CSIR - NATIONAL PHYSICAL LABORATORY

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From: Director, CSIR-NPL
Tender No. 14-VII/NV(3055-GTE)25PB/T-128 Dated: 07.01.2026

CORRIGENDUM

With reference to NPL's Global Tender ID: **2025_CSIR_822903_1** for "**XRF Instrument/X-Ray Fluorescence Spectrometer**". All the prospective bidders are hereby informed that some changes have been made in the technical specification of captioned tender. Revised specifications are as follows:

Original Specifications	Final Specifications
Attached in Annexure I	Attached in Annexure II

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

Sr. Controller of Stores & Purchase

FORM TO BE FILLED BY IO WHILE CONVENING PRE-BID MEETING OF TSC.

File No. 14-VII/NV(3055-GTE)25PB/T-128 **Date: 28/10/2025**

Pre-bid Meeting

Name of Indentor: Dr N Vijayan
Indent No. NPL15102025 GAP1809326 / 2025-26
Item Description XRF Instrument
No. of Budgetary Quotes: 2 Nos
(1) A pre-bid meeting of TSC was held on 23rd Dec. 2025
(2) Following queries were raised by participating Bidders:

Name of the Firm	Queries Raised	Remarks, if any
M/s. Rigaku (Indian Agent: IR Tech)	Mr. Srivastava from IR Tech., Pvt. Ltd., Noida raised a query that their engineer are well qualified and got a training from OEM. They are sufficient enough to give training to the operating personnel /scientist of CSIR-NPL.	The committee accepted the suggestions given by the PBC participant from IR Tech., Noida

Indentor's recommendation

1. The comments, as received from bidders during PBC, and our response is as follows:

Tender Specification and its number	Comment of bidder	Response of Indentor (Accepted/ Not accepted)	Revised specification (If any)	Justification for non-acceptance
Tender Specification Number: 12 (Training) **(Old Version)** **12. Training:** Comprehensive training on instrument operation and associated software should be provided at CSIR-NPL, New Delhi, for a group of users. The training shall be conducted over 10 working days and must cover instrument operation, calibration procedures, XRF software, routine maintenance, and application-related guidance by the OEM engineer and application scientist.	Mr. Srivastava from IR Tech., Pvt. Ltd., Noida raised a query that their engineer are well qualified and got a training from OEM. They are sufficient enough to give training to the operating personnel /scientist of CSIR-NPL.	Accepted	**(Revised Version)** **12. Training:** Comprehensive training on instrument operation and associated software should be provided at CSIR-NPL, New Delhi, for a group of users. The training shall be conducted over 10 working days and must cover instrument operation, calibration procedures, XRF software, routine maintenance, and application-related guidance by the supplier's engineer / manufacturer.	NIL

Final recommended specifications (revised after PBC) are as attached at Annexure II and signed by I/O:

Corrigendum to Tender may be issued/ may not be issued.

Recommended Revised Date of Tender submission (if any) is _____

The specifications are generic and broad based.

Submitted to TSC for necessary approvals.

FORM TO BE USED BY TSC FOR FINALISING PRE-BID MINUTES

File No. 14-VII/NV(3055-GTE)25PB/T-128 **Date: 28/10/2025**

TSC Minutes (To be typed clearly by the I/O)

Based on the Pre-bid meeting and recommendation of I/O, following changes have been made in the specifications:

Original Specifications	Final Specifications
Attached in Annexure I	Attached in Annexure II

The file is forwarded to Purchase Section for uploading the final specifications and TSC minutes on the website and CPPP Portal.

Declaration: We hereby declare that we have no conflict of interest with any of the bidder in this tender

Annexure II:

General Specifications: XRF Instrument

1. X-Ray Fluorescence Spectrometer with high speed and high precision for qualitative and quantitative analysis of elements from Boron (5) to Uranium (92) in different types of sample in concentration ranges from ppm level to 100%. The system should have the following features/specifications and must be supplied with all accessories and consumables:

   - **Measurement Capability**: Wavelength Dispersive X-ray Fluorescence (WD-XRF)
   - **Measurable Elemental Range**: Boron (5) to Uranium (92).
   - **X-Ray Generator**: High Frequency X-Ray Generator with minimum power rating of 4KW.
   - **X-ray Tube voltage**: 20-60 kV or better, computer control.
   - **X-ray Tube Current**: 5 - 150 mA or better, computer control.
   - **Stability**: minimum ± 0.005% at ±10% input variation (for both voltage and current).

