations and in assessing the performance and value of our business. Various measures of EBITDA are widely used by investors to measure a company's operating performance without regard to items that can vary substantially from company to company depending upon financing and accounting methods, book values of assets, capital structures and the methods by which assets were acquired.

Although measures similar to Adjusted EBITDA are frequently used by investors and securities analysts in their evaluation of companies, we understand that Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for net income (loss), income (loss) from operations, net cash provided by (used in) operating activities or an analysis of our results of operations as reported under U.S. GAAP. Some of these limitations are:

- Adjusted EBITDA does not reflect our historical cash expenditures or future requirements for capital expenditures or other contractual commitments;
- Adjusted EBITDA does not reflect changes in, or cash requirements for, our working capital needs;
- Adjusted EBITDA does not reflect stock-based compensation expense;
- Adjusted EBITDA does not reflect our income tax expense or cash requirements to pay our income taxes;
- Adjusted EBITDA does not reflect our interest expense, or the cash requirements necessary to service interest or principal payments on our debt;
- although depreciation, amortization and impairment charges are non-cash charges, the assets being depreciated, amortized or impaired will often have to be replaced in the future, and Adjusted EBITDA does not reflect any cash requirements for these replacements; and
- other companies in our industry may calculate EBITDA or Adjusted EBITDA differently than we do, limiting their usefulness as a comparative measure.

Because of these limitations, our Adjusted EBITDA should not be considered as a measure of discretionary cash available to us to reinvest in the growth of our business or as a measure of cash available for us to meet our obligations.

To properly and prudently evaluate our business, we encourage you to review the U.S. GAAP financial statements included elsewhere in this Quarterly Report on Form 10-Q, and not to rely on any single financial measure to evaluate our business.

The following table presents a reconciliation of net loss, the most directly comparable U.S. GAAP measure, to Adjusted EBITDA for the periods presented:

	Three Months Ended		Nine Months Ended	
	September 30,		September 30,	
	2018	2017	2018	2017
	(In thousands)			
Net loss	\$ (6,532)	\$ (3,088)	\$ (20,332)	\$ (17,638)
Depreciation and amortization	2,573	2,726	8,259	8,032
Stock-based compensation ⁽¹⁾	1,128	1,364	3,414	3,982
Interest expense	163	58	358	123
Adjusted EBITDA	<u>\$ (2,668)</u>	<u>\$ 1,060</u>	<u>\$ (8,301)</u>	<u>\$ (5,501)</u>

⁽¹⁾ Represents non-cash stock-based compensation related to vesting and modifications of stock option grants, vesting of restricted stock units and vesting of restricted common stock.

Our financial performance, including such measures as net income (loss), earnings per share and Adjusted EBITDA, are affected by a number of factors including volume and mix of aerogel products sold, average selling prices, our material and manufacturing costs, the costs associated with and timing of capacity expansions and start-up of additional production capacity, and the amount and timing of operating expenses, including patent enforcement costs. As we build out manufacturing capacity in our existing facility and in new facilities in the longer term, we expect increased manufacturing expenses will periodically have a negative impact on net income (loss), earnings per share and Adjusted EBITDA, but will set the framework for improved performance in the long term. Accordingly, we expect that our net income (loss), earnings per share and Adjusted EBITDA will vary from period to period, in particular as and when we expand our manufacturing capacity in existing or new facilities.

As a result of the conclusion of a multiyear petrochemical project with a major Asian energy company and a decline in the volume of subsea projects, which together comprised 19% of our product revenue during 2017, we are experiencing a decrease in revenue during 2018. In addition, we have increased our investment in new initiatives and personnel during 2018 with the objective of restoring long-term growth in our existing markets and developing new business opportunities. As a result of the decrease in revenue and the increase in expense associated with these new initiatives and personnel, we are experiencing an increase in net loss and net loss per share and a decrease in Adjusted EBITDA during 2018.

We expect to experience growth in total revenue and Adjusted EBITDA during 2019 due to expected volume growth in our petrochemical and refinery markets, and an anticipated increase in project-based demand in the subsea and LNG markets. We have also announced a price increase for 2019 which we expect will support the projected increase in revenue and improvement in Adjusted EBITDA during the year. As a result of these factors, we are projecting growth in total revenue versus 2018 in excess of 20%, a decrease in net loss and a return to positive Adjusted EBITDA for the year.

Emerging Growth Company Status

The JOBS Act permits us, as an “emerging growth company,” to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. We have opted out of this provision and, as a result, we comply with new or revised accounting standards as required when they are adopted. This decision to opt out of the extended transition period under the JOBS Act is irrevocable.

Components of Our Results of Operations

Revenue

We recognize product revenue from the sale of our line of aerogel products and research services revenue from the provision of services under contracts with various agencies of the U.S. government and other institutions. Product and research services revenue is recognized upon the satisfaction of contractual performance obligations.

We record deferred revenue for product sales when (i) we have delivered products but other revenue recognition criteria have not been satisfied or (ii) payments have been received in advance of products being delivered.

We have experienced a decrease in revenue during 2018 due to the conclusion of the multiyear petrochemical project with a major Asian energy company and a decrease in project related revenue in the subsea market, which together comprised 19% of our product revenue during 2017.

Cost of Revenue

Cost of product revenue consists primarily of materials and manufacturing expense. Cost of product revenue is recorded when the related product revenue is recognized.

Material is our most significant component of cost of product revenue and includes fibrous batting, silica materials and additives. Material costs as a percentage of product revenue vary from product to product due to differences in average selling prices, material requirements, product thicknesses and manufacturing yields. During the nine months ended September 30, 2018, we have experienced a significant increase in the costs of silica precursor materials, which constitute over 50% of our raw material costs. In addition, we provide warranties for our products and record the estimated cost within cost of revenue in the period that the related revenue is recorded or when we become aware that a potential warranty claim is probable and can be reasonably estimated. During the nine months ended September 30, 2018, a test result has indicated that tested samples performed outside the published performance specifications for a specific attribute of a product and, as a result, we have performed additional testing. We have determined that it is probable we have incurred a liability, however, the liability is not estimable as of September 30, 2018. We will continue to assess the impact of the test results on our customer base and, depending on the assessment, we could be subject to material warranty charges in

future periods. As a result of these factors, material costs as a percentage of revenue will vary from period to period due to changes in the mix of aerogel products sold, the costs of our raw materials or the estimated cost of warranties. However, in general, we expect material costs to decline as a percentage of revenue as we seek to achieve higher selling prices, material sourcing improvements, quality improvements and manufacturing yield enhancements for our aerogel products.

Manufacturing expense is also a significant component of cost of revenue. Manufacturing expense includes labor, utilities, maintenance expense, and depreciation on manufacturing assets. Manufacturing expense also includes stock-based compensation of manufacturing employees and shipping costs. As we increase manufacturing capacity in our East Providence, Rhode Island facility through 2020 and, over time, through the anticipated construction, operation, and expansion of a second manufacturing facility, we expect manufacturing expense as a percentage of product revenue will increase following each such expansion but will decrease in the long-term due to improved manufacturing productivity and increased product revenue supported by the additional capacity.

Our cost of product revenue in absolute dollars has decreased during 2018 compared to 2017. The decrease in cost of product revenue in absolute dollars reflects the impact of a decrease in manufacturing output and a favorable mix of products sold, offset, in part, by an increase in the cost of our raw materials, and an increase in personnel and expense in support of our capacity expansion and growth initiatives. However, due to the impact of the decrease in product revenue during 2018, our cost of product revenue as a percentage of product revenue has increased during 2018 compared to 2017.

Cost of research services revenue consists of direct labor costs of research personnel engaged in the contract research, third-party consulting expense, and associated direct material costs. This cost of revenue also includes overhead expenses associated with project resources, development tools and supplies. Cost of research services revenue is recorded when the related research services revenue is recognized.

Gross Profit

Our gross profit as a percentage of revenue is affected by a number of factors, including the volume of aerogel products produced and sold, the mix of aerogel products sold, average selling prices, our material and manufacturing costs, realized capacity utilization and the costs associated with expansions and start-up of production capacity. Accordingly, we expect our gross profit in absolute dollars and as a percentage of revenue to vary significantly from period to period. As and when we build out our manufacturing capacity, we expect increased manufacturing expenses will periodically have a negative impact on gross profit in the periods following any such expansion.

Due to the conclusion of a multiyear petrochemical project with a major Asian energy company and a decrease in the volume of subsea projects, which together comprised 19% of our product revenue during 2017, we are experiencing a decrease in revenue and an associated decrease in gross profit in absolute dollars and as a percentage of revenue during 2018. During the nine months ended September 30, 2018, we have also experienced a significant increase in the costs of silica materials, which constitute over 50% of our raw material costs. In addition, we have increased investment in manufacturing personnel and expenses during 2018 in support of our objective to increase the capacity of our East Providence, Rhode Island manufacturing facility, operational improvement initiatives and our new business development efforts. As a result of these factors, we have experienced a decrease in gross profit during 2018.

However, in the longer term, we expect gross profit to improve in absolute dollars and as a percentage of revenue due to expected increases in total revenue, production volumes and manufacturing productivity. In addition, we expect the increases in revenue, volume and productivity will be supported by planned capacity expansions, and the realization of material purchasing efficiencies.

Operating Expenses

Operating expenses consist of research and development, sales and marketing, and general and administrative expenses. Operating expenses include personnel costs, legal fees, professional fees, service fees, insurance premiums, travel expense, facilities related costs and other costs and fees. The largest component of our operating expenses is personnel costs, consisting of salaries, benefits, incentive compensation and stock-based compensation. In any particular period, the timing and extent of personnel additions or reductions, legal activities, including patent enforcement actions, marketing programs, research efforts and a range of similar activities or actions could materially affect our operating expenses, both in absolute dollars and as a percentage of revenue.

We have increased our investment in new initiatives and personnel during 2018 with the objective of restoring long-term growth in our existing markets and to develop new business opportunities. However, we have decreased spending for patent enforcement actions during the year. As a result, we have experienced a decrease in operating expenses in absolute dollars during 2018. However, due to the impact of the decrease in revenue during 2018, our operating expenses as a percentage of revenue has increased during 2018 compared to 2017.

Research and Development Expenses

Research and development expenses consist primarily of expenses for personnel engaged in the development of next generation aerogel compositions, form factors and manufacturing technologies. These expenses also include testing services, prototype expenses, consulting services, equipment depreciation, facilities costs and related overhead. We expense research and development costs as incurred. We expect to continue to devote substantial resources to the development of new aerogel technologies. We believe that these investments are necessary to maintain and improve our competitive position. We expect to continue to invest in research and engineering personnel and the infrastructure required in support of their efforts. While we expect that our research and development expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer term, in the nearer term we expect such expenses will increase as a percentage of revenue.

Sales and Marketing Expenses

Sales and marketing expenses consist primarily of personnel costs, incentive compensation, marketing programs, travel and related costs, consulting expenses and facilities related costs. We are expanding our sales force and sales consultants globally to drive anticipated growth in customers and demand for our products. While we expect that sales and marketing expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer-term, in the nearer term we expect such expenses will increase as a percentage of revenue.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel costs, legal expenses, consulting and professional services, audit and tax consulting costs, and expenses for our executive, finance, legal, human resources and information technology organizations. General and administrative expenses have increased as we have incurred additional costs related to operating as a publicly-traded company, which include costs of compliance with securities, corporate governance and related laws and regulations, investor relations expenses, increased insurance premiums, including director and officer insurance, and increased audit and legal fees. In addition, we expect our general and administrative expenses to increase as we add general and administrative personnel to support the anticipated growth of our business and continued expansion of our manufacturing operations. We also expect that the patent enforcement actions, described in more detail under “Legal Proceedings” in Part II, Item 1 of this Quarterly Report on Form 10-Q, if protracted, could result in significant additional legal expense over the medium to long-term. During 2018, general and administrative expense have decreased both in absolute dollars and as a percentage of revenue due to a reduction in patent enforcement costs. In the longer term, however, we expect that general and administrative expenses will increase in absolute dollars but continue to decline as a percentage of revenue.

Interest Expense, Net

For the nine months ended September 30, 2018, interest expense, net consisted of fees and interest expense related to our revolving credit facility and \$0.1 million of accretion of the prepayment liability discount associated with the BASF Supply Agreement. For the nine months ended September 30, 2017, interest expense, net consisted primarily of fees related to our revolving credit facility.

Provision for Income Taxes

We have incurred net losses since inception and have not recorded benefit provisions for U.S. federal income taxes or state income taxes since the tax benefits of our net losses have been offset by valuation allowances due to the uncertainty associated with the utilization of net operating loss carryforwards.

Results of Operations

Three months ended September 30, 2018 compared to the three months ended September 30, 2017

The following tables set forth a comparison of the components of our results of operations for the periods presented:

Revenue

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
(\$ in thousands)						
Revenue:						
Product	\$ 23,342	98%	\$ 26,812	99%	\$ (3,470)	(13)%
Research services	595	2%	386	1%	209	54%
Total revenue	<u>\$ 23,937</u>	100%	<u>\$ 27,198</u>	100%	<u>\$ (3,261)</u>	(12)%

The following chart sets forth product shipments in square feet for the periods presented:

	Three Months Ended September 30,		Change	
	2018	2017	Amount	Percentage
Product shipments in square feet (in thousands)	7,791	8,649	(858)	(10)%

Total revenue decreased \$3.3 million, or 12%, to \$23.9 million for the three months ended September 30, 2018 from \$27.2 million in the comparable period in 2017 primarily as a result of a decrease in product revenue.

Product revenue decreased by \$3.5 million, or 13%, to \$23.3 million for the three months ended September 30, 2018 from \$26.8 million in the comparable period in 2017. This decrease was principally the result of a decline in project work in South America and in the subsea market, offset, in part, by growth in the petrochemical and refinery markets, particularly in Asia and North America.

