CPAchem
The experts in custom-made Certified Reference Materials

# Certificate of Analysis

## CERTIFIED REFERENCE MATERIAL FOR ICP-MS

**Solution of Barium(Ba) concentration 1000 mg/l Matrix: 2% HNO3**

Lot N: XXXXXX
Barcode: XXXXXXXX

Ref N: M206.2NP.L1.L1

Certification Date:XXXXXX

| Component | Certified Value and uncertainty [mg/l] | Metrological traceability |
|---|---|---|
| Ba | 1002.1 ± 3.3 (y) | NIST SRM No 3104a Lot 140909; NIST SRM No 3168a Lot 120629 |

Notes:
(y) WQP 5.15.1.24 *The certified value was obtained by a weighted mean of the results of two independent calibration methods among: Classical Volumetric,Primary Gravimetric, Instrumental (ICP/OES, ICP/MS or IC)*

Density* 1.011 g/cm$^3$ at 20°C

| Starting Material, Purity* | Batch |
|---|---|
| $BaCO_3$ 99.999% | 82093105 |

* *These values are not certified*

Storage Conditions: Store under normal laboratory conditions, at temperatures between 15° to 25°C

Shelf-life: XXXXXXXXXX

Date of opening: ……..

*(Recommended period of use should not exceed 12 months from date of opening)*

**Concept of Certification and traceability statement:**

*This certified reference material is produced using a high purity starting material, acid from sub-boiling and 18 MOhm deionized water.*
*The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA 4/02*
*Property of the result of a measurement whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties (ISO VIM)*
*The metrological traceability is assured through calibration on ICP/MS . The calibration curve is drawn using a series of standard solutions prepared from a certified reference material traceable to SI of NIST (SRM) or BAM (CRM). All contributions in relation to the certification of standard solutions are considered when evaluating the uncertainty.*
*The measurement results are traceable to SI. All analytical balances used for the preparation of the solution are calibrated yearly under an in-house procedure with analytical weights, traceable to DKD, and are checked daily.*
*Class A laboratory glassware is used.*
*The results from temperature measurement are traceable to SI. The thermometers used for solution's calibration are calibrated from an ISO 17025 accredited laboratory. The ambient conditions are controlled with a hygrometer calibrated from an ISO 17025 accredited laboratory.*

**Intended use: *For Laboratory Use Only***

Calibration of ICP/MS, ICP/OES
Preparation of "working reference samples"
Validation of analytical methods
Detection limit and linearity studies
This statement is not intended to restrict the use for other purposes.

**Instructions for the correct use of this reference material:**

This certified reference material can be used directly or can be diluted in an appropriate high purity matrix. Only a clean class A glassware should be used. Do not pipet from container. Obtained concentration (in mg/l) after dilution is a result from the multiplication of certified value of CRM concentration and the CRM's volume used for dilution and divided into the flask's volume used for dilution.

**Stability and storage:**

This CRM is with a guaranteed stability until ±0.5% of the certified concentration within its shelf life. Stability is guaranteed, provided that the solution is kept in its original packaging, tightly closed stored, as written in the section: Storage Conditions. The laboratory performs stability tests according to MQP 5.14.1 therefore solutions with one and the same bar-code number might have different expiration dates.

CERTIFIED ISO 9001

ANAB ANSI National Accreditation Board ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

C.P.A. chem Ltd is accredited to ISO 17034 and ISO/IEC 17025

CPAchem Ltd
www.cpachem.com
e-mail: info@cpachem.com; tel.:+359 42 60 77 16
for France, Belgium and Switzerland:
e-mail: acsd2@wanadoo.fr; tel.:01 30 57 57 32 / fax: 01 30 57 57 33

FOR ANALYSE DUTSCHER SAS

**Hazardous situation:**
The normal laboratory safety precautions should be observed when working with this CRM. Further details for the handling of this CRM are available as safety data sheet.

**Level of homogeneity:**
The material was tested for homogeneity by analyzing randomly selected samples according to an in-house procedure. The level of homogeneity proved satisfactory for a sample volume of 20 ml. The uncertainty incorporates the sample standard deviation combined with the uncertainty calculated from homogeneity and stability studies.
To ensure sufficient homogeneity of the sample prior to use thoroughly mix by inversion.

**Names of certifying officers:**

Laboratory: Tihomir Stoyanov

Manager: Krassimira Taralova

*This document QF 5.17.1/1 version 1 is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31, ISO Guide 35,and Eurachem / CITAC Guides*

*This certificate relates solely to the lot number given above.*
*All processes (including generating of this certificate) are completely controlled by the specialized Computer-Aided-Manufacturing (CAM) software.*

*This Certified Reference Material was produced under a quality management system that is:*
*- Registered to ISO 9001 Quality Management System (Lloyd's Register Quality Assurance Ltd Cert No 0039638)*
*- Accredited according to ISO/IEC 17025 – Testing (ANAB Cert No AT-1836)*
*- Accredited according to ISO 17034 - Reference Material Producer (ANAB Cert No AR-1835)*

## Trace impurities in the actual solution reported in ppm:

(all values below are nominal and not certified)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ag | 0.004 | Cu | <0.0009 | La | <0.0024 | Pt | <0.0097 | Tb | <0.022 |
| Al | 0.006 | Dy | <0.0054 | Li | <0.0001 | Rb | <0.063 | Te | <0.031 |
| As | <0.016 | Er | <0.0035 | Lu | <0.0062 | Re | <0.0081 | Th | <0.014 |
| Au | <0.016 | Eu | <0.0039 | Mg | <0.0006 | Rh | <0.0038 | Ti | <0.0012 |
| B | <0.0078 | Fe | 0.008 | Mn | <0.001 | Ru | <0.0089 | Tl | <0.028 |
| Ba | * | Ga | <0.020 | Mo | <0.0024 | S | <0.071 | Tm | <0.0023 |
| Be | <0.0001 | Gd | <0.0028 | Na | 0.048 | Sb | <0.020 | U | <0.45 |
| Bi | <0.016 | Ge | <0.020 | Nb | <0.0066 | Sc | <0.0016 | V | <0.0018 |
| Ca | 0.018 | Hf | <0.0032 | Nd | <0.0058 | Se | <0.023 | W | <0.017 |
| Cd | <0.0012 | Hg | <0.024 | Ni | <0.0061 | Si | <0.037 | Y | <0.0007 |
| Ce | <0.0085 | Ho | <0.0053 | P | <0.048 | Sm | <0.0058 | Yb | <0.0003 |
| Co | <0.0028 | In | <0.098 | Pb | <0.021 | Sn | <0.050 | Zn | 0.004 |
| Cr | <0.0014 | Ir | <0.0061 | Pd | <0.033 | Sr | 0.006 | Zr | <0.0007 |
| Cs | <0.05 | K | <0.0095 | Pr | <0.0046 | Ta | <0.004 | | |

DOMINIQUE DUTSCHER SAS