

CSIR- NATIONAL PHYSICAL LABORATORY

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From: Director, CSIR-NPL
Tender No. 14-VI/VNS(1108)22PB/T-77

Dated: 05.09.2023

CORRIGENDUM

With reference to NPL's Global Tender ID: **2023_CSIR_722707_1**, Pre-Bid Conference (PBC) was concluded on 16.08.2023 and 29.08.2023 for "Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)". Consequent upon the outcome of PBC, **some changes have been made in the technical specification of captioned tender. Revised specifications are as follows:**

<u>S. N.</u>	<u>Parameters</u>	<u>Specifications</u>
1	Score	Simultaneous benchtop Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) for analysis of the 67 elements of the periodic table from the percentage to ppb range.
2	RF generator	The instrument should be compact and fully PC controlled based on solid-state detector technology (RF generator). Operating frequency 27 MHz/ 40 MHz. Adjustable plasma power from 1000 to 1500 watts or better with coupling efficiency > 75%. There should be flexibility to set variable RF power as per different methods and sample matrices. It should not be fixed. Autoignition and operation, preferably computer-controlled for set point to compensate for changing sample matrix/ impedance. Necessary cooling system and safety interlocks.
3	Polychromator	State of the art Echelle based high-resolution optical system with nitrogen purge optics
4	Wavelength	166-770nm or better continuous wavelength, with an optical resolution of < 0.009nm at 200 nm or better
5	Detector	Completely solid-state detector based on charge transfer/charge injection /programmable array/Charge-coupled device /complementary metal-oxide-semiconductor device for simultaneous measurement with integration/read out time ≤ 1 sec and necessary cooling/ heating system, if required.
6	Plasma Viewing	Dual-view configuration to select axial and radial view with automatic switchover possibility and auto-alignment. There should also be flexibility for

		mixed view analysis in the radial and axial modesto enhance analysis and application needs.										
7	sample input	<table border="1"> <tr> <td>Plasma Torch</td> <td>Demountable using quartz with a suitable injector</td> </tr> <tr> <td>Spray Chamber</td> <td>Glass spray chamber: Scott/Cyclonic type</td> </tr> <tr> <td>Nebulizer</td> <td>Cross-flow/ concentric of chemically resistant material</td> </tr> <tr> <td>Peristaltic pump</td> <td>3 or more channel, 12 roller peristaltic pumps asstandard to deliver sample and reagent with complete tubing for variable flow page</td> </tr> <tr> <td>Sample Introduction Kit</td> <td>HF, salt, and inorganic kits must be provided with the standard kit for aqueous samples.</td> </tr> </table>	Plasma Torch	Demountable using quartz with a suitable injector	Spray Chamber	Glass spray chamber: Scott/Cyclonic type	Nebulizer	Cross-flow/ concentric of chemically resistant material	Peristaltic pump	3 or more channel, 12 roller peristaltic pumps asstandard to deliver sample and reagent with complete tubing for variable flow page	Sample Introduction Kit	HF, salt, and inorganic kits must be provided with the standard kit for aqueous samples.
Plasma Torch	Demountable using quartz with a suitable injector											
Spray Chamber	Glass spray chamber: Scott/Cyclonic type											
Nebulizer	Cross-flow/ concentric of chemically resistant material											
Peristaltic pump	3 or more channel, 12 roller peristaltic pumps asstandard to deliver sample and reagent with complete tubing for variable flow page											
Sample Introduction Kit	HF, salt, and inorganic kits must be provided with the standard kit for aqueous samples.											
8	Plasma tail management	Inert gas must be used for plasma tail management or suitable arrangement.										
9	Plasma and other gas control	Computer-controlled Mass flow controllers/ Electronic flow controllers on all gas lines, including coolant, nebulizer gas, plasma gas, and auxiliary gas. All gases like Plasma flow,Auxiliary flow and nebulizer flow should not be fixed and can be set by the user as per requirement. There should be three different ports to connect different types of gases like plasma gas, Purging gas, Sheargas/organic gas etc.										
10	Hydride kit	Continuous hydride generation assembly with an external gas-liquid separator device.										
11	Minimum detection limit	Cu- 5 ppb or better As- 1ppb or better (with hydride generation)										
12	System software	Window-based, instrument operation and control, data handling and storage, report generation, calibration graph, result display, and printing. The report shall be exportable in multiple formats like pdf, xls, doc, etc. Software upgrade support service free of cost for minimum 7 years from the date of installation										
13	Auto-sampler	Auto-sampler with minimum 80 or more samples capacity with integrated pump and rinse station with sufficient numbers of samples/standardsvials and accessories										
14	Power requirements	230 ± 10% Volts AC, 50 Hz, single phase										
15	Chiller	Chiller/re-circulator must not be mounted to the instrument chassis and should be from the original manufacturer.										
16	Standards for ICP-OES	National Metrology Institute (NMI) traceable single (Al, As, Au, Ag, Bi, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Pd, Pt, Rh, Sb, Sn, Se, Si, Sn, Te, Zn, Hg) and multi-element Standards of minimum 24 elements.										
17	Exhaust hood	A compatible exhaust hood, including ducting, meets complete installation										