Product revenue for the three months ended September 30, 2018 included \$5.0 million to a North American distributor. Product revenue for the three months ended September 30, 2017 included \$5.0 million to a subsea contractor, \$4.0 million and \$3.2 million to two North American distributors, respectively, and \$3.0 million to a South American contractor.

The average selling price per square foot of our products decreased by \$0.11, or 4%, to \$2.99 per square foot for the three months ended September 30, 2018 from \$3.10 per square foot for the three months ended September 30, 2017. The decrease in average selling price reflected a year-over-year decrease in the mix of high-priced subsea products, offset, in part, by the impact of price increases enacted in early 2018. This decrease in average selling price had the effect of decreasing product revenue by \$0.8 million for the three months ended September 30, 2018 from the comparable period in 2017.

In volume terms, product shipments decreased by 0.8 million square feet, or 10%, to 7.8 million square feet of aerogel products for the three months ended September 30, 2018, as compared to 8.6 million square feet for the three months ended September 30, 2017. The decrease in product volume had the effect of decreasing product revenue by \$2.7 million for the three months ended September 30, 2018 from the comparable period in 2017.

Research services revenue increased \$0.2 million, or 54%, to \$0.6 million for the three months ended September 30, 2018 from \$0.4 million in the comparable period in 2017. The increase was primarily due to the timing and amount of funding available under existing research contracts during the three months ended September 30, 2018 versus the comparable period in 2017.

Product revenue was 98% of total revenue for the three months ended September 30, 2018 and 99% for the three months September 30, 2017. Research services revenue was 2% of total revenue for the three months ended September 30, 2018 and 1% of total revenue for the three months ended September 30, 2017.

Cost of Revenue

	Three Months Ended September 30,						Change	
	2018			2017			Amount	Percentage
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue		
(\$ in thousands)								
Cost of revenue:								
Product	\$ 22,154	95%	93%	\$ 22,115	82%	81%	\$ 39	0%
Research services	254	43%	1%	135	35%	1%	119	88%
Total cost of revenue	<u>\$ 22,408</u>	94%	94%	<u>\$ 22,250</u>	82%	82%	<u>\$ 158</u>	1%

Total cost of revenue increased \$0.2 million, or 1%, to \$22.4 million for the three months ended September 30, 2018 from \$22.2 million in the comparable period in 2017. The increase in total cost of revenue was primarily the result of an increase in research services cost of revenue.

Product cost of revenue increased by less than \$0.1 million, or less than 1%, to \$22.2 million for the three months ended September 30, 2018 from \$22.1 million in the comparable period in 2017. The less than \$0.1 million increase was the result of a \$0.6 million increase in material costs, offset, in part, by a \$0.5 million decrease in manufacturing expense. The increase in material costs was driven by an increase in the cost of silica materials, which constitute over 50% of our raw material costs, and a decrease in manufacturing output, offset, in part, by the 0.8 million square foot, or 10%, decrease in product shipments period over period. The decrease in manufacturing expense was the result of decreases in utilities costs of \$0.3 million, maintenance expense of \$0.2 million, and depreciation expense of \$0.1 million, offset, in part, by an increase in other expenses of \$0.1 million.

Product cost of revenue as a percentage of product revenue increased to 95% during the three months ended September 30, 2018 from 82% during the three months ended September 30, 2017. This increase was the result of the high proportion of fixed manufacturing expenses that remained essentially unchanged despite a 13% decrease in product revenue and a decrease in manufacturing output for the three months ended September 30, 2018 from the comparable period in 2017.

Research services cost of revenue increased \$0.1 million, or 88%, to \$0.2 million for the three months ended September 30, 2018 from \$0.1 million for the comparable period in 2017. Cost of research service revenue as a percentage of research services revenue increased to 43% during the three months ended September 30, 2018 from 35% in the comparable period in 2017 due to an increase in outside services utilized to support the contracted research.

Gross Profit

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
(\$ in thousands)						
Gross profit	\$ 1,529	6%	\$ 4,948	18%	\$ (3,419)	(69)%

Gross profit decreased by \$3.4 million, or 69%, to \$1.5 million for the three months ended September 30, 2018 from \$4.9 million in the comparable period in 2017. The decrease in gross profit was the result of the \$3.3 million decrease in total revenue and the less than \$0.2 million increase in total cost of revenue. The decrease in revenue was principally associated with the year-over-year decline in project work in South America and in the subsea market. The increase in total cost of revenue was driven by the increase in the cost of silica materials, which constitute over 50% of our raw material costs, and the decrease in manufacturing output, offset, in part, by the 0.8 million square foot, or 10%, decrease in product shipments period over period.

Gross profit as a percentage of total revenue decreased to 6% of total revenue for the three months ended September 30, 2018 from 18% in the comparable period in 2017.

Research and Development Expenses

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Research and development expenses	\$ 1,384	6%	\$ 1,468	5%	\$ (84)	(6)%

Research and development expenses decreased by \$0.1 million, or 6%, to \$1.4 million for the three months ended September 30, 2018 from \$1.5 million in the comparable period in 2017. The decrease was primarily the result of a decrease in compensation and related costs.

Research and development expenses as a percentage of total revenue increased to 6% for the three months ended September 30, 2018 as compared to 5% in the comparable period in 2017 due principally to the decrease in revenue during the three months ended September 30, 2018.

Sales and Marketing Expenses

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Sales and marketing expenses	\$ 3,061	13%	\$ 2,745	10%	\$ 316	12%

Sales and marketing expenses increased by \$0.3 million, or 12%, to \$3.1 million for the three months ended September 30, 2018 from \$2.8 million in the comparable period in 2017. The \$0.3 million increase was the result of increases in commission and professional fees of \$0.3 million and travel expense of \$0.2 million offset, in part, by a decrease in compensation and related costs of \$0.2 million.

Sales and marketing expenses as a percentage of total revenue increased to 13% for the three months ended September 30, 2018 from 10% in the comparable period in 2017 due to the combination of the increase in sales and marketing expenses and the decrease in revenue during the three months ended September 30, 2018.

General and Administrative Expenses

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
General and administrative expenses	\$ 3,453	14%	\$ 3,765	14%	\$ (312)	(8)%

General and administrative expenses decreased by \$0.3 million, or 8%, to \$3.5 million during the three months ended September 30, 2018 from \$3.8 million in the comparable period in 2017. The \$0.3 million decrease was the result of decreases in compensation and related costs of \$0.4 million, and other general and administrative expenses of \$0.1 million, offset, in part, by an increase in patent enforcement costs of \$0.2 million.

General and administrative expenses as a percentage of total revenue remained unchanged at 14% for the three months ended September 30, 2018 from the comparable period in 2017 due primarily to the decrease in revenue during the three months ended September 30, 2018 from the comparable period in 2017.

Interest Expense, net

	Three Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Interest expense, net	\$ (163)	(1)%	\$ (58)	(0)%	\$ (105)	181%

Interest expense, net, increased to \$0.2 million during three months ended September 30, 2018 from less than \$0.1 million during the comparable period in 2017. The \$0.1 million increase was primarily due to an increase in interest expense associated with outstanding balances under our revolving line of credit and accretion of the prepayment liability discount associated with the BASF Supply Agreement.

Nine months ended September 30, 2018 compared to the nine months ended September 30, 2017

The following tables set forth a comparison of the components of our results of operations for the periods presented:

Revenue

	Nine Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Revenue:						
Product	\$ 66,978	98%	\$ 73,700	98%	\$ (6,722)	(9)%
Research services	1,704	2%	1,569	2%	135	9%
Total Revenue	\$ 68,682	100%	\$ 75,269	100%	\$ (6,587)	(9)%

The following chart sets forth product shipments in square feet for the periods presented:

	Nine Months Ended September 30,		Change	
	2018	2017	Amount	Percentage
Product shipments in square feet (in thousands)	22,685	25,629	(2,944)	(11)%

Total revenue decreased \$6.6 million, or 9%, to \$68.7 million for the nine months ended September 30, 2018 from \$75.3 million in the comparable period in 2017 primarily as a result of a decrease in product revenue.

Product revenue decreased by \$6.7 million, or 9%, to \$67.0 million for the nine months ended September 30, 2018 from \$73.7 million in the comparable period in 2017. This decrease was principally the result of a decline in project work in the subsea market and in South America, and due to the successful conclusion of several LNG projects during 2017, offset, in part, by growth in the petrochemical and refinery markets, particularly in North America and Asia.

Product revenue for the nine months ended September 30, 2018 included \$15.6 million to a North American distributor. Product revenue for the nine months ended September 30, 2017 included \$11.0 million to a North American distributor and \$7.5 million to an Asian distributor.

The average selling price per square foot of our products increased by \$0.07, or 2%, to \$2.95 per square foot for the nine months ended September 30, 2018 from \$2.88 per square foot for the nine months ended September 30, 2017. The increase in average selling price reflected the impact of price increases enacted in early 2018. This increase in average selling price had the effect of increasing product revenue by \$1.7 million for the nine months ended September 30, 2018 from the comparable period in 2017.

In volume terms, product shipments decreased by 2.9 million square feet, or 11%, to 22.7 million square feet of aerogel products for the nine months ended September 30, 2018, as compared to 25.6 million square feet for the nine months ended September 30, 2017. The decrease in product volume had the effect of decreasing product revenue by \$8.4 million for the nine months ended September 30, 2018 from the comparable period in 2017.

Research services revenue increased \$0.1 million, or 9%, to \$1.7 million for the nine months ended September 30, 2018 from \$1.6 million in the comparable period in 2017. The increase was primarily due to the timing and amount of funding available under existing research contracts during the nine months ended September 30, 2018 from the comparable period in 2017.

Product revenue was 98% of total revenue for the nine months ended September 30, 2018 and 2017. Research services revenue was 2% of total revenue for the nine months ended September 30, 2018 and 2017.

Cost of Revenue

	Nine Months Ended September 30,						Change	
	2018		2017					
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage
(\$ in thousands)								
Cost of revenue:								
Product	\$ 60,853	91%	89%	\$ 63,706	86%	85%	\$ (2,853)	(4)%
Research services	746	44%	1%	700	45%	1%	46	7%
Total cost of revenue	<u>\$ 61,599</u>	90%	90%	<u>\$ 64,406</u>	86%	86%	<u>\$ (2,807)</u>	(4)%

Total cost of revenue decreased \$2.8 million, or 4%, to \$61.6 million for the nine months ended September 30, 2018 from \$64.4 million in the comparable period in 2017. The decrease in total cost of revenue was primarily the result of a decrease in product cost of revenue.

Product cost of revenue decreased \$2.8 million, or 4%, to \$60.9 million for the nine months ended September 30, 2018 from \$63.7 million in the comparable period in 2017. The \$2.8 million decrease was the result of a \$2.5 million decrease in material costs and a \$0.3 million decrease in manufacturing expense. The decrease in material costs was driven by the 2.9 million square feet, or 11%, decrease in product shipments period over period and a decrease of \$0.9 million in warranty expense, offset, in part, by an increase in the cost of silica materials, which constitute over 50% of our raw material costs and a decrease in manufacturing output. The decrease in manufacturing expense was the result of decreases in maintenance expense of \$0.9 million and utilities expense of \$0.6 million, offset, in part, by increases in compensation and related costs of \$0.7 million, depreciation expense of \$0.3 million and other costs of \$0.2 million.

Cost of product revenue as a percentage of product revenue increased to 91% during the nine months ended September 30, 2018 from 86% during the nine months ended September 30, 2017. This increase was the result of the high proportion of fixed manufacturing expenses that remained essentially unchanged despite a 9% decrease in product revenue and a decrease in manufacturing output for the nine months ended September 30, 2018 from the comparable period in 2017.

Cost of research services revenue was \$0.7 million for the nine months ended September 30, 2018 and 2017. Cost of research service revenue as a percentage of research services revenue decreased to 44% during the nine months ended September 30, 2018 from 45% in the comparable period in 2017 due to a reduction in outside services utilized to support the contracted research.

Gross Profit

	Nine Months Ended September 30,				Change	
	2018		2017			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
(\$ in thousands)						
Gross profit	\$ 7,083	10%	\$ 10,863	14%	\$ (3,780)	(35)%

Gross profit decreased \$3.8 million, or 35%, to \$7.1 million for the nine months ended September 30, 2018 from \$10.9 million in the comparable period in 2017. The decrease in gross profit was the result of the \$6.6 million decrease in total revenue, offset, in part, by the \$2.8 million decrease in total cost of revenue. The decrease in revenue was principally associated with the decline in project work in the subsea market and in South America, and due to the successful conclusion of several LNG projects during 2017. The decrease in total cost of revenue was driven by the 2.9 million square feet, or 11%, decrease in product shipments period over period and a decrease in warranty expense, offset, in part, by an increase in the cost of silica materials, which constitute over 50% of our raw material costs, and a decrease in manufacturing output.

Gross profit as a percentage of total revenue decreased to 10% of total revenue for nine months ended September 30, 2018 from 14% in the comparable period in 2017 due principally to the decrease in total revenue for the nine months ended September 30, 2018.

Research and Development Expenses

	Nine Months Ended September 30,				Change	
	2018		2017			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
(\$ in thousands)						
Research and development expenses	\$ 4,627	7%	\$ 4,753	6%	\$ (126)	(3)%

Research and development expenses decreased by \$0.1 million, or 3%, to \$4.7 million for the nine months ended September 30, 2018 from \$4.8 million in the comparable period in 2017 due to decreases in professional fees and other expenses of \$0.1 million.

Research and development expenses as a percentage of total revenue increased to 7% for nine months ended September 30, 2018 from 6% in the comparable period in 2017 due to the decrease in total revenue for the nine months ended September 30, 2018.

