



1925 Route 51, Jefferson Hills, PA 15025 USA  
 www.lesker.com; sales@lesker.com  
 SALES: (800) 245-1656  
 Fax: (412) 384-2745

**OFFER**  
**2018 NANO 36 THIN FILM DEPOSITION SYSTEM**

<b>COMPANY</b>	University of Nevada	<b>REFERENCE #</b>	<b>SQ_162190MK1</b>
<b>CONTACT</b>	Stephen M. Spain		
<b>PHONE</b>	(775) 784-6019	<b>DATE</b>	<b>4/26/2017</b>
<b>EMAIL</b>	smspain@unr.edu		

The Kurt J. Lesker Company NANO 36 is a standard system platform comprised of the following major subassemblies and is easily personalized to the user's unique application. This system is configured for magnetron sputtering and is designed to allow efficient interface to a glove box. This system is designed to allow the use of square substrates 100mm x 100mm or smaller and round substrates up to 150mm diameter or smaller. The system is delivered to the customer fully assembled and performance tested.

**BASE SYSTEM DESCRIPTION**

**PROCESS CHAMBER**

- Removable and reconfigurable top and bottom plates on ISO 250 ports (10" tube)
- Horizontally oriented cylindrical stainless steel chamber body
- Spring-loaded, pendulum style, full-access, aluminum front door
- Appropriate pumping, process, gauging and instrumentation ports are included
- Quantity (2) viewports included in the chamber door. Viewports each have 1.26" Ø viewing area.

**VACUUM PUMPING**

- Pfeiffer HiPace 300 - 260 l/s speed control turbo pump is included in the base system
- 3.8 cfm oil sealed mechanical pump is included in the base system
- Foreline trap, mist eliminator, roughing valve, and roughing hardware provided as necessary

NOTE: Roughing pump is located remotely from system frame

NOTE: See "ROUGH VACUUM PUMPING" in Options section below for additional details and other pumping choices

**VACUUM GAUGING**

- Wide range vacuum gauge reads from atmosphere to 10<sup>-9</sup> Torr
- All mounting and connection hardware, adapters, etc.

**OPEN SYSTEM FRAMEWORK**

- Fully enclosed system base cabinet
- Open access to the chamber
- Leveling pads and caster wheels
- Removable enclosure panels

**WATER DISTRIBUTION MANIFOLD**

- Manual shut off valve at manifold
- NPT connections (inlet and outlet), metric adapters supplied when appropriate

**GAS AND PNEUMATIC DISTRIBUTION**

- Inert Vent/Purge gas, compression fitting inlet
- Compressed air (pneumatics), compression fitting inlet
- Process gas, metal face seal inlet(s), metric adapters supplied when appropriate

**POWER DISTRIBUTION**

- Single service drop, 208-240VAC, 50-60Hz, single phase, 3-wire
- Amperage rating based on selected components
- Component wiring is routed to a centralized power distribution module
- EMO protection
- Appropriate safety interlocks
- NOTE: A dedicated earth ground is required
- NOTE: If components dictate, three phase, 5-wire service may be necessary

**KJLC eKlipse BASE SYSTEM CONTROL**

- Laptop User Interface
- Laptop facilitates monitoring and manual actuation of vacuum and deposition process components
- UI Navigation and Title Panel: Visual display and control of System status messages, operation mode, and system abort
- Vacuum Screen: Visual display of valve position, pump status and vacuum status
- Deposition Screen: Indication of shutter position, deposition source control
- Gas Screen: Mass flow controller modes, gas valve status, pressure measurement and control display
- Motion Screen: Substrate rotation speed, and start/stop
- Cooling Screen: Water flow switch status where applicable
- Heating Screen: Temperature setpoints & control parameters, PID and Tuning features
- Automatic pumpdown and vent recipes

**DOCUMENTATION**

- Customer drawing package (including general assembly, vacuum schematic, water flow schematic, and electrical schematics)
- Operation and component manuals provided in English

**WARRANTY AND LIABILITY**

- 12-month standard warranty as described in Kurt J. Lesker Company Standard Terms and Conditions of Sale
- KJLC is not liable for any indirect or consequential damages; KJLC liability shall in no event exceed the amount paid by customer to KJLC for the products described in this document

**FACTORY TESTING AND COMPLIANCE**

- The System is factory tested to comply with the standard NANO 36 System Performance Specifications (SPS) per attached Appendix A
- These will be the only specifications required to meet system compliance and acceptance.
- The customer will be supplied with applicable testing documentation
- No process guarantees of any kind are offered or implied with the system
- The system is manufactured in accordance to CE standards and can be CE marked for an additional cost

**SYSTEM PLACEMENT, INSTALLATION AND TRAINING**

- Customer is responsible for uncrating, placement and connection of the system at the customer’s facility
- Customer is responsible to provide and connect all required utilities including but not limited to compressed air, water, process/vent gas, electric, and dedicated earth ground. Detailed specifications will be provided prior to system shipment
- No spare parts are included with the base system unless specifically stated in this quotation

**Base System Price** **\$51,000**

**SYSTEM OPTIONS AND UPGRADES:**

NOTE: If an option is selected, the system price will reflect the selection. Options not selected will not be included in the system.

