INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

Electrical Engineering Department

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Technical Specifications

Micro Precision 3D Printer with Accessories – 1 Nos.

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	**3D-printing**	The printing technique of the equipment must be based on Digital Light Processing technique such as top-down Projection Micro Stereolithography (PμSL).		
2	**Wavelength**	405nm UV-LED		
3	**Digital Mask Generator**	System should be configured with a digital micromirror device for generating digital masks		
4	**Operating Environment**	a) AC 220-240 V, 50/60 Hz; b) Ambient temperature: 22°C ± 3°C; c) Ambient humidity: 40%-60%		
5	**Optical Resolution**	System must be able to demonstrate the capability of optical resolution of 10 μm or better.		
6	**Printing Size**	System must be able to print product size of at least 90mm (L) x 50mm (W), and the max. height of printed part up to 45mm.		
7	**Z-Resolution**	System must be able to demonstrate the capability to achieve printing layer thickness of 10 μm or better in Z axis with all standard resin materials supplied by OEM		

8	**Printing Resolution**	a) System must enable printing a minimal 2D linewidth of ≤ 12µm. b) System must be able to print 3D feature size of ≤ 50µm. c) System must be able to print tip diameter of microneedle ≥ 15 µm and pore diameter ≥ 50 µm. d) The stitching tolerance must be less than 10 µm.		
9	**Printing Resin**	At least 3 standard resin bottles must be provided for the site acceptance test.		
10	**Open-Source System**	Printer should have the capability to try out third-party resins curable at 405nm.		
11	**Printing System**	a) Projection Monitoring System: System should have projection monitoring system to provide a comparison between the original picture and the projected picture during the printing process, which is convenient for users to monitor whether there is abnormal projection during the printing process b) Manual & Auto-Focusing: System should have auto-focusing as well as manual focusing module to realize the function of focusing at the start of printing process, which can avoid the problem of being out of focus during the printing process, and increase the printing success rate. c) Laser Displacement Sensor: System should have laser displacement sensor to realize the position measurement of the printing platform and the membrane film in X and Y axes, which is used for level adjustment. d) Bubble Scraper Assembly: System must include bubble scraper assembly to remove bubbles and improve print performance. e) XYZ Bidirectional Repeatability: Motorized XYZ stage shall have a bidirectional repeatability of 1 µm or better.		

		f) Micro Vat: System supports optional 5ml micro vat.		
12	**Heating System**	The systems should be capable to print viscous resin under temperature equal to or higher than 60°C		
13	**Washing Unit**	System must include automated washing and cleaning unit which requires minimal manual intervention.		
14	**Air Compressor**	System must include air compressor for quick drying of printed parts post-cleaning.		
15	**Curing Unit**	System must include automated post-cure station using multi-directional 405nm LEDs and 100 W heating to rapidly and evenly cure PμSL parts up to 80°C, with a rotating turntable ensuring consistent mechanical performance and compliance for resins such as HTL-Y-20.		
16	**Desktop/Laptop Computer**	Desktop/Laptop Computer must be provided with below specifications to run the slicing software. a) CPU: Intel Core i7/AMD AthlonTM (Phenom II X4 / X6) multi-core processors 3.0 GHz or higher with SSE2 technology b) Memory: 16 GB RAM or higher c) Free Disk Space: Win 64-bit system; 2GB of free disk space for Windows 64-bit (.NET Framework 4.5 or later) d) Display: 1920 x 1080 resolution or higher; 32-bit color depth (True color) e) Video Card: GPU chip of NVIDIA GeForce GTX 1060, AMD Radeon RX 480 or better; DirectX 11 compatible video card; 1 GB of memory or more, Memory interface width of 256-bit.		
17	**3D-printing Software**	a) Graphical user interface of controlling system b) Open-source process window with adjustable parameters such as exposure intensity, exposure time, printing layer thickness, etc.		

		c) Free to adjust the process parameters in different process steps according to the feature of the product model. Each layer can be given a unique parameter.		
18	**Slicing Software**	Software with data preparation and slicing, with the functions of repairing model, adding supports, and measuring.		
19	**Training & Support**	a) Minimum 4 days on-site training for 2 persons. Training should include usage, operation, and basic maintenance. b) The vendor must provide support to service the proposed software and hardware. c) The vendor must have done similar kind of Installation and Training in India.		
20	**Acceptance test**	The vendor shall provide an acceptance test procedure.		
21	**Operation Manual:**	The vendor has to supply the detailed user manuals with the standard scope of supply. The user manuals can be supplied as a hard copy or soft copy.		
22	**Accessories**	a) Suitable Microscope for inspection – 1 No. b) UPS 3 KVA with 30 min. Battery backup – 1 No. c) Formcure UV Chamber – 1 No. d) Form Wash – 1 No.		
23	**Installation**	a) The vendor should provide labor for the delivery, installation, commissioning of the proposed system. b) Prior to system commissioning, the vendor should share the site prerequisites.		
24	**Commissioning**	a) The vendor shall complete the testing and commissioning of the system within 4 weeks from the date of delivery. b) Commissioning tests should be conducted by the vendor in the presence of representatives from IIT Bombay for the purpose of verifying the performance.		

		c) A fully documented commissioning is to be conducted by OEM-trained engineers. d) The vendor has to oversee integrations, site preparation, installation and configuration.		
25	**Warranty:**	All items should be covered by 12 months warranty including all parts and labour.		
26	**Comprehensive Maintenance Contract**	Bidders must quote rates for Comprehensive Maintenance Contract for 2nd & 3rd year after expiry of 12 months warranty.		
27	**General:**	a) OEM or Authorized Partner should have installed at least two or more 3D printer of similar technical capability in India. b) Past installations at a minimum of two higher educational institutes in India		