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# CERTIFICATE OF GRAVIMETRIC PREPARATION

**PRODUCT:** ICP Multi-Element Standard (23 elements)

**PRODUCT No.:** ICP23A20

**MATRIX:** 5% $HNO_3$ + 0.2% HF

**LOT NO.:** ICP232021C1

**DATE OF PREPARATION:** 16th March 2021

**EXPIRY DATE:** 28th March 2023

**DENSITY VALUE:** 1.039 g/ml @ 20°C

## PREPARATION OF STANDARD:

All standard components have been pre-qualified/verified before use. All analytical measuring devices and instrumentation have been pre-calibrated. The actual concentrations reported below are based on this preparation methodology and compound impurities.

| Elements | Nominal mg/kg | Actual mg/kg | Actual mg/L @ 20°C |
|---|---|---|---|
| As | 96.3 | 96.3 | 100.0 |
| Be | 96.3 | 96.3 | 100.0 |
| Ca | 96.3 | 96.2 | 99.9 |
| Cd | 96.3 | 96.2 | 99.9 |
| Co | 96.3 | 96.3 | 100.0 |
| Cr | 96.3 | 96.3 | 100.0 |
| Cu | 96.3 | 96.3 | 100.0 |
| Fe | 96.3 | 96.3 | 100.0 |
| Li | 96.3 | 96.3 | 100.0 |
| Mg | 96.3 | 96.3 | 100.0 |
| Mn | 96.3 | 96.3 | 100.0 |
| Mo | 96.3 | 96.3 | 100.0 |
| Ni | 96.3 | 96.3 | 100.0 |
| P | 96.3 | 96.2 | 99.9 |
| Pb | 96.3 | 96.3 | 100.0 |
| Sb | 96.3 | 96.2 | 99.9 |
| Se | 96.3 | 96.3 | 100.0 |
| Sn | 96.3 | 96.3 | 100.0 |
| Sr | 96.3 | 96.2 | 99.9 |
| Ti | 96.3 | 96.3 | 100.0 |
| Tl | 96.3 | 96.3 | 100.0 |
| V | 96.3 | 96.2 | 100.0 |
| Zn | 96.3 | 96.2 | 99.9 |

The expanded uncertainty (k=2) due to weighing, volumetric preparation and homogeneity is calculated in compliance with EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurements as ± 0.2 %. All values are verified by ICP-MS analysis using externally sourced ISO 17034 accredited Certified Reference Materials as calibrants/quality controls where possible.

## TRACEABILITY IN THE PRODUCTION OF THIS STANDARD

This product was prepared gravimetrically on a mass/mass basis. The solute was weighed on a balance calibrated by Reagecon engineers using mass standards traceable to the National and International primary standard of mass. Reagecon holds ISO 17025 accreditation for calibration of non-automatic weighing machines (265C). The resulting Balance Certificate of Calibration was issued in accordance with the requirements of ISO/IEC 17025. The balance was calibrated under monitored environmental conditions and atmospheric pressure. Tests were performed for capacity, readability, repeatability, eccentricity and linearity.

**BALANCE ID No.:** RRD077 **CALIBRATION DATE OF BALANCE:** 2nd March 2021

**BALANCE ID No.:** A-0944 **CALIBRATION DATE OF BALANCE:** 24th July 2020

**BALANCE ID No.:** RRD078 **CALIBRATION DATE OF BALANCE:** 17th June 2020

**CALIBRATION AUTHORITY OF BALANCE:** Reagecon Diagnostics Ltd, ISO17025 Accreditation No. 265C.

## TEST METHOD:

The mean result of this standard was verified using a calibrated ICP-MS system according to an in-house test method. The result reported in this certificate was confirmed by analysis of a sample of this lot taken at time of manufacture. The density of this standard was determined using a high performance calibrated density meter.

This certificate relates solely to the lot number given above.

**Approved By:** Paul O'Sullivan

**Date:** 30th March 2021