



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

**Purchase Requisition No. 1000011304 (SRM/RFX No. 6100000158)**

**Specification for Microwave Digestor**

**I. System:** Brand new system for closed vessel acid digestion of various inorganic and organic samples like rocks, sediments, sludge and ceramics for trace element analysis by ICP–MS with all required accessories. Mention the country of origin of the equipment.

**II. Temperature and Pressure:** Microprocessor controlled single or dual magnetron system. Total power 1500 Watt or higher for system. Homogeneous microwave distribution in the cavity. Maximum test temperature 300°C. Operation temperature 230°C or more. Maximum test pressure 100 bars. Operation pressure 40 bar or more for continuous operation for up to 1 hour. Maximum temperature and pressure must be attainable at the same time.

**III. Cavity Chamber:** Cavity volume 43 litres or more. Cavity made of corrosion resistant stainless steel with multilayer PTFE coating. In-built cooling system to cool the vessels by software controlled variable airflow. In-built exhaust system separated from the electronics to prevent corrosion. System that requires removal of hot, pressurized vessels is not acceptable.

**IV. Rotor system and Vessels:** Rotor with 8 or more vessel positions. Facility to use one or multiple vessels. Long life vessels of 100 ml capacity for sample dissolution using HF, HCl, HNO<sub>3</sub> and HClO<sub>4</sub> acids, preferably made up of high purity PTFE–TFM. Number of vessels quoted should be the same as the number of vessel positions in the rotor. Opening and sealing of rotors, vessels and sensors should be easy and quick, preferably without the use of locking stations/ special tools. Vessel must have reliable safety disk or pressure release mechanism for overpressure protection. Self-venting of the vessels is not acceptable as it will lead to contamination and escape of volatile elements. Each vessel must be individually tested & deliverance with pressure test certificate.

**V. Operational Controls:** IR temperature sensors to monitor and control internal temperature of all reaction vessels. Display of internal temperature of each reaction vessel individually. Software should automatically reduce the microwave power in case of temperature overshoot. Simultaneous active pressure measurement and control on all vessel positions. Built-

in control and touch screen coloured graphic display for all routine operations. Capability to create, store, modify and recall custom programmes for process runs. Suitable for connection with an external PC.

**VI. Safety:** Safety shut-off device to prevent thermal overshoots or operational malfunction. Adequate protection from reflected energy of magnetron. No electronic plugs/sockets inside the cavity. Self-resealing pressure responsive safety door.

**VII. Working Conditions:** Input power at 230 volts  $\pm$  10 %, 50 Hz. System should work optimally within the room temperature range of +10°C to +40°C and at high humidity (60–90% at 20°C) atmospheric conditions of Mumbai.

**VIII. Training:** Vendor must have a team of factory trained application personnel to provide user training and application training for at least 2 days at the time of installation.

**IX. Warranty:** Minimum 1 year warranty on the entire system. Two years warranty on magnetron.

**X. Service Kit and Essential Spares:** 8 spare vessels. Necessary consumables, such as the items which usually wear out, for eight spare vessels. Other common spares and service kit.

**XI. Performance Test:** During technical evaluation, supplier would be requested to demonstrate in India, the operational capabilities of the instrument and the accuracy and precision of working pressure and working temperature for continuous operation for 1 hour.