

PD Annex 2 – Technical description

Contracting authority: Geological Survey of Estonia

Title of procurement procedure: Purchase of an isotope analyser for measuring the isotopic composition of water samples

Geological Survey of Estonia (GSE) acquires an analyser for isotope analysis of liquid water samples to apply stable isotope methods in projects related to on groundwater resources and groundwater-surface water interaction.

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 analyser and all the necessary add-ons for carrying out isotopic measurements need to comply with the following technical criteria:

1. The analyser needs to enable simultaneous high-precision measurements of both $\delta^{18}\text{O}$ and $\delta^2\text{H}$ from liquid water samples.
2. The analyser needs to use the laser absorption spectroscopy (LAS) for isotopic analysis.
3. Guaranteed precision (1σ) of the analyser for liquid water samples should be at least $\leq 0.05\text{‰}$ for $\delta^{18}\text{O}$ and $\leq 0.2\text{‰}$ for $\delta^2\text{H}$ or better in a performance mode with the best possible precision.
4. The analyser should enable measurements of samples with high total dissolved solids (TDS) of ≥ 40 g/kg.
5. The analyser is able analyse at least 20 samples or more in 24 hours with a guaranteed precision (1σ) as stated in point 3.
6. Auto-injection system is added to the analyser for automated liquid sample injections for isotopic water analysis.
7. Vaporization/evaporation module (vaporizer) for liquid water analysis that works in combination with the automatic injection system is included or such capability is built into the analyser.
8. Software for controlling analyser operation, data analysis, normalization of measurements, calibration and identification/flagging for possible sample contamination needs to be provided together with access to applicable software updates.
9. The analyser needs to be compatible with the "Laboratory Information Management System (LIMS) for Lasers" software for data processing.
10. A monitor for working with the analyser needs to be included.
11. A kit for processing at least 1000 samples should be provided including at the minimum syringes, glass vials and septa, together with the user manual describing their replacement.
12. A vaporizer cleaning kit needs to be included with a manual for carrying out the cleaning procedure if a separate vaporization module is provided (see point 7 above).
13. The package needs to include at least 3 laboratory water calibration standards in 4-5 mL ampoules.

14. It is possible to operate and monitor the analyser remotely, which includes operations such as start/stop the analysis run, change performance mode, manage job queue etc.

15. The analyser should accept both zero (dry) air and N₂ as carrying-gases.

16. The analyser works with an alternating voltage of 230V and a frequency of 50 Hz and does not require additional cooling for operation. It has added accessories that allow the instrument to continue working even in the event of a short-term power failure (e.g., UPS system or equivalent solution).

17. The dimensions of the analyser taken separately (i.e., without the accessories described in points 6, 7 and 11) are not larger than 30 x 100 x 60 cm (*height x width x depth*) and the weight is up to 50 kg. The analyser will be installed into a building in a remote location, and it must be possible to transport from one room to another using manpower.

18. At least 12-month extended warranty for any repairs/replacement of defective parts, maintenance or calibration must be included.

19. Cost of the tender must include:

19.1 delivery of the analyser and its accessories to the final location;

19.2 installation of the analyser and its accessories at the final location and training, after which the contracting authority is able to independently perform isotopic analyses. The training program must include, among other things, hands-on tasks/instruction in routine analyser maintenance, troubleshooting, sample preparation and handling, calibration, isotopic data post-processing, and quality assurance/quality control (QA/QC).