INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION

PR NO. 1000048939 **RFX NO. 6100002283**

Technical specifications for Chemical Mechanical Polishing System (1 Unit)

Sr. No.	Description	Technical Compliance (YES / NO)	Additional Information (if any)
	Key Generic Requirements:		
a.	The tenderer must provide an installation scheme showing the physical space (footprint) of the machine(s) as well as space required for routine access and all installations including the required gas lines, MFCs, and other related accessories.		
b.	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 (one or more).		
c.	The compliance sheet should be provided by the vendor. The absence of the compliance sheet may result in the cancellation of the purchase order.		
d.	For each compliance, supporting evidence such as manuals and other necessary and supporting documents needs to be provided.		
e.	The vendor should have an Indian representative who can take care of urgent troubleshooting or any process-related queries on an urgent basis.		
f.	Safety features like interlocks to prevent errors in operation and emergency shut-down options should be available.		
g.	The system must be cleanroom compatible with all the necessary support systems, such as vacuum, cooling, power supply systems, computer hardware, and software.		
h.	The machine must be software-controlled with appropriate software and hardware interlocks to protect the machine from any possible operational or non-operational failure, thereby ensuring the safety of the operator and the machine. The system should also incorporate software support to control and monitor polishing processes, guaranteeing ease of use.		
i.	The process must contain all the necessary sensors and controls for safety and performance monitoring. A complete set of system operation and maintenance manuals must be provided.		
j.	A library of process recipes for materials that can be processed by the machine, well-documented by the company, must also be included.		
k.	The control computer system/PLC should be state-of-the-art, with a pre-loaded operating system and the software required to run the machine. The control panel must contain all the buttons needed to operate the machine.		
l.	The software must allow for configurable user groups with		

	different access privileges. Three different modes, operator, engineer, and admin, should be provided for easy and safe handling of the tool.			
m.	The software must allow the user to write and edit machine recipes.			
n.	The software must provide full system monitoring and recording of full system states in log files.			
o.	The system must provide access to sample process history and security protocols.			
p.	The system must provide system fault detection and diagnosis.			
q.	Automatic and manual control modes should be available in the software. The system should provide programmable control over all polishing parameters.			
r.	The system should be configurable for various environments, including air and inert gases, with controlled flow.			
	Technical Specifications (Specific):			
	Chemical Mechanical Polishing (CMP) system:			
1.	CMP Machine housing	Size:1000W 1022D 2011H (mm)(Changeable) Material: Stainless steel with cleanroom-compatible painting		
2.1	Polishing Platen (Table) & Platen Quick-Change Base	Diameter: Φ16 inch (Φ406 mm) Material: Teflon Coated Aluminum Speed: 0 ~ 200 rpm or more		
2.2	Platen Cooling Structure	To minimize Thermal Drift caused by frictional heat during Process		
2.3	Extra Polishing Platen:	Teflon Coated Aluminum, Dia.=16inch, 406mm		
3.1	Polishing Head (Membrane Type)	Diameter: 4-inch to 6-inch Material: Aluminum and Stainless Steel Speed: 0 to 200 rpm or more Pressure: 70~500g/㎠ (1psi~7.1psi) for 4"& 6" wafer by variable air pressure electronic controller		
3.2	Low-Pressure Control for Wafer	• 50g/cm^2(0.7psi) • 3.5g/cm^2(0.05psi) Controllable Pressure or lower		
3.3	Head Carrier (**Wafer Carrier)**	4-inch (2 Nos.)		
4.	Slurry Pump: 3 Numbers	Roller Pump Nozzle: Silicon Tube Flow Rate: Max.400 ㎖/min or more		
5.	New Oscillating Type Conditioning System (OHC)	In Situ Conditioning Application: * Nylon Brush for Pad Cleaning and High-Pressure Rinse (New) *3 - High-Pressure DIW Rinse		

		* Diameter: Φ190~195mm (Φ20mm Segment-18EA) * Material: Anodized Aluminum * Speed: 0 ~ 160 rpm * Load: 2~7 kgf		
6.	Down Force Monitoring/ Calibration	Load Cell and Indicator		
7.	Consumables:	**1.** 4-inch Membrane Rubber(4MR), (**10 Nos.**) **2.** 4-inch Peek Retainer Ring(4PRR) (**3Nos.**) **3.** EPC Ring for 3" wafer CMP; 75mm center hole (4") (**10 Nos.**) • Adapter ring to modify 4" carrier to polish 3" wafers - EPC Ring-76C100OD1HXXXT **4.** EPC Ring for Coupon Wafers CMP **(10 Nos.)** • Adapter ring to modify 4" carrier to polish coupon wafers - EPC Ring-XY S150OD1HXXXT OR XYS100OD1HXXXT		
8.	System Control	System Control using PC (Suitable Windows PC)		
9.	Electricity	220V, Single-phase, CE-certified electricity		
10.	System operation and maintenance manuals (paper, file)			
	Components to be Processed include:			
11.	Si, Oxide, Metal (including Cu; Ni; Sn; Tungsten (W)), Poly-Si, Si-Nitride.			
12.	Wafer Sizes:	**Coupons, 2, 3, 4 (inch wafers)**		
	Programmable/Controllable features:			
13.	All Polishing parameters need to have Programmable Control.			
14.	**Dimensions:** To fit within standard laboratory spaces.	Compact dimensions Preferred: ~1000W*1022D*2011Hmm Material: Stainless Steel with Cleanroom Compatible painting Weight: 600 Kg or less		
15.	**Process Demonstration:**			
a.	**Polishing Process for Different Wafer Types**: The CMP system should be capable of processing various wafer materials, including silicon (Si), SiO_2, Metal (including Cu; Ni; Sn, W), ensuring uniform removal rates and minimal defects.			
b.	Demonstration should include process setup and include emergency shutdown and start-up procedures.			
16.	**Packaging and Shipment:**			
a.	The CMP system should be securely packed to prevent damage during transit, with all fragile components adequately cushioned.			

b.	The packaging should include necessary documentation, installation manuals, and a list of included components.			
17.	**Acceptance Criteria:**			
a.	Site Acceptance Test (SAT): • **The system must undergo SAT at the IITB site, replicating the factory acceptance test parameters with the following:** a) **Process Control and Repeatability:** The vendor must demonstrate that the CMP system can polish a 300-500 nm thick SiO_2 layer (on a 4" wafer) down to a final thickness of 100-50 nm. To verify repeatability, the vendor must polish three wafers and show that the SiO_2 thickness variation between them is less than 5%. The wafers may also contain patterns of polysilicon and tungsten metal. (The sample testing wafer provided by the customer). b) **Post-Polishing Inspection of Results:** Thickness variation across 4-inch wafer will be measured with ellipsometry (will be done by customer). Surface roughness will be measured with AFM. Surface roughness of less than 4 nm RMS to be demonstrated for 50-100 nm thick SiO2 post-CMP. SEM/optical imaging and profilometry will be used for checking dishing/ CMP profile near structures. No slurry particles or large voids leftover due to removal to be observed.			
b.	**Installation and Qualification:** Installation and on-site qualification of the system by the OEM (Original Equipment Manufacturer).			
c.	**Training:** - On-site operational training for two engineers, covering system operation, maintenance, and process control. - Training shall be provided by the OEM authorized/ certified skilled personnel.			
d.	**Process Performance Verification:**	WIWNU (Within Wafer Non-Uniformity): below 5% WTWNU (Wafer to Wafer Non-Uniformity): below 5% (5 wafers)		
e.	**Warranty:** One-year standard warranty.			