Sales and Marketing Expenses

	Nine Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Sales and marketing expenses	\$ 10,281	15%	\$ 9,271	12%	\$ 1,010	11%

Sales and marketing expenses increased by \$1.0 million, or 11%, to \$10.3 million for the nine months ended September 30, 2018 from \$9.3 million in the comparable period in 2017. The \$1.0 million increase was the result of increases in commission and professional fees of \$0.5 million, travel related costs of \$0.4 million, and other external sales and marketing expense of \$0.5 million offset, in part, by a decrease in compensation and related costs of \$0.4 million.

Sales and marketing expenses as a percentage of total revenue increased to 15% for the nine months ended September 30, 2018 from 12% in the comparable period in 2017 due to the combination of the increase in sales and marketing expenses and the decrease in revenue during the nine months ended September 30, 2018.

General and Administrative Expenses

	Nine Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
General and administrative expenses	\$ 12,149	18%	\$ 14,354	19%	\$ (2,205)	(15)%

General and administrative expenses decreased by \$2.2 million, or 15%, to \$12.2 million during the nine months ended September 30, 2018 from \$14.4 million in the comparable period in 2017. The \$2.2 million decrease the result of a decreases in patent enforcement costs of \$2.4 million, and compensation and related costs of \$0.3 million, offset, in part, by increases in legal and professional fees of \$0.3 million, and other administrative expenses of \$0.2 million.

General and administrative expenses as a percentage of total revenue decreased to 18% for the nine months ended September 30, 2018 from 19% in the comparable period in 2017. This decrease was due primarily to the decrease in patent enforcement costs during the nine months ended September 30, 2018 from the comparable period in 2017.

Interest Expense, net

	Nine Months Ended September 30,				Change	
	2018		2017		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Interest expense, net	\$ (358)	(1)%	\$ (123)	(0)%	\$ (235)	191%

Interest expense, net, increased by \$0.2 million, or 191%, to \$0.3 million during the nine months ended September 30, 2018 from \$0.1 million during the comparable period in 2017. The \$0.2 million increase was the result of an increase in interest expense associated with outstanding balances under our revolving line of credit and accretion of the prepayment liability discount associated with the BASF Supply Agreement.

Liquidity and Capital Resources

Overview

We have experienced significant losses and invested substantial resources since our inception to develop, commercialize and protect our aerogel technology and to build a manufacturing infrastructure capable of supplying aerogel products at the volumes and costs required by our customers. These investments have included research and development and other operating expenses, capital expenditures and investment in working capital balances.

Through 2015, we experienced revenue growth and gained share in our target markets. Despite a decline in revenue in 2016, 2017 and 2018, our financial projections anticipate long-term revenue growth, with increasing levels of gross profit and improved cash flows from operations. To support this growth, we expect to incur up to an additional \$12.0 million of capital expenditures related to our plan to increase the capacity of our East Providence, Rhode Island manufacturing facility by 20% by the end of 2020. In addition we expect to incur up to \$130 million of capital expenditures to construct a first manufacturing line in a planned second manufacturing facility to be located in Statesboro, Georgia which, while currently delayed, we believe will ultimately be needed to support this expected long term growth in demand.

We believe that our existing cash balance and available credit will be sufficient to fund a portion of the planned expansion of our East Providence manufacturing facility. In addition, we plan to manage other capital expenditures and working capital balances to maintain the cash resources required to support current operating requirements.

We will need to supplement our cash balance and available credit with anticipated cash flows from operations, local government grants, debt financings, customer prepayments, technology licensing agreements or equity financings to provide the capital required to complete the expansion of our existing manufacturing facility, the first production line in our second manufacturing facility and other strategic business initiatives .

Primary Sources of Liquidity

Our principal sources of liquidity are currently our cash and cash equivalents and our revolving credit facility with Silicon Valley Bank. Cash and cash equivalents consist primarily of cash and money market accounts on deposit with banks. As of September 30, 2018, we had \$5.2 million of cash and cash equivalents.

At September 30, 2018, we had debt obligations of \$5.2 million related to borrowings under our revolving credit facility with Silicon Valley Bank, \$2.0 million of outstanding letters of credit secured by the revolving credit facility and an obligation of \$5.0 million associated with prepayments received pursuant to the BASF Supply Agreement.

We have maintained the revolving credit facility with Silicon Valley Bank since March 2011, which has been amended from time to time. Under our revolving credit facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.5% per annum of the average unused portion of the revolving credit facility. The revolving credit facility matures on April 28, 2019.

Under the revolving credit facility, we are required to comply with both non-financial and financial covenants, including minimum Adjusted EBITDA and minimum Adjusted Quick Ratio covenants, each as defined in the loan agreement. At September 30, 2018, we were in compliance with all such covenants. However, in May 2018 and in August 2018, we obtained from Silicon Valley Bank a waiver with respect to our compliance with the Adjusted Quick Ratio covenants. There can be no assurance that we will be able to comply with these or other covenants in the future or that Silicon Valley Bank will be willing to provide waivers of such covenants. As a result, we could end up in default under the revolving credit facility or unable to continue to borrow under the revolving credit facility. See “Risk Factors -- Risks Related to Our Business and Strategy -- We will require significant additional capital to pursue our growth strategy, but we may not be able to obtain additional financing on acceptable terms or at all” in our Annual Report on Form 10-K for the year ended December 31, 2017.

The effective amount available to us under the facility at September 30, 2018 was \$8.0 million after giving effect to the \$5.2 million of borrowings and \$2.0 million of letters of credit outstanding.

Analysis of Cash Flow

Net Cash Used in Operating Activities

During the nine months ended September 30, 2018, we used \$8.7 million in net cash in operating activities, as compared to the use of \$5.0 million in net cash during the comparable period in 2017, an increase in the use of cash of \$3.7 million. This increase in use of cash was the result of increases in cash used for net loss adjusted for non-cash items of \$2.9 million and cash used by changes in operating assets and liabilities of \$0.8 million.

Net Cash Used in Investing Activities

Net cash used in investing activities is primarily related to capital expenditures to support our growth. Net cash used in investing activities for the nine months ended September 30, 2018 and 2017 was \$2.7 million and \$5.4 million, respectively, in capital expenditures primarily for machinery and equipment to improve the throughput and efficiency of our East Providence facility.

Net Cash Used in Financing Activities

Net cash provided by financing activities for the nine months ended September 30, 2018 totaled \$5.9 million and consisted of \$31.0 million in borrowings under our line of credit and \$5.0 million in prepayment proceeds under the BASF Supply Agreement, offset, in part, by \$29.6 million of repayments under our line of credit and \$0.5 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

Net cash used in financing activities for the nine months ended September 30, 2017 totaled \$0.4 million and consisted of \$0.4 million for payments made for employee tax withholdings associated with the vesting of restricted stock units and less than \$0.1 million for repayments of obligations under capital leases. In addition, we borrowed and repaid \$6.0 million in advances under our line of credit.

Off Balance Sheet Arrangements

Since inception, we have not engaged in any off balance sheet activities as defined in Item 303(a)(4) of Regulation S-K.

Contractual Obligations and Commitments

There have been no material changes to our contractual obligations and commitments as reported in our Annual Report.

Recent Accounting Pronouncements

Information regarding new accounting pronouncements is included in note 2 to our unaudited consolidated financial statements contained in Item 1 of this Quarterly Report on Form 10-Q.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with U.S. GAAP. The preparation of our financial statements and related disclosures requires us to make estimates, assumptions and judgments that affect the reported amount of assets, liabilities, revenue, costs and expenses and related disclosures. We believe that the estimates, assumptions and judgments involved in these accounting policies have the greatest potential impact on our financial statements and, therefore, we consider these to be our critical accounting policies. Accordingly, we evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions and conditions. See our Annual Report and note 2 to our consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for information about these critical accounting policies, as well as a description of our other significant accounting policies.

Certain Factors That May Affect Future Results of Operations

The SEC encourages companies to disclose forward-looking information so that investors can better understand a company's future prospects and make informed investment decisions. This Quarterly Report on Form 10-Q contains such "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These statements involve known and unknown risks, uncertainties and other important factors which may cause our actual results, performance or achievements to be materially different from any future results, performances or achievements expressed or implied by the forward-looking statements. Forward-looking statements include, but are not limited to, statements about: our beliefs in the appropriateness of our assumptions, the accuracy of our estimates regarding expenses, loss contingencies, future revenues, future profits, uses of cash, available credit, capital requirements, and the need for additional financing; the performance of our aerogel blankets; our expectation that we will be successful in obtaining, enforcing and defending our patents against competitors and that such patents are valid and enforceable; our belief that our products possess strong competitive advantages over traditional insulation materials, including the superior thermal performance and the thin, easy-to-use and durable blanket form of our products; our plans to construct a second manufacturing facility in Statesboro, Georgia; our plans to expand capacity in our East Providence, Rhode Island manufacturing facility; our estimates of annual production capacity; our strategic partnership with BASF and the potential benefits of such a relationship, including the potential for it to create new product and market opportunities; the BASF Supply Agreement, our supply to BASF of its Spaceloft A2 product, the potential for future cash advances from BASF under the BASF Supply Agreement (payment of which are subject to certain conditions) to provide a source of financing for some portion of the cost of the planned capacity expansion in our East Providence, Rhode Island manufacturing facility and planned construction of our proposed manufacturing plant expected to be located in Statesboro, Georgia, and the potential for BASF to become a significant customer for our products; our joint development

agreement with BASF, and the potential for it to support the development of new aerogel products and technologies; our beliefs about the usefulness of the square foot operating metric; our beliefs about the financial metrics that are indicative of our core performance; our beliefs about the usefulness of our presentation of Adjusted EBITDA; our expectations about the effect of manufacturing capacity on financial metrics such as Adjusted EBITDA; our expectations about future revenues, expenses, gross profit, net loss, loss per share and Adjusted EBITDA, sources and uses of cash, capital requirements and the sufficiency of our existing cash balance and available credit; our beliefs about the outcome, effects or estimated costs of current or potential litigation or their respective timing, including expected legal expense in connection with our patent enforcement actions; our expectations about hiring additional personnel; our plans to devote substantial resources to the development of new aerogel technology; our expectations about product mix; our expectations about future material costs and manufacturing expenses as a percentage of revenue; our expectations of future gross profit and the effect of manufacturing expenses, manufacturing capacity and productivity on gross profit; our expectations about our resources and other investments in new technology and related research and development activities and associated expenses; our expectations about short and long term (a) research and development (b) general and administrative and (c) sales and marketing expenses; our expectations of near term revenue declines; our expectations of revenue growth, increased gross profit, and improving cash flows over the long term; our intentions about managing capital expenditures and working capital balances; our expectations about incurring significant capital expenditures in the future; our expectations about the expansion of our workforce and resources and its effect on sales and marketing, general and administrative, and related expenses; our expectations about future product revenue and demand for our products; our expectations about the effect of stock based compensation on various costs and expenses; our expectations about potential sources of future financing; our beliefs about the impact of accounting policies on our financial statements; our beliefs about the effect of interest rates, inflation and foreign currency fluctuations on our results of operations and financial condition; and our beliefs about the expansion of our international operations.

Words such as “may,” “will,” “anticipate,” “estimate,” “expects,” “projects,” “intends,” “plans,” “believes” and words and terms of similar substance used in connection with any discussion of future operating or financial performance, identify forward-looking statements. All forward-looking statements are management’s present expectations of future events and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those described in the forward-looking statements. These risks include, but are not limited to, those set forth in this Quarterly Report on Form 10-Q and under the heading “Risk Factors” contained in Item 1A of our Annual Report.

In light of these assumptions, risks and uncertainties, the results and events discussed in the forward-looking statements contained in this Quarterly Report on Form 10-Q might not occur. Stockholders and other readers are cautioned not to place undue reliance on the forward-looking statements, which speak only as of the date of this Quarterly Report on Form 10-Q. We are not under any obligation, and we expressly disclaim any obligation, to update or alter any forward-looking statements, whether as a result of new information, future events or otherwise. All subsequent forward-looking statements attributable to Aspen Aerogels, Inc. or to any person acting on its behalf are expressly qualified in their entirety by the cautionary statements contained or referred to in this section.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure results primarily from fluctuations in interest rates as well as from inflation. In the normal course of business, we are exposed to market risks, including changes in interest rates which affect our line of credit under our revolving credit facility as well as cash flows. We may also face additional exchange rate risk in the future as we expand our business internationally.

Interest Rate Risk

We are exposed to changes in interest rates in the normal course of our business. At September 30, 2018, we had unrestricted cash and cash equivalents of \$5.2 million. These amounts were held for working capital and capital expansion purposes and were invested primarily in deposit and money market accounts at a major financial institution in North America. Due to the short-term nature of these investments, we believe that our exposure to changes in the fair value of our cash as a result of changes in interest rates is not material.

As of September 30, 2018, we had \$5.2 million drawn and outstanding on our revolving credit facility. At September 30, 2018, we also had \$2.0 million of outstanding letters of credit supported by the revolving credit facility.

Under our revolving credit facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. At our election, the interest rate applicable to borrowings under the revolving credit facility may be based on the prime rate or LIBOR. Prime rate-based rates vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum, while LIBOR-based rates vary from LIBOR plus 3.75% per annum to LIBOR plus 4.25% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.5% per annum of the average unused portion of the

revolving credit facility. On April 25, 2018, the Loan Agreement was amended to extend the maturity date of the facility to April 28, 2019.

At September 30, 2018, the amount available to us under the revolving credit facility was \$8.0 million after giving effect to the \$5.2 million in borrowings and \$2.0 million of letters of credit outstanding under the facility.

Inflation Risk

Although we expect that our operating results will be influenced by general economic conditions, we do not believe that inflation has had a material effect on our results of operations during the periods presented in this report. However, we have experienced an increase in our raw material cost, and in particular silica materials, due to a supply imbalance in the silanes market during the nine months ended September 30, 2018. In addition, our business may be affected by inflation in the future.