		and testing.
18	Essential Accessories	<ul style="list-style-type: none"> i. Two additional Torch, Nebulizer and injector should be quoted in addition to a standard supply with the equipment. ii. RF coil -3nos iii. Plasma plume cutting consumable- Cone, Snout/ Nozzle- 3nos iv. Complete installation test kit v. Filled Argon gas cylinders(02nos) with regulators (02 nos), filled Nitrogen gas cylinders (02nos) with regulators (02 nos). Gas distribution line and gas changeover switch to connect a minimum 2Argon and 2 Nitrogen cylinders with moisture traps. vi. Latest branded data station with original licensed software compatible with the system, along with the latest with LCD/TFT/LED minimum 24" display monitor including all interfacing accessories and interfaced LaserJet printer vii. All required Pump/other tubing and needles of auto-sampler viii. 10kVA online UPS (including the total number of batteries) with 1-hour backup
19	Operational and service manual	Operating and service manuals
20	After-sales support	Assurance for providing spares/accessories and support services for at least 10 years from the date of installation.
21	Installation & training	Onsite operation and application training to users for at least 5 days for 3 persons. Quality assurance/Quality Control should be demonstrated at the time of installation, and a performance certificate must be provided
22	Warranty	2-year standard warranty from the date of commissioning

Therefore, following extension in due date of submission & date of opening of the said tender may be read exactly as follows:

Due date & time of tender submission

For : 05.09.2023 up to 3:00 PM (IST)

Read as: 19.09.2023 up to 3:00 PM (IST)

Date & Time of Tender Opening

For : 06.09.2023 at 3:00 PM (IST)

Read as: 20.09.2023 at 3:00 PM (IST)

All other terms & conditions of said tender will remain the same.



Sr. Controller of Stores & Purchase

CSIR- National Physical Laboratory

Minutes of the meeting

Date: 29-08-2023

Sub: TSC meeting for discussing the specifications for Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES).

In connection with the procurement of an Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) system under the MLP project (MLP 190932), a pre-bid meeting everybody was organised on 16th August 2023 at 10:30 A.M. in second-floor conference room in the hybrid mode. Some of the technical committee members were present online and some offline. Four companies participated in the pre-bid conference: i) Perkin Elmer, ii) Spectro, iii) Agilent and iv) Thermofischer. All the company presented their viewpoint and suggested modifications. All the modifications/suggestions were noted down. To finalize the specifications, a second meeting was conducted on 29th August 2023 at 12 noon in the director conference room. The committee discussed the viewpoints of the company representatives and finalized the specifications. The following members were present in the meeting.

Dr. H.K. Singh, Chief Scientist (CSIR-NPL)	Chairman
Dr. Sachchidanand Singh, Chief Scientist (CSIR-NPL)	Member
Dr. Priyanka Saxena, Sr. Scientist (, CSIR-NEERI, Delhi Zonal Lab)	External Expert
Dr. Anjana Dogra, Sr. Pr. Scientist (CSIR-NPL)	Member
Dr. Sudhir Kumar Sharma, (CSIR-NPL)	Internal Expert
Mr. Arvind Gautama, Sr. Scientist (CSIR-NPL)	Special invitee
Dr. V. N. Singh, Pr. Scientist (CSIR-NPL)	Indenter

The committee discussed the technical specifications in detail, and the technical specifications finalised as Annexure-I.