**ROUGH VACUUM PUMPING OPTIONS**

RP7	1	KJLC 3.8 cfm oil-sealed mechanical roughing pump and foreline valve NOTE: Roughing pump is located remotely from system frame	\$0	INCLUDED IN BASE
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**BASE FLANGE OPTIONS**

BF17	1	(3) GUN SPUTTER FLANGE • Allows the use of up to (3) 2" or 3" sputter sources	\$0	INCLUDED IN BASE
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**MAGNETRON SPUTTERING OPTIONS**

KJLC TORUS® Mag Keeper

- Up to three 2", or 3" TORUS® magnetron sputtering sources mounted via KJLC vacuum coupling
  - Typical source to substrate distance of 4"-6" (102-152mm), manually adjustable
  - Low profile CDS (Compact Dome Shutter) effectively eliminates cross contamination between adjacent sputter sources.
  - Flex mount assembly for Torus® source to provide ex-situ tilt capability included
  - No Anode Shield or Target Clamp Assembly yields quick target change capability and eliminates potential for debris build up and flaking
  - High Vacuum and UHV Compatible
  - Accepts up to 0.375" thick (non-magnetic) targets with a 3" cathode
  - Accepts up to 0.250" thick (non-magnetic) targets with a 2" cathode
  - Low operating pressure capability ≥ 0.5mTorr
  - No deposition materials are included unless specifically stated in this offer
- NOTE: Source quantity and option selected may limit flex capability

SOURCE POSITION					
1	MS1	1	TORUS® Mag Keeper 2", standard strength magnet assembly	\$7,100	\$7,100
2	MS0		SELECT SOURCE HERE USING DROPDOWN	\$0	NOT SELECTED
3	MS0		SELECT SOURCE HERE USING DROPDOWN	\$0	NOT SELECTED

**MAGNETRON SPUTTERING SOURCE POWER SUPPLIES**

PS1	1	KJLC 300W RF power supply with automatic matching network and controller	\$12,700	\$12,700
Note: Limit of three available RF Power supplies				
PS1 WILL POWER THE FOLLOWING SOURCES <input checked="" type="checkbox"/> src 1 <input type="checkbox"/> src 2 <input type="checkbox"/> src 3				
PS0		SELECT POWER SUPPLY	\$0	NOT SELECTED
PS2 WILL POWER THE FOLLOWING SOURCES <input type="checkbox"/> src 1 <input type="checkbox"/> src 2 <input type="checkbox"/> src 3				
PS0		SELECT POWER SUPPLY	\$0	NOT SELECTED
PS3 WILL POWER THE FOLLOWING SOURCES <input type="checkbox"/> src 1 <input type="checkbox"/> src 2 <input type="checkbox"/> src 3				
PO1		Multi-position DC switch	\$3,500	NOT SELECTED
<ul style="list-style-type: none"> <li>• Allows a power supply to drive up to three sputter cathodes</li> <li>• Permits sequential operation of attached cathodes</li> </ul>				
NOTE: Not compatible with RF supply				

**SUBSTRATE FIXTURE AND MANIPULATION**

SF19	1	Rotation <ul style="list-style-type: none"> <li>• Variable speed, motor driven rotating platen (up to 20 rpm)</li> <li>• Accommodates a 150mm substrate</li> </ul> NOTE: Not compatible with heating or cooling	\$1,250	\$1,250
SO1		Substrate shutter <ul style="list-style-type: none"> <li>• 150mm maximum substrate shutter</li> </ul>	\$3,700	NOT SELECTED

**PROCESS PRESSURE CONTROL**

PC4	1	Upstream Pressure Control (used with Magnetron Sputtering) VAT 3-position gate valve <ul style="list-style-type: none"> <li>• One (1) Fujikin FCST1000F flow controller (0-100 sccm), all cables, and PID upstream pressure control electronics</li> <li>• One (1) Inficon CDG025D Capacitance Manometer 100 mTorr (0.13 mbar) pressure transducer</li> <li>• Orbitally welded gas lines provide maximum vacuum integrity</li> <li>• All MFC's will be calibrated for N2.</li> </ul> NOTE: This option is required with magnetron sputtering	\$9,200	\$9,200
PC2	1	Additional process gas channel (one available) <ul style="list-style-type: none"> <li>• Fujikin FCST1000F Mass flow controllers</li> <li>• MFC's will be calibrated for (0-20 sccm)</li> <li>• All MFC's will be calibrated for N2.</li> </ul>	\$2,800	\$2,800

**FILM THICKNESS CONTROL**

FT0		<i>SELECT MONITOR OR CONTROL USING DROPDOWN</i>	\$0	NOT SELECTED
CO1		Single standard crystal sensor	\$1,800	NOT SELECTED