Foreign Currency Exchange Risk

We are subject to inherent risks attributed to operating in a global economy. Principally all of our revenue, receivables, purchases and debts are denominated in U.S. dollars.

Item 4. Controls and Procedures.

(a) Evaluation of Disclosure Controls and Procedures .

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

As of September 30, 2018, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on such evaluation, our principal executive officer and principal financial officer have concluded that, as of September 30, 2018, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

(b) Changes in Internal Controls .

During the nine months ended September 30, 2018, there were no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) promulgated under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II — OTHER INFORMATION

Item 1. Legal Proceedings.

Patent Enforcement Actions

In May 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd. (“Nano”) and Guangdong Alison Hi Tech., Ltd. (“Alison” and together with Nano, the “Respondents”) in the International Trade Commission (“ITC”). The ITC complaint alleged that these two China-based companies engaged in unfair trade practices by importing aerogel products in the United States that infringed, and/or are manufactured by processes that infringe, several of our patents in violation of Section 337 of the Tariff Act. In the ITC complaint, we sought exclusion orders from the ITC that direct the United States Customs and Border Protection to stop the importation of these infringing products. In June 2016, the ITC instituted an investigation based on our complaint. In September 2017, the Administrative Law Judge (“ALJ”) presiding over the ITC investigation issued an Initial Determination finding that Alison and Nano infringed our patents relating to aerogel insulation and/or the methods of manufacturing aerogel insulation. As part of the Initial Determination, the ALJ found that Alison and Nano infringed all the patent claims asserted against each of them across the three asserted patents and that Alison and Nano failed to prove that the asserted claims were invalid. The ALJ also recommended a limited exclusion order as a remedy to prevent the importation of infringing aerogel products into the United States. In February 2018, the ITC issued its final determination confirming the ALJ’s infringement and validity determinations except with respect to one dependent product claim where the ITC found the claim not infringed. The ITC also revised some of the ALJ’s claim constructions. However, the ITC affirmed that Alison and Nano each violated Section 337 of the Tariff Act and issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. The exclusion order, which is enforced by the United States Customs and Border Protection, is currently in effect. In June 2018, Alison has filed a notice of appeal seeking a review of the ITC determination and order by the United States Court of Appeals for the Federal Circuit (CAFC). In its opening brief filed in September 2018, Alison has sought an appeal of ITC’s finding that a product composition patent asserted by us against Alison is valid and infringed. As neither respondents appealed the ITC findings of validity or infringement with respect to asserted process patents, the exclusion order remains valid and enforced irrespective of the outcome of the appeal. The ITC and we as intervenor, are expected to file response briefs by November 20, 2018. In addition to Respondents’ contention at the ITC that the asserted patents were invalid, Alison also filed petitions with the United States Patent and Trademark Office (“USPTO”) requesting Inter-Partes Review to cancel certain claims in three of our manufacturing process patents and one product patent. A three-member panel of Administrative Patent Judges at the USPTO denied all of Alison’s petitions to institute Inter-Partes Review challenging the validity of these Aspen patents. Alison also filed similar requests with the Chinese Patent Office (“SIPO”) seeking to invalidate two of our Chinese manufacturing process patents and two of our Chinese product patents. After the conclusion of the oral proceedings and before any decision issued by the SIPO, Alison withdrew all of its requests for invalidation of our Chinese patents. In May 2018, Alison filed another request seeking invalidation of one of our manufacturing process patents at SIPO, the same patent that it previously sought to invalidate and subsequently withdrew the request in 2017. After conducting an oral proceeding on September 6, 2018, the Patent Reexamination Board of SIPO (“PRB”) issued a decision on October 26, 2018 holding Aspen’s issued patent as amended as valid. The decision by the PRB is subject to an appeal to the Beijing IP court.

In April 2016, we also filed a patent infringement suit at the District Court in Mannheim, Germany against the Respondents and two European resellers asserting their infringement of one of our German patents. We subsequently asserted infringement of another three patents against Nano and a European reseller of Alison’s products at the Mannheim court. We have since settled with one European reseller in exchange for a commitment not to procure infringing products and cooperation with our case. In January 2018, the court issued a series of judgments by acknowledgement (German, “Anerkenntnisurteil”) finding the second reseller, Hiltex, liable for infringement and also issued injunctions against Hiltex. The judgments resulted from a settlement agreement in which Hiltex agreed not to resell the infringing products in Europe where at least one of the asserted patents are active. Nano and Alison also initiated a nullity actions in German Federal Patent Court against our asserted German patents. On the first patent (EP1638750) challenged at the Federal Patent Court, on September 25, 2018 the Court conducted an oral proceeding and determined that the patent is valid as originally issued and dismissed the challenge to its validity. They likewise filed an opposition to one of the asserted patents at the European Patent Office (“EPO”). The infringement litigation against Alison and Nano remains ongoing with respect to the earlier asserted patent while the Mannheim court stayed the proceedings involving subsequently asserted patents pending resolution of the nullity actions and the EPO opposition.

Due to their nature, it is difficult to predict the outcome or the costs involved in any litigation or administrative proceedings, including any appeals process. Furthermore, the Respondents may have significant resources and interest to litigate and therefore, these litigation matters could be protracted and may ultimately involve significant legal expenses. In addition to the foregoing, we have been and may be from time to time party to other legal proceedings that arise in the ordinary course of business and to other patent enforcement actions to assert our patent rights.

Brazilian Enforcement Action

In August 2018, we filed an enforcement suit against Qualiman Engenharia E Montagens LTDA (“Qualiman”), one of our South American customers, in civil court in Sao Paulo, SP Brazil seeking payment of past due invoices totaling approximately \$2.9 million. In October 2018, the Brazilian court ruled in our favor with respect to Qualiman’s obligation to pay us immediately. As part of the remedy, the Court ordered Qualiman’s customer, Petroleo Brasileiro S.A. to redirect part of its payments to Qualiman to a court-administered bank account and other appropriate actions. The proceeding is ongoing and the court decision is subject to an appeal to a higher court.

Item 1A. Risk Factors.

There have been no material changes to the risk factors included in our Annual Report.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

(a) *Unregistered Sales of Equity Securities* . None.

(b) *Use of Proceeds from Initial Public Offering of Common Stock* .

We registered shares of our common stock in connection with our initial public offering pursuant to a registration statement on Form S-1 (File No. 333-195523), which was declared effective by the SEC on June 12, 2014, and a registration statement on Form S-1 (File No. 333-196719) filed pursuant to Rule 462(b) of the Securities Act of 1933, as amended.

We received aggregate net proceeds from the offering of approximately \$74.7 million, after deducting \$4.3 million of underwriting discounts and approximately \$3.5 million of offering expenses.

As of September 30, 2018 we have used \$19.8 million of the net proceeds of the offering to repay all amounts outstanding under our subordinated notes and our revolving credit facility; \$31.0 million of the net proceeds of the offering for capital expenditures related to our third production line; \$7.2 million of the net proceeds of the offering for our planned manufacturing facility in Statesboro, Georgia; the remainder of the net proceeds of the offering for general corporate purposes. There was not a material change in our planned use of the balance of the net proceeds from the offering as described in our final prospectus dated June 12, 2014, filed with the SEC on June 16, 2014.

(c) *Purchases of Equity Securities By the Issuer and Affiliated Purchasers* .

We did not repurchase any of our equity securities during the quarter ended September 30, 2018.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

Executive Agreement

On November 7, 2018, the Company entered into an executive employment agreement effective as of January 1, 2019 (the “Effective Date”), for a three year term with its Chief Executive Officer, Donald R. Young (the “Employment Agreement”), which agreement replaces Mr. Young’s current employment agreement with the Company that is set to expire on December 31, 2018. Pursuant to this agreement, Mr. Young continues to serve as our Chief Executive Officer, Mr. Young’s annual base salary remains at \$515,000 per year and Mr. Young is eligible to receive an annual performance-based cash bonus (the “Performance Bonus”) as determined by our board of directors with a target of 100% of his year-end base salary (the “Performance Bonus Target”). Mr. Young’s base salary may be increased, but not decreased, at the discretion of our board of directors.

Mr. Young is entitled to the following benefits in connection with a termination of his employment or a change of control. Upon termination by the Company not for cause or termination by Mr. Young for good reason (a "Qualifying Termination") prior to a change of control, Mr. Young is entitled to receive upon execution of a release, an amount equal to two times the sum of his annual base salary and his Performance Bonus Target, each as then in effect. He is also entitled to a pro rata portion of the Performance Bonus based on the number of months worked in the year of termination, any accrued but unpaid Performance Bonus for the prior fiscal year, 24 months of COBRA health care insurance benefits, six months of outplacement services and accelerated vesting by three months of substantially all of his stock-based awards and option grants then outstanding, which options shall remain exercisable for at least one year following such Qualifying Termination. Upon a Qualifying Termination that occurs within 24 months after the occurrence of a change of control (the "CIC Qualifying Termination"), Mr. Young will be entitled to a pro rata portion of the Performance Bonus based on the number of months worked in the year of termination, any accrued but unpaid Performance Bonus for the prior fiscal year, 24 months of COBRA health care insurance benefits, six months of outplacement services, complete accelerated vesting of substantially all of Mr. Young's stock-based awards and option grants then outstanding, which stock options shall be exercisable for at least one year following such CIC Qualifying Termination and (i) if the CIC Qualifying Termination occurs during the Performance Period (defined below), two times the sum of his annual base salary and his Performance Bonus Target, each as then in effect and (ii) if the CIC Qualifying Termination occurs after the Performance Period, two and one-half times the sum of his annual base salary and his Performance Bonus Target, each as then in effect. To the extent any outstanding options or stock-based awards are not assumed by the Company's successor in a change of control, all stock options and stock-based awards shall become fully vested and exercisable as of the change of control.

In addition, in the event of a change of control of the Company, if the closing price per share of the Company's common stock, as quoted on the NYSE as of the effective date of the change of control (the "CIC Price") is equal to or greater than \$6.00, Mr. Young will be entitled to receive a bonus payment calculated as a percentage of the Net Proceeds (as defined in the Employment Agreement), with such percentage ranging from 4% to 6.5% depending upon the CIC Price (the "Bonus"). The Bonus will be paid at the same time and in the same form and proportion of consideration as the proceeds paid to the Company or its equity holders as a result of the change of control, subject to certain limitations. In order to be eligible for the Bonus, the change of control of the Company must occur between the Effective Date and January 1, 2021, which period may be extended by our board of directors at its discretion (the "Performance Period"), and must occur while Mr. Young is employed by the Company or during the six months after he is terminated by the Company without cause.

Section 280G of the Internal Revenue Code (the "Code"), denies a company a tax deduction for certain payments made to an executive in connection with a change of control if the payments exceed a certain amount. Section 4999 of the Code imposes on the executive an additional 20% excise tax on those payments. If the aggregate of the payments and benefits that Mr. Young receives pursuant to his executive agreement or pursuant to any other plan or agreement with us are subject to the excise tax imposed by Section 4999 of the Code, under Mr. Young's executive agreement, we are required to reduce the amount of the aggregate payments so that they are not subject to Section 4999 of the Code unless the aggregate value of the payments and benefits on an after tax basis would be greater than if they are not reduced.

Item 6. Exhibits.

(a) Exhibits

- 10.1 + [Non-Employee Director Compensation Policy.](#)
 - 10.2 + [Executive Agreement, dated November 7, 2018, by and between the Company and Donald R. Young.](#)
 - 31.1 [Certification of principal executive officer under Section 302\(a\) of the Sarbanes-Oxley Act of 2002.](#)
 - 31.2 [Certification of principal financial officer under Section 302\(a\) of the Sarbanes-Oxley Act of 2002.](#)
 - 32 [Certifications of the principal executive officer and the principal financial officer under Section 906 of the Sarbanes-Oxley Act of 2002.](#)
 - 101 The following materials from Aspen Aerogels, Inc.'s Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, formatted in XBRL (eXtensible Business Reporting Language): (i) the Consolidated Balance Sheets (unaudited) as of September 30, 2018 and December 31, 2017, (ii) the Consolidated Statements of Operations (unaudited) for the three and nine months ended September 30, 2018 and 2017, (iii) the Consolidated Statements of Cash Flows (unaudited) for the nine months ended September 30, 2018 and 2017, and (iv) the Notes to Consolidated Financial Statements (unaudited).
- + Management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

ASPEN AEROGELS, INC.

Date: November 7, 2018

By: /s/ Donald R. Young
Donald R. Young
President and Chief Executive Officer
(principal executive officer)

Date: November 7, 2018

By: /s/ John F. Fairbanks
John F. Fairbanks
Vice President, Chief Financial Officer and Treasurer
(principal financial officer and principal accounting officer)

ASPEN AEROGELS, INC.

NON-EMPLOYEE DIRECTOR COMPENSATION POLICY ¹

The Board of Directors of Aspen Aerogels, Inc. (the “Company”) has approved the following Non-Employee Director Compensation Policy (this “Policy”) which establishes compensation to be paid to non-employee directors of the Company to provide an inducement to obtain and retain the services of qualified persons to serve as members of the Company’s Board of Directors.

Applicable Persons

This Policy shall apply to each director of the Company who is not an employee of, or consultant to, the Company or any Affiliate (each, an “Outside Director”). “Affiliate” shall mean a corporation which is a direct or indirect parent or subsidiary of the Company, as determined pursuant to Section 424 of the Internal Revenue Code of 1986, as amended.

Equity Grants

All equity grant amounts set forth herein shall be subject to automatic adjustment in the event of any stock split or other recapitalization affecting the Company’s common stock.