Technical specifications of inductively coupled plasma optical emission spectrometer (ICP-OES)

<u>S. N.</u>	<u>Parameters</u>	<u>Specifications</u>	<u>Perkin Elmer</u>	<u>Spectro</u>	<u>Agilent</u>	<u>Thermofischer</u>	<u>Final specification</u>	<u>Remarks</u>
1	Score	Simultaneous benchtop Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) for analysis of the 67 elements of the periodic table from the percentage to ppb range.	No change	No change	No change	No change	Simultaneous benchtop Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) for analysis of the 67 elements of the periodic table from the percentage to ppb range.	
2	RF generator	The instrument should be compact and fully PC controlled based on solid-state detector technology (RF generator). Operating frequency 27 MHz/ 40 MHz. Adjustable plasma power from 1000 to 1500 watts or better with coupling efficiency > 75%. There should be flexibility to set variable RF power as per different methods and sample matrices. It should not be fixed. Autoignition and operation, preferably computer-controlled for set point to compensate for changing sample matrix/ impedance. Necessary cooling system and safety interlocks.	No change	No change	No change	No change	The instrument should be compact and fully PC controlled based on solid-state detector technology (RF generator). Operating frequency 27 MHz/ 40 MHz. Adjustable plasma power from 1000 to 1500 watts or better with coupling efficiency > 75%. There should be flexibility to set variable RF power as per different methods and sample matrices. It should not be fixed. Autoignition and operation, preferably computer-controlled for set point to	

							compensate for changing sample matrix/ impedance. Necessary cooling system and safety interlocks.	
3	Polychromator	State of the art Echelle based high-resolution optical system with nitrogen purge optics	Polychromator/Suitable optical system:	State of the art Paschen Runge (gas sealed optics) based high-resolution or Echelle based optical system with nitrogen purge optics	No change	No change	State of the art Echelle based high-resolution optical system with nitrogen purge optics	Not accepted as writing a suitable optical system will make it very general and will not serve the purpose, and accepting spectro requests will make it very specific.
4	Wavelength	166 - 847 nm or better continuous wavelength, with an optical resolution of < 0.009 nm at 200 nm	No change	166 -770 nm or better, with an optical resolution of < 0.009nm at 200 nm	167-785nm or suitable range to cover all periodic table elements as per ICPOES technology	Please Amend as Wavelength 167-847nm or better continuous wavelength, with an optical resolution of < 0.007nm at 200 nm	166 - 770 nm or better continuous wavelength, with an optical resolution of < 0.009 nm at 200 nm or better	Accepted

