

## \*\*COMPLETE THIS FORM TO INITIATE SUPPLIER SCOUTING\*\*

### MEPNN Supplier Scouting Opportunity Synopsis

\*The submitting entity agrees to notify NIST MEP of the status of actions taken as a result of this scouting instance within 30 days after receiving a results report. For instances where the submitting entity is an MEP Center submitting on behalf of a client, the MEP Center agrees to notify NIST MEP on behalf of their client. For instances where the submission is direct from federal/state agencies or is a private company, the submitting federal/state agency or private company entity agrees to notify NIST MEP. Notification should be via email to [scouting@nist.gov](mailto:scouting@nist.gov), indicating the following:

- Contact with matches identified in report complete and supply contract awarded, process complete
- Contact with matches identified in report complete and no supply contract awarded, process complete
- Contact with matches identified in report complete and supply negotiations underway, process in progress
- Contact with matches identified in report underway; supply negotiations not yet begun; process in progress
- Contact with matches identified in report not yet begun, process in progress
- Contact with matches identified in report will not occur within the next 6-months, process complete

**Semiconductor Furnaces**

\_\_\_\_\_ days  
**Opportunities will be posted for 30 days unless specified**

Item to be Scouted

**Please describe the item application/ the end use of item.\* Provide the item number if applicable: (N95 Mask vs Protective Mask).**

The National Institute of Standards and Technology (NIST) seeks information on commercial vendors that are capable of providing three horizontal tube furnace stacks to support nanofabrication of semiconductors in the Center for Nanoscale Science and Technology (CNST), NIST's NanoFab user facility. Each furnace stack will have 4 furnace tubes, where two are ambient and two are low pressure chemical vapor deposition (LPCVD). The three furnace stacks will be sited and used as a shared resource accessible to researchers from industry, academia, NIST, and other government agencies in the CNST NanoFab. NIST's CNST NanoFab seeks to acquire a three horizontal four tube stack systems that will be used to grow oxides (both dry and wet), anneal thin films, and deposit, using LPCVD, thin dielectric films to support a variety of NIST mission critical programs. The CNST NanoFab has numerous NIST mission critical and external projects, including the NIST on a chip nanophotonic efforts, that utilize thick dielectric cladding layers over their nanoscale fabricated photonic structures. The CNST NanoFab also has research efforts in the nanoelectronics domain, where thermally grown, thin silicon dioxide layers are utilized as gate dielectrics in advance integrated circuit architectures. The LPCVD systems will allow for tailoring and optimizing of the stress, stoichiometry, density, optical constants, and optical losses of the deposited films, thereby allowing for the construction of high efficiency nanophotonic and nanoelectronic architectures. Dense, high quality, LPCVD dielectric films are utilized as waveguide layers in linear and non linear photonic applications and as high efficiency dielectrics in nanoelectronics. The three horizontal four tube LPCVD furnace systems shall accommodate substrate sizes up to 150 mm diameter semi spec silicon substrates. The overall performance and the success of the numerous existing and future NIST mission critical projects carried out in the CNST NanoFab will depend critically on the ability to accurately grow, anneal and deposit thin films in furnace systems.

2022-125

Supplier Scouting Number (NIST MEP use)

333242

Scouting customer/product [NAICS Code](#), if known

<b>TECHNICAL INFORMATION:</b>	<b>1.</b>	Supplier Information	<b>a. Type of supplier being sought*</b> <input checked="" type="checkbox"/> <b>Manufacturer</b> <input type="checkbox"/> <b>Contract Manufacturer</b> <input type="checkbox"/> <b>Distributor</b> <input type="checkbox"/> <b>Other</b> _____
			<b>b. Reason for scouting submission*</b> <input type="checkbox"/> <b>2<sup>nd</sup> Supplier</b> <input type="checkbox"/> <b>Price</b> <input type="checkbox"/> <b>Re-shore</b> <input type="checkbox"/> <b>Past supplier no longer available</b> <input type="checkbox"/> <b>New Product Startup</b> <input type="checkbox"/> <b>Other</b> _____
	<b>2.</b>	Summary of Technical Specification	<b>a. Describe the manufacturing processes (elaborate to provide as much detail as possible).*</b> <div style="font-size: 24pt; text-align: center; padding: 10px 0;">Item needed as one standalone unit</div> <b>b. Provide dimensions / size / tolerances / performance specifications for the item.*</b>