Annual Restricted Stock Grants

Commencing in calendar year 2015, each Outside Director shall be granted (i) restricted shares of the Company’s common stock (the “Annual Stock Grant”) equal in value to \$51,000 under the Company’s 2014 Employee, Director and Consultant Equity Incentive Plan or such plan in effect on the date of grant (the “Stock Plan”) and (ii) stock options to purchase shares of the Company’s common stock (the “Annual Option Grant”, and together with the Annual Stock Grant, the “Annual Equity Grant”) equal in value to \$34,000 under the Stock Plan each year on or about the time of the annual meeting of the Board of Directors following the Company’s annual meeting of stockholders; provided that if there has been no annual meeting of stockholders held by the first day of the third fiscal quarter, each Outside Director will still receive any Annual Equity Grant provided for under this Policy on the first day of the third fiscal quarter of such year. The number of shares of common stock to be granted to each Outside Director as his or her Annual Stock Grant shall be calculated using the fair market value of the Company’s common stock as of the grant date, which shall be deemed to be the closing price on such date of the Company’s common stock on a national securities exchange. The number of shares of common stock subject to the Annual Option Grant to be granted to each Outside Director as his or her Annual Option Grant shall be calculated using the fair value of the dollar amount of the Annual Option Grant computed in accordance with FASB ASC Topic 718. For any new Outside Director joining the Board of Directors after the date of the Annual Equity Grant, such new Outside Director shall receive equity grants on the first day of his or her service on the Board of Directors equal to the pro rata share of that year’s (i) Annual Stock Grant calculated by multiplying the number of days of such year that the such new director will serve by the quotient of \$51,000 divided by 365 and (ii) Annual Option Grant calculated by multiplying the number of days of such year that the such new director will serve by the quotient of \$34,000 divided by 365 and in each case calculating the number of shares using the methodology set forth above for Annual Equity Grants but calculated using the closing stock price and other values on such new Outside Director’s first day of service on the Board of Directors.

Terms for All Equity Awards

Unless otherwise specified by the Board of Directors or the Compensation and Leadership Development Committee (the “Compensation Committee”) at the time of grant, all equity awards granted under this Policy shall (i) vest on the earlier of (a) one year from the date of the grant with respect to an Annual Equity Grant or (b) the day prior

¹ This revised Non-Employee Director Compensation Policy replaces and supersedes the Company’s prior Non-Employee Director Compensation Policy, and became effective on June 20, 2018.

to the annual meeting for the fiscal year following the date of grant, subject to the Outside Director’s continued service on the Board of Directors, (ii) each stock option shall terminate ten years from the date of grant of such stock option, and (iii) each equity award shall be granted under the Company’s standard form of agreement unless on or prior to the date of grant the Board of Directors or the Compensation Committee shall determine that other terms or conditions shall be applicable prior to the grant of such equity award.

Such restricted stock and stock options shall become fully vested immediately prior to a Change of Control. “Change of Control” means the occurrence of any of the following events: (i) Any “Person” (as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”)) becomes the “Beneficial Owner” (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities of the Company representing 50% or more of the total voting power represented by the Company’s then outstanding voting securities (excluding for this purpose any such voting securities held by the Company or its affiliates or by any employee benefit plan of the Company) pursuant to a transaction or a series of related transactions; or (ii) (a) a merger or consolidation of the Company whether or not approved by the Board of Directors, other than a merger or consolidation which would result in the voting securities of the Company outstanding immediately prior thereto continuing to represent (either by remaining outstanding or by being converted into voting securities of the surviving entity or the parent of such corporation) more than 50% of the total voting power represented by the voting securities of the Company or such surviving entity or parent of such corporation, as the case may be, outstanding immediately after such merger or consolidation; or (b) the sale or disposition by the Company of all or substantially all of the Company’s assets in a transaction requiring stockholder approval.

Cash Fees

Annual Cash Payments

The following annual cash fees shall be paid to the Outside Directors serving on the Board of Directors and the Audit Committee, Compensation Committee and Nominating and Governance Committee, as applicable.

Board of Directors or Committee of Board of Directors	Annual Retainer Amount for Chair (in lieu of the annual retainer amount for a member)	Annual Retainer Amount for Member
Board of Directors	\$65,000	\$35,000
Audit Committee	\$15,000	\$7,500
Compensation Committee	\$10,000	\$5,000
Nominating and Governance Committee	\$8,000	\$4,000

If the Company holds more than 12 board meetings in a calendar year, each Outside Director will receive a fee of \$1,500 for each additional board meeting attended in person and a fee of \$1,000 for each additional board meeting attended by telephone or by other means of communication. If the Company holds more than 12 meetings of the Audit Committee in a calendar year, each member of such committee will receive a fee of \$1,500 for each additional committee meeting attended in person and a fee of \$1,000 for each additional committee meeting attended by telephone or by other means of communication. If the Company holds more than 8 meetings of either of the Compensation Committee or the Nominating and Governance Committee in a calendar year, each member of such committee will receive a fee of \$1,500 for each additional committee meeting attended in person and a fee of \$1,000 for each additional committee meeting attended by telephone or by other means of communication.

Payment Terms for All Cash Fees

Cash payments payable to Outside Directors shall be paid quarterly in arrears as of the last day of each fiscal quarter.

Following an Outside Director’s first election or appointment to the Board of Directors, such Outside Director shall receive his or her cash compensation pro rated beginning on the date he or she was initially appointed or elected. If an Outside Director dies, resigns or is removed during any quarter, he or she shall be entitled to a cash payment on a pro rated basis through his or her last day of service.

Maximum Compensation

In any fiscal year that ends on or after December 31, 2018, the sum of the grant date fair value (determined as of the date of grant in accordance with FASB ASC Topic 718) of all awards made pursuant to the Stock Plan, to an individual as compensation for service as a non-employee director, together with cash compensation earned by the non-employee director during any fiscal year, shall not exceed \$500,000.

In a fiscal year in which a non-employee director serves the Company in another capacity (including as an interim officer), the non-employee director compensation limit shall not apply to any compensation arrangements established with respect to such service.

Expenses

Upon presentation of documentation of such expenses reasonably satisfactory to the Company, each Outside Director shall be reimbursed for his or her reasonable out-of-pocket business expenses incurred in connection with attending meetings of the Board of Directors and Committees thereof or in connection with other business related to the Board of Directors.

Amendments

The Nominating and Governance Committee or the Board of Directors shall review this Policy from time to time to assess whether any amendments in the type and amount of compensation provided herein should be adjusted in order to fulfill the objectives of this Policy.

EXECUTIVE AGREEMENT

This Executive Agreement (this “**Agreement**”) is dated as of November 7, 2018 and will be effective as of January 1, 2019 (the “**Effective Date**”), by and between Aspen Aerogels, Inc., a Delaware corporation (the “**Company**”), and Donald R. Young (the “**Executive**”).

Recitals :

- A.** The Company and the Executive previously entered into an executive agreement, dated as of December 16, 2015, which was effective as of January 1, 2016 (the “**Prior Agreement**”). The Prior Agreement expires by its terms as of December 31, 2018.
- B.** The Company and the Executive desire to continue Executive’s employment on the terms and conditions set forth in this Agreement, and replace the Prior Agreement in its entirety with this Agreement.
- C.** As an employee of the Company, the Executive has previously received and will continue to be given access to or come into contact with certain proprietary and/or confidential information of the Company.
- D.** The Company and the Executive are parties to an Employment, Confidentiality and Non-Competition Agreement dated December 16, 2015 (the “**Confidentiality and Non-Competition Agreement**”).
- E.** The foregoing recitals shall be incorporated into and be a part of this Agreement.

Agreement :

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

1. Definitions. As used herein, the following terms shall have the following meanings.

“**Affiliate**” means with respect to any Person, any other Person that, directly or indirectly through one or more intermediaries controls, is controlled by, or is under common control with, such Person and/or one or more Affiliates thereof. As used in this definition, the term “control,” including the correlative terms “controlling,” “controlled by” and “under common control with,” means the possession, directly or indirectly, of the power to direct or cause the direction of the management or policies (whether through the ownership of securities or any partnership or other ownership interests, by contract or otherwise) of a Person.

“**Board**” means the Company’s board of directors.

“**Cause**” means: (i) willful misconduct, dishonesty, fraud or breach of fiduciary duty to the Company; (ii) deliberate disregard of the lawful rules or policies of the Company, failure to perform assigned duties, or breach of an employment or other agreement with the Company, which results in direct or indirect loss, damage or injury to the Company; (iii) the unauthorized disclosure of any trade secret or confidential information of the Company; (iv) the commission of an act which constitutes unfair competition with the Company or which induces any customer or supplier to breach a contract with the Company; (v) conduct substantially prejudicial to the business of the Company; or (vi) the indictment of Executive for any felony involving deceit, dishonesty or fraud, or any criminal conduct by the Executive that would reasonably be expected to result in material injury or reputational harm to the Company. For purposes hereof, whether or not the Executive has committed an act or omission of the type referred to in subparagraphs (i) through (vi) above will be determined by the Board in its reasonable, good faith discretion, based upon the facts known to the Board at the relevant time.

“ **Change of Control** ” shall mean the first to occur of any of the following events: (i) the consummation of a reorganization, merger, consolidation or other similar transaction of the Company with or into any other Person or Group (within the meaning of Section 13(d)(3) of the Securities Act of 1934, as amended) in which holders of the Company’s voting securities immediately prior to such reorganization, merger, consolidation or other similar transaction will not, directly or indirectly, continue to hold at least a majority of the outstanding voting securities of the Company; (ii) a sale, lease, exchange or other transfer (in one transaction or a related series of transactions) of all or substantially all of the Company’s assets; (iii) the acquisition by any Person or any Group of such quantity of the Company’s voting securities as causes such Person or Group (other than a Person or Group who is a shareholder of the Company on the Effective Date) to own beneficially, directly or indirectly, as of the time immediately after such transaction or series of transactions, more than 50% of the combined voting power of the voting securities of the Company other than as a result of (a) an acquisition of securities directly from the Company or, (b) an acquisition of securities by the Company which by reducing the voting securities outstanding increases the proportionate voting power represented by the voting securities owned by any such Person or Group to more than 50% of the combined voting power of such voting securities; or (iv) a change in the composition of the Board within a two (2) year period such that a majority of the members of the Board are not Continuing Directors. As used herein, the term “ **Continuing Directors** ” shall mean as of any date of determination, any member of the Board who (a) was a member of the Board immediately after the Effective Date, or (b) was nominated for election or elected to the Board with the approval of, or whose election to the Board was ratified by, at least a majority of the Continuing Directors who were members of the Board at the time of that nomination or election; provided, however, that in no case shall (1) the public offering and sale of the Company’s common stock by its shareholders pursuant to a registered secondary offering or (2) the voluntary or involuntary bankruptcy of the Company constitute a Change of Control.

“ **CIC Price** ” means the closing price per share of the Company, as quoted on the NYSE as of the effective date of the Change of Control.

“ **Future Payment Event** ” means all or any part of the Proceeds payable in connection with a Change of Control that are to be paid to the Company’s equity holders after the effective date of the Change of Control: (a) in connection with escrowed or withheld Proceeds for purposes of satisfying any indemnification claims or other obligation to the acquirer; (b) in installment payments over time; (c) in connection with an earnout; (d) in connection with the Company’s or its successor’s achievement of a milestone; or (e) a similar mechanism to defer or condition payment.

“ **Good Reason** ” means: (i) any material breach by the Company of this Agreement; (ii) a material reduction or material adverse change in the Executive’s current duties, responsibilities and authority, without his consent; (iii) the demand by the Company for the Executive to relocate or commute more than 40 miles from Northborough, Massachusetts without his consent; or (iv) any reduction by the Company in the Executive’s Base Salary or the Executive’s Performance Bonus Target without his consent, except for across-the-board compensation reductions based on the Company’s financial performance similarly affecting all or substantially all senior management employees of the Company. For purposes hereof, whether or not the Executive has Good Reason to terminate his employment by the Company pursuant to subparagraphs (i) through (iv) above will be determined by the Board in its reasonable, good faith discretion, based upon the facts known to the Board at the relevant time.

“ **Net Proceeds** ” means Proceeds, less any indebtedness for borrowed money and other liabilities of the Company and its Affiliates required by the buyer to be paid out of the Proceeds (other than the payment of bonuses pursuant to this Agreement) and the Transaction Expenses, actually received by the Company’s equity holders in connection with a Change of Control. Net Proceeds shall include any Proceeds payable in connection with a Future Payment Event.

“ **Permanent Disability** ” means the Executive is unable to perform, by reason of physical or mental incapacity, his then duties or obligations to the Company, for a total period of one hundred eighty (180) days in any three hundred sixty (360) day period.

“ **Performance Period** ” means the two (2) year period commencing on the Effective Date and ending on the second (2nd) anniversary of the Effective Date, provided, however, that the Performance Period may be extended in the discretion of the Board.

“ **Percentage Interest** ” means the percentage set forth opposite the CIC Price in the table below:

CIC Price	Percentage Interest
Below \$6.00	0.0%
\$6.00 - \$6.49	4.0%
\$6.50 - \$6.99	5.0%
\$7.00 - \$8.49	6.0%
Above \$8.49	6.5%

In the event the shares of the Company’s common stock are subdivided or combined into a greater or smaller number of shares or if the Company issues shares of common stock as a stock dividend on its outstanding common stock or additional shares or new and different shares or other securities of the Company or other non-cash assets are distributed with respect to such shares of common stock, the CIC Prices in the table above shall be appropriately increased or decreased proportionately to reflect such events.

“ **Person** ” means an individual, a partnership, a corporation, a limited liability company, an association, a joint stock company, a trust, a joint venture, an unincorporated organization or any other entity, including a governmental entity or any department, agency or political subdivision thereof.