5	Detector	Completely solid-state detector based on charge transfer/couple injector/programmable array/Charge-coupled device /complementary metal-oxide-semiconductor device for simultaneous measurement with necessary cooling/ heating system, if required.	with integration time 1 second or better	No change	Integration /readout time	Please add the system should be quoted with CID (Charges Injection Detector.	Completely solid-state detector based on charge transfer/charge injection programmable array/Charge-coupled device /complementary metal-oxide-semiconductor device for simultaneous measurement with integration/read out time ≤ 1 sec and necessary cooling/ heating system, if required.	CID added												
6	Plasma Viewing	Dual-view configuration to select axial and radial view with automatic switchover possibility and auto-alignment. There should also be flexibility for mixed view analysis in the radial and axial modes to enhance analysis and application needs.	No change	No change	No change	No change	Dual-view configuration to select axial and radial view with automatic switchover possibility and auto-alignment. There should also be flexibility for mixed view analysis in the radial and axial modes to enhance analysis and application needs.													
7	sample input	<table border="1" data-bbox="421 1107 898 1342"> <tr> <td data-bbox="421 1107 611 1246">Plasma Torch</td> <td data-bbox="611 1107 898 1246">Demountable using quartz with a suitable injector</td> </tr> <tr> <td data-bbox="421 1246 611 1342">Spray Chamber</td> <td data-bbox="611 1246 898 1342">Glass spray chamber: Scott/Cyclonic type</td> </tr> </table>	Plasma Torch	Demountable using quartz with a suitable injector	Spray Chamber	Glass spray chamber: Scott/Cyclonic type	No change	No change	4 or more channel, 10 or more roller peristaltic pumps as standard to deliver	No change	<table border="1" data-bbox="1581 1107 1845 1342"> <tr> <td data-bbox="1581 1107 1809 1182">Plasma Torch</td> <td data-bbox="1809 1107 1845 1182">De</td> </tr> <tr> <td data-bbox="1581 1182 1809 1246">Spray Chamber</td> <td data-bbox="1809 1182 1845 1246">Gl</td> </tr> <tr> <td data-bbox="1581 1246 1809 1305">Nebulizer</td> <td data-bbox="1809 1246 1845 1305">Cr</td> </tr> <tr> <td data-bbox="1581 1305 1809 1342">Peristaltic pump</td> <td data-bbox="1809 1305 1845 1342">3</td> </tr> </table>	Plasma Torch	De	Spray Chamber	Gl	Nebulizer	Cr	Peristaltic pump	3	<p>Not acceptable using quartz with a suitable chamber: Scott/Cyclonic concentric of chemical or more channel, 12 roller perist</p>
Plasma Torch	Demountable using quartz with a suitable injector																			
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Sample Introduction Kit	HF, salt, and inorganic kits must be standard kit for aqueous samples.																	
8	Plasma tail management	Inert gas must be used for plasma tail management.	Inert gas/Air gas	No change	No change	Inert gas must be used for plasma tail management or Non consumable unlike cooling cone interface based.	Inert gas must be used for plasma tail management or suitable arrangement.	No change as specificatio n includes this										
9	Plasma and other gas control	Computer-controlled Mass flow controllers/ Electronic flow controllers on all gas lines, including coolant, nebulizer gas, plasma gas, and auxiliary gas. All gases like Plasma flow, Auxiliary flow and nebulizer flow should not be	No change	Add Volume Flow controllers o also	≤1ml/min flow setting	No change	Computer-controlled Mass flow controllers/ Electronic flow controllers on all gas lines, including coolant, nebulizer gas, plasma gas, and	Volume flow controller is not accepted, flow will be as required .										

		fixed and can be set by the user as per requirement. There should be three different ports to connect different types of gases like plasma gas, Purging gas, Sheargas/organic gas etc.					auxiliary gas. All gases like Plasma flow, Auxiliary flow and nebulizer flow should not be fixed and can be set by the user as per requirement. There should be three different ports to connect different types of gases like plasma gas, Purging gas, Sheargas/organic gas etc.	
10	Hydride kit	Continuous hydride generation assembly with an external gas-liquid separator device.	No change	No change	No change	No change	Continuous hydride generation assembly with an external gas-liquid separator device.	
11	Minimum detection limit	Cu- 5 ppb or better As- 1 ppb or better (with hydride generation)	No change	No change	No change	No change	Cu- 5 ppb or better As- 1 ppb or better (with hydride generation)	
12	System software	Window-based, instrument operation and control, data handling and storage, report generation, calibration graph, result display, and printing. The report shall be exportable in multiple formats like pdf, xls, doc, etc. Software upgrade support service free of cost for minimum 7 years from the date of installation	No change	No change	No change	No change	Window-based, instrument operation and control, data handling and storage, report generation, calibration graph, result display, and printing. The report shall be exportable in multiple formats like pdf, xls, doc, etc. Software upgrade	

