

## CERTIFIED REFERENCE MATERIAL

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<sup>[1]</sup>, ISO Guide 35<sup>[2]</sup>, and Eurachem / CITAC Guides<sup>[3]</sup>

Lot N: 404665

Barcode: 83090745

Certification Date: 2015-Dec-11  
Date of Stability last check: 08.11.2017

### Description of the Reference Material (CRM):

**Solution of:** Silver (Ag) concentration 1.000 g/l in 2% Nitric Acid (HNO<sub>3</sub>)

**Material Number:**

86659.180

**Certified value/  
Uncertainty:**

Element

Certified Value and  
Uncertainty [mg/l]:

Metrological traceability:

Ag

1002.0 ± 4.4 <sup>(a)</sup>

NIST SRM No 3151 Lot 992212

### Method(s) of certification used:

CRM's calibration procedure(s):

Notes:

(a) WQP 5.15.1.1

The certified value was obtained using ICP/OES or ICP/MS calibration

### 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<sup>[5]</sup>). The metrological traceability is assured through calibration on AAS. The calibration curve is drawn using a series of standard solutions prepared from a certified reference material traceable to SI of NIST (SRM) and of accredited according to ISO/IEC 17025<sup>[6]</sup> and/or ISO 17034<sup>[7]</sup> laboratories/producers. 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 daily checked. 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.

### Starting material :

Ag

Ag - 83090745

**Density \*:**

1.016 g/cm<sup>3</sup> at 20 °C

**Minimum shelf-life:**

06.2020 (unopened bottle in aluminized bag)

**Date of opening:**

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

\* These values are not certified

### Intended use: For Laboratory Use Only

Calibration of AAS

Preparation of "working reference samples"

This statement is not intended to restrict the use for other purposes.

Validation of analytical methods

Detection limit and linearity studies

### 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:

Storage conditions: To be stored under normal laboratory conditions

This CRM is with a guaranteed stability until  $\pm 0.5\%$  of the certified concentration within its shelf-life. Stability is guaranteed provided that the solution is kept in its original packaging, tightly closed as written in Storage conditions. According to an in-house procedure the producer will monitor this CRM at appropriate intervals and the purchasers will be notified of any significant changes resulting in recertification or with withdrawal of the CRM during the state period of the validity of the certificate.

The original packaging consists of the bottle & its aluminized bag. The aluminized bag is an inseparable part of the unit packing of the CRM.

**Hazardous situation:**

The normal laboratory safety precautions should be observed when working with this RM. Further details for the handling of this RM 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 officer:**

Manager:  Krassimira Taralova

[1] ISO Guide 31: Reference materials - Contents of certificates, labels and accompanying documentation

[2] ISO Guide 35: Reference materials - General and statistical principles for certification

[3] EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement

[4] ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories

[5] ISO 17034: General Requirements for the Competence of Reference Material Producers

*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)