**COMPUTER CONTROL AND SOFTWARE**

CC1	eKlipse™ ADVANCED Control Includes all items detailed in KJLC eKlipse BASE Computer Control, plus: <ul style="list-style-type: none"> <li>• Provides for automated process control</li> <li>• Standard Chart Recorder (plots up to 10 signals or “pens” simultaneously) and datalogging (.csv file)</li> <li>• Graphical Recipe Builder generates a recipe via mouse or touchscreen selectable user interface components</li> <li>• Recipe Database Screen provides selection &amp; editing of stock recipes, with copy functionality for modification of existing &amp; saving of new recipes</li> <li>• Programming/control via a keyboard/touch pad or pop-up window on touch screen</li> <li>• Supports multiple user accounts and password levels with custom security access for recipes and screens</li> <li>• Ability to export/import recipes from and any KJLC tool running eKlipse Computer control with similar components and identical deposition techniques</li> <li>• System event log captures all user login/logout events, all recipes executed, and system status messages</li> <li>• Provides access to KJLC and user created recipes</li> <li>• E-mail and Twitter equipment status notifications upon request (pressure, recipe, preventative maintenance etc.)</li> </ul> NOTE: System must be connected to an internet access point	\$12,100	NOT SELECTED
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**TOTAL SYSTEM PRICE / TERMS AND CONDITIONS:**

Total system price with options as selected (FOB Shipping Point, Prepaid & Add):	\$84,050
Crate fee:	\$1,000
Estimated Freight and Handling Charges:	\$1,500
Estimated Total:	\$86,550

**SHIPMENT:** 14-16 weeks after KJLC acceptance of order and receipt of first progress payment. Please note that shipment date is subject to review at time of order. Customer is responsible for all freight, crating and handling charges.

**TERMS:** Click here for LEF-203 KJLC Standard Terms and Conditions of Sale  
 Kurt J. Lesker Company Standard Terms and Conditions of Sale (LEF-203) shall apply to, and are incorporated by this reference into, the agreement(s) for the transaction(s) proposed or described in this document. These Terms and Conditions are available at the link above and are also available directly through the Kurt J. Lesker Company website at www.lesker.com. They can also be obtained by email request to sales@lesker.com or by calling 1-800-245-1656.

**PAYMENT:** KJLC Standard Progress Payments will apply:

- 30% Net 30 days with order acceptance
- 60% Net 30 days upon shipment
- 10% Net 45 days after shipment (or, when applicable, Net 30 days after KJLC startup and training). Note: If a customer delays shipment or the startup and training visit beyond 30 days, then A) half of this progress payment will become due immediately, B) equipment warranty will begin immediately, and C) storage fees may apply. KJLC will issue a written notice.

**NOTE:** All prices are in US Dollars  
No duty or taxes are included  
Prices valid for 30 days

## Appendix A - SPS

### 2017 Nano Performance Specifications

The System will comply with the Kurt J. Lesker Company (KJLC) standard Specifications (SPS) as follows. These will be the only specifications required to meet system compliance.

**Reference SQ\_162190MK1 for configurations and options selected and purchased. Some options may limit performance specifications.**

## Vacuum Performance

Process Chamber (PC) Pumping (ref Note 1)							
1	Torr	5.0E-05	1.0E-05	5.0E-06	5.0E-07	5.0E-08	Q_162190MK1
	mbar	6.7E-05	1.3E-05	6.7E-06	Stephen M. Spa	6.7E-08	
	260l/s Turbopump			●	(775) 784-6019		

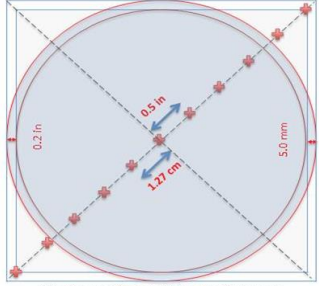
smspain@unr.edu

Note 1	Base Pressure is defined as the lowest observed pressure achieved in a clean, dry, properly conditioned chamber after a minimum of 12 hours of pumping. The base pressure value referenced is the minimum base pressure achieved.
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## Deposition Source Performance

Magnetron Sputtering Sources (ref Note 2)						
		Uniformity	<=+/-2.5%	<=+/-3%	<=+/-5%	<=+/-7.5%
2	Torus® Sputtering Sources, RF Power, 150mm Wafer				●	
	Torus® Sputtering Sources, DC/PDC Power, 150mm Wafer				●	

Note 2	Torus® sources are operated at typical sputtering pressures (< 20 mTorr) and utilize Si wafers for deposition. SiO2 Target run with RF Power, film thickness >=500Å. Al Target run with DC Power, film thickness >=1500Å. Ni Target run with High Strength Torus® & DC Power, film thickness >=1500Å.
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Note 3	<p>All Films are measured on a properly calibrated Profilometer, Reflectometer or Ellipsometer (if applicable).</p> <p>Measurement points are taken starting at the center of the substrate and then radially outward every 0.5 inches (12.7mm), nominally (reference figure to the right).</p> <p>Uniformity calculation formula is: ((Max - Min) / (2 x Avg)) x 100% with a 0.2 inch (5mm) edge exclusion.</p>	 <p style="font-size: small; text-align: center;">Circular and Square Reference Substrate For Visual Reference Only; Not an indication of actual substrate size</p>
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