							support service free of cost for minimum 7 years from the date of installation	
13	Auto-sampler	Auto-sampler with minimum 120 or more samples capacity with integrated pump and rinse station with sufficient numbers of samples/standards vials and accessories	No change	80 or more	No change	No change	Auto-sampler with minimum 80 or more samples capacity with integrated pump and rinse station with sufficient numbers of samples/standards vials and accessories	
14	Power requirements	230 ± 10% Volts AC, 50 Hz, single phase	No change	No change	No change	No change	230 ± 10% Volts AC, 50 Hz, single phase	
15	Chiller	Chiller/ re-circulator must not be mounted to the instrument chassis and should be from the original manufacturer.	No change	No change	No change	No change	Chiller/ re-circulator must not be mounted to the instrument chassis and should be from the original manufacturer.	
16	Standards for ICP-OES	National Metrology Institute (NMI) traceable single (Al, As, Au, Ag, Bi, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Pd, Pt, Rh, Sb, Sn, Se, Si, Sn, Te, Zn etc.) and multi-element Standards of minimum 24 elements.	No change	No change	(1000ppm & 200ml).Single element standards of Hg,Au,P&S (100ml).Internal Standard mix 200ml	No change	National Metrology Institute (NMI) traceable single (Al, As, Au, Ag, Bi, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Pd, Pt, Rh, Sb, Sn, Se, Si, Sn, Te, Zn, Hg) and multi-element Standards of minimum 24 elements.	Hg added and etc removed
17	Exhaust hood	A compatible exhaust hood, including ducting, meets complete installation and	No change	No change	No change	No change	A compatible exhaust hood, including	

		testing.					ducting, meets complete installation and testing.	
18	Essential Accessories	<ul style="list-style-type: none"> i. Two additional Torch, Nebulizer and injector should be quoted in addition to a standard supply with the equipment. ii. RF coil -3 nos iii. Plasma plume cutting consumable- Cone, Snout/ Nozzle- 3 nos iv. Complete installation test kit v. Filled Argon gas cylinders (02 nos) with regulators (02 nos), filled Nitrogen gas cylinders (02 nos) with regulators (02 nos). Gas distribution line and gas changeover switch to connect a minimum 2 Argon and 2 Nitrogen cylinders with moisture traps. vi. Latest branded data station with original licensed software compatible with the system, along with the latest with LCD/ TFT/LED minimum 24” display monitor including all interfacing accessories and interfaced LaserJet printer vii. 15 kVa online UPS (including the total number of batteries) with 1-hour backup 	No change	Suitable KVA	More gas cylinders	No change	<ul style="list-style-type: none"> i. Two additional Torch, Nebulizer and injector should be quoted in addition to a standard supply with the equipment. ii. RF coil -3 nos iii. Plasma plume cutting consumable- Cone, Snout/ Nozzle- 3 nos iv. Complete installation test kit v. Filled Argon gas cylinders (02 nos) with regulators (02 nos), filled Nitrogen gas cylinders (02 nos) with regulators (02 nos). Gas distribution line and gas changeover switch to connect a 	10 kVA UPS is enough

							<p>minimum 2 Argon and 2 Nitrogen cylinders with moisture traps.</p> <p>vi. Latest branded data station with original licensed software compatible with the system, along with the latest with LCD/ TFT/LED minimum 24" display monitor including all interfacing accessories and interfaced LaserJet printer</p> <p>vii. All required Pump/other tubing and needles of auto-sampler 10 kVA online UPS (including the total number of batteries) with 1-hour backup</p>	
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19	Operational and service manual	Operating and service manuals (hardcopy and softcopy both)	No change	No change	No change	No change	Operating and service manuals	(hardcopy and softcopy both) removed: committee suggestion
20	After-sales support	Assurance for providing spares/accessories and support services for at least 10 years from the date of installation.	No change	No change	No change	No change	Assurance for providing spares/accessories and support services for at least 10 years from the date of installation.	
21	Installation & training	Onsite operation and application training to users for at least 5 days for 3 persons. Quality assurance/Quality Control should be demonstrated at the time of installation, and a performance certificate must be provided	No change	No change	No change	No change	Onsite operation and application training to users for at least 5 days for 3 persons. Quality assurance/Quality Control should be demonstrated at the time of installation, and a performance certificate must be provided	
22	Warranty	1-year standard + 2 years extended warranty from the date of installation	No change	No change	No change	No change	2-year standard warranty from the date of commissioning	Suggestion by committee