MINISTERSTVO ŠKOLSTVÍ MLÁDEŽE A TĚLOVÝCHOVY

EVROPSKÁ UNIE
EVROPSKÝ FOND PRO REGIONÁLNÍ ROZVOJ
INVESTICE DO VAŠÍ BUDOUCNOSTI

OP Výzkum a vývoj pro inovace

Equipment Purchase and Sale Agreement
between
Optomec, Inc. and University of West Bohemia
Entered into pursuant to the Civil Code, Act no 89/2012 Coll., Section 2079 et sequentes, as amended

SELLER: Optomec, Inc.
Address: 3911 Singer Boulevard, NE, Albuquerque, NM 87109, U.S.A.
Telephone: +1-505-761-8250
Official: David Ramahi, President/CEO
Corp. No: 1126853

BUYER: University of West Bohemia
Address: Univerzitni 8, Plzen, 306 14, Czech Republic
Telephone: +420 377 634 542Official: doc. PaedDr. Ilona MAURITZOVÁ, Ph.D., the Rector
ID No: 49777513

THIS AGREEMENT (otherwise known as "Agreement" or "Contract") entered into this (date), by and between Buyer and Seller, otherwise known individually as ("Party") or together as ("Parties"), agree to the following items and conditions, which are binding on both Parties:

Article I: Sale of Equipment and Services

Buyer hereby agrees to purchase from Seller, and Seller hereby agrees to deliver to Buyer and transfer the ownership rights to the Goods to Buyer, the equipment (the "Equipment") and related services (the "Services"), together the "Goods," set forth in the attached Price Quotation, attached as Exhibit A. The Goods are described in detail in the following documents: 1. Product Specification attached as Exhibit B; and, 2. the "Service Agreement," attached as Exhibit C.

Related Services provided by Seller are: delivery of the Equipment, its installation, commissioning, demonstration of its proper functioning on the Buyer's premises, supply technical documentation and user manual, provide training for five operators directly on the Equipment.

The Equipment shall be provided with appropriate fully-fledged software with full one-year license for a PC.

Seller shall supply to Buyer also technical documentation relating to the Equipment and user manuals in English language in both, printed and electronic formats, and the Acceptance Test related to the Equipment, attached as Exhibit E.

Article II: Time of Essence

The Parties agree hereto that time is of the essence regarding this Agreement. If Buyer is delinquent on any payments due Seller, then the Acceptance Test date and/or the Delivery Date will be extended

by one week for every week of Buyer delay.

Article III: Acceptance Test

The Seller performs a standard Acceptance Test on the Equipment, attached as Exhibit E, prior to shipment. The Acceptance Test measures actual Equipment performance and compares it to the system specification. The Acceptance Test is subject to revision from time to time and the latest version of said Acceptance Test shall be used at the time the actual acceptance test is conducted. The Buyer may choose to attend the acceptance test at their discretion. If the Buyer chooses to attend the acceptance test, Seller will provide Buyer with a two-week notice of the test, and Buyer will not delay the acceptance and shipment of the Equipment unnecessarily.

Article IV: Purchase and Payment

The Buyer will accept the Goods and pay for the Goods with a Total Purchase Price of Four Hundred Forty-four Thousand Nine Hundred Thirty-five US Dollars ($444,935 USD) as specified in the Price Quotation (Exhibit A).

The purchase price will be paid by the Buyer in US dollars based on an invoice supplied by the Seller. The purchase price will be invoiced by the Seller in the form of four (4) partial payments as follows:

- **50 % of the total purchase price** upon signing the Contract and against a partial invoice issued by the Seller in accordance with the Contract;
- **30 % of the total purchase price shall be paid** promptly upon the delivery of the Airway bill to the buyer in accordance with the Contract and against a partial invoice issued by the Seller; attached to this partial invoice shall be a copy of the Airway bill;
- **15% of the total purchase price** after completion of the installation and initial operator Training (at customer site) and against a partial invoice issued by the Seller;
- **5% of the total purchase price** after completion of the 4 days Applications Training (at customer site) and against a partial invoice issued by the Seller. Attached to this partial invoice shall be a copy of the certificate of completion of the 4 days Applications Training.

The invoice shall contain all elements of a proper accounting and tax document, as stipulated in applicable legal regulations, including without limitation the Act No. 235/2004 Sb. on value added tax, as amended. If the invoice lacks the required elements, the Buyer is entitled to return it within the repayment term to the Seller for completion, without being in arrears. The repayment term shall begin running anew once the duly completed or corrected invoice is delivered to the Buyer.

The invoice maturity is stipulated 45 days after it is demonstrably delivered to the Buyer.

Should the Buyer be in default with payment of partial invoice, the Seller will be entitled to request an

interest on late payment of 1% of the invoice price per week of the delay from the Buyer, but not to exceed a total of 5%.

The Buyer will be entitled to off-set any contractual penalties that the Seller is obliged to pay, against the invoiced amount.

The Buyer will adhere to the terms of this Contract, the Price Quotation (Exhibit A) and the Seller's 'Terms and Conditions of Sale,' attached as Exhibit D. In the event of differences, this Contract will supersede the Price Quotation; and, the Price Quotation will supersede the Seller's Terms and Conditions of Sale.

The Seller and the Buyer both acknowledge the sufficiency of this consideration. In addition to the Total Purchase Price specified in this Agreement, the amount of any present or future sales, use, excise, import or similar tax applicable to the sale of the Goods will be paid by the Buyer, or alternatively, the Buyer will provide the Seller with a tax exemption certificate acceptable to the applicable taxing authorities.

The purchase price is stipulated as the highest possible price including all fees and any other costs associated with the supply of the Goods pursuant to this Contract (except income tax, import duties and VAT). The price includes transportation as well as relevant insurance, assembly, installation of the Goods and its setting into operation; demonstration of the required functions and parameters of the Goods as specified in the Contract herein, and also training of the operation staff members, and other costs associated with obtaining the acceptance tests, certificates, attests and transfer of rights.

Article V: Wire Transfer Information

Buyer will make all wire transfer payments to Seller by international wire transfer to the following account:

Bank Name:	Bank of the West
Telephone:	+1-505-717-3360
Address:	Bank of the West 5501 Jefferson, NE Albuquerque, NM 87109-5841 U.S.A.
Swift Code:	BWSTUS66
Account Name:	Optomec
Account Number:	284022746
ABA Routing Number:	121100782
Optomec Contact:	Jennifer Silva

Telephone: +1-505-314-1204

Article VI: Time of Performance of the Public Contract

The Seller undertakes to supply the Goods to the Buyer and fulfill all of its obligations under the Contract (including installation of the Equipment, Services etc.) **no later than five (5) months** upon entering into the Contract, unless Article II is invoked. The Airway bill shall be issued in regard to the handover and acceptance of the Goods. The Buyer shall be entitled not to collect the Goods if they appear defective. Should the Seller be in delay with the performance of the obligations specified in the previous sentences in this article, the Buyer will be entitled to request the Seller to pay a contractual penalty of 1% per week from the total purchase price. The total amount of the penalty is limited to 5% of the purchase price.

Article VII: Place of Performance of the Public Contract

Unless stipulated otherwise in the Contract, the Goods will be delivered pursuant to INCOTERMS 2010 DAP (Univerzitni 2795/26, Plzen, 301 00 Czech Republic). The place of performance is University of West Bohemia, Univerzitni 2795/26, Plzen, 301 00, Czech Republic.

The Buyer is obliged to check completeness of the Goods and that the Goods are free from any defects immediately after the Goods are accepted from an authorised carrier. The Buyer is obliged to confirm in writing (including via e-mail) to the Seller that the Goods were delivered complete and free from any obvious defects within 5 business days after accepting the Goods from the authorised carrier.

If the Goods accepted by the Buyer pursuant to the above section are found to be defective, or incomplete, the Buyer will inform the Seller about the fact in writing within 5 business days after the Goods are accepted from the authorized carrier at the latest. Next steps will be in accordance with the provisions of Article VIII.

The Buyer will be responsible for providing an environment and peripheries meeting the requirements specified in the Product Specification, as shown in Exhibit B. After the Equipment arrives at the Buyer's installation site, the Buyer will inform the Seller, at which time the Seller will arrange to send staff to install the Equipment after notification. In the event that the Buyer's installation site is not prepared or available upon delivery of the Equipment, Buyer agrees to make the Final Payment to Seller on the date such delay exceeds sixty (60) days from the date of delivery of the Equipment.
Seller is required to provide training for the Buyers' five operators of the Equipment in the extent of no less than three days on Buyer's premises directly on the Equipment. The training will involve installation training and Applications training for the operation of the Equipment, all its parts, including the scope of delivery and the software in full extent.

Article VIII: Warranty

The Goods will be covered by the 'Limited One Year Warranty,' as specified in the Product Specification (Exhibit F). Failure of the Goods to be installed by Buyer at their facility within a 60-day period from shipment, will begin the warranty period.

Article IX: Rights and Obligations of the Contracting Parties

The Seller is obliged to deliver the Goods in the agreed quantity, quality and design. All the Goods supplied by the Seller to the Buyer according to this Agreement must meet the qualitative requirements as stipulated herein.

The Seller is obliged to supply to the Buyer Goods free of any defects and according to the terms and conditions stipulated herein.

The ownership title to the Goods is transferred to the Buyer on the day the Goods are duly accepted from the authorized carrier. At the same moment, the risk of damage is also transferred to the Buyer.

The Seller is obliged to immediately inform the Buyer about possible risk of not meeting the deadline, and about any circumstances that might prevent the Goods from being delivered.

The Seller agrees that any receivables that may be claimed from the Buyer and that come to existence based on this Agreement may not be assigned or set off by a unilateral legal act.

The Seller is liable to the Buyer for any damage caused by violation of duties stipulated in this Agreement or obligations stipulated by generally binding legal regulations.

The Seller is obliged to observe all the commitments contained in the Tender Documents and in its Bid submitted to the tender before this Contract was signed.

Article X: Force Majeure

Neither Seller nor Buyer shall be liable to the other for default or delay in delivering or accepting goods hereunder if caused by an Act of God, war, terrorism, mobilization, riot, strike, embargo, shortage of utility, facility, material or labor, delay in transportation, breakdown or accident, or compliance with or action taken to carry out the extent or purpose of any law or regulation. When only a part of Seller's or Buyer's capacity to perform is excused under this paragraph, Seller or Buyer must allocate production, deliveries, or receipt of deliveries among various customers or suppliers then under contract for similar products during the period when Buyer or Seller is unable to perform. The allocation must be effected in a commercially fair and equitable manner. When either Seller or Buyer claims an excuse for non-performance under this paragraph, it must give notice in writing to

the other party. When an allocation has been made, notice of the estimated quota made available for Buyer or Seller, as the case may be, must be given. Should such inability to perform continue for a period in excess of sixty (60) days Seller shall not be obligated to sell, nor shall Buyer be obligated to purchase, at a later date, that portion of the goods which Seller is unable to deliver or Buyer is unable to receive or use because of any of the aforementioned causes beyond the control of the Parties.

For other reasons that may cause delay or prevention of the shipment or payment, the party responsible for the delay or prevention shall notice the other party in a reasonable time with detailed explanations, and shall bear all the liabilities to the related claims, damages and costs.

Article XI: Validity and Effect on the Agreement

The Agreement becomes valid effective on the day it is signed by authorized representatives of two Contracting Parties.

The Agreement can only be terminated for reasons stipulated in the Agreement or specified by law.

A Contracting Party affected by the other party´s failure to meet its obligation may unilaterally terminate this Agreement for a gross violation of the Agreement; in particular, the following will be considered a gross violation of this Agreement:

a) The Buyer´s failure to pay the purchase price in accordance with this Agreement for more than 60 days after the due date of a relevant invoice;
b) Seller´s failure to duly deliver the Goods, or even part of the Goods, on the agreed date;
c) Seller´s failure to supply Goods possessing the characteristics declared by the Seller in this Agreement;
d) Removal of defects by the Seller is delayed for more than the agreed timeframe stipulated in the Warranty (Article VIII);
e) Seller´s failure to provide correct information or documents indicative of the actual situation in the Bid that had been submitted to the tender before this Agreement was signed, which have or could have affected the result of the Tender.

Once the Agreement becomes ineffective, all and any obligations of the Contracting Parties arising from this Agreement will cease to exist. The ineffectiveness or termination of the Agreement will not affect the existence of the right claim damages and contractual penalties stipulated in case of violation of the contractual obligations existing before the Agreement becomes ineffective, and obligations of the Contracting Parties that are to survive this Agreement by their nature or by law.

Article XII: Jurisdiction

This Agreement will be governed by the laws of the Czech Republic, irrespective of its choice of law principles. To the extent that a party hereto desires to bring an action for preliminary or final injunctive relief, such party shall be entitled to bring such an action against the other party in the forum of the principal place of business of such other party. For all other matters related to this Agreement, both parties agree to submit to the jurisdiction of the courts of the Czech Republic. In the event that any word, phrase, clause, sentence, or other provision in this Agreement shall violate or be deemed unenforceable under any applicable statute, ordinance or rule of law in any governing jurisdiction, such provision shall not affect the rights and obligations of the Parties with regard to the remaining provisions of the Agreement. The unlawful or unenforceable provision shall be replaced by a lawful and enforceable provision, which so far as possible results in the same economic effects as the unlawful or unenforceable provision.

Article XIII: Notices

Any notices required to be given by this Agreement shall be in writing by either personal delivery to the party requiring notice, with a written receipt, or by mailing such notice to the last known address of the party requiring notice by FedEx or UPS courier. The effective date of such notice shall be the date of receipt of such notice.

Article XIV: Assignment

Neither party to this Agreement shall assign its rights and obligations under this Agreement, except by merger or operation of law, without prior written consent of the other party, which consent shall not be unreasonably withheld.

