INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai 400076.

PR No.1000051519 **RFx. No. 6100002602**

ICP-OES with Microwave Digester

Sr. No	Item Description and Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	SPECTROMETER: **1.** Bench top design, True simultaneous and background correction including simultaneous measurements of all analyte wavelengths, internal standard and background ICP-OES system using solid-state detector technology & polychromator based optical system. **2.** The resolution of the system must be 0.007nm at around 200nm or better. The entire optical system must be closed in an argon purged and temperature stated optical enclosure. **3.** A system purge of the polychromator for determinations made at wavelengths below 190nm must be standard. Argon may be used as purge gasses and the gas flows must be controlled by the system controller. **4.** Viewing of the plasma must be computer controlled. Dual View (torch). The system should have option of selecting any wavelength in any mode (axial/radial or both) as per users' discretion. **5.** The instrument must be able to perform determinations across the entire spectrum, both UV and Visible 167- 852nm **6.** Simultaneous echelle type grating & 265 mm or less effective focal length. **7.** The semi demountable dually viewed torch is to be quickly and simply removeable, fully interlocked and is to be supplied as standard with a 2.0mm diameter demountable center tube ICP SYSTEM GAS CONTROL: **1.** The instrument must monitor all gas pressures through mass flow control. The interlocks must be continuously monitored and if any interlock is interrupted, the plasma should shutdown automatically. All the MFC should be factory fitted * **2.** Plasma ignition and shut down must be computer controlled and totally automated. **3.** The instrument must include a mechanism to eliminate the cool end of the plasma for minimizing self – absorption and physical interference. **4.** The optic system must have a beam blocker to protect the optical components from the extreme UV region when no data acquisition is taking place. **5.** The total gas consumption of the ICP including the purge gas must be < 20L/min. A supporting document available on public domain must be provided. **6.** The system is to be fully interlocked against gas failure.		

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	SYSTEM DETECTOR • Solid- state detector (CID/CCD) optimized for performance across the entire emission spectrum, anti-blooming protection to enable the simultaneous measurement of trace level analytes in the presence of major matrix constituents. • Peltier cooled detector to a temperature of at least –45 deg C to minimize dark current there by enhancing instrument performance & detection limits. • The detector must have Full frame imaging capabilities RF GENERATOR • The solid-state RF Generator must run at frequency of 27MHZor more. The RF Power should be selectable at 750, 1150 or 1350 W. SAMPLE INTRODUCTION SYSTEM • The instrument must include appropriate ICP torch and Concentric Glass/quartz nebulizer (Acid Resistive) spray chamber system as a standard for Aqueous sample. • The system must include a peristaltic pump of 3 channel selectable at 30 or 45 rpm, that allows for on- line addition of internal standards • Chiller/re-circulator should not be mounted to the instrument chassis and should be from the original manufacturer of imported origin. Vendor should supply chiller re-circulator of appropriate capacity along with the system. • System should also have HF kit including all parts of Sample introduction system. SYSTEM SOFTWARE • The instrument system software shall be based on the windows operating system. • The software shall provide full control of all instrument functions including plasma ignition, gas flows, viewing position, and monitoring of safety interlocks. • Software should also have comprehensive wavelength library (50,000 lines or more) with indication of preferred line for each element. It should feature automatic identification of possible spectral interferences when selecting wave lengths for analysis • The facility for automatic back up of data onto a server must be offered along with the instrument software. PERFORMANCE • Time from standby to first measurement should be <u><</u>20 minutes Simultaneous analysis of all elements presents in your sample at a time.		

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	INSALLATION UTILLITIES **1.** The scope of supply should also include branded PC with Monitor 21 **2.** A mono laser printer, **3.** High pressure Argon gas regulator -2 No **4.** Stainless Steel Hood with Exhaust Fan including necessary fitting and Ducting Facility filters etc. along with suitable capacity **5.** Argon Gas Cylinder, Purity: 99.999% in 47 liters Carbon Steel Cylinder with Valve and Valve guard. Gas Volume: 7.0 m3 – 2 Nos **6.** Gas Purification Panel for the above gases include Molecular Sieve, Moisture & Oxygen traps with necessary Tubing's – 100 metre, Nuts, Ferrules and Manifold, Name Plate **7.** Multi-element Standards for calibration MICROWAVE DIGESTION SYSTEM 1. Offered system should be able to digest coal, wastewater, ores, minerals by offered system. 2. Offered instrument should be latest and model should be available on OEM website. 3. Offered instrument should have installed microwave power of 2000 watts or more 4. Offered rotor should accommodate minimum 20 or more vessels at a time and should be offered with minimum 04 vessels. 5. Vessel's specification: - maximum temperature & pressure limits: 250^{O}C or more and 110 bar or more - Vessel volume – min 45 ml or more with minimum filling volume of 3 ml or lesser. - sample digesting capacity per vessel – 1.5 grams or more per vessels - Offered rotor & vessel should have hold time of more than 2 hours at maximum operating temperature to digest difficult samples. 6. Reaction control: Temperature and mechanical pressure control on all positions with springs made of metal alloys/peek or material independent of temperature for precise pressure control. 7. Offered system/rotor should have maximum pressure capacity of 150 bar or more for utmost safety. 8. Instrument offered should have built in touch screen display of minimum 9" or more for graphical representation of reaction parameters. External/detachable controllers are not acceptable. 9. Instrument memory for data storage – On board storage capacity of minimum 12 GB or more. 10. Instrument should be offered with Laboratory software to collect, analyze and export (PDF-, CSV-format) measurement data. 11. Instrument should be upgradable with drying rotor, acid evaporation and microwave induced oxygen combustion in future.		

	12. Closure of the vessels should be possible by hand and no torque wrench should be used for closure & opening. 13. Instrument should be offered optionally with 06 reusable quartz inserts for micro sample digestion. <u>Warranty:</u> The warranty of the equipment should be for a period of 12 months from the date of installation		