

# Certificate of Analysis

## Certificate of Analysis

### CERTIFIED REFERENCE MATERIAL

Solution of Mercury (Hg) concentration 1.000 g/l in 5% Nitric Acid (HNO<sub>3</sub>)

Lot N: CXXXXXX  
Barcode: 84469199

Ref N: M224.5NP

Certification Date: 07.01.2019

Component	Certified Value and uncertainty [mg/l]	Metrological traceability
Hg	998.9 ± 8.1 <sup>(a)</sup>	NIST SRM No 3133 Lot 061204

Notes:

(a) WQP 5.15.1.1 *The certified value was obtained using ICP/OES or ICP/MS calibration*

Density\* 1.050 g/cm<sup>3</sup> at 20°C

Starting Material, Purity*	Batch
HgO 99.999%	82082239

\* *These values are not certified*

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

Shelf-life: 02.2021

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-MS. 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-MS, ICP-OES

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:**

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:**

*Responsible for quality control: B. COULANGE\**

*\*This certificate has been computer generated and does not signated*

*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 – Testing (ANAB Cert No AT-1836)
- Accredited according to ISO 17034 - Reference Material Producer (ANAB Cert No AR-1835)

**Trace impurities in the actual solution reported in ppm:**

(all values below are nominal and not certified)

Ag	0.001	Cu	<0.0009	La	<0.0024	Pt	<0.0097	Tb	<0.022
Al	<0.0018	Dy	<0.0054	Li	<0.0001	Rb	<0.063	Te	<0.031
As	0.029	Er	<0.0035	Lu	<0.0062	Re	<0.0081	Th	<0.014
Au	<0.016	Eu	<0.0039	Mg	0.004	Rh	<0.0038	Ti	<0.0012
B	<0.0078	Fe	0.03	Mn	<0.001	Ru	<0.0089	Tl	<0.028
Ba	<0.0005	Ga	<0.020	Mo	0.005	S	<0.071	Tm	<0.0023
Be	<0.0001	Gd	<0.0028	Na	<0.007	Sb	<0.020	U	<0.45
Bi	<0.016	Ge	<0.020	Nb	<0.0066	Sc	<0.0016	V	<0.0018
Ca	0.01	Hf	<0.0032	Nd	<0.0058	Se	<0.023	W	<0.017
Cd	<0.0012	Hg	*	Ni	<0.0061	Si	0.03	Y	<0.0007
Ce	<0.0085	Ho	<0.0053	P	<0.048	Sm	<0.0058	Yb	<0.0003
Co	<0.0028	In	<0.098	Pb	<0.021	Sn	<0.050	Zn	<0.0032
Cr	<0.0014	Ir	<0.0061	Pd	<0.033	Sr	<0.00006	Zr	<0.0007
Cs	<0.05	K	<0.0095	Pr	<0.0046	Ta	<0.004		