2. The generator should be a microprocessor-controlled, water-cooled unit with a re-circulating system that utilizes ion exchange resin. It should have built-in protective features, including abnormal cooling water temperature detection, a water failure relay, tube voltage leakage detection, an overvoltage limit, and provisions for tube current limit and automatic aging function of the X-Ray Tube.

2.1. X-ray Tube: It should be an end-window type X-Ray tube with a Rh-target and equipped with programmable settings. The minimum distance between the sample and the X-Ray tube target should be set to achieve maximum intensity, preferably with a thinnest Beryllium Window of 75µ or less.

2.2. Goniometer: It should be a compact, high-precision, and high-speed microprocessor-controlled goniometer with a stepper motor driver and an independent driving mechanism for both θ-2θ measurements. It should have a minimum stopping angular reproducibility of ±0.005 degrees, ensuring high sensitivity and high-resolution measurements. The scanning range of the goniometer should cover at least the element range from Boron to Uranium. The slew speed should be 200°/min (2θ) or higher.

2.3. Spectrometer Optics:

2.3.1. The spectrometer should be equipped with a minimum of an 8-position bi-directional crystal changer and should be supplied with LiF (200), PET, Ge curve, crystals to cover from O^8 to Mg^{12}, Dedicated crystals for analysis of Carbon and Boron.

(a). The instrument should have required crystals for analysis of light elements such as Boron, Silicon, Sodium, Magnesium, and Fluorine and lower limit for these elements preferably <50ppm and lower limit for carbon is <500ppm.

2.3.2. The temperature stability inside the spectrometer chamber should be maintained within ±0.1°C. A separate electrical connection for the temperature control and spectrometer chamber or an equivalent solution should be provided to avoid frequent conditioning time. The X-Ray path should offer the option to select either vacuum or Helium for liquid sample analysis. Furthermore, the spectrometer must be equipped with a high-speed vacuum pump (for the Sample chamber and Spectrometer chamber) to maintain a stable vacuum condition, along with an air lock mechanism.

3. Protection of Spectrometer chamber and X-ray Tube must be available against liquid spillage and dust particle from sample and sample breakage.

3.1. **Detectors**: The spectrometer should be equipped with two types of detectors: a Flow Proportional Counter (F-PC) and a scintillation counter (SC). Both detectors must incorporate a digital multichannel analyzer for X-ray counting, ensuring higher counting linearity and improved precision. The scintillation counter and F-PC should have a minimum counting linearity of 1800 Kcps or higher.

3.2. **Collimators**: Provision should be made for at least three primary collimators (Fine / Coarse / Ultra-coarse) to ensure optimum sensitivity and resolution across the complete analytical range (B to U). The collimators should be automatically controlled through software

3.3. **Area Limiting Diaphragm**: Three or more area limiting diaphragms should be there for optimum S/N ratio.

3.4. **Primary X-Ray beam filters**: Minimum four suitable primary beam filters should be supplied for the X-Ray Optics with minimum filter thickness.

3.5. **Mapping Mechanism:** The XRF system should include a provision for a mapping mechanism, which combines a high resolution camera and a multi-directional sample stage. This mechanism allows for the identification of inclusions and contaminants on the sample surface using a very small amount of sample and bulk solid sample, with a spot size as small as 500µ or less.

3.6. **Automatic Sample Changer**: The main system should be supplied with an automatic sample loader capable of holding minimum of 45 samples. A minimum of 20 stainless steel sample holders should be provided, along with different-sized mask covers such as 30-34 mm, 18-20 mm, and 8-10 mm, or their equivalents.

3.7. **Sample Handling**: The spectrometer should be capable of handling solids, powders, pressed powder pellets, liquids, fused beads, etc. The sample presentation port should be equipped with an air lock mechanism, and the sample spinning mechanism should be provided as a standard feature.

4. **Data Acquisition System and Software**: The system software should be user-friendly, and the operating system must have the latest configuration built-in along with licensed version of latest MS Office (MS Office 365 will not be acceptable), along with necessary software. Additionally, the system should provide printing, copying, and scanning facilities to enable smooth delivery of observed data to the users. The software should perform the following functions:

The system should allow for qualitative, quantitative, and semi-quantitative analysis (standard less) with automatic theoretical correction for overlapping peaks, photoelectron correction using Fundamental Parameter Software, correction for atmospheric effects, and correction for impurities. The system should also include a matching library and standardization library. Additionally, there should be provisions for quantification based on a standard less Fundamental Parameter method.