Article XVI: Additional agreement

The Seller shall archive the counterpart of the Contract, including its amendments, original accounting documents and other documents related to the execution of the Contract for no less than three years upon the end of the OP RDI, but in any case at least until the year 2022. Throughout this period, the Seller shall allow persons authorized to monitor projects to inspect the documents related to the performance of the Contract and, in particular to provide the requested information and documents to employees of or persons authorized by project monitoring bodies in OP RDI, and it shall cooperate with such persons and provide them with conditions for conducting the inspection of project implementation. Furthermore, all documents and the Contract-related documents shall be secured against loss, theft, and deterioration.

The Seller acknowledges that, pursuant to section 2, paragraph e) of the Act No. 320/2001 Sb., on financial control in public administration and amendment to certain laws (the Financial Control Act), as amended, it is a person obliged to cooperate in the performance of financial control. In the scope of inspection and for three years following the end of the Operational Programme, the managing

authority of the Operational Programme Research and Development for Innovation (OP RDI) shall have the right to access those parts of the Tender, the Contract and related documents which are protected under special legal regulations (e.g. as trade secret and classified information), provided that the requirements stipulated in legal regulations (e.g. section 8, 9 and 20 of the Act No. 255/2012 Sb.) are met. The managing authority of the Operational Programme Research and Development for Innovation has the right to inspect in an equivalent manner the Seller's subcontractors, if applicable (see Annex 2 to the guidelines for applicants and beneficiaries of OP RDI – Rules for Selection of Contractors at http://www.msmt.cz/strukturalni-fondy/spolecne-prilohy-prirucek-pro-zadatele-a-prijemce-op-vavpi-3).

In regard to all outcomes of the contract, the Seller shall be required to adhere to and comply with the OP RDI Visual Identity Manual, available on the website of the Ministry of Education of the Czech Republic: http://www.msmt.cz/strukturalni-fondy/manual-vizualni-identity-op-vavpi.

Article XVII: Publication of Agreement

The Seller acknowledges and agrees this Contract will be made public on the Purchaser´s website pursuant to the Public Contracts Act section 147 (a), and that the actual price paid for the supply of the subject-matter of the Agreement will also be made public by the deadlines and in a manner defined by the Public Contracts Act section 147 (a).

Article XVIII: Closing Provisions

The relationship between the Parties will be governed by Czech law. Unless expressly stipulated otherwise in the Agreement, the relationships that come to existence based on this Agreement and arising from this Contract are governed by the relevant provisions of the Civil Code, Act no. 89/2012, Coll., as amended, and other applicable laws.

All and any changes and amendments to the Agreement may only be made by a written agreement of the Contracting Parties and must respect provisions of the Public Contracts Act, Section 82, subsection 7. Such agreements must be in the form of numbered amendments to the Agreement signed by both Parties and dated.

If any of the Parties is unable to duly perform this Agreement due to circumstances preventing it from doing so, the Party will be obliged to inform the other Party about the fact without undue delay and initiate a meeting of the Buyer´s and Seller´s representatives.

If a reason causing one provision to be invalid only affects a certain provision of the Agreement, only

this particular provision will be invalid, unless its nature, contents or the circumstances under which it was stipulated indicate that it is not severable from the rest of the Agreement.

The Contracting Parties will always strive to reach amicable settlement of possible disputes arising from the Agreement. Possible disputes arising from the Agreement will be resolved in accordance with the valid laws by local authorities with appropriate competences in the Czech Republic. In accordance with the Civil Procedure Code, Act no. 99/1963, Coll., Section 89(a), the disputes arising from this Agreement or relating to this Agreement will be resolved by the district (Okresní soud Plzeň- město) or regional court in Pilsen (Krajský soud v Plzni).

The Agreement is made out in 4 identical copies, each of which is valid as original. Each of the Contracting Parties will receive 2 identical copies.

The Contracting Parties declare that they have read the Agreement before signing, and agree with its content without any reservations. The Agreement expresses their sincere, real, free serious will. The authorized representatives of the Contracting Parties attach signatures in their own hand to confirm that these statements are authentic and true.

This Agreement is intended to represent the entire agreement between the Parties hereto. Any oral agreements or representations entered into or made prior to the execution of this Agreement are considered merged hereunto and made a part hereof.

IN WITNESS WHEREOF, the Parties hereto have entered into this Agreement on the date set forth below:

SELLER

Optomec, Inc.

By: _____

Name: Jennifer Silva
Title: Controller

Date: 4-22-14
+ signature must be notarized

Key Comm Atty 1/29/2015

BUYER

University of West Bohemia

By: _____

Name: doc. PaedDr. Ilona MAURITZOVÁ, Ph.D.
Title: the Rector

Date: - 2 -05- 2014

Západočeská univerzita v Plzni
1

Exhibit A – Price Quotation

OPTOMEC PROPRIETARY AND CONFIDENTIAL INFORMATION

OPTOMEC
Additive Manufacturing Systems — From Nano to MACRO™
www.optomec.com
3911 Singer NE / Albuquerque, NM 87109
Phone: (505) 761-8250 Fax: (505) 761-6638

PREPARED FOR:
Dr. Radek Soukup
Department of Technologies and Measurement
Regional Innovation Centre for Electrical Engineering
Univerzitní 8
Plzeň, Czech Republic
Tel: +420 377 634 503

Quote Date:	3/20/2014
Quote in effect for:	Award Period
Prepared by:	Mike Kardos

QUOTATION NO:
Q-UWB-20MAR2014

Item	System and Option Description	Qty	Unit Price	Extension
1	**Aerosol Jet 300-UP System + Service PAK 2**	1	$375,700	$375,700
	Fine Feature Print Head (FFH)			
	Includes Heater & Shutter			
	Nozzles = 100, 150, 200, 250, 300um diameter			
	Dual Atomizer Deposition Control Module			
	Sprint Series Pneumatic Atomizer w/ Heater & Stirrer			
	Sprint Series Ultrasonic Atomizer			
	300mm x 300mm Work Area with Heated Platen			
	XY Auto Motion Control System			
	Z Axis Manual Control			
	Vision System (Process+Alignment Cameras+Lighting)			
	Stainless Steel Cabinet with Granite Table Top			
	Safety Cover & Cabinet Doors - CE Compliant			
	Two Vacuum Pumps			
	Computer Control System			
	AJ 'VMTools' SW (see Note 7)			
	AJ 'Micro' Process Control SW			
	Spares Kit			
	Transformer for local power supply (if necessary)			
	Service PAK 2:			
	Installation and Start-up Package		Included	Included
	- Shipping & Insurance to US Airport			
	- Installation & Training at Customer's Facility			
	Advanced Application Workshop		Included	Included
	- 4 days Applications Training (at customer site)			
	- Conducted at Customer Site (30-60 days after install)			
	- Delivered by AJ scientist or Sr. Engineer			
	Optional Upgrades			
2	**Sprint Wide Feature Print Head (WFH)**	1	$22,300	$22,300
	Includes Shutter			
	Nozzles = 0.75 round; 1.5mm and 3.0mm slotted			
	Interchangeable with FFH			
3	**700 mW, 830nm IR Laser Subsys + Optics**	1	$27,800	$27,800
	Includes Laser Safe Glass and Panels			
	SYSTEM TOTAL			**$425,800**

Item	Services Description	Qty	Unit Price	Extension
4	**AJ Annual Remote Service Contract**	1	$22,674	$22,674
	Online and Telephone System Support			
	Online and Telephone Application Support			
	SW updates			
	Consumable Parts Kit			
	Discount on spare parts and support services			
5	**Shipment from US Airport to Plzen**	1	$15,000	$15,000
	SERVICES TOTAL			**$37,674**

SYSTEM AND SERVICES SUBTOTAL		**$463,474**
University Discount Valid For Award Period	-4%	$18,538.96
SYSTEM AND SERVICES TOTAL		**$444,935**

NOTES:

1. Prices are quoted in US DOLLARS
2. Payment Terms: As per Purchase and Sale Agreement
3. Each Party is responsible for their own travel and expenses.
4. Limited Warranty: Warranty Period 1 year after installation.
5. Customer responsible for providing electrical, gas, exhaust per system specification prior to install including installation of a transformer necessary to provide proper power to the system
6. Requires English language version of AutoCAD 2002 or higher, not included in base configuration.
7. Prices based on Incoterms 2010 DAP Pilsen
8. All other Optomec Standard Terms & Conditions Apply.

Please direct all inquiries regarding this quotation to:

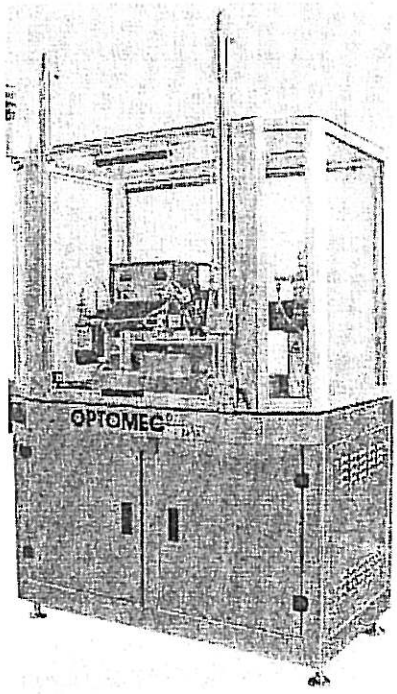
Michael Kardos
mkardos@optomec.com
+1-650-326-7660 phone
+1-307-690-4350 cell

Exhibit B – Product Specification

OPTOMEC®

Additive Manufacturing Systems — from Nano to MACRO™

Aerosol Jet® 300 Deposition System Specification



MADE IN THE U.S.A.

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TABLE OF CONTENTS

AEROSOL JET PROCESS AND SYSTEM OVERVIEW

Optomec's Aerosol Jet process is an additive process, which deposits a wide variety of materials onto a wide variety of substrates without conventional masks or thin-film equipment. The Aerosol Jet Print System was initially invented through a DARPA-funded program focused on developing Direct Write methods for depositing electronics materials. Aerosol Jetis also capable of depositing a variety of polymers, adhesives and bio-related materials.

The Aerosol Jet process works as follows:

- Liquid material is placed into an atomizer which creates a dense aerosol of tiny droplets between 1-5 microns in size.
- The aerosol is carried by a gas flow to the deposition head.
- Within the deposition head, the aerosol is focused by a second gas flow and the resulting, high velocity converging particle stream is deposited onto the substrate creating features as small as 10 microns in size.
- A shutter and motion control system allow for the creation of complex patterns on the substrate.
- For low-temperature substrates, deposited material can be laser sintered to achieve properties near to those of the bulk material without damage to the surrounding substrate.

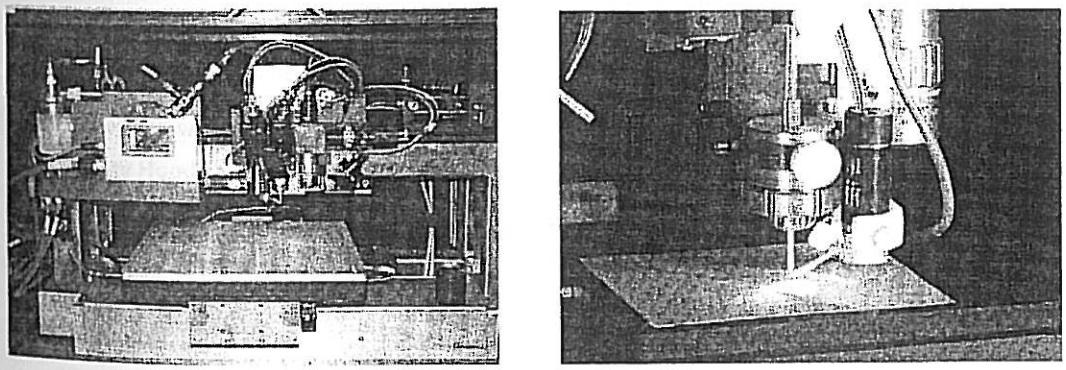
A key, added benefit of the Aerosol Jet process is that it eliminates most of the material waste common to traditional electronics manufacturing and does not require post processing with corrosive chemicals or cleaning with water. From this perspective, Aerosol Jet can be considered as an environmentally friendly process.

The Optomec Aerosol Jet Deposition System consists of the following standard components:

A. Aerosol Jet Deposition Module
B. Main Controller System
C. Motion Control Module
D. Vision Module
E. Safety Hood
F. System Base and other supporting mechanical hardware
G. Aerosol Jet Software
H. Process and Platen vacuum pumps

The Optomec Aerosol Jet 300 Print System has the following optional components and software:

A. 700mW 830nm IR Multimode Laser System including Class IV Laser Safe Hood
B. Motorized Z-Axis (User directed positional adjustments)
C. Sprint 3MM Wide Feature Printhead ™
D. Manual Tilt – 15 degree increments up to 60 degrees in tilt.
E. UV Cure Module (UJ35)
F. AutoCAD® (North America Only)



External view of the Aerosol Jet Motion System (left) with close-up of the Aerosol Jet deposition head (right).

AEROSOL JET DEPOSITION SYSTEM COMPONENTS

A) **Aerosol Jet Deposition Module (Sprint Ultrasonic and Pneumatic Atomizers are used separately):**
   1) Sprint Pneumatic Atomizer/Virtual Impactor Assembly – Capable of handling liquid materials with viscosities of 1 to 1000cp with mix and stirring. Input gas line of 2000cc/minute (max) from the Process Control Module (PCM).
   2) Sprint Ultrasonic Atomizer – Capable of handling liquid materials with viscosities of 0.7 to 10cP (including high vapour pressure liquids). Input gas line of 50cc/minute (max) from the PCM.
   3) Sprint Fine Feature Deposition Head – Input gas line of 200cc/minute (max) from the PCM.
   4) Mechanical Shutter – Used to interrupt the aerosol stream between the deposition head and the substrate. 'Open' to 'close' cycle time is 2ms.
   5) Process Control Module (PCM) – The PCM supplies user defined gas flow to the atomizers and deposition head and contains all of the electronics necessary to operate the subsystem.

