

Technical Specification for Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES)

The instrument will be installed at JNPT, Mumbai, and NOT at the IIT Madras campus

Vendor eligibility criteria:

1. A list of at least 3 Institutions/R&D units/Industries where similar instruments have been supplied in India, including contact details (name of the person-in-charge, email, and phone number), should be provided.
2. The quoted model's three performance certificates in reputed institutions in India should be enclosed duly signed and stamped by the concerned scientist.

Technical specifications:

S.No	Specifications	Descriptions
1	ICP-OES system	<p>The ICP spectrometer system should be a benchtop model with compact size, able to determine trace and measure elements in diverse kinds of samples like soil, sludge, groundwater, water samples, etc. The system should be able to determine major, minor and trace elements in a single run measurement.</p> <p>Spectrometer: It should be fully PC-controlled ICP-OES with the following specifications. The complete system should have extensive safety & service diagnostic facility.</p>
2	Optical & detection	<ul style="list-style-type: none"> • The instrument must be a dual-view ICP-OES Spectrometer for multi-element analysis using solid-state detector technology. • The Instrument must have an Echelle-based optics that utilizes a single charge-coupled device (CCD) /charge induced detector (CID) or better • The optical resolution of the system should be better than 0.007 nm at 200 nm • The entire optical system must be enclosed in a purged and thermostated optical enclosure.
3	Torch and plasma view	The ICP torch must be vertically or horizontally aligned, easily mountable by the user, preferably a system with computer-controlled axial and radial viewing.
4	Wavelength range	The spectrophotometer must cover the spectral range from 170-780 nm or better
5	Sensitivity	Capable of multi-element analysis with preferably at least 10 ppb sensitivity for each element.

6	Gas flow control	<p>The instrument must be provided with three independent mass flow controllers for plasma, auxiliary, and nebulizer gases with the variable gas controller.</p> <p>The interlock must be continuously monitored, and plasma should shutdown automatically if any interruption during the analysis occurs.</p>
7	RF generator	The solid-state RF Generator must run at a frequency of 40 or 27 MHz or better. The RF Power should be variable and a maximum of 1500 W or better to handle complex matrix samples.
8	Plasma	The instrument must include a mechanism to eliminate the end of the plasma for minimizing self-absorption and physical interference.
9	Peristaltic pump	Minimum 4 channels peristaltic pumps with variable speed. The flow rate should be between 0.5 - 5.0 mL/min or better and will have the flexibility to add internal standard online.
10	Accessories	<ul style="list-style-type: none"> • The instrument must include accessories for low detection limits of Mercury, Arsenic, and other hydride forming elements. A hydride kit should be offered. • Air compressor and purification panels for Argon should be included • The vendor should take care of the installation of ducting from the gas cylinders to the instrument. • A suitable fume exhaust system should be quoted • A suitable chiller re-circulator with appropriate capacity should be provided along with the system.
11	System software	Software-based on the windows operating system should be provided for full control of all instrument functions, including plasma ignition, gas flows, viewing position, and monitoring of safety interlocks.
12	Computer	Computer specification: Processor - Intel i5 (5th generation) ; RAM - 8 GB ; Hard disk - 1 TB ; Graphic Card; DVD writer; and 28 inch monitor.
13	Performance	Analytical linearity over 5 orders of magnitude with the ability to use alternate wavelengths that are measured simultaneously.
14	Training	Training should be imparted to 3 persons for 2-3 working days on the operation and maintenance at JNPT, Mumbai.
15	Warranty	The warranty of the equipment should be at least 36 months from the date of installation, along with all accessories and equipment. During the warranty period, free upgrades of the soft wares, if any, should be provided.

16	Other accessories (Should be quoted separately)	<ul style="list-style-type: none"> • Auto-sampler capable of handling minimum 200 or more samples must be included. • Must provide single element standards for 20 elements and mixed multi-elements for 21 elements. • Gas cylinders (4 Argon, 1 Nitrogen) with regulator and gas panels.
17	Spare parts	2 additional torch kits; 1 additional nebulizer/spray chamber; 1 additional sample introduction kit for HF., extra tubing, consumables for generator and filter should be quoted separately.
18	Performance certificates	The quoted model should have at least 5 installations in India/Abroad. Five performance certificates of the quoted model in reputed institutions in India should be enclosed duly signed and stamped by the concerned scientist.