“ **Proceeds** ” means the gross amount that, absent this Agreement and any other substantially similar agreements, would have been received by or distributable to the Company’s equity holders in connection with a Change of Control, including any initial payment and any subsequent payments received in connection with a Future Payment Event. Any non-cash Proceeds will be valued in good faith by the Board.

“ **Qualifying Termination** ” means the date on which the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d), or the Executive terminates employment for Good Reason as provided in Section 3(e).

“ **Substantial Risk of Forfeiture** ” means that future Proceeds otherwise payable in connection with a Change of Control are conditioned on the occurrence of a future milestone (such as, without limitation, the attainment of a prescribed level of sales, revenues, earnings, equity value, return on invested capital or internal rate of return), such that, at the time the milestone is established, the possibility that the milestone will not be achieved is substantial, as further defined in Treasury Regulation §1.409A-1(d), without regard to the provision of that section under which additions or extensions of forfeiture conditions are disregarded.

“ **Transaction Expenses** ” means all fees and expenses payable by the Company or the Company’s equity holders for services provided to the Company and/or its equity holders in connection with the consummation of a Change of Control or any Future Payment Event, including without limitation, investment banking, accounting and attorneys’ fees.

2. Employment. The Company agrees to employ the Executive, and the Executive hereby accepts employment with the Company consistent with the Executive’s position and duties, upon the terms and conditions set forth in this Agreement.

(a) Term. The term of this Agreement shall commence on the Effective Date and continue until the earlier of (i) December 31, 2021 or (ii) the termination of this Agreement in accordance with the provisions of Section 3 (the “ **Employment Period** ”). The Executive’s employment with the Company shall be “at will,” meaning that the Executive’s employment may be terminated by the Company or the Executive at any time and for any reason.

(b) Position and Duties.

(i) During the Employment Period, the Executive shall serve as the Chief Executive Officer of the Company and shall have the duties, responsibilities and authority consistent with such position that are designated by the Board, subject to the direction and supervision of the Board.

(ii) The Executive shall devote his best efforts and his full business time and attention (except for permitted vacation periods and reasonable periods of illness or other incapacity) to the business and affairs of the Company. The Executive shall perform his duties and responsibilities to the best of his abilities in a diligent, trustworthy businesslike and efficient manner. Notwithstanding the foregoing, the Executive may, to the extent not otherwise prohibited by this Agreement, devote such amount of time as does not interfere or compete with the performance of the Executive's duties under this Agreement to any one or more of the following activities: (i) engaging in charitable activities, including serving on the boards of directors of charitable organizations or (ii) serving on the board of directors of any other company with the prior written approval of the Board.

(iii) The Executive agrees to abide by the Company's Code of Business Conduct and Ethics, Anti-Corruption Policy, Complaints Handling Policy, Insider Trading Policy, Disclosure Controls and Procedures Under the Securities Exchange Act of 1934, Form 8-K Disclosure Compliance Policy, Regulation FD Disclosure Policy, the Chief Executive Officer's Delegation of Authority and the Short-Term Investment Policy, each as in effect from time to time and such other policies, rules and regulations as the Company may adopt from time to time.

(c) Salary and Benefits

During the Employment Period, Executive shall be entitled to the following compensation and benefits:

(i) **Base Salary**. During the Employment Period, Executive shall be entitled to the following compensation and benefits: The Executive's base salary shall be \$515,000 (such annual salary, as it may be adjusted upward by the Board in its discretion, being referred to as the "**Base Salary**"). The Base Salary shall be payable in regular installments in accordance with the Company's general payroll practices, shall be subject to customary withholding and may be increased (but not decreased) at the discretion of the Board.

(ii) **Annual Performance Bonus**. The Executive shall be eligible to earn an annual cash incentive bonus (the "**Performance Bonus**") of not less than one-hundred percent (100%) of the Executive's then effective Base Salary (each, a "**Performance Bonus Target**"), subject in all respects to the terms and conditions established by the Board.

(iii) **Expense Reimbursement**. The Company will reimburse the Executive for all reasonable travel and other expenses incurred by the Executive in connection with the performance of his duties and obligations under this Agreement. The Executive shall comply with such reasonable limitations and reporting requirements with respect to expenses as may be established by the Company from time to time.

(iv) **Benefit Plans and Programs**. The Executive shall be entitled to participate in all compensation or employee benefit plans or programs and receive all benefits and perquisites for which salaried employees of the Company generally are eligible under any plan or program now or established later by the Company on the same basis as similarly situated senior executives of the Company. The Executive may participate to the extent permissible under the terms and provisions of such plans or programs, in accordance with program provisions. Nothing in this Agreement will preclude the Company from amending or terminating any of the plans or programs applicable to salaried employees or senior executives of the Company as long as such amendment or termination is applicable to all salaried employees or senior executives, as the case may be, so long as such plans or programs are replaced with plans no less favorable, in the aggregate, than existing plans.

(v) The Executive shall also be eligible for grants of long-term incentive compensation, including, options to purchase the Company's common stock, restricted stock and/or restricted stock units, all on terms and conditions established by the Board.

(vi) **Clawback Policy**. All compensation shall be subject to any forfeiture or clawback policy established by the Company generally for senior executives from time to time and any other such policy required by applicable law.

(d) Change of Control

(i) Bonus Payable. If (a) a Change of Control is consummated within the Performance Period, (b) the CIC Price is equal to or greater than \$6.00, and (c) Executive is employed by the Company in good standing on the effective date of the Change of Control or has been terminated by the Company without Cause during the six-month period prior to the effective date of the Change of Control, then Executive shall be eligible to receive a payment equal to the product of (a) the Percentage Interest and (b) the Net Proceeds (the “**Bonus**”). For purposes of this Section 2(d), “Change of Control” shall not include a Change of Control within the meaning of clause (iv) of the definition of Change of Control in this Agreement.

(ii) Form of Payment. The Bonus shall be payable in the same form of consideration (cash, securities, or other non-cash consideration) and, if in more than one form, in the same proportion, as the Proceeds paid to the equity holders of the Company, as applicable. Notwithstanding the foregoing, to the extent securities laws or other laws prohibit payment of securities or non-cash consideration to the Executive or impose conditions or restrictions that make such payment adverse to the Company or acquirer, or to the extent it is otherwise impractical to make payment in the form of securities or non-cash consideration, or to the extent the acquirer in the Change of Control does not agree to pay or to permit the Company to pay securities or non-cash consideration under this Agreement, or the Board of Directors of the Company (the “**Board**”) otherwise decides not to make payment in the form of securities or non-cash consideration, then the Company may pay cash in lieu of such securities or non-cash consideration, in which event the cash payment shall equal the fair market value of such securities or non-cash consideration as determined by the Board. If required by applicable law or the operative Change of Control agreements, the cash, securities and non-cash consideration paid under this Agreement shall be subject to the same restrictions and obligations applicable to the cash, securities or other non-cash consideration paid to the Company or the holders of the Company’s equity securities in the Change of Control. Notwithstanding the foregoing, to the extent there are restrictions on the Executive’s ability to resell the securities or non-cash consideration or the securities or non-cash consideration is not reasonably liquid and such restrictions or liquidity limitations would be reasonably likely to prevent the Executive from selling on a public market or exchange sufficient securities or non-cash consideration in an orderly manner to pay on a timely basis required taxes due with respect to the securities or non-cash consideration received, cash in lieu of such securities or non-cash consideration will be paid to the Executive to the extent required to cover such tax obligations.

(iii) Time of Payment. The Company shall pay or cause to be paid to the Executive the Bonus at the same time and on the same terms and conditions that payment is made to the Company’s equity holders or the Company in respect of the Change of Control, whether in one payment or in a series of payments. Notwithstanding the foregoing, except if the Future Payment Event is subject to a Substantial Risk of Forfeiture, if the Proceeds payable in connection with a Future Payment Event will be received by the Company or the Company’s equity holders on a date that is later than the fifth (5th) anniversary of the effective time of the Change of Control, Executive will not be eligible to receive a distribution in connection with those Proceeds. If the Future Payment Event is subject to a Substantial Risk of Forfeiture at the time the Change of Control becomes effective, the Executive shall remain eligible to receive a distribution from any additional Proceeds received in connection with that Future Payment Event in accordance with this Section.

(iv) Options and Stock-Based Awards. In the event of a Change of Control, notwithstanding anything to the contrary in any then outstanding option agreement or stock-based award agreement (other than the Restricted Stock Agreement between the Company and the Executive dated as of December 11, 2015 and amended as of August 2, 2017 (the “Restricted Stock Agreement”) which will continue to be governed in accordance with its terms): (a) to the extent any outstanding stock options and other stock-based awards are not assumed by the Company’s successor in a Change of Control, the vesting of all stock options and other stock-based awards outstanding and held by the Executive as of the Change of Control shall immediately accelerate and become fully vested and exercisable, subject to any permitted action by the Board upon a Change of Control under the Company’s applicable equity plan to terminate the stock options or other stock-based awards upon a Change of Control, provided, however, that the foregoing shall not apply to any outstanding equity award to the extent such acceleration of vesting would result in a violation of Section 409A of the Code; and (b) all of the share price performance hurdles set forth in the Stock Option Agreement between the Executive and the Company dated December 11, 2015, as amended (the “Performance Option”), will be deemed to have been met and the Performance Option shall immediately accelerate and become fully vested and exercisable if either (x) not assumed by the Company’s successor in a Change in Control or (y) in the event of a Qualifying Termination after a Change of Control.

(v) **Forfeiture**. If: (i) a Change of Control does not occur during the Performance Period; (ii) the Executive's employment terminates for any reason prior to the effective date of a Change of Control other than as a result of a termination by the Company without Cause during the six-month period prior to the effective date of the Change of Control; or (iii) on or after the effective date of Change of Control, the Company terminates the Executive's employment for Cause, the Executive shall forfeit on the date the termination of his employment becomes effective his rights to any payments of the Bonus.

3. Termination. During the Employment Period, the Executive's employment hereunder may be terminated without any breach of this Agreement under the following circumstances:

(a) **Death**. The Executive's employment hereunder shall terminate upon his death.

(b) **Disability**. The Company may terminate the Executive's employment upon the Executive's Permanent Disability. If any question shall arise as to whether the Executive has a Permanent Disability so as to be unable to perform the essential functions of the Executive's then existing position or positions with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive's guardian has no reasonable objection as to whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company's determination of such issue shall be binding on the Executive. Nothing in this Section 3(b) shall be construed to waive the Executive's rights, if any, under existing law including, without limitation, the Family and Medical Leave Act of 1993, 29 U.S.C. §2601 et seq. and the Americans with Disabilities Act, 42 U.S.C. §12101 et seq.

(c) **Termination by Company for Cause**. The Company may terminate the Executive's employment hereunder for Cause.

(d) **Termination by Company Without Cause**. The Company may terminate the Executive's employment hereunder at any time without Cause. Any termination by the Company of the Executive's employment under this Agreement which does not constitute a termination for Cause under Section 3(c) and does not result from the death or Permanent Disability of the Executive under Section 3(a) or (b) shall be deemed a termination without Cause.

(e) **Termination by the Executive**. The Executive may terminate his employment hereunder at any time for any reason, including but not limited to Good Reason. For purposes of this Agreement, "Good Reason" shall mean that the Executive has complied with the "Good Reason Process" (hereinafter defined) following the occurrence of any purported Good Reason event without the Executive's express written consent. "Good Reason Process" shall mean that (i) the Executive reasonably determines in good faith that a "Good Reason" condition has occurred; (ii) the Executive notifies the Company in writing of the Good Reason condition within sixty (60) days of the first occurrence of such condition; (iii) the Executive cooperates in good faith with the Company's efforts, for a period not less than thirty (30) days following receipt of such notice (the "Cure Period") to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) the Executive terminates his employment within sixty (60) days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

(f) **Notice of Termination**. Except for termination as specified in Section 3(a), any termination of the Executive's employment by the Company or any such termination by the Executive shall be communicated by written Notice of Termination to the other party hereto. For purposes of this Agreement, a "Notice of Termination" shall mean a notice which shall indicate the specific termination provision in this Agreement relied upon.

(g) **Date of Termination**. "Date of Termination" shall mean: (i) if the Executive's employment is terminated by his death, the date of his death; (ii) if the Executive's employment is terminated on account of Permanent Disability under Section 3(b) or by the Company for Cause under Section 3(c), the date on

which Notice of Termination is given; (iii) if the Executive's employment is terminated by the Company under Section 3(d), the date on which a Notice of Termination is given; (iv) if the Executive's employment is terminated by the Executive under Section 3(e) without Good Reason, thirty (30) days after the date on which a Notice of Termination is given, and (v) if the Executive's employment is terminated by the Executive under Section 3(e) with Good Reason, the date which is specified in the Notice of Termination, provided that such date must occur within the sixty (60) day period after the end of the Cure Period. Notwithstanding the foregoing, in the event that either party gives a Notice of Termination, the Company may unilaterally accelerate the Date of Termination.

4. Compensation on Termination.

(a) Termination Generally. If the Executive's employment with the Company is terminated for any reason, the Company shall pay or provide to the Executive (or to his authorized representative or estate) (i) any Base Salary earned through the Date of Termination, unpaid expense reimbursements (subject to, and in accordance with, Section 2(c) of this Agreement) and, to the extent required by law, unused vacation that accrued through the Date of Termination, such amounts to be paid no more than thirty (30) days after the Executive's Date of Termination; and (ii) any vested benefits the Executive may have under any employee benefit plan of the Company through the Date of Termination, which vested benefits shall be paid and/or provided in accordance with the terms of such employee benefit plans (collectively, the "**Accrued Benefits**").

