

	INDIAN INSTITUTE OF TECHNOLOGY BOMBAY MATERIALS MANAGEMENT DIVISION Powai, Mumbai 400076.
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Ref. PR No. 1000057478

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Item Description – Lab Equipment for Microfactory.

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	Basic 3D Printer	Printing Technology: FDM / FFF Technology Build Volume (W x D x H): Minimum 6 × 6 × 6 in Printing Speed: Minimum 20 in/s Layer Resolution: 0.002 in or better Extruder Type: Direct Drive or Equivalent Hot End: All Metal Hot End Nozzle Diameter: 0.4 mm standard Maximum Nozzle Temperature: Minimum 280°C Heated Build Plate: Required (Minimum 100°C) Filament Diameter: 1.75 mm Compatible Materials: PLA, PETG, TPU, and equivalent engineering-grade filaments Auto Bed Leveling: Required Filament Run-Out Detection: Required Power Loss Recovery: Required Connectivity: USB and Wi-Fi Monitoring Facility: Camera-based monitoring preferred Operating System Compatibility: Windows, Linux, and macOS Power Supply: 220–240V AC, 50 Hz Accessories: Complete system with necessary software, cables, and operational accessories		
2	Medium-Size Multi-Color 3D Printer	Printing Technology: FDM / FFF Technology Build Volume: Minimum 8 × 8 × 8 in Printing Capability: Multi-color and/or multi-material printing support Extruder Type: Direct-Drive Extruder		

		Nozzle Material: Hardened steel or equivalent durable material Nozzle Diameter: 0.4 mm standard, with interchangeable nozzle support Maximum Nozzle Temperature: Minimum 300°C Heated Build Plate: Required Maximum Build Plate Temperature: Minimum 100°C Build Plate Type: Flexible removable build plate preferred Printing Speed: Minimum 11.81 in/s Layer Resolution: 0.002 in or better Filament Diameter: 1.75 mm Material Compatibility: PLA, PETG, TPU, ABS, ASA, PA, PC, and equivalent materials Auto Bed Leveling: Required Filament Run-Out Detection: Required Power Loss Recovery: Required Connectivity: USB and Wi-Fi Monitoring Camera: Integrated camera preferred Power Supply: 220–240V AC, 50 Hz Accessories: Complete system with software, cables, and operational accessories		
3	Multi Nozzle 3D Printer	Printing Technology: FDM / FFF Technology Build Volume: Minimum 9.84 × 8.66 × 9.84 in Extrusion System: Multi-Nozzle or Multi-Material Printing Capability Filament Diameter: 1.75 mm Layer Resolution: 0.002 in or better Extruder Type: Direct Drive Extruder Nozzle Diameter: 0.4 mm standard Maximum Nozzle Temperature: Minimum 280°C Heated Build Plate: Required Maximum Build Plate Temperature: Minimum 100°C Enclosed Build Chamber: Required Chamber Temperature Control: Required Automatic First Layer Calibration: Required Print Surface: Removable Flexible Build Plate Cooling System: High Efficiency Part Cooling System Connectivity: USB, Ethernet, and Wi-Fi Display: Color Touchscreen Firmware Update: Via USB or Network Material Compatibility: PLA, PETG, TPU, ABS, ASA, PA, PC, PVA, and equivalent engineering-grade materials Print Recovery: Power Loss Recovery Required		

