



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

**Technical Specifications for Wire-cut EDM for  
Medical Applications**

**PR No. 1000014133 ( Rfx No. 6100000319)**

**Requirement and Specifications**

**A. Manufacturing System**

1. Energy source: Series of electric discharge
2. Process: EDM Wire-cut (Electric Discharge Machining/erosion)
3. Built-in system to provide machining environment (electrodes, dielectric liquid, electric voltages, software, Computer system, wires, Accessories, etc.)
4. Suitable for manufacturing of surgical instruments, Medical implants, tools, dies, etc.

**B. Part Geometry and Quality**

1. Build size: 400 mm x 300 mm x 300 mm (Height) or more
2. Minimum Feature size: 0.2 mm or less
3. Surface roughness: less than Ra 0.5 microns
4. Machining accuracy: 0.005 mm or more

**C. Machine Tool**

1. Auxiliary Table traverse: 75 x 75 mm or more
2. Z- Axis travel: 300mm or more
3. Wire electrode diameter: in the range of 0.05-0.3 mm
4. Work-piece weight: 1500 kg or less
5. Taper angle:  $\pm 25^\circ/50$  mm or more
6. Job admit: at least 275 mm or more
7. Machine type: Submerged/flushing
8. Overall machine size: 3000x2900x2800 mm or less
9. Automatic/semi-automatic lubrication system.
10. Granite work table should be provided.
11. C3 grade ground ball screws for all axes with included certificates.
12. LM guide used should be of P1 grade with 1-micron grade accuracy with included certificates.

**D. Pulse Generator and power supply**

1. Servo system: AC servo/stepper for all axes
2. CNC controller: Inbuilt
3. Controlled axes: X, Y, Z, u, v simultaneously
4. Interpolation: linear and circular

5. Average power consumption: 20 kVA or less

### **E. Dielectric Specifications**

1. Filtration system: De-ionized water
2. Paper filtration+ mineral bed filtration: 10micron or more
3. Non corrosive tank for dielectric system: at least 800 liter

### **F. Part and Tool Materials**

1. Part material including alloys: Biocompatible Titanium, SS, Copper, Brass, Carbide, Aluminum
2. Part materials: ISO/ASTM certified, sterilizable/autoclavable for direct use in human body
3. Possibility of using tool/wire materials from third parties, Waste wire management

### **G. Software**

1. Viewing, orienting, layout of multiple CAD (DWG/DXF) files
2. Edit feature to fix bad drawing files, including those imported from other software (Solidworks, CATIA, etc.), generate program and monitor machining status.
3. Indicator for machining status.
4. Windows operating system with easy user interface.
5. Minimum 15” LCD screen, keyboard, mouse, USB, Ethernet, 1GB program memory.
6. Machining management with power interruptions
7. Indicator for machining time required (for a job), utilization, and remaining
8. Automatic log-keeping and display of all jobs done, and maintenance status
9. Indications and warnings for any mal-functioning (positioning, breakages, leakages, energy source, etc.)
10. Automatic management of sparks
11. Circuits for low electrode wear, mirror finish, tungsten carbide machining, aluminum machining.
12. Tools and toolbox
13. Operation manual and detailed part drawings.

### **H. Warranty and Maintenance, commissioning, and accessories**

1. The supplier should provide the machine calibration certificates for different parameters like accuracy, repeatability, evaluation of thermal distortion, accuracy of interpolations, etc.
2. The supplier should provide certificates related to conformity with health, safety and environmental protection standards for machines.
3. The supplier should provide feedback about the machine from other customers from government institutes.
4. The supplier should be able to demonstrate the machine installed at other locations.
5. The supplier should provide purchase orders (including total cost) from at least three central govt. institutes along with financial bid.
6. There should be a service contract between machine manufacturer and supplier for 5 years, if applicable.
7. The supplier should mention all the standard accessories supplied along with machine
8. Working area of the machine should have safety enclosure with transparent windows.
9. Foundation kit like vibration mounting pads, bolts, etc. required for foundation to be supplied.
10. Detailed drawing of foundation indication necessary details to be supplied.

11. Requirements of water and compressed air lines to be specified (if required).
12. Special requirements like isolation, vibration criteria, air conditioning, dust free atmosphere, Power requirements and flooring to be specified.
13. Calibration of the machine after Installation.
14. Supplier has to provide required training to engineers after installation of the machine in the following areas: Machine operation, CNC Programming, mechanical maintenance, electrical and CNC maintenance and CNC control system, etc.
15. Three sets of the following documents in English are to be supplied with the machine: Operator manual, Programming manual, spare parts list, Maintenance manual, Electrical wiring diagrams, Preventive maintenance checklist, trouble shooting charts and guidelines. Machine test charts, Machine assembly drawings, Documents of all the bought out items, etc.
16. Supplier should have installed similar or better configuration machines in at-least 05 locations in India, and should provide their contact details.
17. The OEM should ensure continued supply of spares throughout the useful life of the machine, but not less than 15 years.
18. Comprehensive (hardware and software) warranty for five years after commissioning.
19. If the system remains down (non-functional) for 15 days after filing of complaint the warranty period to be extended for period between dates of reported problem and fixing.
20. Free upgrades of software for five years after commissioning.
21. Complete set of machining tools needs to be provided along with the machine.
22. The supplier should provide the sample benchmarking part as per the drawings given to them during technical evaluation and allowing us to monitor the process.
23. Complete installation of the overall system including loading/unloading at the installation site.

**H. Evidence to the following parameters should be submitted along with the technical bids-**

1. Machining accuracy
2. Repeatability
3. Positional accuracy
4. Surface finish
5. Health and electrical safety