B) **Main System Controller:**
   1) Includes CPU (running Microsoft Windows 7.0). Runs Aerosol Jet 'KEWA' software, which coordinates the operation of the system.
   2) Ergo Arm with Computer display, keyboard and mouse.

C) **Motion Control Module:**
   1) 300mmX300mm heated platen (w/ vacuum chuck for fixturing) heats substrates up to 120C.
   2) The 400mm travel X-axis motion stage is mounted to a 3 inch granite base. Travel accommodates 50mm pitch between working tools, alignment camera, deposition head and laser plus 300mm substrates.
   3) The 300mm travel Y-axis motion stage is mounted to X-axis carriage. Stages are pinned and aligned to 10 arc seconds.
   4) Working tools are mounted on a manual, or optional motorized, user controlled Z-axis stage with 50mm travel.
   5) X and Y axis positional accuracy is +/- 6um with repeatability of +/- 1um respectively.
   6) System provides 0.5g acceleration at 100% duty cycle.
   7) Direct drive servo motors for X and Y axis provide a maximum velocity of 300mm/sec.
   8) A 2-axis, ACS motion controller is used to control the motors.

D) **Vision Module:**
   1) Process Viewing Camera allows for viewing of the deposition area. A viewing window is displayed on the main computer monitor. The process viewing camera has a magnification of ~200X when viewed on the computer monitor.
   2) An Alignment Camera allows for the alignment of the deposition head to the substrate. A viewing window is displayed on the main computer monitor. The alignment camera has a magnification of ~200X when viewed on the computer monitor.

E) **Safety Hood**
   1) Provides viewing through clear polycarbonate safety windows.
   2) Provides access to the work area through a 'roll top' style opening.
   3) An air handling manifold is also provided with this option that allows for the handling of air inside the work area while the system is in operation (external air flow system not included).
   4) Includes cabinet doors for the electronics housed under the motion table.

F) **System Base and other supporting mechanical hardware:**

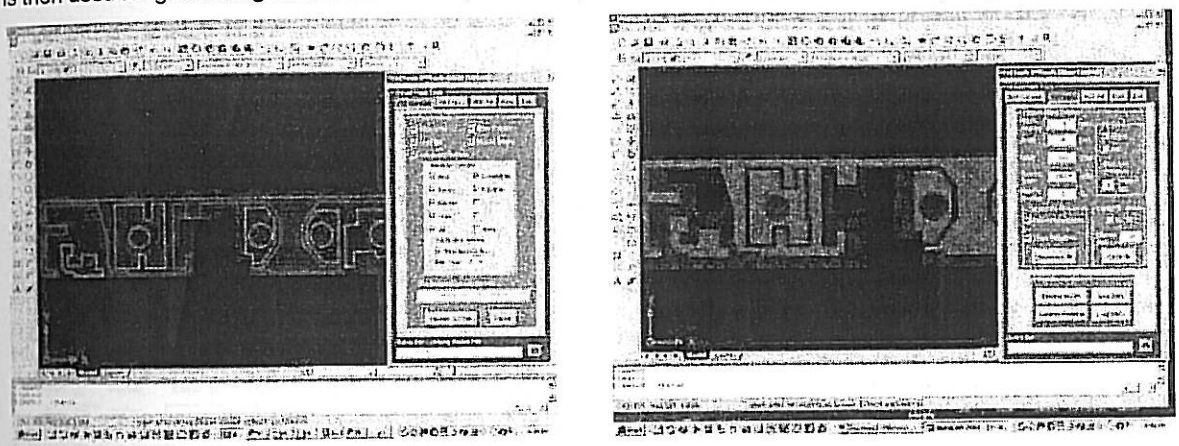
1) A stainless steel base serves as a rigid support for the granite motion table and also houses the process control module, CPU, motion control and other electronics.
2) Various adjustment stages for fine adjustment of working tools.
3) Safety switches and operating controls.
4) Approximate overall dimensions are 864mm D x 1372mm W x 2322mm H (with hood; does not include dimensions for ErgoArm and monitor).
5) Overall weight of the Aerosol Jet 300 Print System is approximately 680 Kg.
6) A Nitrogen gas input of 1CFM at 80PSI is required to operate the PCM. – **Refer to P&ID Drawing.**
7) Vacuum Pumps for Platen and Virtual Impactor (115 or 230VAC; 50 or 60Hz; (2) 22Lpm).
8) 120/240VAC, 50/60Hz, 30amps. (2 Hot/1 Neutral/1 Ground) **- Refer to Facility Interface Drawing.**

AEROSOL JET DEPOSITION SYSTEM SOFTWARE

The Aerosol Jet System comes with 2 supporting software packages:

- VMTools: VMTools is an AutoCAD plug-in compatible with AutoCAD 2002 through 2023 (English Version only). VMTools is typically operated on a Windows-based PC separate from the Aerosol Jet System (PC and AutoCAD are not included). VMTools is used to develop toolpath commands based on industry standard DXF and DWG CAD files.
- Aerosol Jet Workstation Control software ("KEWA"). KEWA runs on the Main System Controller and provides the user with a graphical user interface to operate the Aerosol Jet System.

VMTools is a Visual Basic Applications Macro that runs within the AutoCAD environment. DXF or DWG files are imported into VMTools and polylines are created to fill existing features using various 'filling algorithms'. VMTools is then used for generating motion controller specific toolpath files that can be understood by KEWA.

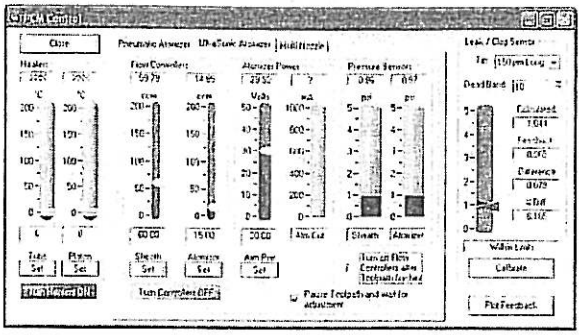


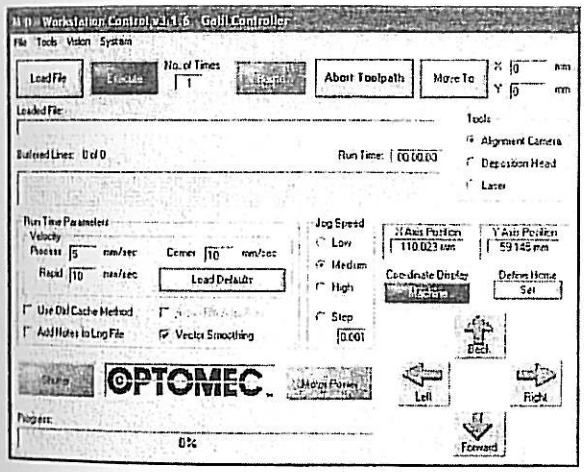
CAD data is imported and closed poly lines are created (left). Poly lines are filled using selected raster spacing and fill algorithm (right).

A text output file is created with vector commands for motion control (left). The user can embed various process related commands so that those parameters can be coordinated with the movement of the X-Y stages.

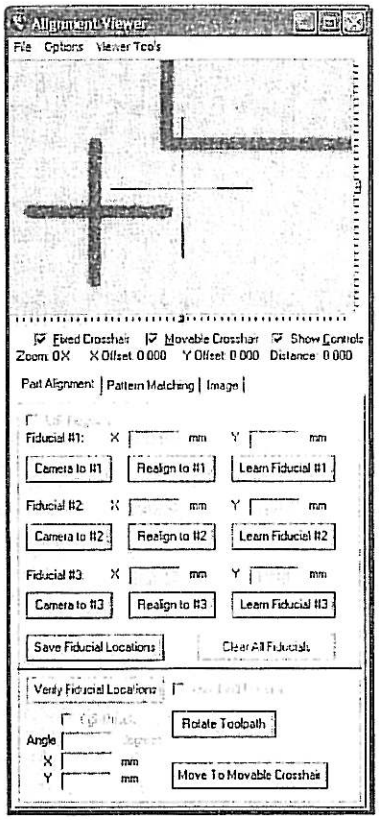
KEWA is a .Net executable for Windows that runs on the CPU incorporated with the Aerosol Jet System. It provides the main graphical user interface for controlling all aspects of the Aerosol Jet System operation. Micro can be used manually to control the Aerosol Jet System or can be highly automated by importing the output files from VMTools. In addition to providing overall operator control, KEWA also provides some advanced features that simplify substrate handling:

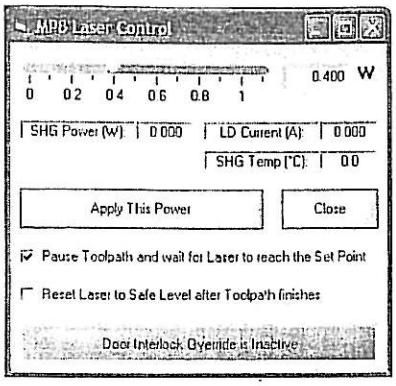
- Tool offset calibration
- Pattern recognition for automatic part alignment
- Toolpath adjustment for misaligned or rotated parts





The KEWA main screen (left) allows for manual part movement, toolpath loading and tool selection (camera, laser, etc.) The PLC control screen (right) allows for manual setting of various operating parameters of the Process Control Module.





The Process Viewer screen (left) allows the user to locate starting points and rotate toolpath instructions if substrates are misaligned. The Laser Control screen (right) allows the user to control laser power.

OPTIONAL SYSTEM COMPONENTS & SOFTWARE

A) **700mW IR Laser System:**
   1) Wavelength: 830 nanometers.
   2) Maximum power (mW): 700
   3) Operating Mode: continuous wave
   4) Spatial Mode: multimode
   5) Power Stabilization: < 1% of set value
   6) Raw beam diameter (mm): 1
   7) Focused Spot Size (microns): ~ 15
   8) Shutter open/close time: <1 ms
   9) Vision system magnification: ~200X in a 350mm square viewing window
   10) Working distance: ~ 31 mm
   11) Controller input voltage (volts): 110
   12) Camera input voltage (volts): 110
   13) Laser Safe Hood
      i) Provides viewing through a laser safety windows whose optical density provides sufficient attenuation of the laser beam such that the nominal hazard zone, as described by IEC EN 60825-1:1994, is contained within the enclosure.
      ii) With the integrated hood, the Aerosol Jet Deposition System is fully CE compliant.

B) **Motorized Z-Axis** (User directed positional adjustments) + 3-Axis motion controller upgrade.
   1) A user assisted, Motorized "Z" solution providing 50mm (2") of available travel. This solution is an upgrade from Aerosol Jet's standard 50mm manual micrometer driven "Z" height control. Motorized Z is controlled through the KEWA motion control GUI. Users can develop recipes that automatically set printhead operating height from the surface of the substrate.

C) **Sprint 3MM Wide Feature Printhead ™**
   1) The Sprint 3MM Wide Feature Printhead enables non-contact, room temperature printing of large features in a single pass. The Printhead comes equipped with series of standard interchangeable nozzles including 0.75mm round, 1.5 and 3.0mm slotted. The 3MM Wide Feature Printhead can produce geometries from ca. 0.3mm to 1.5mm wide, with layer thickness ranging from ca. 100nm to 10's of microns. As with all Aerosol Jet Printhead solutions, a broad range of material types are supported, including conductive pastes and nanoparticle inks, dielectrics, polymers, masking materials and even biomaterials; all of which can be precisely deposited onto planar and 3-dimensional surfaces.

D) **Manual Tilt – 15 degree increments up to 60 degrees in tilt.**
   1) Manual Tilt mounting bracket for Sprint Fine Feature Printheads provides 15° incremental printhead tilt, up to 60° of available tilt angle, from a perpendicular start point is available. This capability enables printing into difficult to target print areas or onto non-planar and 3-D surfaces.

E) **UV Cure Module (UJ35)**
   1) The UV Cure module has an easy-to-read display and easy-to-operate panel simplifying operation. Equipped with temperature feedback control, the UV Cure module provides excellent irradiation stability. Both "all" and "individual" UV irradiation modes are available for synchronized or non-synchronized irradiation. In addition to its user friendliness and energy efficiency, the UV Cure module has a high irradiation intensity power of 9,200 mW/cm2 (wavelength: 385nm) and high irradiation accuracy of ± 3%. The UV Cure module provides outstanding performance for bonding and fixing when used with UV curable resins. It measures 80 mm (3.15") in width, 125 mm (4.9") in height, and 140 mm (5.5") in depth.

F) **AutoCAD® (North America Only)**
   1) Required for supporting of Optomec's VMTools toolpath generation software.

SYSTEM PRE-REQUISITES

A) **AutoCAD®** 2002 through 2013 (English language version)
   1) Supporting Optomec's VMTools
   2) Typically operated on a Windows 7-based PC separate from the Aerosol Jet System

B) **H^2O Controlled Temperature Supply/Return (For Ultrasonic Atomizer Only)**
   1) Temp Range: 10C – 40C
   2) Temperature Stability: +/- 0.5C
   3) Heating/Cooling Capacity: 100W at Setpoint
   4) Pump Flow: 4LPM Min.
   5) ¼ inch tube connection
   6) Optomec Strongly recommends that "house" H2O supply not be used due to temperature fluctuations.
   7) Optomec recommends Thermo-NESLAB RTE-7 Digital One Refrigerated Bath or similar product for H2O Temperature Control.

