## **Specification – Certified Reference Material**

## **Volumetric Standards**

**Certified Reference Material for standardization of volumetric solutions** 

## **Accreditation:**





Merck KGaA, Darmstadt, Germany is accredited by the German accreditation authority as registered reference material producer (D-RM-15185-01-00) in accordance with **ISO 17034**.

**Producer:** Merck KGaA, Frankfurter Str. 250, 64293 Darmstadt, Germany

**Description of CRM:** Volumetric Standards

Certified Reference Materials for standardization of volumetric solutions

**Storage:** +15°C to +25°C tightly closed in the original container

Analyte	Expiry date	Specification as mass fraction	Associated uncertainty*, U=k·u (k=2)
Potassium hydrogen phthalate	5 years	≥ 99.80%	0.10%
Benzoic acid	5 years	≥ 99.80%	0.10%
Iron(II)ethylenediammonium sulfate	3 years	≥ 99.50%	0.35%
Potassium dichromate	5 years	≥ 99.90%	0.10%
Potassium iodate	5 years	≥ 99.70%	0.10%
Sodium carbonate	5 years	≥ 99.80%	0.10%
Sodium chloride	5 years	≥ 99.85%	0.10%
di-Sodium oxalate	5 years	≥ 99.70%	0.10%
Tris(hydroxymethyl)amino- methane	5 years	≥ 99.80%	0.10%
Zinc	5 years	≥ 99.90%	0.10%
Calcium carbonate	5 years	≥ 99.90%	0.10%

<sup>\*</sup> The uncertainty can vary depending on the primary reference material.



Metrological traceability: Directly traceable to the corresponding / suitable primary standard NIST SRM

NIST: National Institute of Standards and Technology, Gaithersburg, USA

Measurement method: The certified mass fraction was determined by potentiometric titration.

These volumetric standards are intended for standardisation of volumetric Intended use:

solutions in accordance / relation to the chapter reagents of the Pharmacopoeia

(Ph. Eur., USP where applicable).

## Associated uncertainty:

The associated uncertainty  $U_{CRM}$  reported with the certified values is calculated as combined expanded uncertainty  $U_{\text{CRM}} = k \cdot u_{\text{CRM}}$  in accordance with GUM and EA-4/02, with k=2 as the coverage factor for a 95% coverage probability.

The combined uncertainty  $u_{CRM}$  is derived from combination of the squared uncertainty contributions:

 $\mathbf{u}_{\text{CRM}} = \sqrt{\mathbf{u}^2_{\text{characterisation}} + \mathbf{u}^2_{\text{homogeneity}} + \mathbf{u}^2_{\text{stability}}$ 

is the uncertainty in accordance with DIN EN ISO/IEC 17025 which includes the **u**<sub>characterisation</sub>:

contributions of the primary reference material and the measuring system. The characterisation measurements have been conducted by our DAkkS accredited

calibration laboratory.

is the between-bottle variation in accordance with ISO 17034. The assessment of **U**homogeneity:

homogeneity is performed by analysis of a representative number of systematically

chosen sample units.

is the uncertainty obtained from short-term and long-term stability in accordance u<sub>stability</sub>:

with ISO 17034. The stability studies are the basis for the quantification of the

expiry date of this reference material for the unopened bottle.

Detailed information is provided by the certificates and the certification report on our website.

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