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The experts in custom-made Certified Reference Materials

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

Solution of 23 components : 1000 mg/l each of Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn; Matrix: 10% HNO3

Lot N: XXXXXX
Barcode: XXXXXXXX

Ref N: N9303941.L1

Certification Date:XXXXXX

Component	Certified Value and uncertainty [mg/l]	Metrological traceability
Ag	1006.9 ± 2.8 (y)	NIST SRM No 3151 Lot 992212
Al	996.2 ± 3.9 (y)	NIST SRM No 3101a Lot 140903
B	1000.8 ± 4.3 (y)	NIST SRM No 3107 Lot 110830
Ba	1006.9 ± 4.8 (y)	NIST SRM No 3104a Lot 140909
Bi	1005.0 ± 3.7 (y)	NIST SRM No 3106 Lot 991212
Ca	1004.6 ± 2.3 (y)	NIST SRM No 3109a Lot 130213
Cd	998.2 ± 4.2 (y)	NIST SRM No 3108 Lot 130116
Co	1000.7 ± 3.9 (y)	NIST SRM No 3113 Lot 000630
Cr	1001.1 ± 4.6 (y)	NIST SRM No 3112a Lot 030730
Cu	997.8 ± 2.9 (y)	NIST SRM No 3114 Lot 121207
Fe	997.7 ± 4.1 (y)	NIST SRM No 3126a Lot 140812
Ga	1007.8 ± 3.8 (y)	NIST SRM No 3119a Lot 140124
In	1002.5 ± 3.2 (y)	NIST SRM No 3124a Lot 110516
K	1002.5 ± 3.6 (y)	NIST SRM No 3141a Lot 140813
Li	1003.5 ± 3.1 (y)	NIST SRM No 3129a Lot 100714
Mg	1002.1 ± 2.4 (y)	NIST SRM No 3131a Lot 140110
Mn	1005.0 ± 2.6 (y)	NIST SRM No 3132 Lot 050429
Na	1005.5 ± 2.3 (y)	NIST SRM No 3152a Lot 120715
Ni	1000.6 ± 4.0 (y)	NIST SRM No 3136 Lot 120619
Pb	1010.0 ± 6.7 (y)	NIST SRM No 3128 Lot 101026
Sr	994.9 ± 3.1 (y)	NIST SRM No 3153a Lot 990906
Tl	998.2 ± 5.3 (y)	NIST SRM No 3158 Lot 993012
Zn	995.4 ± 4.4 (y)	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* 1.085 g/cm^3 at 20°C

Starting Material, Purity*	Batch
Ag 99.996%	82094089
$Al(NO_3)_3$ 99.999%	82107611
H_3BO_3 99.999%	82079628
$BaCO_3$ 99.9955%	82088873
Bi 99.999%	82076030
$Ca(NO_3)_2$ 99.998%	82104108
Cd 99.999%	82088095
$Co(NO_3)_2$ 99.999%	82099909
$Cr(NO_3)_3$ 99.999%	82085827
$Cu(NO_3)_2$ 99.999%	82104160
Fe 99.99%	82108946

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

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Ga 99.984%	82088750
In 99.995%	82082383
KNO_3 99.998%	82104047
$LiNO_3$ 99.999%	82099602
$Mg(NO_3)_2$ 99.999%	82104078
$Mn(NO_3)_2$ 99.993%	82099220
$NaNO_3$ 99.99%	82107789
$Ni(NO_3)_2$ 99.999%	82085957
$Pb(NO_3)_2$ 99.997%	82103965
$Sr(NO_3)_2$ 99.994%	82099473
$TlNO_3$ 99.5%	82088941
Zn 99.99%	82102036

* *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/OES . 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/OES, AAS
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.

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:

This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.
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)

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- 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)

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