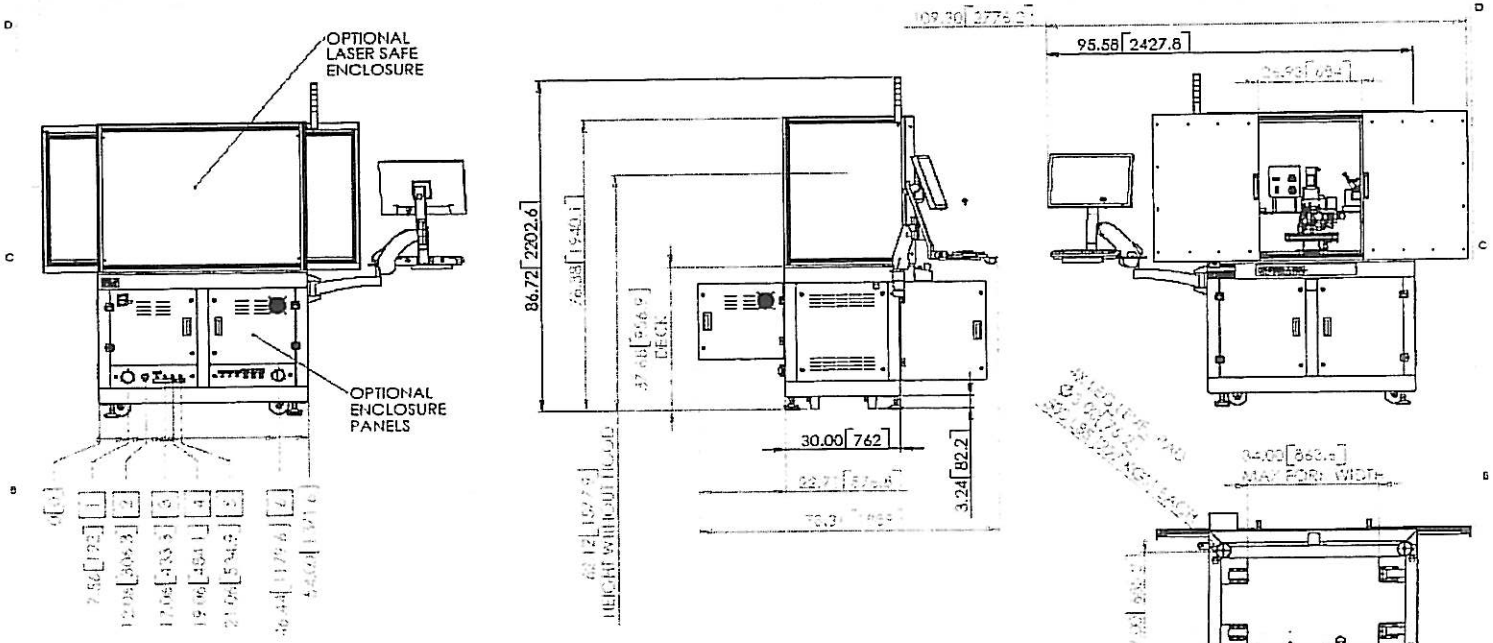
C) **Process Gas (for the sheath and atomizer)**
   1) **Operator supplies 60 - 80 psi dry inert gas (nitrogen or compressed air) at 1 cfm.**
   2) Compressed air must be filtered through a desiccator and have an oil filter as well. It is critical that the source gas (air) is clean, no particulates, and dry, no oil, water, or other moisture source.
   3) **1/4" Swagelok® connector. Provides gas for the sheath and atomizer.**

D) **Power**
   1) 120/240VAC, 50/60Hz, 30amps. (2 Hot/1 Neutral/1 Ground). ***International customers responsible for installing supplied power transformer, if required.***

AEROSOL JET DEPOSITION SYSTEM FACILITY DRAWING

REVISIONS

ZONE	REV.	EC NO.	DESCRIPTION	DATE	APPROVED
	A		INITIAL RELEASE	5/18/2007	FM33
	B		REPLACED HOOD ENCLOSURE	2/11/2008	
	C		SHOWED MACHINE WITH HOOD OPENED	10/27/2008	FM33
	D		CHANGED TO SIDE OPENING HOOD	2/22/2011	FM33
	E		ADDED OPEN DOOR DEPTH	6/13/2011	K.FORTE



FACILITY CONNECTIONS

ITEM NUMBER	DESCRIPTION	CONNECTION SIZE	REQUIREMENT
1	FILTERED AIR SUPPLY (OPTIONAL)	3" OD TUBE	OPTIONAL FAN FILTER UNIT
2	POWER	AWG 10-4 SO WIRE	30A, 120/240VAC, GROUND AND NEUTRAL REQUIRED
3	N2 SUPPLY	1/4" OD TUBE	2.5 SLM [5.3 SCFH] MIN; .4 - .6 MPa [60 - 80 PSIG]
4	TEMP CONTROLLED PROCESS H2O IN	1/4" OD TUBE	10-50°C; 3.8 LPM [1 GPM] MIN; 40W HEAT LOAD PER ULTRASONIC ATOMIZER
5	TEMP CONTROLLED PROCESS H2O OUT	1/4" OD TUBE	
6	EXHAUST (OPTIONAL)	3" OD TUBE	2500 SLM [88 SCFM]; 500 Pa VACUUM [2" H20] MIN

OPTOMEC

AEROSOL JET SYSTEM

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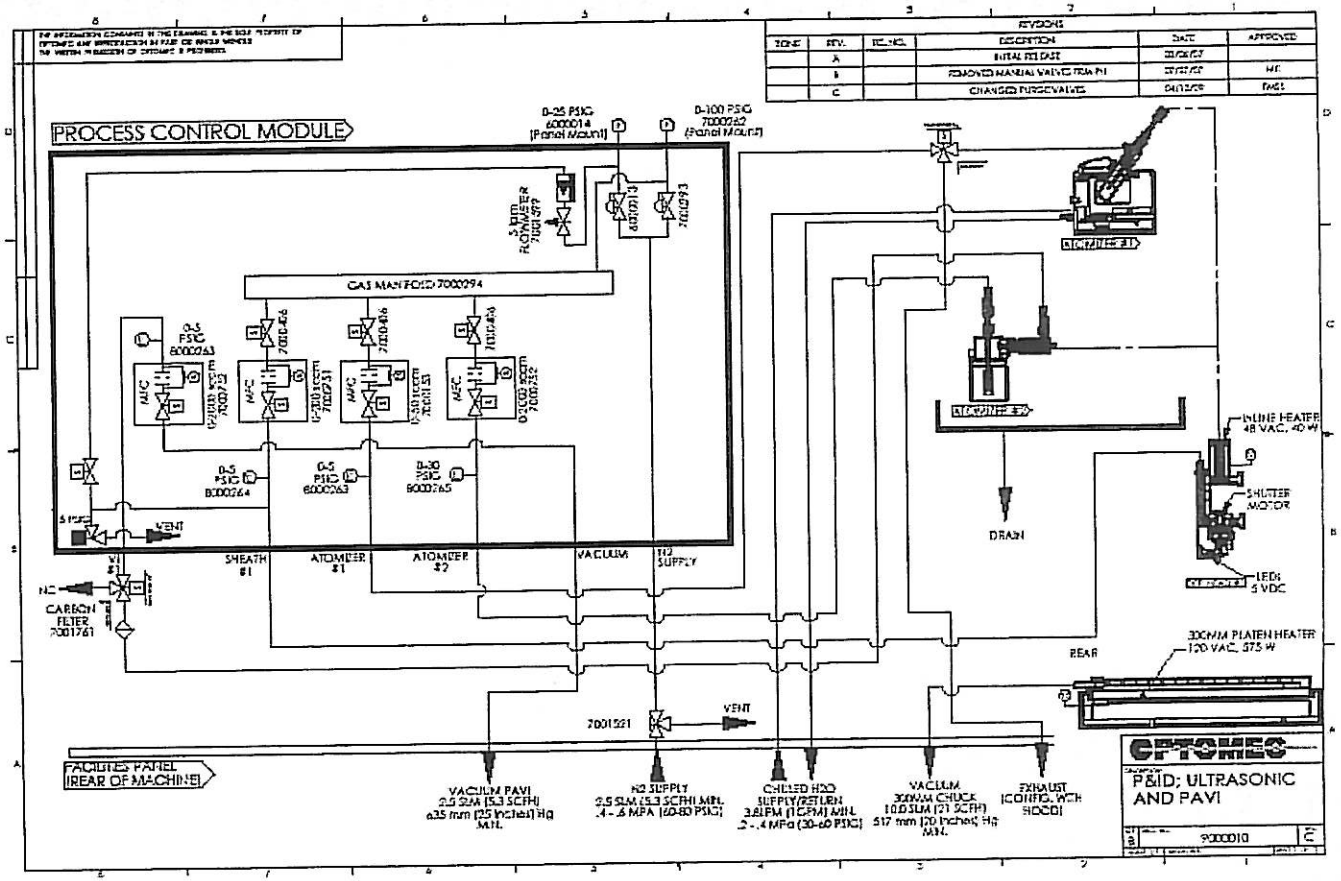
AEROSOL JET DEPOSITION SYSTEM P&ID DRAWING



LIMITED ONE (1) YEAR WARRANTY

Manufacturer: Optomec, Inc.
Address: 3911 Singer Blvd., NE, Albuquerque, NM, U.S.A. - 87109

This warranty shall continue for a period of (1) one year from the date of delivery. However, in no event shall the warranty extend beyond eighteen (18) months from the date of delivery, unless an extended warranty contract is purchased. Failure of the System to be installed by Buyer at their facility within a 60-day period from shipment, will begin the warranty period. Further, Buyer will be responsible for all replacement costs (including parts and labor) for any damaged components to the System associated with the delayed installation. This warranty is non-transferable. It is limited to the original Buyer. Seller warrants that the System furnished will be free from manufacturing defects, provided Buyer's operating personnel abide by the instructions given at the time of delivery and make such minor adjustments as may be required during use of the System, including: adhering to the "Customer Shipping Procedure for the Safe Transportation of Optomec Systems," refraining from breaking the seal on the PCM cover in Aerosol Jet
overriding the interlock systems. THIS WARRANTY SHALL BE VOID FOR FAILURE TO FOLLOW THESE INSTRUCTIONS AND PROCEDURES. ADDITIONALLY, SUPPLEMENTAL INSTALLATION CHARGES MAY APPLY TO THOSE WARRANTIES THAT ARE VOIDED FOR FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS AND PROCEDURES. This warranty does not extend to consumable items defined by the Seller. Further, this warranty does not extend to the System if the Buyer removes or conceals any trademark logos of the Seller on the System. If anything is found which is broken, or not as specified, notice shall be given in writing to Seller within (30) thirty days after the System is received by Buyer so that Seller may correct same, and in the absence of such notice, no claims for such defect or the like shall be allowed by Buyer. Seller warrants that it will repair f.o.b. its factory, or furnish without charge f.o.b. its factory, a similar part to replace any material in the System which within (1) one year after the date of shipment is proved to the satisfaction of Seller to have been defective at the time it was sold, natural wear and breakage through carelessness, accidents, abuse, negligence, and Acts of God excepted, provided that all parts claimed defective shall be returned, properly identified, to Seller's branch house having jurisdiction over the territory, charges prepaid. This warranty to repair applies only to new and unused machinery, which, after shipment from the factory of Seller has not been altered, changed, repaired or treated in any manner, and does not extend to trade accessories sold or operated with the machinery. Buyer shall render necessary and friendly assistance to Seller in and about remedying the defect. When at the request of Buyer a representative of Seller is sent to remedy or repair machinery and the same is found to have been carelessly or improperly handled, the expense incurred by Seller in putting it in working order shall be paid by Buyer. No attempt by Seller or its representatives to remedy any defects shall constitute a waiver of any of the provisions of this agreement, and, if a mechanical expert visits the System and does not leave it working properly, Buyer shall give immediate notice in writing to Seller at its head office, stating specifically the failure or neglect complained of. No claim of breach of warranty or that quality of goods is not in accordance with the contract shall constitute a cause for cancellation of this contract or any part of it. Seller shall in no event be liable for breach of warranty in an amount exceeding the purchase price of the System or the purchase price of the specific defective component.

If a complaint is made to Seller by Buyer that the System is not meeting the above warranty, then Seller shall have the right to make a test of the System. If Seller exercises this right, such test shall be conducted by an Agent of Seller who shall have entire charge of the System. Buyer shall furnish the load necessary for such test, and all assistance, electricity, materials, gas, etc., and other things necessary for such test. Such test shall be made within a reasonable time after such complaint has been received by Seller at its home office. If such test shall show the System to operate according to the warranty, then Buyer shall deliver to Seller's Agent a written acknowledgement of such fact; however, if at the end of such test Buyer fails or refuses to deliver to Seller's Agent a written acknowledgement that the System operates according to the system warranty, then Buyer shall immediately notify Seller at its home office, by registered letter, what in particular Buyer claims to be defective in the System within the warranty, and Seller shall have a reasonable time to remedy such defects. The failure of Buyer to notify Seller as before provided for, of the claimed defects within fifteen (15) days after the complaint of the test, shall constitute and be construed to be an acknowledgment by Buyer that the System has operated successfully at the test in strict accordance with the warranty. If the complaint is not made within fifteen (15) days after the System is put in operation, or if such test cannot be conducted because of the fault of Buyer, then the warranty shall be null and void and Seller shall not be bound by it, and the System shall then be considered accepted by Buyer. No legal action shall commence against Seller with respect to the liability of Seller hereunder more than twelve (12) months after shipment of the System.

If Seller shall, at the request of Buyer, render assistance of any kind in operating the System, or any part of it, or in remedying any defects at any time, the assistance shall in no case be deemed an acknowledgment on Seller's part of a breach by it or this warranty, or excuse for any failure to fully keep and perform the conditions of this warranty.

This Agreement shall be divisible as to each System and attachment for which a separate price is named, and the failure of any article to fulfill the warranty shall not affect the liability of Buyer for any other article ordered.

The warranty described in this Agreement is in lieu of all other warranties. THE PARTIES AGREE THAT THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED FROM THIS AGREEMENT.