		Operating System Compatibility: Windows, Linux, and macOS Accessories: Complete system with software, accessories, and operational tools		
4	Filament Maker & Shredder	System Type: Integrated Plastic Shredder and Filament Extruder Application: Recycling of 3D Printing Waste into Filament Shredder Motor Power: Minimum 700 W Throughput Capacity: Minimum 3 kg/hour (Shredding) Input Material: Plastic Scrap, Failed 3D Prints, and Support Material Safety Features: Safety Interlocks and Emergency Stop Extrusion Temperature: Minimum 250°C Heating System: Multi-Zone Temperature Control Filament Diameter: 1.75 mm and 2.85 mm Filament Diameter Tolerance: ± 0.10 mm or Better Supported Materials: PLA, ABS, PETG, TPU, HIPS, and Equivalent Thermoplastics Filament Production Rate: Minimum 100 g/hour Cooling System: Integrated Filament Cooling System Diameter Monitoring: Automatic Filament Diameter Control Preferred Control Interface: Digital Display and Control Panel Power Supply: 220–240V AC, 50 Hz Accessories: Complete system with extrusion nozzles, spool holder, shredding unit, and operational accessories		
5	5-Axis CNC Engraving Machine	Machine Type: 5-Axis CNC Engraving and Milling Machine Working Area (X $\times$ Y $\times$ Z): Minimum 23.62 $\times$ 15.75 $\times$ 3.94 in Number of Axes: Simultaneous 5-Axis Machining Capability Machine Structure: Heavy-Duty Metal Construction Work Table: T-Slot or Equivalent Work-Holding Table Motion System: Precision Linear Guideways and Ball Screw Drive System Positioning Accuracy: ± 0.002 in or Better Repeatability: ± 0.0008 in or Better Spindle Power: Minimum 1.5 kW Spindle Speed: Up to 24,000 RPM or Higher Collet System: Industry Standard Collet System Controller: Industrial CNC Controller Drive System: Servo Motors or Equivalent Precision Motion System		

		Programming: G-Code Compatible Software Compatibility: Compatible with Standard CAD/CAM Software Supported Materials: Wood, Acrylic, Plastic, Foam, PCB, Soft Metals, and Composite Materials Connectivity: USB and/or Ethernet Operating Voltage: 220–240V AC, 50 Hz Safety Features: Emergency Stop and Overload Protection Accessories: Complete machine with controller, tooling kit, clamps, cables, and operational accessories		
6	CO2 Laser Cutting and Engraving Machine	Machine Type: CO₂ Laser Cutting and Engraving System Working Area: Minimum 47.24 × 47.24 in Laser Power: Minimum 100 W CO₂ Laser Source Laser Wavelength: Approximately 10.6 μm Processing Capability: Laser Cutting and Engraving Positioning Accuracy: ±0.004 in or Better Motion System: Precision Linear Motion System Cooling System: Industrial Water-Cooling System Cutting Speed: Programmable Variable Speed Control Engraving Speed: Programmable Variable Speed Control Supported Materials: Acrylic, MDF, Wood, Leather, Paper, Fabric, Rubber, and Similar Non-Metallic Materials Power Supply: 220–240V AC, 50 Hz File Compatibility: DXF, AI, PLT, BMP, JPG, PNG, and Equivalent Standard Formats Controller: Industrial Laser Controller		
7	Desktop Forming Machine	Machine Type: Desktop Vacuum Forming Machine Forming Area: Minimum 11.02 × 11.02 in Sheet Size Capacity: Minimum 11.81 × 11.84 in Maximum Forming Depth: Minimum 6.12 in Material Thickness Capacity: Up to 0.16 in or Higher Heating System: Electric Heating System with Adjustable Temperature Control Vacuum System: Integrated Vacuum Forming System Operating Interface: Digital or User-Friendly Control Interface Forming Capability: Suitable for Thermoplastic Sheet Forming Supported Materials: ABS, HIPS, PETG, Acrylic, and Equivalent Thermoplastic Sheets Temperature Control: Adjustable Heating Control Frame Construction: Heavy Duty Metal Construction Power Supply: 220–240V AC, 50 Hz		

