

Thapar Institute of Engineering and Technology, Patiala

Technical Specifications for ICP-OES

Body

- The body and chassis materials should be chemical (includes various acids) resistant.
- The design should be robust such that the instrument becomes least susceptible to the accidental misalignment.

System Requirement

- ICP-OES Instrument must be true simultaneous, bench top, dual view with polychromator.
- ICP-OES must be dual view with fast/rapid changeover to axial and radial view. Viewing of the plasma must be computer controlled. The instrument should have the facility of automatic switch between the viewing modes during analysis.
- CID or CCD or SCD detector or suitable detector along with polychromator, which should cover the entire analytical wavelength range in one analytical step/run.
- Wavelength range: 130–770 nm to cover majority of the elements
- Resolution 8.0 pico-meter or better range as per application
- The system must include a four channel, variable speed, computer controlled peristaltic pump.
- Simultaneous echelle grating/ Paschen Runge polychromator with all software controlled variable gas flow systems.
- The software-controlled RF generator should be with frequency of 27/ 42 MHz. The RF generator must deliver an optimal power output range of 600–1500 Watt or better.
- The RF Generator should be air (preferred) or water cooled via noiseless water chiller. The chiller/re-circulator, if any, should not be mounted to the instrument chassis and should be from the original manufacturer of imported origin.
- Computerized Gas flow controllers with variable gas controlling Software controlled variable gas mass flow controller for Plasma, Auxiliary, Nebulizer gas and makeup gas.

Or

Computer-controlled solenoid valves setup to regulate the flow automatically for plasma and Auxiliary line. MFC for nebulizer gas and Variable flow controller for Makeup gas.

- The instrument should have efficient facility or technology to eliminate the cool end of the plasma to help in minimizing the self-absorption and physical interferences. This must be done through the PC.
- The instrument should have an inbuilt camera for real time viewing of Plasma.
- The instrument should be offered with Hydride/vapor generation system in complete.
- Exhaust system (fume chamber) with 10 ft extension must be supplied with the instrument.

PC/Software

- User friendly software to control the monitor and instrument which can smoothly execute the various tasks of the instruments. The instrument system software must 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 (minimum of 40,000 wavelengths) with indication of preferred line for each element. It should features automatic identification of possible spectral interferences when selecting wavelengths for analysis and should have search mode for identification of unknown wavelengths. Operating software must be 21CFR Para II Compliant. The vendor must support the lifetime warranty for the software/software installed for the operational and analytical purposes.
- Latest compatible branded All in One PC (Core i7 processor, 1TB HDD, 8GB RAM, 64 bit, Ethernet Port, multiple USB Ports, 27 inch screen, Compatible Windows and office Original) and branded laser color multifunctional printer to be supplied with the instrument. The PC must have a licensed MS office & windows TM OS.

Backup

- A compatible branded online UPS for power back up of minimum 60 minutes or more.

Standards and Accessories

- Four (04) filled Argon gas (of required purity grade) cylinders (Min. 47 L each) or nitrogen generator (in case required) with 04 stage manifold
- Filled Oxygen Gas (of required purity grade) cylinder (Min. 47 L each) with regulator and gas panel.