This is the entire agreement between the parties and no other warranties shall be implied. No statements, displays, models, samples, or representations made by Seller shall be considered part of the Agreement

Exhibit C – Service Agreement

OPTOMEC
Additive Manufacturing Systems — from Nano to MACRO™

Aerosol Jet® Hot Line Annual Support Agreement

PLEASE TAKE THE TIME TO READ THE FOLLOWING TERMS AND CONDITIONS UNDER WHICH OPTOMEC, INC. AGREES TO PROVIDE SUPPORT AND SERVICES FOR YOUR OPTOMEC EQUIPMENT AND PROGRAMS (COLLECTIVELY, THE "SYSTEM"). THIS AGREEMENT IS BETWEEN YOU ("CUSTOMER") AND OPTOMEC, INC. ("VENDOR"). YOUR SYSTEM, FOR PURPOSES OF THIS AGREEMENT IS DEFINED IN APPENDIX A OF THIS SERVICE CONTRACT ("AGREEMENT").

HERE ARE THE DETAILS OF YOUR AGREEMENT.

1. General Provisions

1.1 Scope

This Agreement describes the terms and conditions of Service and Support to be provided by Vendor for the Customer's System.

1.2 Vendor's Responsibility and Competence

The Vendor shall ensure that adequately trained and competent personnel perform its services in a timely manner.

The Vendor is fully responsible for third parties (sub-contractors) that are assigned by the Vendor to fulfill the Vendor obligations according to this Agreement.

The Vendor shall inform the Customer of any special circumstances that may affect the operation or availability of the System.

1.3 Customer's Obligations

The Customer shall apply for security clearance for Vendor's personnel to the extent this is necessary for the Vendor's fulfillment of this Agreement.

The Customer shall ensure that personnel who utilize and maintain the System are sufficiently trained and competent.

The Customer shall perform routine maintenance of the System in accordance with the schedule outlined in the user manual provided with the System.

In the event that parts or consumables are not acquired from the Vendor or from the original supplier or an authorized dealer of same, the Customer shall ensure compliance with the product specifications for the System.

The Customer shall not carry out services that are the Vendor's responsibility under this Agreement.

The Customer shall enable the Vendor to carry out its obligations by giving the Vendor timely access to the site where the System is installed. The Customer shall provide the Vendor written notice if the System is relocated.

Customer is responsible to provide and maintain the environment, facilities and services necessary to meet the Vendor specifications for the proper operation of the System.

2. The Vendor's Obligations

2.1 General Provisions

The Vendor's services at the Customer's premises shall be carried out during normal business hours between 8am and 5pm.

The Vendor shall provide the Customer with documentation that describes the service activities that have been carried out. This shall include documentation of changes and modifications that the Vendor has implemented in accordance with this Agreement.

The Vendor shall provide any documentation or instructions that are necessary for the Customer's use of the System.

2.2 Services that are included in the Agreement

The following table summarizes the Service and Support provided under this Agreement:

Services	Availability
System Online & Telephone Support	1 business day response time
Application Online & Telephone Support	1 business day response time
Software Updates	Included
System Field Change Orders (FCOs)	Option
System Performance Check	Option
Preventive Maintenance one onsite visit including travel, labor & parts	Option
Consumable Parts Kit	Included
Emergency Repair Service Response time – (separate purchase order required)	Best Effort
Prepaid Emergency Service Credits	Option

2.3 Description of Standard Services Provided

2.3.1 System Online & Telephone Remote Support (STANDARD)

All Customer requests for support for the maintenance, use, operation and any other matters regarding the System will be made through telephone or email (requestsupport@optomec.com) In the event that the Customer needs guidance with respect to possible or assumed errors, the Vendor shall provide competent personnel available to the Customer by telephone within one business day of the request. Telephone support will be available to the Customer during Vendor's normal business hours from 8am to 5pm MST, Monday through Friday, excluding US Holidays. The Customer can make request for telephone support outside these hours, and the Vendor will make an attempt to accommodate such request. Response to certain Customer support requests may be made electronically via email. In the event that an onsite service visit is necessary, this will be made available to the Customer under the terms of the Emergency Repair Service Response provisions of this Agreement. The Customer also will be provided with logon authorization to Vendor's OptoCare^{tm} Web Site (optocare.optomec.com), which provides on-demand access to e-Training videos, answers to Frequently Asked Questions, and access to a user Forum. **Vendor is not liable for damages that occur to the system during the course of providing remote support.**

2.3.2 Applications Online & Telephone Remote Support (STANDARD)

This Service Agreement also entitles Customer to Application Support Services provided by Vendor's Application Engineers. Such services will include guidance on: materials selection, processing techniques, and parameter settings to achieve desired results. This service is limited to only guidance based on Vendor's past experience in these application areas and does not include developmental and research activities. Vendor does offer a separate service for application and process development that may require new research study and/or utilize Vendor's laboratory facilities. These types of projects can be quoted on a case-by-case basis.

2.3.3 Software Updates (STANDARD)

From time to time the Vendor may issue revisions or updates to the System software to provide improvements to existing functionality and/or bug fixes. These revisions and updates may be made available to the Customer at no charge. If installation by the Vendor is required, the installation will be performed during the next scheduled Preventive Maintenance visit.

2.3.4 Consumables Part Kit (STANDARD)

Vendor shall provide the Customer with a kit containing the consumable items required by Customer to perform daily, weekly and monthly routine service.

2.4 Additional Optional Services

The following optional service items are available to the Customer under a separate agreement or Purchase Order

2.4.1 System Field Change Orders (OPTION)

From time to time the Vendor may make modifications to the System to improve performance or correct errors and may make them available as Field Change Orders. The Customer may elect to purchase FCOs. The Vendor will schedule a time with the Customer to implement the FCO.

2.4.2 System Performance Check (OPTION)

Customer may elect to purchase a one-day on-site performance evaluation of the System to ensure compliance with specified operating parameters. If required the Vendor shall make tuning adjustments and recommendations to optimize system performance.

2.4.3 Preventive Maintenance (OPTION)

Customer may elect to purchase a Preventative Maintenance Service visit. The Vendor shall carry out routine preventive maintenance of the System, which the Vendor assesses to be necessary to prevent errors and malfunctions. Such maintenance shall include systematic inspections, adjustments, lubrications, and replacement of components. A schedule of preventive maintenance tasks to be performed is defined in Appendix B. An annual preventive maintenance service of the System is highly recommended to keep the system operating at peak efficiency. All material, labor, and travel costs related to the routine preventive maintenance service is included. Upon completion of the preventive maintenance, Vendor will provide Customer with a report containing a list of items inspected or serviced, the results of the inspection or service, and any corrective action taken to resolve any discrepancy.

2.4.4 Emergency Service Repair Response (OPTION)

If Vendor equipment is inoperable for any reason, Customer agrees to notify Vendor and work with Vendor personnel to resolve the problem remotely. If the equipment cannot be repaired remotely, Vendor agrees to have a representative at Customer's site on a best effort basis and upon receipt of Customer's purchase order unless equipment is still under warranty. Customer's purchase order shall cover the cost, travel, labor and materials in the performance of the service.

2.4.5 Emergency Service Credits (OPTION)

Customer may elect to purchase Emergency Service Credits in advance to minimize dispatch delays. Invoices against these credits will only be issued after completion of emergency service. Unused emergency service credits may be applied to the purchase of other Vendor services.

3.0 General Terms of the Agreement

3.1 Effective Date

This Agreement shall be in effect for a period of one year from the later of the Effective Date specified herein or upon the installation of the System at the Customer's site.

3.2 Costs and Terms of Payment

The costs for the services provided under this Agreement are defined in Appendix A, along with the detailed description of the System. Payment shall be due upon receipt of invoice. The Vendor is entitled to additional remuneration for any expenses that are caused by the relocation of the System during the term of the Agreement.

3.3 Renewal

This Agreement is automatically renewed for one (1) year at a time. Either party may cancel the renewal of the Agreement with 30 days written notice prior to the expiration of the Agreement. If Vendor changes the costs for the renewal of Agreement, Vendor shall provide the Customer with 60 days written notice. A re-commissioning fee to be determined by the Vendor will apply if the current Agreement lapses more than 30 days.

3.4 Confidentiality

It is recognized that during the course of Vendor's work with Customer, both parties, Customer and Vendor, may have occasion to conceive, create, develop, review, or receive information that is considered by either Party to be confidential or proprietary, including, but not limited to, processes used to perform services, specifications, and drawings (collectively, "the Confidential Information"). Both during the term of this Agreement and thereafter, both Parties agree to maintain in confidence such Confidential Information unless or until:

1. It is now or subsequently becomes generally available to the public through no fault or breach on the part of the Receiving Party;
2. The Receiving Party can demonstrate to have had rightfully in its possession the Confidential Information prior to disclosure to Receiving Party by Disclosing Party;
3. It is independently developed by Receiving Party without the use of any Confidential Information; or
4. The Receiving Party rightfully obtains the Confidential Information from a third party who has the right to transfer or disclose it.

Both Parties agree to use all reasonable precautions to ensure that all such Confidential Information is properly protected and kept from unauthorized parties or disclosure.

If requested by the Disclosing Party, the Receiving Party agrees to promptly return to the Disclosing Party all materials, writings, equipment, models, mechanisms, and the like obtained from or through the Disclosing Party, including, but not limited to, all Confidential Information, all of which the Receiving Party recognizes is the sole and exclusive property of the Disclosing Party.

Both Parties agree that the Receiving Party will not, without first obtaining the prior written permission of the Disclosing Party:

1. Directly or indirectly utilize such Confidential Information in its own business;
2. Manufacture and/or sell any product that is based in whole or in part on such Confidential Information; or
3. Disclose such Confidential Information to any third party.

3.5 Conditions of Default and Remedies for Cure

A failure by either party to meet its obligations or terms of the Agreement shall constitute a condition of default. Upon receipt of written notice of a condition of default, the violating party shall have 30 days to correct the condition of default. If such default has not been corrected this Agreement shall terminate 31 days after written notice of default was received. If the Vendor's default results in termination of the Agreement the Vendor will reimburse the Customer on a pro rata basis for the remainder of the term of the Agreement.

Any modification or change to the System made by the Customer without the prior written approval of the Vendor is a cause for immediate termination of this Agreement.

In the event that maintenance or service cannot be performed as specified in this Agreement, the Vendor shall as soon as possible notify the Customer in this respect. The notification shall inform the Customer about the reason for the delay and if possible state when performance can be expected.

3.6 Dispute Resolution

In the event that any dispute arises between the parties in relation to this Agreement, or out of this Agreement, and the dispute is not resolved by negotiation, the parties agree to submit the dispute to mediation. The parties further agree that their participation in mediation is confidential and a condition precedent to any party pursuing any other available remedy in relation to the dispute.

Any party to the dispute may give written notice to the other party of his or her desire to commence mediation, and a mediation session must take place within [30] thirty days after the date that such notice is given.

The parties must jointly appoint a mutually acceptable mediator. If the parties are unable to agree upon the appointment of a mediator within [7] seven days after a party has given notice of a desire to mediate the dispute, any party may apply to an organization or person agreed to by the parties in writing, for appointment of a mediator.

The parties further agree to share equally the costs of the mediation, which costs will not include costs incurred by a party for representation by counsel at the mediation.

New Mexico law shall govern the parties' rights and obligations under this Agreement.

3.7 Limitation of Liability

IN NO EVENT SHALL EITHER PARTY BE LIABLE TO THE OTHER FOR ANY INDIRECT, CONSEQUENTIAL, INCIDENTAL, PUNITIVE OR SPECIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTIMG FROM LOSS OF USE, DATA OR PROFITS, EVEN IF SUCH OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

##

APPENDIX A

Customer_____

Address _____

Equipment Location_____

Effective Date_____

Service Tag No._____

This Agreement terminates _____year(s) from the Effective Date stated above.

Description of System and equipment options covered by this Agreement:
[Item] [Quantity] [Model Number] [Description]

Cost of Service .....

Taxes.....

Total.....

APPENDIX B

Aerosol Jet System Preventive Maintenance Tasks (PURCHASE OPTION)

NOTE: The following is an example of the maintenance routines to be performed on the system. The preventive maintenance tasks shown may be configuration dependent and must be performed by an Optomec certified service technician. A separate schedule of Routine Maintenance tasks to be performed by the Owner is shown in the user manual.

Aerosol Jet System Preventive Maintenance Checklist	Annual Service
Process Control Module	
Pressure test PCM	√
Check flow controller output, replace MFC as needed	√
Check pressure transducer response	√
Verify shutter driver functionality	√
Verify PLC communication and operation	√
Calibrate mass flow controllers	√
Motion Control System	
Inspect, clean and lubricate stages as needed	√
Inspect and level heated platen, if applicable	√
Tune heated platen PID parameters	√
Check stage limits and home switches for functionality and repeatability	√
Ultrasonic Atomizer	
Check ultrasonic atomizer power output and tune, if required	√
Visually inspect for leaks and repair, if required	√
Pneumatic Atomizer	
Visually Check Atomizing jet for clogs/leaks	√
Inspect and replace worn/damaged seals as needed	√
Visually Inspect Virtual Impactor and replace worn inserts/seals, if required	√

Aerosol Jet System Preventive Maintenance Checklist (continued)	Annual Service
Deposition Head	
Replace any worn/damaged seals	√
Inspect internal threads	√
Visually check critical internal features for damage	√
Check mounting hardware for excessive wear	√
Visually inspect tube heater and thermocouple	√
Tune PID loop	√
Check shutter functionality, replace blade if necessary and available	√
Check/adjust shutter limit of motion	√

Enclosure (if applicable)	
Inspect enclosure and front, rear door seals	√
Inspect doors for proper operation	√

System Software	
Install updates, patches to Micro and VMTools™, if needed	√

Laser System Maintenance (if applicable)	
Inspect/adjust laser for power output	√
Inspect/adjust external shutter	√
Clean and realign optics as needed	√
Inspect /adjust safety interlocks	√

Exhibit D – Optomec, Inc., Terms and Condition of Sale

Optomec, Inc.

