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MATERIALS MANAGEMENT DIVISION
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Reference No. (PR No. 1000018309) **RFx No. 6100000883**

TECHNICAL SPECIFICATIONS

Profilometer

1. **TECHNICAL SPECIFICATIONS (GENERIC):**

The primary purpose of the equipment is to measure the film thickness having a "step". The measurement is to be obtained by "physical contact" method using a pointed stylus tip which scans the surface having a step etched into it. The step height provides the thickness of the deposited films. It should collect accurate step height and surface roughness measurements and should have 3D Mapping functionality. The range of thickness which is to be examined is from nanometer to millimeter with angstrom level vertical resolution. Displays of surface topography, calculation of average / mean surface roughness are required. Additionally, system also to have 2D stress measurement to calculate sample stress. The entire setup for the Profilometer should include

1.1 Base unit- Profilometer Set up
1.2 Vibration Isolation Table
1.3 Accessories

All of the above items should be from the same manufacturer.

2. **TECHNICAL SPECIFICATIONS (SPECIFIC):**

2.1. Measurement Technique

Following are must-have features:

2.1.1. contact stylus Profilometry,
2.1.2. system with LVDT/LVDC sensor technology.
2.1.3. All-in-one sensor that enables scans at large vertical range (up to 1 mm)

2.2. Power

Following are must-have features:

2.1.1. In accordance with standard Indian power outlets/ supply and should be supplied with an environmental enclosure.

2.2. Stylus

Following are must have features:

2.2.1. Stylus force: 1 to 15 mg.

2.2.2. Stylus radius: Include 5 stylus of less than equal to 2 um diameter and 2 stylus of larger (> 10 um) diameter in the main system quote

2.2.3. Stylus exchange and XY stage mounting

2.3. Sample requirements

2.3.1. Sample size: Between 1 to 100mm and up to 50 mm thickness.

2.3.2. Sample X/Y Stage: Motorized 150mm x 150mm or better translation with 360°, rotation with 1micron XY repeatability.

2.3.3. Dedicated vacuum chuck of at least 8 inch for wafer samples.

2.4. Camera

2.4.1. Real-Time scanning window

2.4.2. Viewable through high-definition >3 megapixel color video microscope.

2.4.3. video microscope: Allow viewing of sample surface to enable stylus to stay in view during the scan

2.4.4. Video microscope should have a minimum 0.275 to 2.2 mm vertical FOV or more.

2.5. Computer specs

2.5.1. Latest version compatible with the set up. 64-bit Desktop Computer with Windows® 10 Pro operating system, 3.2GHz processor, 4GB RAM, 500GB hard drive or better specifications.

2.6. 2 D Stress Measurement

2.6.1. Stress measurement capability calculates tensile and compressive stress simultaneously.

2.7. Measurement Software and Parameters

2.7.1. The system should include automated measurement collection with analysis software which includes advanced parameters, such as S-Parameters, V-Parameters. P-Parameters, Step-Height, Surface-Area, Slope and Volume analysis. Data Analyzer tree should display all applied filters - Gaussian Regression, Fourier, Histogram, and statistical. Should be possible to load several profiles together to do the comparison. It should also be possible to extract data in Excel compatible format. It should be possible to save data and re-analyze at a later stage without actually doing the scan. The system should be capable of sub nanometer resolution with suitable stylus. The system should have live 3D visualization and stitching capability.

2.8. Two calibration standards

2.9. Vibration isolation table quoted with the system

2.10. Process Demonstration for onsite acceptance

2.10.1. The system should include automated measurement collection with analysis software which includes advanced parameters, such as S-Parameters, V-Parameters. P-Parameters, Step-Height, Surface-Area, Slope and Volume analysis. Data Analyzer tree should display all applied filters - Gaussian Regression, Fourier, Histogram, and statistical. Should be possible to load several profiles together to do the comparison.

2.10.1.1. Scan length: Scan length should be at least 50 mm. scanning should be either tip scan or stage scan, but not both

2.10.1.2. Step height repeatability: Step height repeatability ~ 4Angstrom or better, 1 sigma on steps ≤1µm or better.

2.10.1.3. Data points/scan: minimum of 120,000 or higher.

2.10.1.4. Noise: Less than 1 nm

2.10.1.5. Vertical resolution: 1 Angstrom or lower

2.10.1.6. Vertical measurement range: 1 nm - 1 mm

2.10.1.7. 2 D Stress Measurement

2.10.1.8. Save data and re-analyze at a later stage without actually doing the scan

2.10.1.9. Capability of sub nanometer resolution with suitable stylus

2.10.1.10. Live 3D visualization and stitching capability

3. **Warranty:** Standard warranty of minimum 1 year from the date of installation must be included.
4. **Extended Warranty:** Must include extended warranty of 2 years by beyond the actual warranty

5. **ADDITIONAL TERMS & CONDITIONS**

5.1. The tenderer must provide an installation scheme showing the physical space (footprint) of the item(s) as well as space required for routine access and all installations including related accessories.

5.2. The vendor should have installed similar types of systems in centrally funded technical institutes or government research labs. Purchase order (PO) and user list should be provided as supporting evidence.

5.3. Compliance sheet should be provided by the vendor. The absence of the compliance sheet may result in the cancellation of the purchase order.

5.4. For each compliance, supporting evidence such as manuals and other necessary and supporting documents needs to be provided.

5.5. The vendor should have an Indian representative which can take care of the urgent troubleshooting or any queries on an urgent basis.

5.6. Installation and training of the system should be demonstrated.