(b) Qualifying Termination Prior to a Change of Control. If the Executive incurs a Qualifying Termination during the Employment Period and prior to a Change of Control, then in addition to the Accrued Benefits, and subject to the Executive signing a separation agreement containing, among other provisions, a general release of claims in favor of the Company and related persons and entities, confidentiality, non-compete, return of property and non-disparagement, in a form and manner satisfactory to the Company (the "**Separation Agreement and Release**") and the Separation Agreement and Release becoming fully effective, all within sixty (60) days of the Date of Termination (the "**Release Period**");

(i) the Company shall pay the Executive an amount equal to two hundred percent (200%) of the sum of (A) the Executive's then effective Base Salary and (B) an amount equal to the Executive's then effective Performance Bonus Target (the "**Severance Amount**").

(ii) the Company shall pay the Executive any accrued but unpaid Performance Bonus for the prior fiscal year then owed or fully earned by the Executive in accordance with Section 2(c)(ii) above (the "**Earned Performance Bonus**");

(iii) the Company shall pay the Executive a pro-rata portion of the Performance Bonus based upon actual achievement of the performance metrics for the fiscal year in which the Termination Date occurs (calculated by dividing the number of full months of the applicable fiscal year through the Date of Termination by 12, and multiplying this fraction by the Executive's then effective Performance Bonus Target) (the "**Pro-Rata Bonus**");

(iv) the COBRA eligible health care insurance benefits (e.g., health, dental) being provided by the Company to the Executive on the Date of Termination shall continue in place at the same cost to the Executive as applied to "active" participants on the Date of Termination for a period equal to the lesser of (i) the COBRA Benefit Period or (ii) twenty-four (24) months ("**Health Care Continuation Benefit**"). The "COBRA Benefit Period" means the period of time after such termination during which COBRA benefits are available to the Executive as of the Date of Termination as set forth in the Company's health care plan. The Executive shall be responsible for applying for the COBRA eligible health care insurance benefit, paying for the same and submitting evidence of such premium costs to the Company for reimbursement during the COBRA Benefit Period. The Company shall reimburse the Executive for the employer's portion of such premiums (as applicable to the active rate) within 15 days of receipt of evidence of the payment of the premium costs to the Company ("**Premium Reimbursement Payments**"). Notwithstanding the foregoing, if the Company determines, in its sole discretion, that such reimbursement of the premiums would result in a violation of the nondiscrimination rules of Section 105(h)(2) of the Internal Revenue Code of 1986, as amended (the "**Code**") or any statute or regulation of similar effect (including but not limited to the 2010 Patient Protection and Affordable Care Act, as amended by the 2010 Health Care and Education

Reconciliation Act), then in lieu of reimbursing the premiums, the Company, in its sole discretion, may elect to instead pay the Executive on the first day of each month of such period, a fully taxable cash payment equal to the premiums for that month, subject to applicable tax withholdings (such amount, the “ **Special Severance Payment** ”), for the remainder of such period. The Executive may, but is not obligated to, use such Special Severance Payment toward the cost of premiums;

(v) if the Executive requests, the Company shall pay (“ **Outplacement Payments** ”) for an outplacement service (to be selected by the Company) for services rendered in assisting the Executive in locating another job, for a period of six (6) months following the Date of Termination or until the Executive begins working for another employer, whichever occurs first (“ **Outplacement Services** ”). These Outplacement Payments, which the Company shall make directly to the vendor providing Outplacement Services, are contingent upon the Executive’s cooperation with the outplacement service and upon active efforts by the Executive to locate another position;

(c) **Options and Stock Based Awards**. Notwithstanding anything to the contrary in any then outstanding option agreement or stock-based award agreement (other than the Restricted Stock Agreement, which will continued to be governed in accordance with its terms), (a) the vesting of such number of stock options and other stock-based awards outstanding and held by the Executive as would have vested in the three (3) months immediately following the Date of Termination had the Executive continued his employment for such three (3) month period shall immediately accelerate and become vested and exercisable as of the Date of Termination and (b) subject to any permitted action by the Board upon a Change of Control or other merger, sale, dissolution or liquidation of the Company under Company’s applicable equity plan to terminate the stock options or other stock-based awards, any such vested stock option shall be exercisable for not less than one (1) year from the Date of Termination.

(d) **Timing and Form of Severance Payments**. The benefits provided to Executive under Sections 4(b)(i), (ii), (iii), (iv), and (v) shall be paid in the form and at the time specified below:

(i) Severance Amount shall be paid in substantially equal installments in accordance with the Company’s payroll practice over twenty-four (24) months commencing within sixty (60) days after the Date of Termination; provided, however, that if the 60-day period begins in one (1) calendar year and ends in a second calendar year, the Severance Amount shall begin to be paid in the second calendar year by the last day of such 60-day period; provided, further, that the initial payment shall include a catch-up payment to cover amounts retroactive to the day immediately following the Date of Termination. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2).

(ii) Earned Performance Bonus shall be paid in a lump sum within sixty (60) days after the Date of Termination; provided, however, that if the 60-day period begins in one (1) calendar year and ends in a second calendar year, the Earned Performance Bonus shall be paid in the second calendar year by the last day of such 60-day period.

(iii) The Pro-Rata Bonus shall be paid when the annual performance bonus would have been otherwise paid if Executive had continued his employment through the applicable performance period.

(iv) Health Care Continuation Benefit shall commence immediately upon the Executive’s Date of Termination and the Executive shall immediately become eligible for Reimbursement Payments in accordance with Section 4(b)(iii), provided however if an executed Separation Agreement and Release has not become fully effective within Release Period, the Company shall immediately cease making Premium Reimbursement Payments (or, if applicable, Special Severance Payments) and the Executive shall be obligated to promptly repay to the Company any previously received Premium Reimbursement Payments (or, if applicable, any Special Severance Payments).

(v) Outplacement Services shall commence immediately upon the Executive’s Date of Termination, provided however if an executed Separation Agreement and Release has not become

fully effective within the Release Period, Outplacement Services shall immediately cease and the Executive shall be obligated to promptly repay to the Company any previously made Outplacement Payments.

(e) Rights to Severance. The receipt of any severance payments or benefits pursuant to Section 4 shall be subject to (i) the Executive's submission to the Company of an executed Separation Agreement and Release that becomes fully effective within the Release Period and (ii) the Executive's continued compliance with the Confidentiality and Non-Competition Agreement. In the event an executed Separation and Release Agreement does not become fully effective within the Release Period, the Executive shall forfeit his right to receive any severance payments or benefits under Section 4 and, as specified in paragraph (d) above, the Company shall have the right to recoup from the Executive any previously made severance payments or benefits. In the event the Executive breaches any of the provisions set forth in the Confidentiality and Non-Competition Agreement, in addition to all other legal and equitable remedies, the Company shall have the right to terminate or suspend all continuing payments and benefits to which the Executive may otherwise be entitled pursuant to Section 4 without affecting the effectiveness of the Executive's release or the Executive's obligations under the Separation Agreement and Release.

(f) Other Termination Events. The Executive hereby agrees that no severance compensation shall be payable upon termination of the Executive's employment with the Company (i) by the Company with Cause; (ii) by the Executive without Good Reason; or (iii) as a result of the Executive's death or Permanent Disability, and the Executive hereby waives any claim for severance compensation except as set forth in Section 4(b).

5. Change of Control. The provisions of this Section 5 shall apply in lieu of, and expressly supersede, other than with respect to the requirement for the execution and delivery of a Separation Agreement and Release, the provisions of Section 4 regarding severance pay and benefits upon a Qualifying Termination, if a Qualifying Termination occurs within twenty-four (24) months after the occurrence of a Change of Control (" **CIC Qualifying Termination** "). This Section 5 shall terminate and be of no force or effect beginning twenty-four (24) months after the occurrence of a Change of Control.

(a) Qualifying Termination after a Change of Control. During the Employment Period, if the Executive incurs a CIC Qualifying Termination, then in addition to the Accrued Benefits, and subject to the signing of the Separation Agreement and Release by the Executive and the Separation Agreement and Release becoming irrevocable within the Release Period:

(i) the Company shall pay the Executive an amount equal to: (i) if the Qualifying Termination occurs during the Performance Period, two hundred percent (200%) of the sum of (A) the Executive's then effective Base Salary and (B) the Executive's then effective Performance Bonus Target; and (ii) if the Qualifying Termination occurs following the Performance Period, two hundred and fifty percent (250%) of the sum of (A) the Executive's then effective Base Salary and (B) the Executive's then effective Performance Bonus Target (" **CIC Severance Amount** ");

(ii) the Company shall pay the Executive any accrued but unpaid Performance Bonus for the prior fiscal year then owed or fully earned by the Executive in accordance with Section 2(c)(ii) above (" **CIC Earned Performance Bonus** ");

(iii) the Company shall pay the Executive the Pro-Rata Bonus;

(iv) the COBRA eligible health care insurance benefits (e.g., health, dental) being provided by the Company to the Executive on the Date of Termination shall continue in place at the same cost to the Executive as applied to "active" participants on the Date of Termination for a period equal to the lesser of (i) the COBRA Benefit Period or (ii) twenty-four (24) months (" **CIC Health Care Continuation Benefits** "). The Executive shall be responsible for applying for the COBRA eligible health care insurance benefit, paying for the same and submitting evidence of such premium costs to the Company for reimbursement during the COBRA Benefit Period. The Company shall reimburse the Executive for the employer's portion of such premiums (as applicable to the active rate) within 15 days of receipt of evidence of the payment of the premium costs to the Company. (" **CIC Premium Reimbursement Payments** "). Notwithstanding the foregoing, if the Company determines, in its sole discretion, that

such reimbursement of the premiums would result in a violation of the nondiscrimination rules of Section 105(h)(2) of the Code or any statute or regulation of similar effect (including but not limited to the 2010 Patient Protection and Affordable Care Act, as amended by the 2010 Health Care and Education Reconciliation Act), then in lieu of reimbursing the premiums, the Company, in its sole discretion, may elect to instead pay the Executive on the first day of each month of such period a fully taxable cash payment equal to the premiums for that month, subject to applicable tax withholdings (such amount, the “**CIC Special Severance Payment**”), for the remainder of such period. The Executive may, but is not obligated to, use such Special Severance Payment toward the cost of premiums;

(v) if the Executive wishes, the Company will pay for an outplacement service (“**CIC Outplacement Payments**”) (to be selected by the Company) for services rendered in assisting the Executive in locating another job, for a period of six (6) months following the Date of Termination or until the Executive begins working for another employer, whichever occurs first (“**CIC Outplacement Services**”). These CIC Outplacement Payments, which the Company shall make directly to the vendor providing the CIC Outplacement Services, are contingent upon the Executive’s cooperation with the outplacement service and upon active efforts by the Executive to locate another position

(vi) CIC Severance Amount shall be payable in a lump sum within sixty (60) days after the Date of Termination; provided, however, that if the 60-day period begins in one (1) calendar year and ends in a second calendar year, such payment shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2).

(vii) CIC Earned Performance Bonus shall be paid in a lump sum within sixty (60) days after the Date of Termination; provided, however, that if the 60-day period begins in one (1) calendar year and ends in a second calendar year, the Earned Performance Bonus shall be paid in the second calendar year by the last day of such 60-day period.

(viii) The Pro-Rata Bonus shall be paid when the annual performance would have been paid if Executive had continued his employment through the payment date.

(ix) CIC Health Care Continuation Benefit shall commence immediately upon the Executive’s Date of Termination and the Executive shall immediately become eligible for Reimbursement Payments in accordance with Section 5(a)(iv), provided however if an executed Separation Agreement and Release has not become fully effective within the CIC Release Period, the Company shall immediately cease making CIC Premium Reimbursement Payments (or, if applicable, any CIC Special Severance Payments) and the Executive shall be obligated to promptly repay to the Company any previously received CIC Premium Reimbursement Payments (or, if applicable, any CIC Special Severance Payments).

(x) CIC Outplacement Services shall commence immediately upon the Executive’s Date of Termination, provided however if an executed Separation Agreement and Release has not become fully effective within the CIC Release Period, CIC Outplacement Services shall immediately cease and the Executive shall be obligated to promptly repay to the Company any previously made CIC Outplacement Payments.

(b) Options and Other Stock Based Awards. Notwithstanding anything to the contrary in any then outstanding option agreement or stock-based award agreement (other than Restricted Stock Agreement, which will continue to be governed in accordance with its terms), the vesting of all stock options and other stock-based awards outstanding and held by the Executive shall immediately accelerate and become fully vested and exercisable as of the Date of Termination, and subject to any permitted action by the Board upon a Change of Control under the Company’s applicable equity plan to terminate the stock options or other stock-based awards upon a Change of Control, any such vested stock option shall be exercisable for not less than one (1) year from the Date of Termination.

(c) Right to Severance under Section 5. The receipt of any severance payments or benefits pursuant to Section 5 shall be subject (i) the Executive’s submission to the Company of an executed Separation Agreement and Release that becomes fully effective within the CIC Release Period and (ii) to the

Executive's continued compliance with the Confidentiality and Non-Competition Agreement. In the event an executed Separation and Release Agreement does not become fully effective within the Release Period, the Executive shall forfeit his right to receive any severance payments or benefits under Section 5 and, as specified in paragraph (c) above, the Company shall have the right to recoup from the Executive any previously made severance payments or benefits. In the event the Executive breaches any of the provisions set forth in the Confidentiality and Non-Competition Agreement, in addition to all other legal and equitable remedies, the Company shall have the right to terminate or suspend all continuing payments and benefits to which the Executive may otherwise be entitled pursuant to Section 5 without affecting the effectiveness of the Executive's release or the Executive's obligations under the Separation Agreement and Release.

(d) Continued Compliance. The receipt of any severance payments or benefits pursuant to Section 5 shall be subject to the Executive not violating any of the provisions set forth in the Confidentiality and Non-Competition Agreement. In the event the Executive breaches any of the provisions set forth in the Confidentiality and Non-Competition Agreement, in addition to all other legal and equitable remedies, the Company shall have the right to terminate or suspend all continuing payments and benefits to which the Executive may otherwise be entitled pursuant to Section 5 without affecting the Executive's release or the Executive's obligations under the Separation Agreement and Release.

