

PD Annex 2 – Technical description

Contracting authority: Geological Survey of Estonia

Title of procurement procedure: Purchase of a Portable Laser Induced Breakdown Spectrometer

Geological Survey of Estonia (GSE) acquires a portable hand-held laser-induced breakdown spectrometer (LIBS) for rapid on-site elemental analysis. Portable LIBS must be compatible for on-site and real-time elemental analysis of rock and sediment samples in field and laboratory conditions.

All possible references in this description to a specific standard, source of purchase, process, trademark, patent, type, origin or production method (for example, product brand names, product designations, manufacturing company names, etc.) contain the clause "or equivalent". All equivalent products or systems must meet at least the specified requirements in terms of maintenance costs, quality and other conditions characterizing the product or system.

The acquired spectrometer must meet the following technical conditions and requirements:

1.	A portable hand-held Laser-Induced Breakdown Spectrometer (LIBS) for rapid on-site elemental analysis. Portable LIBS must be compatible for on-site and real-time elemental analysis of rock and sediment samples in field and laboratory conditions.
2.	Elemental Range: Covers the entire range of elements from lithium (Li) to uranium (U).
3.	Elemental Range for quantification: manufacturer-built pre-calibration model must be included to quantify at least the following elements: Li, Be, C, Na, Mg, Al, Si, S, K, Ca, Ti, Mn
4.	Detection Sensitivity: High sensitivity, capable of detecting trace elements in rocks and minerals down to ppm or lower concentrations. Lithium detection limit must be at least 0.005%
5.	Laser Source: A high-energy (3-6mJ), pulsed laser
6.	Atmosphere: the system must use fluxing with inert gas for improved performance; sufficient quantity of gas for working with LIBS for 30 days in 8 h shifts must be included in the offer.
7.	Spectral Range: Spectral range must be at least 200-900 nm or wider.
8.	Spatial Resolution and Rastering: Adjustable spot size or focus for analysing specific features or minerals within a sample. Instrument must allow rastering (mapping) of elements over a custom area with at least 100 µm diameter beam.
9.	Analysis Software: User-friendly software with spectral libraries included. Must be possible to install software on an external device (e.g., a PC).
10.	Quantification Models: Robust quantification models for accurate determination of elemental concentrations in geological samples. Quantification algorithms specifically designed for mineralogical and geological analysis must be included.
11.	Default model building: The system must allow calibrations and matrix-specific quantification models build-up by the user.
12.	Data Storage: At least 16 GB SD internal data storage capacity for storing multiple spectra and analysis results, including spectral libraries for future reference.

13. **Real-Time Analysis:** Rapid data acquisition and real-time analysis capabilities for efficient fieldwork or geological exploration.
14. **Power Source:** Portable power source (e.g., rechargeable battery) with extended operation time for remote geological surveys. A battery charger (220 VAC, EU AC adapter) and at least one spare battery.
15. **Weight and Portability:** Lightweight <3 kg and compact design for easy transport to remote field locations. Includes a safety case for transportation.
16. **Environmental Resistance:** Robust construction with resistance to environmental factors such as dust, humidity, and temperature variations encountered in geological fieldwork.
17. **Safety Features:** Safety interlocks, eye protection, and emission control mechanisms to ensure safe operation in various geological settings.
18. **Calibration Standards:** Compatibility with certified reference materials for accurate instrument calibration.
19. **Reporting Capabilities:** Reporting software with customizable templates for generating detailed reports.
20. **Data transfer:** data transfer capabilities for integration with geological mapping and analysis software. Data must be transferable via Bluetooth or USB (at least 2.0) port.
21. **Maintenance Requirements:** Low maintenance requirements, with easy access to critical components for servicing in the field.
22. **Warranty:** 24-month extended warranty for any repairs/replacement of defective parts, maintenance, cleaning or calibration must be included.
23. **Training:** Training must include onsite training (one day) for 3 persons