This three multi tube furnace systems are intended to be used by NanoFab users who need to grow, anneal and deposit thin films on wafers throughout the nanofabrication processing. Each tube of the furnace system shall have the ability to accommodate small pieces up to 150 mm diameter semi spec silicon wafers. The system shall be stable and capable of operating 24 hours a day, 7 days a week. 2. Furnace System: a) The furnace system shall consist of three furnace banks, where each bank has the following configuration: i. Bank 1 horizontal four-tube system shall consist of four processing tubes in the following configuration from top to bottom: i. Furnace Tube 1 shall accommodate wet and dry oxidation processes at temperatures less than or equal to 1150 oC ii. Furnace Tube 2 shall accommodate anneal processes at temperatures less than or equal to 1150 oC iii. Furnace Tube 3 shall accommodate LPCVD TEOS processes iv. Furnace Tube 4 shall accommodate LPCVD low temperature oxide (LTO) processes ii. Bank 2 horizontal four-tube system shall consist of four processing tubes in the following configuration from top to bottom: i. Furnace Tube 1 shall accommodate high temperature wet and dry oxidation processes at temperatures less than or equal to 1300 oC ii. Furnace Tube 2 shall accommodate high temperature anneal processes at temperatures less than or equal to 1300 oC iii. Furnace Tube 3 shall accommodate LPCVD silicon nitride processes iv. Furnace Tube 4 shall accommodate polycrystalline silicon processes iii. Bank 3 horizontal four-tube system shall consist of four processing tubes in the following configuration from top to bottom: i. Furnace Tube 1 shall accommodate high temperature wet and dry oxidation processes at temperatures less than or equal to 1300 oC ii. Furnace Tube 2 shall accommodate high temperature anneal processes at temperatures less than or equal to 1300 oC iii. Furnace Tube 3 shall accommodate LPCVD silicon nitride processes iv. Furnace Tube 4 shall accommodate doped polycrystalline silicon processes b) The 3 horizontal four-tube deposition systems shall meet the standard to accommodate an installation in a class 100 cleanroom c) The 3 horizontal four-tube deposition systems shall accommodate substrate sizes up to 150 mm diameter, semi spec silicon wafers. d) The 3 horizontal four-tube deposition systems' control software shall allow for: i. Automatic recipe operation in operator mode. ii. Automatic and manual operation in administrator mode. e) Each tube shall be equipped with a separate standalone computer control module that allows for modifying, selecting, running, holding and aborting deposition recipes. Therefore, each furnace bank of the horizontal four tube system shall be equipped with four separate computing modules with four screens that independently control the respective furnace tube. f) Each furnace tube of the 3 horizontal four-tube deposition systems shall allow processing up to 50 silicon wafers per process run. g) All furnace tubes shall have at least 3 temperature control zones.

**c. List required materials needed to make the product, including materials of product components.\***

Item needed as one standalone unit.

2. Summary of Technical Specifications and Performance Requirements  
cont.

**d. Are there applicable certification requirements?\***  Yes  No  
Please explain

**e. Are there applicable regulations?\***  Yes  No  
Please explain

**f. Are there any other standards, requirements, etc.?\***  Yes  No  
Please explain

**g. Additional Comments: Is there other information that would impact the item's performance or usefulness? Please explain.**

<b>BUSINESS INFORMATION:</b>			
	<b>3. Volume and Pricing</b>	<b>3a. Estimated potential business volume (i.e., #Units Per Day, Month, Year) *:</b>	
			1 Unit
	<b>4. Delivery Requirements:</b>	<b>b. Estimated target price / unit cost information (flexible and negotiable <u>not</u> accepted) *:</b>	
			\$2,700,000.00
	<b>5. Additional Comments:</b>	<b>a. When is it needed by? (Immediate, 30 Days, 6 months, etc.)*</b>	
			ASAP
		<b>b. Describe packaging requirements (i.e., individually/group packaging)*</b>	
			Flexible
	<b>6. Shipping Information:</b>	<b>c. Where will this item be shipped? *</b>	
		NIST, 100 bureau Drive, Gaithersburg, MD 20899	
<b>7. Other Information:</b>	<b>Is there other information you would like to include?</b>		

Photos or diagrams of the item (helpful but not required).