4.1. Fixed Precision measurement: By setting the required precision preceding measurement, the software should calculate the shortest measuring time after pre-measurement including peak to background intensity.

4.2. The software should be user friendly and must guide the user for best conditions for matrix correction.

4.3. The software should be equipped with data transfer facility. Output of X-ray tube should be reduced automatically in accordance with standby period of operation.

4.4. **Analysis:** The automatic analysis is made according to the analysis schedule table preset for each sample. Displaying of "Analysis result" and "Status of operation" should be available.

4.5. **Data processing:** Saved data of qualitative and quantitative analyses can be re-processed.

4.6. **Qualitative application:** Editing measuring conditions used in the qualitative analysis with analysis program and data analysis conditions, and creating files for each analysis purpose can be made. "Select Element Range", "Parameters", "Check Measuring Condition" and "Output Information" should be included in that.

4.7. **Quantitative application:** Editing measuring conditions used in the quantitative analysis with analysis program and quantification calculation conditions, and creating files for each analysis purpose can be made. Setting of "Application information", "Standard sample", "Analysis condition", "Measuring condition determination", "Regression calculation (Calculation curve creation)", "Analysis control information" and etc., and the measurement program should be included in that. Automatic calibration function (for various sample state: metal, powder, polymer, ceramics) should be included.

5. **Chiller:** Compatible recirculating type chiller for the proposed instrument should be supplied with the minimum warranty period of one year. It should have noise level of 90dB or lesser.

6. **UPS:** Compatible Insulated Gate Bipolar Transistor (IGBT) based ONLINE UPS with built-in isolation transformer equipped with 30 minute battery backup (for the main XRF unit and the whole chiller) should be supplied with the system. The UPS along with batteries should have minimum warranty period of one year.

7. **Manual Sample Preparation Equipment:**

   7.1. 30 ton or higher manual/semi-automatic pellets press with die set for steel rings (different dia ranges from 5 mm, 10 mm, 15 mm, 20 mm, 25 mm and 30mm, 34 mm for making suitable pellets). SS rings with diameters of 5 mm (5 Nos), 10 mm (5 Nos), 15 mm (5 Nos), 20 mm (5 Nos), 25 mm (10 Nos) and 30mm (25 Nos), 34 mm (25 Nos) should be provided along with the system.

   7.2. The vendor should provide Pestle mortar (6" dia: 2 Nos) along with the system.

   7.3. Mylar film or Polypropylene film (500 precut/roll (5 Nos)) to be provided for packing loose powder and liquid samples.

   7.4. Sample cup (500 nos.) for use with liquid or powder sample should be included.

8. **Supply of CRM**

The vendor should provide the following standard reference materials (SRM) or equivalent CRM for instrument calibration along with valid certificate from any National Measurement Institute (NMI). The vendor should also provide necessary set of standards for instrument calibration and performance testing (of detectors).

1. SRM 1880b - Portland Cement
2. SRM 1881b - Portland Cement blended with Fly ash
3. SRM 2061 - TiAl (NbW) Alloy for Microanalysis
4. SRM 1270a - Chromium-Molybdenum Low-Alloy Steel

These SRM/CRM samples must be in original vials as packed from any National Measurement Institutes (NMIs).

9. **Gas cylinder(s):**Gas cylinders for P10 & He gas (each 01 No) with 47 lits along with compatible regulators (double stage) one for each type of gas.

10. **Power rating:** All electrical connectors provided with the supplied instrument should comply with Indian standards

11. **Warranty:** A minimum warranty of 1 year shall be provided for the complete scope of supply, including the WDXRF unit, chiller, UPS with batteries, and pressed pellet accessories, effective from the date of successful installation and commissioning.

12. **Training:** Comprehensive training on instrument operation and associated software should be provided at CSIR-NPL, New Delhi, for a group of users. The training shall be conducted over 10 working days and must cover instrument operation, calibration procedures, XRF software, routine maintenance, and application-related guidance by the supplier's engineer/ manufacturer.