TERMS AND CONDITIONS FOR INTERNATIONAL SALE

The following *Terms and Conditions for International Sale*, the Quotation, and all documents referenced in the Quotation shall constitute the entire agreement ("Agreement") between Optomec, Inc. ("Seller") and the purchaser ("Buyer"). The Quotation terms prevail over any inconsistent or conflicting terms in this *Terms and Conditions for International Sale* document. No terms or conditions other than those stated herein, and no agreement or understanding, oral or written, in any way purporting to modify these terms or conditions, whether contained in Buyer's purchase or shipping release forms or elsewhere, shall be binding on Seller unless hereafter made in writing and signed by its authorized representative. All proposals, negotiations, and representations, if any, made prior to and with reference hereto, are merged herein. No form of acceptance except Seller's written acknowledgment sent to Buyer, or Seller's commencement of performance shall constitute valid acceptance of Buyer's purchase order.

1. RISK OF LOSS: Unless otherwise specified on the face of this document, all sales made hereunder shall be Incoterms 2000 F.C.A. U.S.A. Airport[1]. Seller will deliver the shipment to the first carrier, cleared for export, where risk of loss passes to the Buyer along with title to the products priced. The mode of transport will be by air and road.

2. PRICE: Price quotations shall remain in effect for the period of time specified in the quotation, but if no such time period is specified, billing shall be based on prices in effect at the time of shipment. Unless specifically included in the price quotation, such quotations will not include supplying pre-production or evaluation samples or supplying test data of any kind.

3. PAYMENT TERMS: Payment terms will be provided in the Optomec quote. Payments that have not been paid as provided in this Agreement shall be subject to an interest charge of eighteen percent (18%) per annum from the date payment is originally due.

4. DELIVERY: Seller shall use its best efforts to make deliveries in the quantities and at the times specified in this order. Unless the Buyer specifies shipping instructions, which have been agreed to by the Seller, shipment and delivery will be made by the carrier and in the manner designated by the Seller to the U.S.A. Airport. Seller shall not be liable for delays or defaults in deliveries due to causes beyond Seller's control and without its fault or negligence. If the Buyer elects to delay shipment of the goods for a period of more than thirty (30) days from notice that the goods are ready to be shipped, Buyer will be charged for the goods in full as if shipped/delivered, and will furthermore be charged daily storage fees as long as the goods remain on Seller's premises. Should Buyer fail to comply, Seller retains the right to sell the goods to a third party and produce a new set of good to fulfill Buyer's order. Failure of the deliveries to be installed by Buyer at their facility within a 60-day period from shipment, will begin the warranty period. Further, Buyer will be responsible for all replacement costs (including parts and labor) for any damaged components to the System associated with the delayed installation. In the event that a facility is not ready for installation (as defined in the respective Aerosol Jet® or LENS® Pre-Installation Agreement) upon the arrival of the Seller's installation team, Buyer will have thirty-six (36) hours to cure the deficiencies of the facility or assume liability for all expenses and costs associated with the delayed installation. Acceptance of the System must occur within a reasonable time from receipt and installation or will be deemed to have occurred if Buyer is able to use and/or does use the System in a manner consistent with the System's Installation Checklist. If the Buyer purchases an Advanced Application Workshop or other professional services offering, the Buyer must use the Workshop or services within six (6) months of the order date or shipment date, whichever is later.

If the Buyer purchases a service plan, any modification or change made to the System by the Buyer, without the Seller's consent, is cause for immediate termination of the service plan agreement.

5. SHIPPING, HANDLING, AND INSURANCE: INCOTERMS 2000 F.C.A U.S.A. AIRPORT. SELLER WILL PAY ALL SHIPPING, HANDLING, AND INSURANCE CHARGES TO U.S.A. AIRPORT. BUYER WILL PAY ALL SHIPPING, HANDLING, AND INSURANCE CHARGES FROM THE U.S.A. AIRPORT TO THE FINAL DESTINATION.

6. CONDITIONAL SALE: All sales made hereunder are conditional on the Buyer obtaining Seller's consent, which will not be withheld unreasonably, before reselling the System.

7. INTELLECTUAL PROPERTY: Subject to any license rights expressly granted herein, Seller retains all right, title and interest in all of its patents, trade secrets, trademarks, copyrights, software, inventions, technology, ideas, concepts, know-how, tooling, techniques and other proprietary materials, intellectual property and confidential information. All right, title and interest in and to any inventions, discoveries, improvements, methods, ideas, and other forms of intellectual property, which are made, created, developed, written, conceived or first reduced to practice by Seller solely, jointly or on its behalf, in the course of, arising out of, or as a result of work performed under an order, whether or not invoiced, shall be the sole and exclusive property of Seller. Buyer shall not copy, reverse engineer, disassemble, derive or subject to technical analysis any technology, component, module, hardware, firmware, software or other feature of the System. Seller's systems are protected under United States and foreign patents and patents pending.

8. SOFTWARE: Any Seller and third party software or firmware (collectively "Software") delivered by Seller to Buyer hereunder is licensed, not sold. Seller grants to Buyer a non-exclusive, nontransferable license to use the Software only in executable object code and only for the purpose of operating the System. Buyer may not modify, adapt, translate, reverse engineer, decompile, disassemble or create a derivative work based upon the Software or allow others to do so except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation. Buyer shall not make or distribute unauthorized copies of the Software, and shall acquire no rights of ownership in the Software. Title to and ownership of the Software and all extensions, enhancements and modifications thereof shall remain at all times with Seller and/or its licensors.

9. CONFIDENTIALITY: Both Parties shall protect as proprietary and keep confidential all proprietary information including, but not limited to, designs, processes, drawings, specifications, reports, data, and other technical or business information and the features of all parts, equipment, tools or fixtures, and other items furnished or disclosed by either Party (collectively, "Confidential Information") and designated as being confidential. Such disclosed proprietary information shall only be used in the performance of this Agreement and shall not be disclosed to any third party without the Disclosing Party's consent. Both during the term of this Agreement and for a period of five (5) years thereafter, both parties agree to keep in confidence such Confidential Information, unless: (a) it is now or subsequently becomes generally available to the public through no fault or breach on the part of the Receiving Party;

[1] FCA is an INCOTERM 2000 for "free carrier."

(b) the Receiving Party can demonstrate to have had rightfully in its possession the Confidential Information prior to disclosure to the Receiving Party by the Disclosing Party; (c) it is independently developed by Receiving Party without the use of any Confidential Information; or (d) the Receiving Party rightfully obtains the Confidential Information from a third party who has the right to transfer or disclose it. Both Parties agree to use all reasonable precautions to ensure that all such Confidential Information is properly protected and kept from unauthorized parties or disclosure. If requested by either Party, the Receiving Party agrees to promptly return to the Disclosing Party all materials, writings, equipment, models, mechanisms, and the like obtained from or through the Disclosing Party, including, but not limited to, all Confidential Information, all of which the Receiving Party recognizes is the sole and exclusive property of the Disclosing Party. The terms of this confidentiality clause are to be enforceable simultaneously with any prior agreed upon written Non-Disclosure Agreement(s) between the Parties.

10. DEFAULT: Failure by Seller or Buyer to meet the terms of this Agreement, other than for payment, shall constitute a condition of default. Upon receipt of written notice of a condition of default, the defaulting party shall have thirty (30) days to cure the condition of default. If the condition of default is not cured during this period, this Agreement shall terminate thirty-one (31) days after written notice of the condition of default was received. The parties shall proceed as specified in section 10 (b).

11. TERMINATION: (a) Seller shall have the right to cancel purchase orders of the Buyer in the event the Buyer fails to comply with the terms of payment specified in this Agreement or in any prior or subsequent purchase order included herein. In the event Seller shall have reasonable grounds to doubt, at any time, the Buyer's financial responsibility to perform under this Agreement, the Seller shall demand, in writing, adequate assurances of performance from the Buyer and shall, until such assurances are received from Buyer, suspend its performance under this Agreement. Upon receipt of a justified demand, as provided hereunder, Buyer's failure to provide adequate assurances of performance, acceptable to the Seller, within thirty (30) days of the receipt of such notice, shall be considered a repudiation of the Agreement and shall entitle the Seller to proceed as specified in section (b) of this paragraph. (b) Except as otherwise provided herein, this Agreement is subject to termination in whole or in part, at the election of Buyer upon delivering thirty (30) days advance written notice to Seller. Upon receipt of such termination notice, Seller shall forthwith discontinue all work and the incurring of any additional expenses relating hereto except as may be directed by Buyer in the termination notice. In such event, Buyer shall pay such amount as Seller and Buyer may agree is to be paid by reason of the termination. In the event of failure to agree upon the amount to be paid by reason of the termination, Buyer will pay to Seller and Seller agrees to accept in full payment: (i) The stipulated price with respect to products completed in accordance with Buyer's order, (ii) Seller's cost and expense, including a reasonable allowance for profit, in connection with the unfinished work and raw materials on hand acquired for the completion of this Agreement, and (iii) Cost or damages of completion or cancellation (as the case may be and at the election of Seller) of contracts for raw materials ordered specifically for this Agreement. Provided that the total payments under (ii) and (iii) shall not exceed the stipulated price with respect to the same products, if finished, less the estimated cost of finishing work and unprocessed raw materials on hand acquired by Seller in connection with this Agreement. Nothing in this paragraph shall in any way modify any other provision of these terms and conditions relating to cancellation or termination by Buyer.

12. FORCE MAJEURE: Neither Seller nor Buyer shall be liable to the other for default or delay in delivering or accepting goods hereunder if caused by an Act of God, war, mobilization, riot, strike, embargo, shortage of utility, facility, material or labor, delay in transportation, breakdown or accident, or compliance with or action taken to carry out the extent or purpose of any law or regulation. When only a part of Seller's or Buyer's capacity to perform is excused under this paragraph, Seller or Buyer must allocate production, deliveries, or receipt of deliveries among various customers or suppliers then under contract for similar products during the period when Buyer or Seller is unable to perform. The allocation must be effected in a commercially fair and equitable manner. When either Seller or Buyer claims an excuse for non-performance under this paragraph, it must give notice in writing to the other party. When an allocation has been made, notice of the estimated quota made available for Buyer or Seller, as the case may be, must be given. Should such inability to perform continue for a period in excess of sixty (60) days Seller shall not be obligated to sell, nor shall Buyer be obligated to purchase, at a later date, that portion of the goods which Seller is unable to deliver or Buyer is unable to receive or use because of any of the aforementioned causes beyond the control of the parties.

13. CHANGES: Buyer may from time to time request changes in this Agreement, including but not limited to, changes in drawings, designs, specifications, method of inspection, method of packaging, order period, method of shipment, and/or place of delivery, or other provisions contained herein, by written instruction to Seller in a change order notice or letter from Buyer's Purchasing Department. Seller shall determine whether such change causes an increase or decrease in cost or time of performance of this Agreement and thereafter shall notify Buyer's Purchasing Department in writing within thirty (30) days from the date of receipt of such change order notice, or letter, or within such other time limit as agreed to by Buyer and Seller, and a mutually satisfactory adjustment shall be negotiated. The agreed to adjustment shall be incorporated as part of this Agreement by means of a written change order notice from Buyer's Purchasing Department. Seller's failure to advise Buyer's Purchasing Department that an adjustment is necessary prior to performance of the work called for by the change order notice shall constitute Seller's agreement to conform to said change order notice without an increase in price and without charge for cost of material and/or tooling rendered obsolete and that delivery will be made as specified by this Agreement. In the event that the requested change order notice is of such a nature and scope as to preclude mutual agreement between Buyer and Seller, Buyer or Seller may terminate this Agreement. Any termination hereunder shall be considered a termination for the convenience of the Buyer and governed by paragraph 11(b) of this Agreement.

14. SALES AND OTHER TAXES: The purchase price does not include sales, use, excise or other taxes. Consequently, in addition to the purchase price specified herein, the amount of any present or future sales, use, excise or other tax applicable to the sale of products sold hereunder or the use of such products by the Buyer shall be paid by the Buyer or, in lieu thereof, the Buyer shall furnish Seller with a tax exemption certificate acceptable to the appropriate taxing authority. Buyer is also responsible for payment of all government taxes, duties and levies, including but not limited to VAT; federal, state and local sales tax; withholding tax; and import/export duties.

15. LIMITATION OF LIABILITY: IN NO EVENT SHALL EITHER PARTY BE LIABLE TO THE OTHER FOR ANY INDIRECT, CONSEQUENTIAL, INCIDENTAL, PUNITIVE OR SPECIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, EVEN IF SUCH OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, Seller shall not be liable to Buyer for any loss, claim, damage, or liability of whatsoever kind or nature, including

compensatory, consequential, punitive, incidental, exemplary, or special damages, which may arise from or in connection with Buyer's use, handling, or storage of any material, inks or otherwise, labeled hazardous or otherwise, used within any LENS or Aerosol Jet® process and/or System.

16. ARBITRATION: Regardless of its place of negotiation, execution, or performance, this Agreement will be governed by and construed in accordance with the laws of the State of New Mexico, United States of America, irrespective of its choice of law principles. Any dispute, controversy, or claim arising out of or relating to this Agreement, or the breach, termination, or invalidity thereof, shall be settled by arbitration under the UNCITRAL Arbitration Rules in effect on the date of this Agreement. The appointing authority shall be the International Centre for Dispute Resolution. The case shall be administered by the International Centre for Dispute Resolution under its Procedures for Cases under the UNCITRAL. The language of the arbitration shall be English. Three arbitrators shall be appointed in accordance with the UNCITRAL Arbitration Rules in effect on the date of this Agreement.

