

Technical Specification for Nanoindentation and Scratch tester

Feature	Requirement	Complied/Not Complied	Ref page No
General	<ul style="list-style-type: none"> a) Nano and Micro-indentation system should be based on Load-Displacement type of measurement capability for automatic determination of hardness, elastic modulus, fracture toughness and micro-scratch measurements b) Nano and Micro indentation system should allow sample mounting in horizontal direction and indentation is performed in vertical direction. c) It should have a referencing mechanism on the indentation module for taking the constant reference from the sample surface and to eliminate the thermal drift during the indentation d) In publicly accessible brochures, datasheets, or websites, examples must be visible for scrutiny. 		
Nano and Micro indentation	<ul style="list-style-type: none"> a) Normal Load range: 10 mN to 30 N or better b) Normal Load resolution: 10 μN or lesser c) Depth resolution [nm]: 0.06 or lesser d) Contact Force Hold Time: Unlimited e) Frame stiffness [N/m]: $\geq 10^8$ f) Calibrated Vickers Indenter g) Force sensor and depth sensor h) Standard hardness samples for calibration i) Depth profiling with continuous-multi-cycle mode 		
Scratch tester	<ul style="list-style-type: none"> a) Load range: 10 mN to 30 N or better b) Load bit resolution: 10 μN or lesser c) Lateral force bit resolution: 10 μN or better d) Depth Range: 0 to 1000 micro meter e) Depth Resolution: 0.06 nano Meter f) Depth Noise Floor: 1.8 nano meter g) Scratch Length: 70 mm or more with synchronized optical observation over the whole length. h) Scratch speed :0.1 to 600 mm/min or better i) Acoustic emission sensor with 150kHz 		

	<p>frequency and dynamic Range 65 dB should be available to measure the noise induced during the scratch measurement</p> <p>j) Certified spherical tipped/Rockwell diamond indenter (100 μm radius)</p> <p>k) Pre-scan and post-scan modes by contact mode to get the surface profile and measure the true residual depth</p> <p>l) Software must be capable to generate Synchronized 2D panorama image with force and depth signals</p> <p>m) Software must define critical load automatically</p> <p>n) Active force feedback should be available for curved samples (documents should be produced)</p> <p>o) Follow focus in optical analysis allowing to stay in focus regardless of sample flatness</p>		
Automated XYZ motorized stage	<p>a) Automated X-Y Stage Movement: 70 x 70 mm or better</p> <p>b) Automated Z Stage Movement: 28 mm or better</p> <p>c) XYZ repositioning accuracy: 1.1 μm or better</p>		
Optical Microscope	<p>a) Video camera with minimum of 1280 x 1024 pixels resolution or better</p> <p>b) Objectives: 5x, 20x and 100x</p> <p>c) Illumination: White light</p>		
Software and System controller	<p>a) Multiple data analysis methods: Oliver & Pharr, Hertz, creep, stress-strain, adhesion, etc</p> <p>b) Indentation matrix mapping visualization and statistic distribution</p> <p>c) Automatic measurement report generator etc</p> <p>d) Fully user definable scratch modes: Single and multiple scratches, multi-cycle wear, constant load, incremental or progressive loads, user defined load profiles, etc</p> <p>e) Computer system (at least 23 inch or higher size monitor, windows 10 /11 pro with license) capable of running and visualizing all the processes related to the test without delay and lag.</p> <p>f) Data acquisition module with multi-channel signal conditioner,</p>		

	<p>Sample holder, standard samples and indentors</p> <p>g) Universal sample holder for accommodating different shapes and sizes of samples should be provided, sample length maximum up to 30 mm</p> <p>h) Standard samples should be provided with data sheet / certificates.</p>		
<p>Installation Reference</p> <p>(Demo sample's measurement and evaluation)</p>	<p>a) List of minimum 5 Government research / Educational institutions where a similar unit is supplied in India and minimum 5 diamond samples supplied by IITM need to be analysed and report must be submitted along with quotation.</p>		
<p>Warranty</p>	<p>At least three years from the date of installation of the equipment</p>		

(Note: It is mandatory for the bidders to provide the compliance statement (comply/not comply) for the Above points with document proof as required).If the compliance statement (comply/Not comply) is not furnished for the evaluation. Bidders will be disqualified.