

Calibration Service for *Corentium Pro* Radon Monitors

Service Description

Professional calibration of a *Corentium Pro* continuous radon monitor (calibration object) against an AlphaGUARD® reference instrument (working standard) at two different but constant radon levels and under constant humidity conditions. Additional exposure to nearly radon-free atmosphere for the determination of background signals (sensor contamination by long-lived radon decay products). Adjustment of the calibration factor according to the results of the calibration measurement.

The calibration certificate is issued in English language and documents the traceability of the calibration to national standards, which realize the physical units of measurements according to the International System of Units (SI).

Calibrations are conducted in accordance with requirements of **ISO/IEC 17025:2017** "*General requirements for the competence of testing and calibration laboratories*".

The examinations are done in consideration of **ISO 11665-5:2020** "*Measurement of radioactivity in the environment - Air: radon-222 - Part 5: Continuous measurement methods of the activity concentration*" and **IEC 61577-4:2009** "*Radiation protection instrumentation - Radon and radon decay product measuring instruments - Part 4: Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)*"

Scope of Calibration Service

- Inspection for damage and hardware malfunction of the calibration object and repair of a damaged/faulty device, if possible.
- If available, the last 3 measurements from the instrument's memory are examined for data corruption events or other malfunctions.
- If necessary, the software program (firmware) of the *Corentium Pro* is updated to the latest firmware version.
If a new "CRA" (*Corentium Report & Analysis*) software version has become available since the last calibration, it will be supplied to the customer on a USB memory stick with the return of the radon monitor after calibration.

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- Batteries are replaced by new ones if the capacity of installed batteries, measured with a battery tester, is less than 70%.
- Determination of the calibration object's current consumption.
- Determination of the background value of the radon monitor by exposure to nearly radon-free atmosphere ($<2 \text{ Bq/m}^3$) for a minimum of 80 hours. Evaluation of the background signals, quantification of sensor contamination by long-lived radon decay products and calculation of the lowest detection limit related to common working times (1h, 8h and 40h).
- Calibration measurements by exposure of the *Corentium Pro* radon monitor in a calibration chamber together with the reference instrument (type: AlphaGUARD®). The radon monitors are exposed to two constant radon levels (exposure no.1: in the range of 300-400 Bq/m^3 for $>90 \text{ h}$, exposure no.2: in the range of 2000 – 2500 Bq/m^3 for $>40 \text{ h}$). The reference instrument has DAKKS calibration by the German Federal Office for Radiation Protection – BfS, Berlin.
- Evaluation of the results and correction of the calibration factor by the weighted average correction factor determined by the calibration measurements. The results of the calibration measurement corrected with the new calibration factor are indicated on the calibration certificate.
- A calibration certificate is issued as printed document and a calibration label is attached on the radon monitor. The calibration documents and files are also supplied to the customer on a USB memory stick.
- Return shipment of the calibrated *Corentium Pro* unit to the customer.

Additional information:

Time necessary for the calibration: Due to long exposure times that are necessary in order to accurately calibrate electronic radon monitors the entire calibration measurements and data processing procedures require a period of 2-3 weeks.

Validity period of the calibration certificate: Calibration certificates in general don't have an expiry date, however, the current calibration software for *Corentium Pro* radon monitor requires setting a calibration validity date to the calibration object. The validity set by default is 2 years from the calibration date. If the use of the radon monitor is restricted in the country of the customer by legal requirements in terms of statutory recalibration intervals, the validity period of the calibration certificate will be respected accordingly. It is under the responsibility of the customers to inform GT-Analytic about statutory recalibration intervals in their countries, if applicable, and to care about the recalibration of the radon monitors in due time. Upon request by the customer, a validity period different from 2 years can be set to the radon monitor.