17. GENERAL: (a) Any clause required to be included in a contract of this type by any applicable law or administrative regulation having the effect of law shall be deemed to be incorporated herein. (b) Waiver by Seller or Buyer of any breach of these provisions shall not be construed as a waiver of any other breach.

Exhibit E – Acceptance Test

OPTOMEC®
Additive Manufacturing Systems — from Nano to MACRO™

Aerosol Jet®

Aerosol Jet 300P, 300CE, Display Lab, Solar Lab
Optomec Factory Customer Acceptance Document

Revision	2/27/2011
Document Number	M014
Author Approval:	Stephen Barnes
QA Approval:	Mike O'Reilly
Eng. Approval:	Dave Bohling
Mfg Approval:	Louie Armijo

Table of Contents

1 Revisions

Publish Date	Author	Changed Section(s)	Changes Made
3/26/2010	SMB	3, 11, 5	General reformat, updated Tools and Supplies, platen vacuum test updated to new design, add tests for multiple pneumatic atomizers, exhaust pull down adjusted to match manufacturing test.
2/9/2011	MOR ME BH	2, 3, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16	updates to reflect PA heater/stirrer, 8-Nozzle test, updated Laser testing, various control limits, Added Print Specs when running Print Tests

2 Overview

2.1 Purpose

This document outlines Customer Acceptance procedures for Aerosol Jet 300P, 300CE,Display Lab, and Solar Lab systems leading to final system acceptance signoff.

2.2 Scope

This document covers testing of the Process Control Module (PCM), Motion, Pneumatic and Ultrasonic Atomizers, the Deposition Head, the Heated Platen, the Tube Heater, the Purge System, the Shutter, and the Laser.

This document is intended to be a generic test document for a variety of systems and configuration. It may include sections that reference components that are not included in the system being tested. Those sections are not required to be completed.

3 Tools and Supplies Needed

3.1 Equipment and Tools Needed

a. PC with latest version of Aerosol Jet Workstation Control software
b. Vacuum Pumps
c. 150µm Deposition Tip
d. Sheet of Acetate film (transparency or overhead projector film)

3.2 Materials Needed

a. Nitrogen Gas or Clean Dry Air Supply
b. Silver Nanoparticle Ink – Cabot CSD-32
c. DI Water

4 General Notes on Test Procedures

Unless otherwise indicated, the nitrogen supply should stay connected to the PCM during testing. Unless otherwise indicated, the bottle pressure should be set to 60-80 psi and the PCM internal regulator to 30 psi.

The Certificate of Acceptance is attached to the end of this document. This sheet will need to be printed and signed off by the customer as an indication that the system has been fully tested and accepted by the customer.

5 Safety Features

5.1 Hood Interlock

Purpose: Verify opening the hood causes an E-stop condition.

5.1.1 Setup Test

If the E-Stop button is pressed, release it.

Close the hood.

Turn on the laser control module, if available.

Turn on the power to the motion.

5.1.2 Run Test

Open the hood.

5.1.3 Acceptance Criterion

Function	Pass / Fail
Opening the Hood shows an E-stop message in the Workstation Control Software.	
Opening the Hood button disables the laser.	
Opening the Hood button disables the motion.	

Table 1 Hood Interlock Testing Data

5.2 Emergency Stop Button

Purpose: Verify pressing the E-stop button causes an E-stop condition.

5.2.1 Setup Test

Close the hood.

If the E-Stop button is pressed, release it.

Turn on power to the motion.

Turn on the laser control module.

5.2.2 Run Test

Press the E-Stop button.

5.2.3 Acceptance Criterion

Function	Pass / Fail
Pressing the E-Stop button shows an E-stop message in the Workstation Control Software.	
Pressing the E-Stop button disables the laser.	
Pressing the E-Stop button disables the motion.	

Table 2 Emergency Stop

6 Platen Testing

6.1 Platen Level

Purpose: Ensure that the platen moves perpendicularly to the alignment camera.

6.1.1 Setup

Attach a dial indicator to the gantry with the point touching the top surface of the platen.

6.1.2 Perform Test

Move the platen so the indicator is at the top center of the platen and record the indicator's measurement.

Move the platen so the indicator is at the lower right corner and record the reading of the indicator.

Move the platen so the indicator is at the lower left corner and record the reading of the indicator.

6.1.3 Acceptance Criteria

Location	Dial Indicator Reading, inches	Deviation from Top Center, inches	Pass or Fail (Deviation must be less than 0.001 " to pass)
Top Center		0.000	
Lower Right			
Lower Left			

Table 3 Platen Level Test Data

7 Laser Testing

7.1 Safety

CAUTION

THE AJ300 IR LASER IS A CLASS IV LASER PRODUCT OPERATED IN A CLASS I MODE WHEN RUN IN AN INTERLOCKED AJ300 LASER ENCLOSURE. THE AJ300 IR LASER SYSTEM SHOULD BE TESTED IN A CLASS 1 MODE.

7.2 Laser Focus Test

Purpose: Verifythat the position of the minimum laser focus is coincident with the position of the Laser Camera Focus.

7.2.1 Setup

Tape a piece of burn paper under the microscope objective.

7.2.2 Run Test

1. Load the toolpath LaserFocusCheck. The LaserFocusCheck toolpath sets the laser current to 0.4 amps, and scans the laser spot over the burn paper at a predetermined z axis height. The scan should produce a 10 mm crosshair.
2. In the Diode Laser Control Window, click the Laser On button to enable the laser.
3. Execute the LaserFocusCheck toolpath.
4. Verify that a crosshair has been produced on the burn paper.
5. Check the focus of the crosshair image in the Laser Camera. Adjust the Laser Camera focus (if needed) by adjusting the Laser Camera Focusing Ring.

7.2.3 Acceptance Criteria

Table 4 Laser Burn Mark Test Results

Horizontal Burn width (mm)	Vertical Burn width (mm)	Maximum Allowable width (mm)	Horizontal Focus Pass/Fail	Vertical Focus Pass/Fail

7.3 Sintering Test

Purpose: Verify proper sintering of printed lines.

7.3.1 Setup

Load the toolpath "LaserSinteringTest" into Micro.

Configure the system for deposition of silver nanoparticle ink using pneumatic atomization.

Place two 1x2 inch glass microscope slides on the platen as shown in Figure 1. Set the approximate position of line 1 as zero.

Turn on the platen vacuum to secure the slides.

Load the deposition parameters.

7.3.2 Run Test

Run the toolpath. Ink will be deposited on both slides.

Load the file "LaserSinteringTest_L." This toolpath will be used to sinter the first set of lines (on slide 1) using a laser current of 1.5 amps.

Execute the file "LaserSinteringTest_L."

Bake the second slide at 300 °C for 30 minutes.

Probe the resistance of each line of slide 1 and record each resistance value. Calculate the average and standard deviation of the measurements.

Probe the resistance of each line of slide 2 and calculate the average and standard deviation of the measurements.

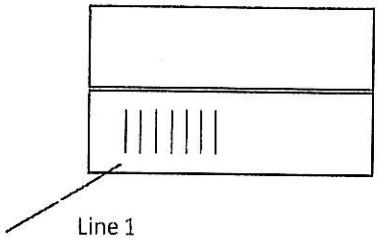


Figure 1 Slide Orientation for Laser and Oven Sintering

7.3.3 Acceptance Criteria

	Line Resistance (Laser Sintered), Ohms	Line Resistance (Oven Sintered), Ohms	Difference, %	Difference is less than xx% Pass / Fail
Average				
Standard Deviation				

Table 5 Laser and oven-sintered resistance measurements

8 Deposition Head Testing

8.1 Ultrasonic Atomizer with 0.5X Print Head

Purpose: Verify Ultrasonic Atomizer Deposition Quality

8.1.1 Setup

Material	Diluted Cabot CSD-66-D Ag ink
Atomizer Translation position	approximately 7 mm
Atomizer angle position	approximately 38°
PCM Parameters	
Sheath Flow	55 cc/min.
Carrier Gas flow	12 cc/min.
Atomizer Voltage	48 V
Process Velocity	3 mm/sec.
Rapid Velocity	30 mm/sec
Corner Velocity	0.5 mm/sec
Tip Size	150 µm
Tube Heater	Off
Substrate / Platen Heat	60 C
Substrate Type / Cleaning Process	Glass / Recipe CC1
Tool path	AJ test single nozzle toolpath.prg

Table 6 UA Deposition Recipe (Typical)

Sample Preparation

Place 2.5 ml of ink solution in a sample vial.

Set vial height using vial height adjuster and tighten vial collar per Table 6

Place vial in atomizer.

Set atomizer positions (translation & angle) per recipe.

Place glass slides (2 X 3in) on platen per Figure 2 . Use platen vacuum or tape two edges of the glass to the platen to prevent movement.

Micro Preparation

Load the appropriate toolpath into micro.

Deselect box titled "Turn off flow controller after end of toolpath".

Set substrate speed per Table 6.

Set coordinate display to "Build"

Move substrate to start position such that the tip is over the middle of the substrate.

Select "Set".

Deposition Preparation

Set each of the following parameters in the order suggested to avoid clogging.

Set Sheath flow rate per Table 6. Wait 2 minutes for Pressure to come up.

Set Carrier Gas flow rate per Table 6

Set Atomizer voltage per Table 6

DO NOT DEVIATE FROM PERSCRIBED FLOW RATES

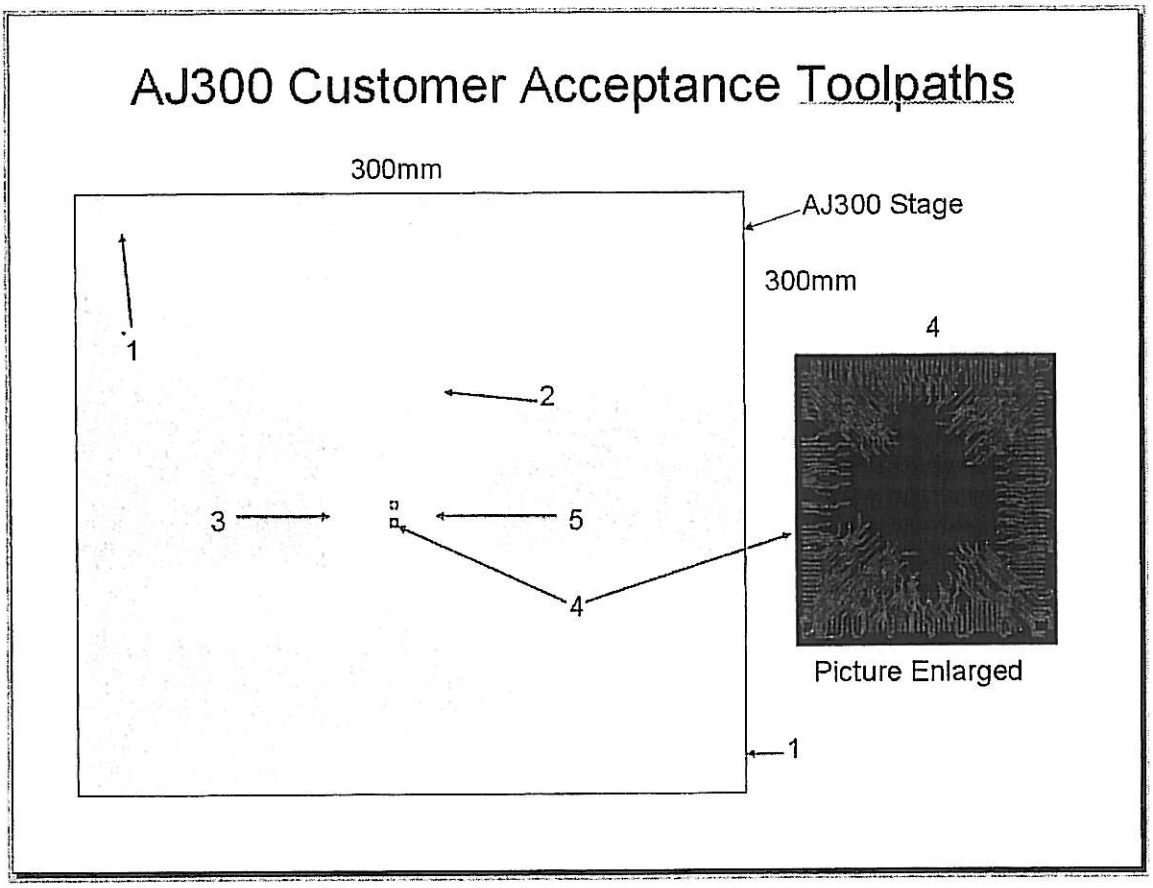


Figure 2 Single Nozzle Test Toolpaths

Item #	Description (Toolpath)	Detail	Line Width	LW Pass/Fail Criteria	Line Quality P/F Criteria	Print HW	Ink	Ink Print Proces	Substrate	Substrate Cleaning Spec	Pass/Fail
2	Lines - Straight	20 Lines, 30mm Length, .5mm Apart	15um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head	CSD66D	C66UAS15	Glass	CC1	
3	Lines with Probe Pads	10 Lines, 5mm Probe Lines w/ 1mm Pads - No Resistivity Spec Due to Requirement for Sintering	20um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head	CSD66D	C66UAS20	Glass	CC1	
4	Redistribution Pattern	See Image	20um	+/- 25%	Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head	CSD66D	C66UAS20	Glass	CC1	
5	Circle	Two Concentric Circles	20um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head	CSD66D	C66UAS20	Glass	CC1	

Table 7 Tool Paths and Structures

8.1.2 Perform Test

Wait approximately one minute after material is initially visible and the Sheath pressure has stabilized.

Select "Execute" to begin the tool path.

For Ultrasonic Acceptance, print each of the Items as stated in Figure 2. Confirm that the correct Ink Process is being run. Note the starting location of the toolpaths is in the lower left corner of the 2 X 3in glass slides.

