Supelco®

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Certified Reference Material
Reference material certificate

Phosphorus Standard for AAS

TraceCERT®
Traceable Certified Reference Materials

Product no.:	51474
Lot no.:	BCCK3495
Description of CRM:	Phosphoric acid (pure material) in high-purity water (18.20 MΩ·cm, 0.22 µm filtered).
Expiry date:	APR 2026
Storage:	Store at 5°C-25°C
Density (certified) at 20°C:	1000.1 kg m^{-3} ± 0.5 kg m^{-3}

Constituent	Certified values at 20°C and expanded uncertainties, $U = k \cdot u$ ($k = 2$) [1][2]	
Phosphorus	**1001 mg kg^{-1} ± 4 mg kg^{-1}**	**1001 mg L^{-1} ± 4 mg L^{-1}**

Metrological traceability:	Directly traceable to NIST SRM 84l. [3]
Measurement method:	The certified value is established by acidimetric titration in accordance with ISO/IEC 17025.[4]
Intended use:	Calibration of AAS, ICP spectrophotometry or any other analytical technique.
Instructions for handling and correct use:	The bottle's temperature must be 20°C. Shake well before every use. If storage of a partially used bottle is necessary (at the user`s risk), the cap should be tightly sealed and the bottle should be stored at reduced temperature (e.g. refrigerator) to minimize transpiration rate.
Health and safety information:	Please refer to the Safety Data Sheet for detailed information about the nature of any hazard and appropriate precautions to be taken.
Packaging:	250 mL HDPE bottle
Accreditation:	Sigma-Aldrich Production GmbH is accredited by the Swiss Accreditation Service SAS as reference material producer under no. SRMS 0001 in accordance with international standard ISO 17034[5]
Certificate issue date:	16 MAY 2023

SWISS ACCREDITATION sas.admin.ch SRMS 0001

ISO 17034
SRMS 0001

S. Matt – CRM Operations

Dr. P. Zell – Approving Officer

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Digitally signed by Pîslaru Rodica
Date: 2024.01.17 20:14:23 EET
Reason: MoldSign Signature
Location: Moldova

Certification process details:

The certified value of the content (mg/kg) is determined using acidimetric titration. The mean value is based on seven individual measurements. All measurements are traced gravimetrically to an internationally accepted reference material e.g. from NIST (USA) or BAM (Germany).

Homogeneity assessment:

Due to the production process, a homogeneous solution derives. Nevertheless a small homogeneity contribution is included into the calculation of content uncertainty of this CRM.

Density Measurement:

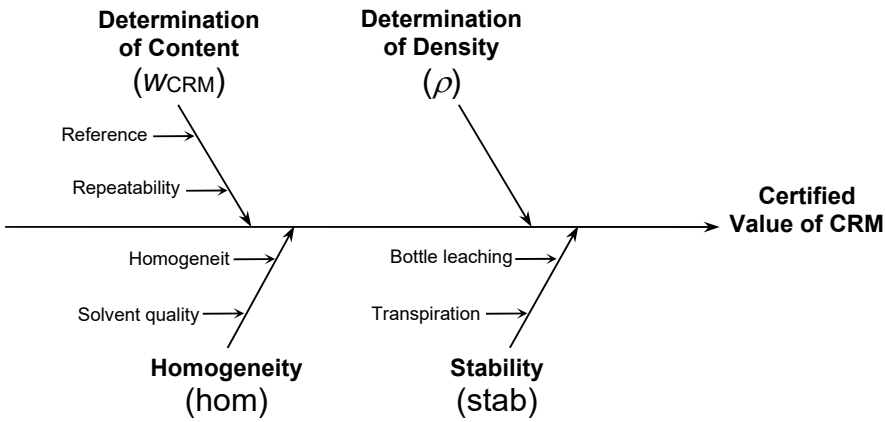
The density measurement is carried out under the scope of the ISO/IEC 17025 accreditation according to ISO 15212-1 [6] and using the digital density meter DMA 4500M from Anton Paar with an oscillating U-tube installed. The measurement uncertainty is calculated according to Eurachem/CITAC Guide and reported as combined expanded uncertainty at the 95% confidence level, using a coverage factor of k = 2.

Uncertainty evaluation:

The uncertainty contributions are illustrated by the following cause-effect diagram:

Typical relative contributions are:

$u(w_{CRM})$	0.1 – 0.3 %
u_{hom}	< 0.03 %
u_{stab}	< 0.2 %
$u(\rho)$	< 0.05 %



The combined standard uncertainty is calculated by combination of the standard uncertainties of the input estimates according to Eurachem/CITAC Guide "Quantifying Uncertainty in Analytical Measurement" and ISO 17034.[2][5]

Expanded uncertainty is then calculated to a confidence level of 95%, typically by multiplying with a confidence level factor of k=2.

References:

[1] ISO Guide 35:2017, "Reference materials - Guidance for characterization and assessment of homogeneity and stability"
[2] Eurachem/CITAC Guide, 3rd Ed. (2012), "Quantifying uncertainty in analytical measurement"
[3] Eurachem/CITAC Guide, 2nd Ed. (2019), "Metrological Traceability in chemical measurement"
[4] The accredited testing laboratory STS 0490 performs the measurements and weighing steps for the certification of this CRM under ISO/IEC 17025:2017, "General requirements for the competence of testing and calibration laboratories"
[5] ISO 17034:2016, "General requirements for the competence of reference material producers"
[6] DIN EN ISO 15212-1:1998, Oscillation-type density meters - Part 1: Laboratory instruments

Certificate of analysis revision history:

Certificate version	Certificate issue date	Reason for version
01	16 MAY 2023	Initial version

Disclaimer:

The purchaser must determine the suitability of this product for its particular use. Sigma-Aldrich Production GmbH makes no warranty of any kind, express or implied, other than its products meet all quality control standards set by Sigma-Aldrich Production GmbH. We do not guarantee that the product can be used for a special application.