Specification – Certified Reference Material

Certipur® Buffer solution pH 4.01 (25°C)

Certified Reference Material for pH measurement

Accreditation:

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-RM-15185-01-00

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
Product no.:	1.09406.0500
Description of CRM:	Certipur® Buffer solution pH 4.01 (25°C) Certified Reference Material for pH measurement
Expiry date:	3 years
Storage:	+15°C to +25°C tightly closed in the original container
Composition:	potassium hydrogen phthalate

Specification	Associated uncertainty, $U=k\cdot u$ ($k=2$)
pH value 4.00 – 4.02	**±0.02 (25°C)**

Metrological traceability: The pH value of this certified buffer solution is directly traceable to primary certified reference materials characterised by PTB and verified by SRMs from NIST.
NIST 189x, 188x, 185x, 186 Ix, 186 IIx, 187x
PTB OX-xxx/xx, TA-xxx/xx, PHT-xxx/xx, PHO-xxx/xx, BO-xxx/xx
PTB: Physikalisch Technische Bundesanstalt, Braunschweig, Germany
NIST: National Institute of Standards and Technology, Gaithersburg, USA

Measurement method: pH value is measured with a combined glass electrode after 5-point calibration according to DIN 19268 with reference buffer solutions according to DIN 19266, IUPAC, NIST, Ph.Eur. and USP.

Intended use:	This certified reference material is intended for use as a calibration standard for pH instruments or pH electrodes or as a control sample for measuring the pH value.
Instructions for handling and correct use:	The pH value is strongly dependent on the temperature. It is therefore necessary to keep the temperature constant within the measurement.
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.
Preparation:	This certified reference material is prepared gravimetrically from potassium hydrogen phthalate and high purity water.

Associated uncertainty:

The expanded uncertainty U_{CRM} is calculated as $U_{CRM}=k \cdot u_{CRM}$, where $k=2$ is the coverage factor for a 95% coverage probability and u_{CRM} is the combined standard uncertainty in accordance to ISO 17034.

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

$$u_{CRM} = \sqrt{u^2_{Characterisation} + u^2_{Homogeneity} + u^2_{Stability}}$$

$u_{characterisation}$:	is the uncertainty in accordance with DIN EN ISO/IEC 17025 which includes e. g. contributions of the primary reference material and the measuring system.
$u_{homogeneity}$:	is the between-bottle variation in accordance with ISO 17034. The assessment of homogeneity is performed by analysis of a representative number of systematically chosen sample units.
$u_{stability}$:	is the uncertainty obtained from short-term and long-term stability in accordance with ISO 17034. The stability studies are the basis for the quantification of the expiry date of this reference material for the unopened bottle.

Informative values:

Temperature dependence[1]:

Temperature [°C]	Δ pH
5	- 0.01
10	- 0.01
15	- 0.01
20	- 0.01
25	± 0.00
30	± 0.00
35	+ 0.02
40	+ 0.02
45	+ 0.04
50	+ 0.05

[1]Temperature deviation data provided for reference only. Values are not batch-specific and should not be considered certified values.

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