Document Measurement results in Table 8.

8.1.3 Acceptance Criteria

Toolpath	Average Line width (measured in three places), µm	LW and LQ Pass / Fail
Item# 2 Lines – Straight		
Item# 3 Lines with Probe Pads		
Item# 4 Redistribution Pattern		
Item# 5 Circle		

Table 8 Ultrasonic Atomizer Print Test Results

8.2 Pneumatic Atomizer with 05X Print Head

Purpose: Verify Pneumatic Atomizer Deposition Quality

8.2.1 Setup

Material	Cabot CSD-32 Ag ink
PCM Parameters	
Sheath Gas Flow	60 sccm
Exhaust Gas Flow	~ 570 sccm.
Atomizer Gas Flow	600 sccm
Process Velocity	3 mm/sec.
Rapid Velocity	30 mm/sec
Corner Velocity	0.5 mm/sec
Tip Size	200 µm
Tube Heater	Off
Substrate / Platen Heat	60 C
Atomizer Ink Temperature	30 C
Stirring Speed	~60-120 rpm
Substrate Type	Glass soaked in Ammonium Hydroxide
Tool path	AJ test single nozzle toolpath.prg

Table 9 PA Deposition Recipe (Typical)

Sample Preparation

Put a stir bar in atomizer.

Place 30 ml of ink into atomizer.

Set atomizer stem height to between 5mm and 10mm of insertion into ink.

Set atomizer ink temperature and stirring speed as indicated in Table 9.

Place glass slides (2 X 3in) on platen per Figure 2 . Use platen vacuum or tape two edges of the glass to the platen to prevent movement.

Micro Preparation

Load the toolpath into micro.

Deselect box titled "Turn off flow controller after end of toolpath".

Set substrate speed per Table 9..

Set coordinate display to "Build"

Move substrate to start position such that the tip is over the middle of the substrate.

Select "Set".

Deposition Preparation

Set each of the following parameters in the order suggested to avoid clogging.

Set Sheath flow rate per Table 9. Wait 2 minutes to allow pressure to come up.

Set Exhaust Gas flow rate per Table 9.

Set Atomizer Gas flow rate per Table 9.

Wait for sheath pressure to stabilize

Using workstation control software, move platen below print head. If deposition is not seen, lower the exhaust pressure in 10 sccm increments. Each time the exhaust pressure is lowered, wait for the sheath pressure to fully stabilizer before checking for deposition.

8.2.2 Perform Test

Wait approximately one minute after material is initially visible and the Sheath pressure has stabilized.

Select "Execute" to begin the tool path.

At the end of the toolpath, turn off the flow rates starting with the atomizer, waiting until the pressure drops to 0, then the exhaust and then the sheath.

For Pneumatic Acceptance, print each of the Items as stated in Table 10. Confirm that the correct Ink Process is being run. Note the starting location of the toolpaths is in the lower left corner of the 2 X 3in glass slides.

Document Measurement results in Table 11.

8.2.3 Acceptance Criteria

Item #	Description (Toolpath)	Detail	Line Width	LW Pass/Fail Criteria	Line Quality P/F Criteria	Print HW	Ink	Ink Print Process	Substrate	Substrate Cleaning Process	Pass /Fail
1	Lines - with Corners	10 Lines, 20 X 20mm Length, 1mm Apart, Upper Left and Lower Right of 300mm Platten	50	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head, BGI Style Atomizer	CSD66	C66BAJS50	Glass	CC1	
2	Lines - Straight	20 Lines, 30mm Length, .5mm Apart	30um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head, BGI Style Atomizer	CSD66	C66BAJS30	Glass	CC1	
3	Lines with Probe Pads	10 Lines, 5mm Probe Lines w/ 1mm Pads - No Resistivity Spec Due to Requirement for Sintering	30um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head, BGI Style Atomizer	CSD66	C66BAJS30	Glass	CC1	
4	Redistribution Pattern	See Image	30um	+/- 25%	Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head, BGI Style Atomizer	CSD65	C66BAJS30	Glass	CC1	
5	Circle	Two Concentric Circles	30um	+/- 25%	Continious Lines, Max Overspray +/- 25% of LW Outside Line Edge	Single Nozzle 0.5X Head, BGI Style Atomizer	CSD66	C66BAJS30	Glass	CC1	

Table 10 Tool Paths and Structures

Toolpath	Average Line width (measured in three places), µm	LW and LQ Pass / Fail
Item#1 Lines with Corners		
Item# 2 Lines – Straight		
Item# 3 Lines with Probe Pads		
Item# 4 Redistribution Pattern		
Item# 5 Circle		

Table 11 Pnuematic Atomizer Print Test Results

8.3 Pneumatic Atomizer with 8-Nozzle Print Head

Purpose: Verify Pneumatic Atomizer Deposition Quality with 8-Nozzle Print Head

8.3.1 Setup

Material	Undiluted Cabot CSD-32 Ag ink
PCM Parameters	
Sheath Gas Flow	800 sccm
Exhaust Gas Flow	2300 sccm.
Atomizer Gas Flow	2500 sccm
Process Velocity	100 mm/sec.
Rapid Velocity	100 mm/sec
Corner Velocity	0.5 mm/sec
Tip Size	200 µm x 8
Substrate / Platen Heat	60˚C
Atomizer Ink Temperature	30˚C
Stirring Speed	~60-120 rpm
Substrate Type	Glass soaked in Ammonium Hydroxide for 10 minutes
Tool path	None

Table 12 PA 8-Nozzle Deposition Recipe

Sample Preparation

Put a stir bar in atomizer.

Place 30 ml of ink into atomizer.

Set atomizer stem height to between 5mm and 10mm of insertion into ink.

Set atomizer ink temperature and stirring speed as indicated in Table 12.

Place glass on platen. Use platen vacuum or tape two edges of the glass to the platen to prevent movement.

Micro Preparation

Set each of the following parameters in the order suggested to avoid clogging.

Set Sheath flow rate per Table 12.

Set Exhaust Gas flow rate per Table 12.

Set Atomizer Gas flow rate per Table 12.

Using workstation control software, move platen below print head.

8.3.2 Perform Test

Wait for sheath pressure to stabilize

Wait approximately two minutes after material is initially visible and the Sheath pressure has stabilized.

Using the jog buttons on micro, draw a set of lines at 100mm/s.

At the end of the toolpath, turn off the flow rates starting with the atomizer, waiting until the pressure drops to 0, then the exhaust and then the sheath.

Record Measurements in Table 13.

Line #	Average LW (Measured in 3 Places), µm
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Table 13 8-Nozzle Line Width Data

8.3.3 Acceptance Criteria

Criteria	Pass / Fail
All lines are within a 15 µm span. For example, if the largest is 60 µm and the smallest 45 µm, the print would pass.	
All lines below 60 µm	

Table 14 8 Nozzle Print Acceptance Criteria

9 Extended Use Dry Run Test

9.1 Extended Stage and Pressure Test

Purpose: Verify system stability during 3 hours of mechanical operation. This test does not include printing.

9.1.1 Setup Test

Load the "Aerosol Jet 3 hour system run test.prg" toolpath.

Install a 150 µm nozzle on the deposition head.

Set the Sheath flow at 75cc.

Ensure that the deposition nozzle and shutter will not interfere with any platen movements.

Move the stages to 0.005, 0.005 in machine coordinates.

Set the process and rapid speeds to 200 mm/s.

Press the "Set Home" button on the Workstation Control Software.

9.1.2 Run the 12 hour system dry run test

Execute the toolpath.

Verify that the stages are moving.

Verify that the sheath and atomizer MFCs have turned on.

Wait for the sheath pressure to stabilize and record the pressure in Table 15

Allow the system to run for the duration of the 3 hour test period.

Record the sheath pressure in Table 15 at test end.

9.1.3 Acceptance Criterion

Version of toolpath	

Time	Allowable sheath pressure, psi	Actual Sheath Pressure, psi	Pass / Fail
Start of test	.095 – 1.05		
End of test	.095 – 1.05		

Table 15 Sheath Pressure Monitoring for Duration Test

Criteria	Pass / Fail
3 Hour Test Ran Without Error	
Moving components do not rub, interfere, or squeak	

Table 16 Extended Run Test Results

10 Aerosol Jet System Certificate of Conformance

Customer	
Serial Number	
Test Completion Date	

Test Required	Test	Section	Pass / Fail	Customer Initials	Notes
☐	Safety Features	5			
☐	Platen Testing	6			
☐	Laser Testing	7			
☐	Deposition Head Testing	8			
☐	Extended Use	9			

Customer Acceptance Sign and Date: _____ / _____

Customer Printed Name and Title: _____ / _____

Exhibit F - Warranty

LIMITED ONE (1) YEAR WARRANTY

Manufacturer: Optomec, Inc.
Address: 3911 Singer Blvd., NE,
Albuquerque, NM, U.S.A. - 87109

This warranty shall continue for a period of (1) one year from the date of delivery. However, in no event shall the warranty extend beyond eighteen (18) months from the date of delivery, unless an extended warranty contract is purchased. Failure of the System to be installed by Buyer at their facility within a 60-day period from shipment, will begin the warranty period. Further, Buyer will be responsible for all replacement costs (including parts and labor) for any damaged components to the System associated with the delayed installation. This warranty is non-transferable. It is limited to the original Buyer. Seller warrants that the System furnished will be free from manufacturing defects, provided Buyer's operating personnel abide by the instructions given at the time of delivery and make such minor adjustments as may be required during use of the System, including: adhering to the "Customer Shipping Procedure for the Safe Transportation of Optomec Systems," refraining from breaking the seal on the PCM cover in Aerosol Jet® systems by opening such covers, and refraining from overriding the interlock systems. THIS WARRANTY SHALL BE VOID FOR FAILURE TO FOLLOW THESE INSTRUCTIONS AND PROCEDURES. ADDITIONALLY, SUPPLEMENTAL INSTALLATION CHARGES MAY APPLY TO THOSE WARRANTIES THAT ARE VOIDED FOR FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS AND PROCEDURES. This warranty does not extend to consumable items defined by the Seller. Further, this warranty does not extend to the System if the Buyer removes or conceals any trademark logos of the Seller on the System. If anything is found which is broken, or not as specified, notice shall be given in writing to Seller within (30) thirty days after the System is received by Buyer so that Seller may correct same, and in the absence of such notice, no claims for such defect or the like shall be allowed by Buyer. Seller warrants that it will repair f.o.b. its factory, or furnish without charge f.o.b. its factory, a similar part to replace any material in the System which within (1) one year after the date of shipment is proved to the satisfaction of Seller to have been defective at the time it was sold, natural wear and breakage through carelessness, accidents, abuse, negligence, and Acts of God excepted, provided that all parts claimed defective shall be returned, properly identified, to Seller's branch house having jurisdiction over the territory, charges prepaid. This warranty to repair applies only to new and unused machinery, which, after shipment from the factory of Seller has not been altered, changed, repaired or treated in any manner, and does not extend to trade accessories sold or operated with the machinery. Buyer shall render necessary and friendly assistance to Seller in and about remedying the defect. When at the request of Buyer a representative of Seller is sent to remedy or repair machinery and the same is found to have been carelessly or improperly handled, the expense incurred by Seller in putting it in working order shall be paid by Buyer. No attempt by Seller or its representatives to remedy any defects shall constitute a waiver of any of the provisions of this agreement, and, if a mechanical expert visits the System and does not leave it working properly, Buyer shall give immediate notice in writing to Seller at its head office, stating specifically the failure or neglect complained of. No claim of breach of warranty or that quality of goods is not in accordance with the contract shall constitute a cause for cancellation of this contract or any part of it. Seller shall in no event be liable for breach of warranty in an amount exceeding the purchase price of the System or the purchase price of the specific defective component.

If a complaint is made to Seller by Buyer that the System is not meeting the above warranty, then Seller shall have the right to make a test of the System. If Seller exercises this right, such test shall be conducted by an Agent of Seller who shall have entire charge of the System. Buyer shall furnish the load necessary for such test, and all assistance, electricity, materials, gas, etc., and other things necessary for such test. Such test shall be made within a reasonable time after such complaint has been received by Seller at its home office. If such test shall show the System to operate according to the warranty, then Buyer shall deliver to Seller's Agent a written acknowledgement of such fact; however, if at the end of such test Buyer fails or refuses to deliver to Seller's Agent a written acknowledgement that the System operates according to the warranty, then Buyer shall immediately notify Seller at its home office, by registered letter, what in particular Buyer claims to be defective in the System within the warranty, and Seller shall have a reasonable time to remedy such defects. The failure of Buyer to notify Seller as before provided for, of the claimed defects within fifteen (15) days after the complaint of the test, shall constitute and be construed to be an acknowledgment by Buyer that the System has operated successfully at the test in strict accordance with the warranty. If the complaint is not made within fifteen (15) days after the System is put in operation, or if such test cannot be conducted because of the fault of Buyer, then the warranty shall be null and void and Seller shall not be bound by it, and the System shall then be considered accepted by Buyer. No legal action shall commence against Seller with respect to the liability of Seller hereunder more than twelve (12) months after shipment of the System.

If Seller shall, at the request of Buyer, render assistance of any kind in operating the System, or any part of it, or in remedying any defects at any time, the assistance shall in no case be deemed an acknowledgment on Seller's part of a breach by it or this warranty, or excuse for any failure to fully keep and perform the conditions of this warranty.

This Agreement shall be divisible as to each System and attachment for which a separate price is named, and the failure of any article to fulfill the warranty shall not affect the liability of Buyer for any other article ordered.

The warranty described in this Agreement is in lieu of all other warranties. THE PARTIES AGREE THAT THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED FROM THIS AGREEMENT.

This is the entire agreement between the parties and no other warranties shall be implied. No statements, displays, models, samples, or representations made by Seller shall be considered part of the Agreement.

Digitally signed by JUDr. Daniel Volopich