(e) Other Termination Events. The Executive hereby agrees that no severance compensation shall be payable upon termination of the Executive's employment with the Company (i) by the Company with Cause; (ii) by the Executive without Good Reason; or (iii) as a result of the Executive's death or Permanent Disability, and the Executive hereby waives any claim for severance compensation except as set forth in Section 5(a).

(f) Parachute Payments. If Independent Tax Counsel (as that term is defined below) determines that the aggregate payments and benefits provided or to be provided to the Executive pursuant to this Agreement, and any other payments and benefits provided or to be provided to the Executive from the Company or any of its subsidiaries or other affiliates or any successors thereto constitute "parachute payments" as defined in Section 280G of the Code ("Parachute Payments") that would be subject to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then, except as otherwise provided in the next sentence, such Parachute Payments shall be reduced to the extent the Independent Tax Counsel shall determine is necessary (but not below zero) so that no portion thereof shall be subject to the Excise Tax. If Independent Tax Counsel determines that the Executive would receive in the aggregate greater payments and benefits on an after tax basis if the Parachute Payments were not reduced pursuant to this Section 5(f), then no such reduction shall be made. The determination of which payments or benefits shall be reduced to avoid the Excise Tax shall be made by the Independent Tax Counsel, provided that the Independent Tax Counsel shall reduce or eliminate, as the case may be, payments or benefits in the following order (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits. To the extent any payment is to be made over time (e.g., in installments, etc.), then the payments shall be reduced in reverse chronological order. The determination of the Independent Tax Counsel under this Section 5(f) shall be final and binding on all parties hereto. For purposes of this Section 5(f), "Independent Tax Counsel" shall mean a lawyer, a certified public accountant with a nationally recognized accounting firm, or a compensation consultant with a nationally recognized actuarial and benefits consulting firm with expertise in the area of executive compensation tax law, who shall be selected by the Board, and whose fees and disbursements shall be paid by the Company.

6. Tax and Insurance.

(a) Insurance. In no event shall the termination of the Executive's employment by the Company or any such termination by the Executive pursuant to this Agreement release any claim by the Executive for indemnification that he is otherwise entitled to under any director or officer's insurance policy or any articles, bylaws or other foundation documents of the Company. Without limiting the foregoing, the Company shall provide Executive with reasonable director's and officer's insurance coverage that is at least as favorable as the coverage in existence on the date of this Agreement (the "Existing D&O Coverage"); provided, however, that in no event shall the Company be obligated to maintain director's and officer's insurance coverage to the extent that premiums thereunder exceed 200% of the premiums payable by the Company under the Existing D&O Coverage on the date hereof (the "Threshold"); provided, further, that to the extent such premiums exceed the foregoing Threshold, the

Company shall obtain director's and officer's insurance coverage on terms as similar as reasonably practicable to the terms of the Existing D&O Coverage without exceeding the Threshold. Such insurance coverage shall continue in effect during the Employment Period and after the Employment Period ends for a period of six (6) years thereafter. The cost of such coverage shall be paid by the Company. Notwithstanding anything to the contrary in this Agreement, upon the occurrence of a Change of Control, the obligations set forth in this section shall terminate, provided that the Company shall (x) secure "tail insurance" with respect to the Existing D&O Coverage on reasonable terms and conditions of coverage, and (y) require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company to honor any indemnification obligations that the Executive is otherwise entitled to under any articles, bylaws or other foundation documents of the Company in the same manner as the Company's directors and officers immediately prior to such Change of Control.

(b) 409A.

(i) Anything in this Agreement to the contrary notwithstanding, if at the time of the Executive's separation from service within the meaning of Section 409A of the Code, the Company determines that the Executive is a "specified employee" within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that the Executive becomes entitled to under this Agreement on account of the Executive's separation from service would be considered deferred compensation otherwise subject to the twenty percent (20%) additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six (6) months and one (1) day after the Executive's separation from service, or (B) the Executive's death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule.

(ii) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one (1) taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(iii) To the extent that any payment or benefit described in this Agreement constitutes "non-qualified deferred compensation" under Section 409A of the Code, and to the extent that such payment or benefit is payable upon the Executive's termination of employment, then such payments or benefits shall be payable only upon the Executive's "separation from service." The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A-1(h).

(iv) The parties intend that this Agreement shall be administered in accordance with Section 409A of the Code. To the extent that any provision of this Agreement is ambiguous as to its compliance with Section 409A of the Code, the provision shall be read in such a manner so that all payments hereunder comply with Section 409A of the Code. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Section 409A of the Code and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(v) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A of the Code but do not satisfy an exemption from, or the conditions of, such Section.

7. Representations and Warranties of the Executive. Executive hereby represents and warrants to the Company that:

(a) The Executive :

(i) has not been convicted within the last five (5) years of any felony or misdemeanor in connection with the offer, purchase, or sale of any security or any felony involving fraud or deceit, including, but not limited to, forgery, embezzlement, obtaining money under false pretenses, larceny, or conspiracy to defraud;

(ii) is not currently subject to any state administrative enforcement order or judgement entered by a state securities administrator within the last five (5) years and is not subject to any state's administrative enforcement order or judgement in which fraud or deceit (including, but not limited to, making untrue statements of material facts and omitting to state material facts) was found in which the order or judgement was entered within the last five (5) years; and

(iii) legally authorized to work in the United States of America.

(b) This Agreement constitutes the legal, valid and binding obligations of the Executive, enforceable in accordance with its terms, and execution, delivery and performance of this Agreement by the Executive does not and will not conflict with, violate or cause a breach of any agreement, contract or instrument to which the Executive is a party or any judgement, order or decree to which the Executive is subject.

8. Representations and Warranties of the Company. The Company hereby represents and warrants to the Executive that:

(a) The Company is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware. The Company has all requisite corporate power and authority to carry out the transactions contemplated by this Agreement.

(b) The execution, delivery and performance of this Agreement has been duly authorized by the Company. This Agreement constitutes a valid and binding obligation of the Company, enforceable in accordance with its terms. The execution and delivery by the Company of this Agreement, and the fulfillment of and compliance with the respective terms hereof by the Company, do not and shall not (i) conflict with or result in a breach of the terms, (ii) constitute a default under, (iii) result in the creation of any lien, security interest, charge or encumbrance upon the Company's capital stock or assets pursuant to, (iv) give any third party the right to modify, terminate or accelerate any obligation under, (v) result in a violation of, or (vi) require any authorization, consent, approval, exemption or other action by or notice to any court or administrative or governmental body pursuant to, the charter or bylaws of the Company, or any law, statute, rule or regulation to which the Company is subject, or any agreement, instrument, order judgement or decree to which the Company is subject.

9. Notices. All notices, demands or other communications to be given or delivered under or by reason of the provisions of this Agreement will be in writing and will be deemed to have been given when delivered personally, mailed by certified or registered mail, return receipt requested and postage prepaid, or sent via a nationally recognized overnight courier, or sent via facsimile to the recipient with a confirmation of receipt and accompanied by a certified or registered mailing. Such notices, demands and other communications will be sent to the address indicated below:

To the Company :

Aspen Aerogels, Inc.
30 Forbes Road
Northborough, MA 01532
Telephone: (508) 691-1111
Facsimile: (508) 691-1200
Attention: Board of Directors

with copies (which shall not constitute notice) to :

Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
One Financial Center
Boston, MA 02111
Telephone: (617) 348-3013
Facsimile: (617) 542-2241
Attention: Sahir Surmeli

To the Executive :

Address specified on signature page

or to such other address or to the attention of such other person as the recipient party has specified by prior written notice to the sending party.

10. Miscellaneous

(a) **Severability**. Whenever possible, each provision of this Agreement will be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement is held to be invalid, illegal or unenforceable in any respect under any applicable law or rule in any jurisdiction, such invalidity, illegality or unenforceability will not affect any other provision or any other jurisdiction, but this Agreement will be reformed, construed and enforced in such jurisdiction as if such invalid, illegal or unenforceable provision had never been contained herein.

(b) **Complete Agreement**. This Agreement and the agreements referred to herein (including, without limitation, the Confidentiality and Non-Competition Agreement) embody the complete agreement and understanding among the parties and supersede and preempt any prior understandings, agreements or representations by or among the parties, written or oral, which may have related to the subject matter hereof. This Agreement supersedes and terminates the Prior Agreement.

(c) **Waiver of Jury trial**. The parties to this Agreement each hereby waives, to the fullest extent permitted by law, any right to trial by jury of any claim, demand, action, or cause of action (i) arising under this Agreement or (ii) in any way connected with or related or incidental to the dealings of the parties hereto in respect of this Agreement or any of the transactions related hereto, in each case whether now existing or hereafter arising, and whether in contract, tort, equity, or otherwise. The parties to this Agreement each hereby agrees and consents that any such claim, demand, action, or cause of action shall be decided by court trial without a jury and that the parties to this Agreement may file an original counterpart or a copy of this Agreement with any court as written evidence of the consent of the parties hereto to the waiver of their right to trial by jury.

(d) **Counterparts; Facsimile Transmission**. This Agreement may be executed simultaneously in two or more counterparts, any one of which need not contain the signatures of more than one party,

but all such counterparts taken together will constitute one and the same Agreement. This Agreement may also be executed and delivered by facsimile transmission.

(e) Successors and Assigns. The provisions hereof shall inure to the benefit of, and be binding upon and assignable to, successors of the Company by way of merger, consolidation or sale. The Executive may not assign or delegate to any third person the Executive's obligations under this Agreement. The rights and benefits of the Executive under this Agreement are personal to him and no such right or benefit shall be subject to voluntary or involuntary alienation, assignment or transfer. The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would have been required to perform it if no such succession had taken place. As used in this Agreement, "the Company" shall mean both the Company as defined above and any such successor that assumes and agrees to perform this Agreement, by operation of law or otherwise.

(f) Governing Law. All issues concerning this Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, without giving effect to any choice of law or conflict of law provision or rule (whether of the Commonwealth of Massachusetts or any other jurisdiction) that would cause the application of the law of any jurisdiction other than the Commonwealth of Massachusetts.

(g) Remedies. The parties hereto agree and acknowledge that money damages may not be an adequate remedy for any breach of the provisions of the Agreement and that any party may in its sole discretion apply to any court of law or equity of competent jurisdiction (without posting any bond or deposit) for specific performance and/or injunctive or other relief in order to enforce or prevent any violations of the provisions of this Agreement.

(h) Amendment and Waiver. The provisions of this Agreement may be amended and waived only with the prior written consent of the Company and the Executive.

(i) Certain Expenses. The Company agrees to pay, as incurred, to the fullest extent permitted by law, or indemnify the Executive if such payment is not legally permitted, for all legal fees and expenses that the Executive may in good faith incur as a result of any contest by the Company, the Executive or others of the validity or enforceability of or liability under, or otherwise involving, any provision of this Agreement; provided, however, that the Executive shall reimburse the Company for all such payments made by the Company in connection with a contest by the Company if a court of competent jurisdiction or an arbitrator shall find that the Executive did not act in good faith in connection with such contest.

(j) Withholding. All payments made by the Company to the Executive under this Agreement shall be net of any tax or other amounts required to be withheld by the Company under applicable law.

(k) Litigation and Regulatory Cooperation. During and after the Executive's employment, the Executive shall cooperate fully with the Company in the defense or prosecution of any claims or actions now in existence or which may be brought in the future against or on behalf of the Company which relate to events or occurrences that transpired while the Executive was employed by the Company. The Executive's full cooperation in connection with such claims or actions shall include, but not be limited to, being available to meet with counsel to prepare for discovery or trial and to act as a witness on behalf of the Company at mutually convenient times. During and after the Executive's employment, the Executive also shall cooperate fully with the Company in connection with any investigation or review of any federal, state or local regulatory authority as any such investigation or review relates to events or occurrences that transpired while the Executive was employed by the Company. The Company shall reimburse the Executive for any reasonable out-of-pocket expenses incurred in connection with the Executive's performance of obligations pursuant to this Section 11(k).

(l) Survival. The provisions of Sections 1, 2, 4, 5, 6, 9 and 10 of this Agreement shall survive any termination of this Agreement in accordance with the terms of such sections.

[REMAINDER OF THIS PAGE INTENTIONALL Y LEFT BLANK]

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

THE COMPANY :

ASPEN AEROGELS, INC .

By: /s/ John Fairbanks
Name: John Fairbanks
Title: Chief Financial Officer

THE EXECUTIVE :

By: /s/ Donald R. Young
Name: Donald R. Young

Address:

[Signature Page to Donald R. Young Executive Agreement]

CERTIFICATIONS UNDER SECTION 302

I, Donald R. Young, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Aspen Aerogels, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying 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.

Date: November 7, 2018

/s/ Donald R. Young

Donald R. Young
President and Chief Executive Officer
(principal executive officer)

CERTIFICATIONS UNDER SECTION 302

I, John F. Fairbanks, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Aspen Aerogels, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying 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.

Date: November 7, 2018

/s/ John F. Fairbanks

John F. Fairbanks

Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)

CERTIFICATIONS UNDER SECTION 906

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of Aspen Aerogels, Inc., a Delaware corporation (the "Company"), does hereby certify, to such officer's knowledge, that:

The Quarterly Report on Form 10-Q for the quarter ended September 30, 2018 (the "Form 10-Q") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: November 7, 2018

/s/ Donald R. Young
Donald R. Young
President and Chief Executive Officer
(principal executive officer)

Dated: November 7, 2018

/s/ John F. Fairbanks
John F. Fairbanks
Vice President, Chief Financial Officer and Treasurer
(principal financial officer and principal accounting officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.