

CERTIFICATE

Aqueous calibration solution ASTASOL[®]

This Certificate is designed in accordance with ISO Guide 31

Category: Certified reference material

Analyte: Silver (Ag)

Product code: AN 9001 (1N)

Starting primary compound and its purity: Ag, 99.9999%

Matrix:

2% HNO₃ (v/v), prepared from sub boil distilled HNO₃ (ANALPURE[®]) and ultrapure demineralized water (resistivity $\geq 18\text{M}\Omega\cdot\text{cm}$, 0.22 μm filtered)

Density and its expanded uncertainty (k = 2): $1.0102 \pm 0.0005 \text{ g/cm}^3$ (at 20 °C)

Certified value of concentration and its expanded uncertainty (k = 2) at 20 °C

1 000 \pm 2 mg/l

990 \pm 3 mg/kg*

*Mass fraction in mg/kg is derived from density

Specification:

Batch No.: 9008

The date of production: 03.02.2020

Shelf life: 3 years from the date of production

The date of first opening of the bottle:

Expiry date:.....12 months from the first opening of the bottle within shelf life period, which should be indicated on the label of the bottle as well.

Intended use:

For calibration and validation of analytical methods analysing aqueous solutions such as atomic spectrometry (AAS, AES, ICP-OES, ICP-MS), molecular absorption spectrometry and selected electroanalytical methods.

Certification and traceability:

This CRM is certified on the basis of gravimetric preparation. This procedure also ensures a direct traceability to SI unit – kg. Certified concentration, its uncertainty and traceability were verified by gravimetric determination of silver (as AgCl) and by simultaneous determination of silver in independent reference solution (SRM NIST 3151).

Trace impurities in bottled solution (in mg/l):

Determination of trace impurities was performed by AAS, ICP-OES and ICP-MS. Impurity levels are supplied only for information of the user and should not be used as calibration data.

Li	Be											B	C	N	O	F
<0,01	<0,002											< 0,1	N.A	M	M	N.A
Na	Mg											Al	Si	P	S	Cl
<0,05	<0,005											<0,01	<0,1	<0,1	<0,5	N.A
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br
<0,02	<0,05	<0,05	<0,01	<0,01	<0,01	<0,005	<0,001	<0,02	<0,02	<0,001	<0,001	<0,1	<0,02	<0,001	<0,1	N.A
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I
<0,05	<0,01	<0,05	<0,01	<0,05	<0,02	N/A	<0,05	<0,1	<0,001	A	<0,001	<0,05	<0,001	<0,001	<0,1	N.A
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi		
<0,05	<0,01	<0,05	<0,1	<0,05	<0,05	<0,02	<0,2	<0,2	<0,05	<0,001	<0,001	<0,1	<0,001	<0,001		
Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
<0,5	<0,1	<0,05	<0,02	<0,01	<0,1	<0,05	<0,05	<0,1	<0,05	<0,01	<0,01	<0,02				
Th	U															
<0,1	<0,1															

M = matrix

N.A = not analysed

< x = bellow detection limit

A = analyte

Homogeneity and stability:

It has been demonstrated that this CRM is homogeneous and its stability is guaranteed during the whole shelf life provided the solution it kept under conditions presented bellow.

Storing and instruction for use:

This CRM has to be stored in the original closed bottle between 5 – 30 °C. The producer guarantees a declared shelf life and expiration time provided the CRM is properly stored and professionally handled. The temperature of the solution must be 20 ± 0.5 °C before every use. It is necessary to indicate the expiration time, which depends on the date of the first time the bottle was opened. It is important to cover the screw cap and the neck of the bottle with a parafilm layer after each opening to prevent vapour phase losses. It is not recommended to use the standard solution when the bottle contains less than 10 % of the solution. Therefore, in case of nontransparent bottle, it is important to indicate the amount of the solution used, e.g. on the label. Do not pipette from the bottle. Do not return removed aliquots to bottle.

Note:

Detailed information about the production, homogeneity, stability, coding, characterization and storing of this CRM are described in Annex to this Certificate which is its integral part.

Producer:

ANALYTIKA[®], spol. s r.o.
Department of reference materials
Ke Klíčovu 2a/816
190 00 Prague 9 – Vysočany
Czech Republic

www.analytika.net
sales@analytika.net

Phone/Fax: +420 286 589 616

Quality management systems:

ČSN EN ISO 9001:2016
ČSN EN ISO/IEC 17025:2018
ČSN EN ISO 17034:2017



Analytika, spol. s r.o., Department of RM, Reference Materials Producer No. 7501 accredited by CAI according to ČSN EN ISO 17034:2017

Manager of Department of RM:

Ing. Daniela Weissnerová

Head of production department:

Mgr. Mirka Petránková

Date of the first issue: 03.02.2020

Revision:

Date of revision:

Version: 01