Fisher Chemical

CERTIFICATE OF ANALYSIS

CERTIFIED REFERENCE MATERIAL

Solution of 28 components : 100 mg/l each of Al, Ag, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn; Matrix: 5% HNO3

Lot N: 1142882 Ref N: 12956213 Certification Date: 04.08.2025
Barcode: 17068857

Component	Certified Value and uncertainty [mg/l]	Metrological traceability
Al	100.03 ± 0.26 (y)	NIST SRM No 3101a Lot 140903
Ag	99.63 ± 0.31 (y)	NIST SRM No 3151 Lot 160729
As	100.25 ± 0.44 (y)	NIST SRM No 3103a Lot 100818
B	99.83 ± 0.32 (y)	NIST SRM No 3107 Lot 190605
Ba	100.24 ± 0.28 (y)	NIST SRM No 3104a Lot 140909
Be	99.86 ± 0.30 (y)	NIST SRM No 3105a Lot 090514
Bi	99.46 ± 0.38 (y)	NIST SRM No 3106 Lot 180815
Ca	100.70 ± 0.26 (y)	NIST SRM No 3109a Lot 130213
Cd	99.66 ± 0.33 (y)	NIST SRM No 3108 Lot 130116
Co	100.08 ± 0.36 (y)	NIST SRM No 3113 Lot 190630
Cr	99.95 ± 0.29 (y)	NIST SRM No 3112a Lot 170630
Cu	100.12 ± 0.25 (y)	NIST SRM No 3114 Lot 120618
Fe	99.52 ± 0.28 (y)	NIST SRM No 3126a Lot 140812
K	100.32 ± 0.27 (y)	NIST SRM No 3141a Lot 140813
Li	100.24 ± 0.31 (y)	NIST SRM No 3129a Lot 100714
Mg	99.71 ± 0.23 (y)	NIST SRM No 3131a Lot 140110
Mn	100.06 ± 0.25 (y)	NIST SRM No 3132 Lot 050429
Mo	100.04 ± 0.33 (y)	NIST SRM No 3134 Lot 130418
Na	100.14 ± 0.27 (y)	NIST SRM No 3152a Lot 200413
Ni	100.00 ± 0.65 (y)	NIST SRM No 3136 Lot 120619
Pb	100.05 ± 0.30 (y)	NIST SRM No 3128 Lot 101026
Sb	99.70 ± 0.33 (y)	NIST SRM No 3102a Lot 140911
Se	99.67 ± 0.53 (y)	NIST SRM No 3149 Lot 100901
Sr	100.39 ± 0.67 (y)	CPA CRM No SRNO3 Lot SL85028081
Ti	100.44 ± 0.25 (y)	NIST SRM No 3162a Lot 130925
Tl	99.95 ± 0.32 (y)	NIST SRM No 3158 Lot 151215
V	99.93 ± 0.32 (y)	NIST SRM No 3165 Lot 160906
Zn	100.01 ± 0.29 (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 testing methods among: Classical Volumetric,Primary Gravimetric, Instrumental (ICP, ICP/MS or IC)*

Density* 1.035 g/cm^3 at 20°C

Starting Material, Purity*	Batch
$Al(NO_3)_3$ 99.998%	82079390
$AgNO_3$ 99.995%	82107116
As 99.965%	82107215
H_3BO_3 99.999%	82107772
$Ba(NO_3)_2$ 99.998%	82123307
$Be_4O(C_2H_3O_2)_6$ 99.99%	82126612
Bi 99.991%	82123727

Fisher Scientific UK
Bishop Meadow Road, Loughborough, Leicestershire
LE11 5RG, United Kingdom
Website: www.fisher.co.uk
Tel.: +44(0)1509 55 59 54 Fax: +44(0)1509 55 55 44

$Ca(NO_3)_2$ 99.996%	82089283
Cd 99.99%	82093303
$Co(NO_3)_2$ 99.995%	82118662
$Cr(NO_3)_3$ 99.98%	82118365
$Cu(NO_3)_2$ 99.999%	82104900
$Fe(NO_3)_3$ 99.999%	82089825
KNO_3 99.996%	82079215
$LiNO_3$ 99.999%	82079697
$Mg(NO_3)_2$ 99.999%	82089221
$Mn(NO_3)_2$ 99.998%	82104955
$(NH_4)_6Mo_7O_{24}$ 99.993%	82107710
$NaNO_3$ 99.999%	82079253
$Ni(NO_3)_2$ 99.999%	82085711
$Pb(NO_3)_2$ 99.992%	82123222
Sb 99.99%	82118525
Se 99.974%	82118396
$SrCO_3$ 99.995%	82126438
$(NH_4)_2TiF_6$ 99.998%	82089641
$TlNO_3$ 99.993%	82104436
NH_4VO_3 99.991%	82079277
Zn 99.998%	82124014

** These values are not certified*

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

Expiry date: 04.09.2027

Concept of Certification and traceability statement:

This certified reference material (CRM) is produced using a high purity starting material, acid from sub-boiling and 18 MOhm deionised water and filtered through a 0.2 micron filter.

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 using 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, 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. If storage of a partially used bottle is necessary, the cap should be tightly sealed and the bottle should be stored in refrigerator to minimize transpiration rate. 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)
- Accredited according to ISO/IEC 17025
- Accredited according to ISO 17034