- Regulators, Gas panel and four stage Argon gas manual manifolds.
- Separate Aqueous and HF/ inert kit with separate dedicated Spray Chamber, Nebulizer, Torch & Tubing set.
- Semi volatile Organic solvent kit including spray chamber, nebulizer, torch & tubing set for sample intake & drain (pk12). Oxygen gas software controlled variable Mass flow controller/ volume flow controller.
- Hydride generating accessories. Separate & dedicated spray chamber & tubing set should be offered for As, Se & Hg.
- Software controller Argon Humidifier Accessories with gas purge port, tubings, etc. for high TDS applications, if required.
- Software controlled Integrated Sprint valve or Advanced Valve systems or equivalent for increasing sample throughput which can improve precision, save gas costs and reduce consumable costs. Module should be integrated with Autosampler.
- National Institute of Standards and Technology (NIST) certified multi-element aqueous standard/standards (Volume, minimum 100 ml) for determination of metals and non-metals present in drinking water, surface water, wastewater, air particulates, rivers/lakes sediments, sludge, solid waste and biodiesel samples. The standard/standards must cover the maximum number of elements (should include Al, Sb, As, Ba, Be, B, Cd, Ca, Ce, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, P, K, Se, Si, Ag, Na, Sr, S, Tl, Sn, Ti, V, Zn, Te, Br, Cl, I & Bi) in suitable concentration for the aforementioned purposes and should comply with the latest internationally accepted methods of United States Environmental Protection Agency (EPA) or American Society for Testing and Materials (ASTM) International wherever applicable.
- For organic standards for determination of metals and non-metals present in edible oil, lube oil, used oil, greases and biodiesel. The standards should be C21 + K+ S++Sb or V21+K+S+Sb at 900ppm of 100ml, White Kerosene or MIBK of 500ml and 75cst Base Oil of 100ml
- Standard Peristaltic Pump Tubing set sample intake, rinse/drainage, etc. Pk/12 No. (02 Set)
- Standard nebulizer (02 each) with Nebulizer capillary tubing, 1m
- Standard Torch & injector: (03 each)
- Spray chamber drain tubing (01 each)
- Autosampler probe with tubing
- Additional Complete Autosampler tubing set (01 Nos)
- Chiller fluid (Approx. 50 L) for those system which uses a water recirculator
- PFA tubing for gas supplies to nebulizer
- O ring for pre optics windows

- Any other consumable items which may be required for uninterrupted operation for years.
- Additional two set of detector and two set of RF generator should be provided, if it is water cooled.
- Complete tool kit with a copy of (Soft & Hard) the Manual of the instrument must be supplied.
- **Autosampler:** 200 Vial or more position Autosampler with enclosures along with 1000 Tubes.

Warranty/Guarantee

- At least 3 years of full system warranty from the date of installation including the MDS ,UPS, Ducts & Fume Hood. In addition, guaranteed supply of spares and parts for 7 years from the date of discontinuation of the supplied model. This must be mentioned explicitly by the vendor.
- Warranty can be extended after expiry of 03 years. Quote for extended Warranty of 02 years and price of consumable should also be provided in this bid.

Installation & Facility Requirement

- The supplier should mention the exact facilities (including room preparation, electricity, space and others) required for installation and smooth performance of the instrument.
- 5 day training at the time of installation on the site.

Important Notes

- Vendor should have ISO 9001 Certification & CE Certification.
- Specify the gas flow rate through a mass flow /volume flow controller for each case, such as plasma, auxiliary and coolant.
- Specify the maximum power available, sensitivity and resolution in each viewing mode for the same sample.
- Mention the power stability and interference effect for the supplied RF generator frequency.
- Specify the details of grating and prism of your instrument.
- Provide the information about the type of detector and its specifications.
- Provide the details of warm-up time and the gas flow rate during the warm-up.
- Specify the focal length and effective focal length.

- Gas consumption for Argon, Nitrogen (if applicable) and Oxygen, during start-up, operations and purging should be quoted with the technical data sheet which should be attached.
- Specify the detection limit for 30 second integration time for each view for the common elements: Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Gd, Hg, K, La, Li, Mg, Mn, Mo, Na, Nb, P, Pb, S, Sb, Se, Te, Si, Sn, Sr, Ti, Tl, V, Y, Zn, Zr, etc. Please also mention the spectral line used for the detection.
- User list with detailed contact details should also be attached.
- The vendor should have office or agents in India. Qualified technical and service personnel should be available in India.

All the requirements laid down under the above specifications must be carefully read and point to point compliance statement should be enclosed along with the supporting technical literature for each quoted items.

Instrument must be quoted for F.O.R. Thapar Institute of Engineering & Technology, Patiala including the clearance and transportation (DSIR certificate to be provided for custom duty exemption.)