INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai - 400076

PR : 1000016876

Rfx : 61000001050

Tender specifications for Ultra Precision Machining Facility

We intend to purchase **CNC Diamond Turning Machine (DTM)** as a part of Ultra Precision Machining Facility for research, laboratory and industrial applications. The application ranges from ultraprecision machining of components required optical, electro-optics, automobile applications. Quotations are invited from the eligible bidders for providing the mentioned products as per detailed technical specifications provided in technical requirements section. The proposed system should be equivalent with or better than each of the specifications listed in the technical requirement section.

Please follow the instructions carefully and comply your bid accordingly. If any of the instructions are not followed or violated, a submitted bid will be subjected to disqualify.

TECHNICAL SPECIFICATION:

Ultra-Precision Four Axis CNC Diamond Turning Machine :	
Machine Base	Granite to control any thermal expansion
Configuration	Turning (X-Z-C Axis)
Linear Travel	X-Axis: ≥ 210 mm (Linear)
	Z-Axis: ≥ 210 mm (Linear)
Travel Feedback Resolution	≤ 0.010 nm in all linear axis
Type of slide	Hydrostatic bearing slideways with symmetrical linear motor placement and with liquid cooling
Additional Axes (Rotary)	C-Axis: Speed: ≥1500 rpm Positioning Accuracy: ≤ ±1 arc-sec Feedback Resolution: ≤ 0.010 arc-sec
Swing capacity **Slow tool Servo**	≤ 400mm over X & Z axes For rapid manufacture of freeform elements with low spatial density.
Spindles	Type: Air Bearing

	Speed: ≥6000 rpm
	Ultimate Load Capacity: ≥ 130 kg @ 100psi; ≥ 200 kg @150psi
	Motion accuracy: Axial/radial ≤ 15nm Axial Stiffness: ≥ 220 N/µm
Straightness	Horizontal: ≤ 0.25 microns, over full travel in all linear axis
	Vertical: ≤ 0.4 microns, over full travel in all linear axis

Feed rate	Maximum feed rate should be at least up to 3000 mm/min
Drive System	Should have independent linear motors for motion of all axis and rotary motion
Operating system	Real time OS with 64 bit.
Enclosure for Flood coolant system	Stainless Steel compatible with water-based flood coolant. Flood coolant supply system ≥ 12 gal.
Performance	a) Surface Finish: Sa ≤1.5 nm over any 1 mm^2 surface area on a 12.7 mm diameter nickel plated steel test part surface b) ≤ 5 nm anywhere over the aluminium surface of diameter 100 mm
	Figure Error (PV): ≤ 0.15 microns over 75 mm spherical convex surface, 250 mm convex sphere
Performance Evaluation Criteria	Based on a toric surface fabrication in freeform way customer site
Control System	CNC control system windows based on real time operating system
Types of workpiece surface profile	Flat, Sphere, Asphere, Freeform The machine should have the possibility to upgrade in future by incorporating attachments fly-cutting (tool post), micro-milling, FTS. The machine should have the possibility to upgrade in future with Hydrostatic B axis with swing capacity of 220 mm over B axis.
Accessories	Suitable pneumatic vibration control system
	CAM software for aspheres, diffractives & freeform profiles.
	Spindle, slide chiller
	Suitable sliding/flexing tool holder
	Vacuum chuck: ≥ 200 mm diameter
	Optical tool setting station, Tool setting software

	Integrated gauge amplifier for workpiece alignment, tool adjustments
	Front surface probe
	Vibration Isolation system: Horizontal and Vertical vibration isolation starting at 3Hz
	Spindle chiller coolant
SC Diamond Tools	1. Positive Rake: 0.75mm, 1.5mm Tool Nose Radius 2. Zero Rake: 0.5 mm (2 nos.) Tool Nose Radius 3. Negative Rake (10, 15): 0.5mm, 1mm, 1.5mm Tool Nose radius
Additional Requirements	• System should be upgradable to accommodate Fast Tool Servo (FTS) system • **Should provide warranty for 1 year** • **Should provide Spindle warranty for 3 years** • Installation and training at IIT Bombay. • If the machine failed to meet the specified requirements, the vendor will be held liable to take the machine back at their own cost. IIT Bombay will not be responsible for any damage to the machine until it is handed over to the user. • Must have done 3 installation of the same base model during the 5 years in the government academic institutions and R&D labs in India to be supported with installation reports obtained from the Institutions. The names and contact details of the Institutions where the instruments are supplied and installed should be given so that the Technical Committee can ascertain the veracity of the information provided and take that as an input to determine the vendor. • The supplier should have a service centre in India and OEM direct presence of technician should be stationed in India and available for five years.

Following technical details are to be furnished by the supplier along with the offer:

1. Environmental requirement (room preparation) for operating the machine including the power requirements.
2. Overall dimensions of the equipment including sizes and weight and space requirements.
3. Other requirements of utilities like dry air, voltage stabilizer, compressed air line, water line etc.
4. List of spares required for 3 years of operation of the machine.
5. The mechanism for rendering after sales service without causing any delay.
6. The company's policy regarding supply of system software as and when it is upgraded by

the manufacturer.

7. Commitment for the supply of spare parts in future at least for Eight years.