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MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

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Technical Specification for Benchtop Microfocus X-Ray Fluorescence Analyser

1. Applications

The ergonomic benchtop microfocus (energy dispersive) X-ray fluorescence analyser is required for advanced non-destructive chemical analyses and high-resolution chemical mapping of geological samples on a routine basis. The scale of target samples will range from microscopic fossils/mineral grains to macroscopic fossils, rock slabs and drilled cores with variable surface topographies. It is necessary that the analyses must involve minimal to zero sample preparation (no coating) and must be quick and precise. The instrument must have sensitivity to all elements heavier than sodium (Na), with detection limits down to parts per million (ppm). The option to conduct analyses without standards will be considered as an added advantage.

2. Basic Microfocus XRF Configuration:

- *X-ray Source:* One X-ray tube with target material Rh and excitation of 50kV, 30W (possibility of Mo target for smaller spot sizes and a possibility of future upgradation to two X-ray tubes are desirable).
- *Optics:* Polycapillary optics generating high radiation brilliance and resulting in spot sizes smaller than 20 μm . Smaller spot sizes are preferred as the target samples will predominantly be on a microscopic scale.
- *Detector:* Minimum one standard silicon drift detector (SDD) with large surface area equal to or greater than 30 mm^2 (large solid angle and high count rates).
- *Sample Chamber:* A spacious sample chamber (dimensions on the order of 400 x 300 x 100 mm^2) equipped with an internal camera and sufficiently large access window is required. The mobile sample stage should enable high-speed mobility for quick scan analyses and mapping. A wide range of vacuum settings must be possible in the sample chamber as lighter elements are analysed with better precision in high vacuum environments whereas low vacuum settings are needed for fragile fossil samples.
- *Data acquisition:* The instrument should be capable of both high-speed live/continuous quantitative elemental/elemental-ratio mapping as well as slow high-spatial-resolution scans at flexible step size settings.
- *Software:* (1) Instrument control software for tube, stage, camera, spot size, step size and time of analysis must be included. (2) Competent software support for qualitative and quantitative elemental/elemental ratio analyses by spectral peak analysis (with and without standards) is expected. This software must be customisable for geological applications and fully equipped for spectral acquisition, editing, peak fitting, peak area calculation, deconvolution and display of

results. (3) Software support for mapping features must include linear and areal mapping/analyses as well as mosaic stitching capability.

- *System accessories*: The vendor MUST provide a highly competent and compatible computer system to be synced with the XRF analyser. This system MUST have a large memory and storage capacity to ensure efficient use of the software support.

3. Operating Environment:

An air-conditioned dehumidified room and a UPS system with at least 30-minutes backup is required.

4. Warranty:

A minimum of 2-year standard all-inclusive warranty from the date of installation must be provided free of cost by the vendor.

5. Installation and Training:

Installation must be provided by the original equipment manager at the installation site; training for application and maintenance of the instrument must also be provided (at least twice) at the installation site after commissioning. Mutually convenient dates must be agreed upon at least 1 month before the beginning of the training. All expenditures for imparting training will be at no additional cost.

Annual Maintenance Contract (AMC)

A competitive price for an additional 3-year AMC (beyond the warranty period) may also be quoted.

Additional Items for Microfocus X-Ray Fluorescence Analyser

Vendor must intimate all essential pre-installation requirements, operating environment specifications and utility requirements for the quoted Micro-XRF unit at least 2 months prior to installation.

Vendors should include provision for maintenance tools and initial stock of maintenance spares as are essential for the proper operation and maintenance of the equipment in their tender.

The vendor should be fully responsible for the manufacturer's warranty in respect of proper design, quality and workmanship of all the equipment accessories etc. covered by the tender.

Vendors may request for instrument demonstration/exhibition to third-parties on mutually convenient dates subject to instrument availability. Such requests are to be made at least two weeks in advance.