		Safety Features: Over-Temperature Protection and Emergency Stop Application: Prototype Development, Product Design, Packaging and Educational Applications Accessories: Complete system with vacuum unit, frame assembly, and operational accessories		
8	Glass Cutter	Machine Type: CNC Glass Cutting and Drilling Machine Working Area: Minimum 45 × 45 in Processing Capability: Glass Cutting Operations Control System: CNC Based Control System Motion System: Precision Linear Guide and Drive System Positioning Accuracy: ±0.004 in or Better Repeatability: ±0.002 in or Better Drilling Capability: Suitable for Circular and Custom Hole Drilling in Glass Cutting Capability: Straight, Curved, and Profile Glass Cutting Work Table: Air Floatation or Equivalent Glass Handling Table Lubrication System: Automatic Lubrication / Cutting Fluid System Supported Glass Thickness: Suitable for Processing Standard Industrial Glass Sheets User Interface: Industrial Control Panel with Digital Display		
9	Handheld welding	Machine Type: Portable Inverter-Based Welding Machine Welding Processes: MMA (Stick Welding) and TIG Lift Start or Equivalent Input Voltage: Single Phase 220–240V AC, 50 Hz Output Current Range: Minimum 20 A to 200 A Duty Cycle: Minimum 30% at Rated Output Welding Electrode Compatibility: Suitable for Common Welding Electrodes up to 4 mm Diameter Output Current Control: Continuously Adjustable Display: Digital Display for Welding Parameters Technology: IGBT Inverter Technology or Equivalent Safety Features: Overload Protection, Over-Temperature Protection, and Voltage Fluctuation Protection		
10	Hydraulic Multi Cutter	Machine Type: Hydraulic Multi-Cutter / Ironworker Machine Operating System: Hydraulic Operated Cutting Operations: Channel, Angle, Flat Bar, Round Bar, and Square Bar Cutting Punching Capability: Integrated Punching Facility		

		Notching Capability: Integrated Angle Notching Facility Hydraulic Capacity: Minimum 50 Ton Motor Power: Minimum 2.2 kW (3 HP) Structure: Heavy-Duty Fabricated Steel Construction Cutting Accuracy: Suitable for Industrial Fabrication Applications Operation Mode: Manual or Foot-Pedal-Operated Tooling: Interchangeable Cutting and Punching Tooling Safety Features: Emergency Stop and Operator Safety Guards Power Supply: 415V AC, 50 Hz, Three-Phase Application: Fabrication, Structural Steel Work, Educational and Workshop Applications		
11	Band saw	Machine Type: Vertical Band Saw Machine Motor Power: Minimum 900 W Cutting Capacity (Height): Minimum 6.30 in Throat Capacity: Minimum 11.81 in Blade Speed: Variable Speed Operation Work Table: Heavy Duty Tilting Work Table Table Tilting Range: Up to 45° or Better Blade Guide System: Precision Blade Guide Arrangement Frame Construction: Heavy Duty Steel Construction Material Compatibility: Wood, Plastic, Non-Ferrous Metals and Similar Materials		
12	Micro Band Saw	Machine Type: Bench-Top Micro Band Saw Motor Power: Minimum 80 W Cutting Capacity (Height): Minimum 3.15 in Throat Capacity: Minimum 5.91 in Blade Speed: Variable Electronic Speed Control Work Table: Precision Metal Work Table Table Tilting Capability: Up to 45° or Better		
13	Manual Thermo-Cutting	Machine Type: Manual Hot Wire Thermo-Cutting Machine Cutting Technology: Electrically Heated Wire Cutting Temperature Control: Continuously Adjustable Temperature Control Operating Temperature Range: Suitable for Cutting Foam and Thermoplastic Materials Maximum Workpiece Height: Minimum 5.91 in Cutting Reach: Minimum 7.87 in Cutting Element: Replaceable Hot Wire System Material Compatibility: Thermocol, EPS, XPS, Foam Boards, and Similar Materials Frame Construction: Lightweight and Rigid Metal Construction		

