



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

Technical Specifications of Vacuum Casting System for Medical Applications

Requirement and Specifications

A. Manufacturing System

1. Energy source: Pressure of vacuum
2. Process: Vacuum mold casting process
3. Built-in system to provide molding environment (Silicon mold in vacuum chamber)
4. Suitable for manufacturing of medical Instruments, diagnostic and rehabilitation devices

B. Part Geometry and Quality

1. Mold volume: 400 mm x 400 mm x 400 mm or more
2. Housing dimension: 2000 mm x 1600 mm x 900 mm or less
3. Casting capacity: At least 600 ml
4. Pump capacity: 25 m<sup>3</sup>/h or more
5. Ultimate vacuum: At most 0.8 mbar
6. Control system: PLC/SPS or similar
7. Power consumption: 3/1 phase, 50 Hz, 5 kW or less
8. Relevant accessories: Oven (inbuilt), silicon mixer, etc.
9. Features: Separate mixing and molding areas for oven, vacuum mixer, automatic and manual modes of mixing
10. Undercuts: Both internal and external undercuts should be handled
11. Consistent Dimensional accuracy: 99.5%
12. Surface roughness of part: Ra 50 microns or less
13. Strength of parts: As per ISO/ASTM standard for relevant medical application
14. Oven is required.

C. Part Materials

1. Part material: Resins, nylon and glass filled nylon, ABS, polycarbonate, soft and hard rubber, PU, polymers, resins, Silicone rubber, etc.
2. Part materials: ISO/ASTM certified, sterilisable/autoclavable for direct use in human body
3. Possibility of using similar spares from third parties



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4. Consistent mold quality for bulk order (Quantity-25 nos or more) should be possible

**D. Software**

1. Internal storage for saving programs

2. PLC/SPS or similar with manual controls should be possible

3. Indicator for malfunctioning.

**E. Warranty and Maintenance, commissioning, and accessories**

1. The supplier should provide the machine calibration certificates for different parameters like accuracy, repeatability, 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. The supplier should mention all the standard accessories supplied along with machine

7. Working area of the machine should have safety enclosure with transparent windows.

8. Foundation kit like vibration mounting pads, bolts, etc. required for foundation to be supplied.

9. Detailed drawing of foundation indication necessary details to be supplied.

10. Requirements of water and compressed air lines to be specified.

11. Special requirements like isolation, vibration criteria, air conditioning, dust free atmosphere, power requirements and flooring to be specified.

12. Calibration of the machine after Installation.

13. Supplier has to provide required training to engineers after installation of the machine in the following areas: Machine operation, CNC/PLC Programming, mechanical maintenance, electrical maintenance and control system, etc.

14. 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.



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Machine test charts, Machine assembly drawings, Documents of all the bought out items, etc.

15. Supplier should have installed similar or better configuration machines in at-least 05 locations in India, and should provide their contact details.

16. The OEM should ensure continued supply of spares throughout the useful life of the machine, but not less than 15 years.

17. Comprehensive (hardware and software) warranty for five years after commissioning.

18. 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.

19. Free upgrades of software for five years after commissioning.

20. Complete set of machining tools needs to be provided along with the machine.

21. 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.

22. Complete installation of the overall system including loading/unloading at the installation site.

F. Evidence to the following parameters (tests done as per ISO/ASTM standards) should be

submitted along with the technical bids-

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