INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
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Ref. PR No. 1000050608 Rfx. No. 6100002462

Technical Specifications for 3D-Bioprinter

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1.	**Machine**	a. Build Type: Laminar Flow Hood b. Pressure Control Type: Manual/Automatic c. Pressure Display Type: Individual d. Total Number of Print head Positions: Minimum - 6 e. Total Swappable Positions: Minimum 4		
2.	**Cell Deposition With Cell Homogenizer Should Be Capable of Dispensing Cells**	a. No. of heads provided with the printer: 1 b. Swappable: Yes c. Compatible Syringe Type: Plastic (Disposable) d. Syringe Volume: Upto 10ml e. Fill Volume (Max.): Upto 3 ml f. Suspension/Mixing Volume (Max.): 1 ml g. Temperature Range: Room Temperature to 40°C h. Temperature Accuracy (average): ±0.5°C i. Operating Pressure: 0.1-2 bar j. Pressure Setting Resolution: 0.1 bar		
3.	Pneumatic Print Head	a. No. of heads provided with the printer: 2 b. Swappable: Yes c. Compatible Syringe Type: Bioprinting Syringe d. Syringe Volume: Upto 5ml e. Temperature Range: 4°C to 80°C f. Temperature Accuracy (average): ±0.5°C g. Operating Pressure: 0.1-6 bar h. Pressure Setting Resolution: 0.1 bar		

4.	**Thermoplastic Print Head**	a. No. of heads provided with the printer: 1 b. Swappable: No c. Temperature Range: Room Temperature to 450°C d. Temperature Accuracy (average): ±1°C		
5.	**UV Curing Module**	a. No. of heads provided with the printer: 2 b. Swappable: Yes c. UV Wavelength: 365nm and 405 nm		
6.	Motor Driven Tool Head (for Bioink)	a. No. of heads provided with the printer: 1 b. Swappable: Yes c. Compatible Syringe Type: Plastic (Disposable) d. Plunger Type: Plastic (as available with the Syringe) e. Syringe Volume: Upto 5ml f. Deposition Rate (min.) : Approx. 25 µL/s g. Temperature Range: Room Temperature to 70°C h. Temperature Accuracy (average): ±0.5°C		
7.	Motor Driven Tool Head (for Ceramic Paste)	a. No. of heads provided with the printer: 1 b. Swappable: Yes c. Compatible Syringe Type (with Luer Lock Mechanism): Stainless Steel d. Plunger Type: Aluminium/Metallic/Non-Corrosive e. Syringe Volume: Upto 5ml, future upgradable to 10ml and 30ml f. Deposition Rate (min.) : Approx. 25 µL/s g. Temperature Range: Room Temperature to 150°C h. Temperature Accuracy (average): ±0.5°C		
8.	Calibration	a. Manual Calibration: Software Controlled b. Automatic Calibration: Sensor Based (Software Controlled)		
9.	Build Platform (for Bio printing)	a. Swappable: No b. Temperature Range: 10°C to 60°C c. Temperature Accuracy (average): ±0.5°C d. Nozzle Cleaning: With Nozzle Cleaning Tool		

10.	Piezo-based DoD (future Upgradable)	a. Operating Pressure: Upto 6 bar b. Minimum Dispensing Time: 0.15-0.2 ms c. Max. Fluid Temperature: 75°C d. Available Nozzle/Orifice Diameters: 0.1mm, 0.15mm, 0.3mm, 0.4mm, 0.6mm, 0.8mm		
11.	Software Features	a. Infill Patterns: Options (not limited to) Linear, Concentric, Hexagonal, Honeycomb, Cubic, Gyroid b. UV curing setting: Layer-wise c. Infill angle setting: Layer-wise d. Other Features: e. 1- The software should be enable the user to manually set the temperature of each head independently even if the printing is not being executed. f. 2- The software should be able to save settings for each user, and the user should be able to load and reuse the same at a later point. g. 3- There should be an option to create user-specific login. h. 4- The software should enable the user to draw lines forming interconnected patterns in the slicer software. i. 5- The user should be able to edit g-codes from the software UI itself, without having to open the .gcode files. j. 6- Adaptive slicing features, Object splitting feature (manual selection of zone for multi-material), fan speed control for layers during printing k. 7- For cell dispensing head, provision of dispensing cells in a scaffold at predefined XY positions. l. 8- For biomechanical testing, speed of plunger movement, time of compression, repetition count.		
12.	Sterilization	a. HEPA: H-14 b. UV Sterilization: UV-C		
13.	Compressor	a. Compressor Pressure (max.): Upto 8 bar b. Compressor Tank Capacity: Upto 4 Litres		

14.	Operating System	a. PC for machine operation: Integrated (Minimum i7 Processor) b. OS: Windows (Latest)		
15.	Safety	a. Door Type: Polycarbonate with Safety Interlock b. Emergency Button: Easy access push button		
16.	Consumables	a. 5 mL pneumatic syringe: 50 pcs b. 5 mL pneumatic piston: 50 pcs c. Luer lock cap: 50 pcs d. Female-female luer lock connector: 50 pcs e. 5 mL BD Syringe (for bioink): 50 pcs f. 5 mL SS syringe (for ceramic paste) with Luer Lock Mechanism: 10 pcs g. 5 mL glass syringe (For electrospinning): 1 pc h. Dispensing Needles (22G, 25G, 27G): 100 pcs each i. Dispensing Needles (30G, 32G, 34G): 50 pcs each j. Hardened Steel Nozzle (0.4, 0.8,1.0,1.5 mm dia.): 2 pcs each, extra nozzles at additional cost k. SS Nozzle (0.2, 0.4, 0.8, 1.0, 1.5 mm dia.): 2 pcs each, extra nozzles at additional cost l. Glue for thermoplastic printing: 5 pcs m. Pneumatic adapter for bioprinting: 8 pcs n. Coaxial Needle Kit (14G-20G and 16G-22G): 2 pcs each, extra nozzles at additional cost o. 6 Well Plates: 50 pcs p. Petri Dish (90 mm): 50 pcs q. GelMA: 4 g r. Sodium Alginate: 500 g s. Pluronic F127: 500 g t. PCL pellets: 500 g u. PLA pellets: 500 g		
17.	Warranty	Warranty Period: Standard 1 Year Warranty, with Extended Warranty for 1Year.		
18.	Other Terms and Conditions	a. A service engineer shall be stationed for 12 months, with the option for extension, to provide on-site training, debugging,		

		troubleshooting, and support for material printing innovations using the equipment b. Packaging and Transportation to the Customer location to be covered in the Package. c. Lead Time: 180 working days after receiving the PO d. Any discrepancies in the supplied material need to be replaced within 15 working days or as per mutual consensus. e. Purchase orders from Government Institute like IISc, IITs, CSIR, and NIPER. Etc. (Evidence to be provided) f. The bidder or OEM must have CE certification. (Evidence to be provided) g. ISO 9001:2015 Quality management system certificate to be provided. h. The system may be compatible to future-upgradable to incorporate an Electrospinning head and a Biomechanical compression module. i. The Machine will be compatible to all the future upgrades till 5 years.		