		Operating Mode: Manual Operation Power Supply: Suitable Power Adapter/Transformer Included		
14	Thermo-Cutting Machine	Machine Type: Bench-Top Hot Wire Thermo-Cutting Machine Cutting Technology: Electrically Heated Wire Cutting System Temperature Control: Continuously Adjustable Temperature Control Temperature Range: Suitable for Precision Cutting of Foam and Thermoplastic Materials Working Surface: Minimum 13.78 × 9.84 in Cutting Reach (Throat Depth): Minimum 11.81 in Maximum Material Height: Minimum 5.51 in Cutting Wire: Replaceable Hot Wire System Work Table: Flat Precision Work Table Material Compatibility: EPS, XPS, Thermocol, Foam Boards, and Similar Materials Application: Model Making, Architectural Models, Prototyping, and Educational Applications		
15	Scroll Saw	Motor Power: Minimum 80 W Speed Control: Variable Speed Operation Cutting Mechanism: Reciprocating Blade System Throat Capacity: Minimum 11.81 in Cutting Capacity: Suitable for Precision Cutting of Wood, Plastic, and Non-Ferrous Materials Work Table: Precision Metal Work Table Table Tilting Capability: Up to 45° or Better Blade Mounting: Tool-Free or Easy Blade Replacement System		
16	Welding Table	Table Top Size: Minimum 47.24 × 47.24 in Table Height: Minimum 33.46 in Table Material: Heavy Duty Steel Construction Table Top Thickness: Minimum 0.39 in Load Capacity: Minimum 1000 kg Uniformly Distributed Load Surface Finish: Corrosion Resistant Surface Treatment Work holding Compatibility: Compatible with Modular Clamping and Fixturing Systems		
17	PCB Prototyping Machine with Drill-probe and Dispenser	Machine Type: Desktop PCB Prototyping System Application: PCB Printing, Dispensing, Drilling and Circuit Prototyping Number of Axes: Minimum 3-Axis Motion System Working Area: Suitable for PCB Prototyping Applications		

		Conductive Trace Generation: Required Solder Paste Dispensing: Required Automated Drilling Capability: Required Positioning Accuracy: ± 0.002 in or Better Repeatability: ± 0.0008 in or Better Minimum Trace Width: 0.008 in or Better Supported PCB Types: Single-Sided and Double-Sided Prototype PCBs Material Compatibility: Standard PCB Substrates and Equivalent Prototyping Materials Control Software: PCB Design Import and Toolpath Generation Software Included Supported File Formats: Gerber, Excellon and Standard PCB Manufacturing Formats Accessories: Complete machine with dispensing system, drilling tools, probing system, software and operational accessories		
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Terms and Conditions

- Complete technical specification of the instruments and its necessary parts and accessory items required for running the instrument has to be submitted.
- A complete design along with the clear indication/markings of the specification mentioned in the technical bidding document (wherever possible) of the instrument.
- Scanned copy of the technical brochure and website reference of the same must be included in the bid.
- All items in the list should be covered for a comprehensive warranty for at least 2 years. The comprehensive warranty should cover all parts, accessories, spares and labour on site, free maintenance and service on-site at no additional cost, and regular upgradation of software. This should be clearly and explicitly specified.
- There must be a local service centre with the availability of the spares in India.
- A declaration from the principal stating that the spares will be made available for the equipment for at least 5 years from the date of installation.
- The bidder should have supplied equipment with similar or higher specification within India, and must provide scanned copies of 3 purchase orders showing the same. These POs must not be older than 5 years, and at least ONE of them must be from a premier Government Institution or R&D Organization.
- A duly signed detailed User List (at least 5) with the concerned person's valid contact details, in India where the instrument is still in the operational condition must be provided.
- A copy of the Authorization Certificate issued by the principal in favour of the Indian agent along with a certified copy of the Agency Agreement between the foreign Principal and Indian agent. Both these certificates must be up-to-date. (If applicable)

- A duly signed separate compliance sheet of the specification (at every point) mentioned in the technical part along with the deviation (if any). This compliance sheet will not be considered as the technical specification of the instrument.
- Each bidder has to mandatorily quote for all the items as mentioned in BOQ.
- Partial submission of bid is not permitted.