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CERTIFICATE OF ANALYSIS

Product: Standard Solution of: Al 100mg/l; Ba 5mg/l; Be 2mg/l; B 20mg/l; Cd 20mg/l; Cr 20mg/l; Co 50mg/l; Cu 20mg/l; Fe 20mg/l; Pb 200mg/l; Mn 10mg/l; Ni 50mg/l; Se 5mg/l; Tl 100mg/l; V 50mg/l; Zn 50mg/l; Matrix: 10% HNO_3

Batch 16470801

Quality Release Date 16.07.2015

MU0113

Expiry Date: 08.2016

Certified value/ Uncertainty:	Element	Certified Value and Uncertainty [mg/l]:	Metrological traceability:
	Al	98.04 ± 0.49 (a)	NIST SRM No 3101a Lot 060502
	Ba	4.922 ± 0.025 (a)	NIST SRM No 3104a Lot 070222
	Be	1.969 ± 0.011 (a)	NIST SRM No 3105a Lot 090514
	B	20.381 ± 0.097 (a)	NIST SRM No 3107 Lot 110830
	Cd	20.320 ± 0.121 (a)	NIST SRM No 3108 Lot 130116
	Cr	20.384 ± 0.130 (a)	NIST SRM No 3112a Lot 030730
	Co	49.65 ± 0.26 (a)	NIST SRM No 3113 Lot 000630
	Cu	19.641 ± 0.072 (a)	NIST SRM No 3114 Lot 121207
	Fe	19.636 ± 0.102 (a)	NIST SRM No 3126a Lot 051031
	Pb	201.58 ± 2.13 (a)	NIST SRM No 3128 Lot 101026
	Mn	10.001 ± 0.041 (a)	NIST SRM No 3132 Lot 050429
	Ni	50.85 ± 0.30 (a)	NIST SRM No 3136 Lot 120619
	Se	4.921 ± 0.055 (a)	NIST SRM No 3149 Lot 100901
	Tl	101.66 ± 1.34 (a)	NIST SRM No 3158 Lot 993012
	V	50.50 ± 0.25 (a)	NIST SRM No 3165 Lot 992706
	Zn	49.33 ± 0.31 (a)	NIST SRM No 3168a Lot 120629

Density: 1.048 g/cm^3 at 20 °C

Preparation
This certified reference material is produced in a clean room, using a highest purity starting material, acid from sub-boiling and 0.055 µS/cm deionized water. The low-density polyethylene bottle was decontaminated by leaching with high purity acids, 0.055 µS/cm deionized water and triple rinse.
The instructions of ISO Guide 34 were considered for the preparation of this solution.

Contains:

Al 99.999%	50 : Al[Al] :5N : T- : 5 : L06
$Ba(NO_3)_2$ 99.999%	1 : Ba[Ba(NO3)2] :H2O : T- : 5 : L06
$Be_4O(C_2H_3O_2)_6$ 99.999%	1 : Be[Be4O(C2H3O2)6] :2N0.5F : T- : 5 : M01
H_3BO_3 99.999%	5 : B[H3BO3] :H2O : T- : 5 : M05
Cd 99.999%	10[50] : Cd[Cd] : 5N : T- : 5 : M02-02
$Cr(NO_3)_3$ 99.999%	10 : Cr[Cr(NO3)3] :2N : T- : 5 : M01
Co 99.999%	10 : Co[Co] :5N : T- : 5 : K02
Cu 99.999%	10[40] : Cu[Cu] : 5N : T- : 5 : K07-04
Fe 99.99%	10[50] : Fe[Fe] : 5N : T- : 4 : L18-08
$Pb(NO_3)_2$ 99.999%	50 : Pb[Pb(NO3)2] :5N : T- : 5 : M02
Mn 99.993%	10 : Mn[Mn] :5N : T- : 43 : J05
Ni 99.995%	20 : Ni[Ni] :2N : T- : 45 : L07
Se 99.999%	1[10][60] : Se[Se] : 2N : TH2O : 5 : L01-07-04
Tl 99.99%	20 : Tl[Tl] :5N : T- : 4 : M02
NH_4VO_3 99.999%	10 : V[NH4VO3] :3N : T- : 5 : L11
Zn 99.99%	10[50] : Zn[Zn] : 5N : T- : 0 : M02-04

Traceability
The certified value was obtained using ICP/OES calibration according to calibration procedure (a) WQP 5.15.1.1
The calibration curve is drawn using a series of standard solutions prepared from a certified reference material traceable to NIST (SRM) and accredited by laboratories/producers in compliance with ISO/IEC 17025 and/or ISO Guide 34.

Uncertainty
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

Measurement
Batch value certified at the time of measurement.
The certified value is calculated by means of both gravimetric preparation and ICP-OES analysis.

Hazardous
The normal laboratory safety precautions should be observed when working with this standard.
Please refer to Safety Data Sheet (SDS) to further details.

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, mix thoroughly by shaking.

Storage and use
For ICP spectrometer calibration.
If stored unopened in the original packaging, this solution is stable for 3 years from the release date. Shelf life is also limited by the effect of transpiration of solvent through the unopened bottle walls at an average of <0.1% per year. Once the bottle is opened, keep tightly closed at room temperature in the original packaging.
Do not pipette directly from the bottle. Do not pour the used solution back in the bottle.
This standard can be used directly or can be diluted in an appropriate high-purity matrix.
Obtained concentration (in mg/l) after dilution is a result from the multiplication of certified value of standard concentration and the volume used for dilution and divided into the final volume used for dilution. We recommend that the material used be leached with acids.
We suggest rejecting the solution six months after opening.

This document 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.
The product is produced by laboratory accredited to ISO Guide 34 and ISO/IEC 17025

Signature:  (M. Canet)