Specification

Certipur® Certified Reference Material

Producer:	**Merck KGaA, Frankfurter Str. 250, 64293 Darmstadt, Germany.**
Accreditation:	Merck KGaA, Darmstadt, Germany is accredited by the German accreditation authority DAkkS as registered reference material producer D-RM-15185-01-00 in accordance with **ISO Guide 34** and registered calibration laboratory D-K-15185-01-00 according **to DIN EN ISO/IEC 17025.**
Description of CRM:	**Buffer solution pH 10.00 yellow (20°C)** **Certified Reference Material for pH measurement**
Ordering number:	1.09400.0500
Lot number:	example
Composition:	boric acid / potassium chloride / sodium hydroxide
Certified value and uncertainty	**pH value 9.98 - 10.02 ± 0.03 (20°C)** pH value with expanded uncertainty U_{CRM}
Method of Analysis:	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.
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.*
Preparation:	This reference material is prepared gravimetrically from boric acid, potassium chloride, sodium hydroxide and high purity water.
Storage:	Store at +15°C to +25°C tightly closed in the original container.
Minimum shelf life:	3 years

(Laboratory manager)

Application and correct use: This 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. The pH value is strongly dependent on the temperature. It is therefore necessary to keep the temperature constant within the measurement. Details concerning the nature of any hazard and appropriate precautions to be taken are provided in the material safety data sheet.

Expanded uncertainty U_{CRM}: 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 Guide 34.

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

The combined standard uncertainty u_{CRM} is obtained from the standard uncertainties of the characterisation, the homogeneity and the stability.

$u_{Characterisation}$ is the uncertainty in accordance to DIN EN ISO/IEC 17025 which includes the contributions of the primary reference material and the measuring system.

$u_{Homogeneity}$ is the between-bottle variation in accordance to ISO Guide 34. 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 to ISO Guide 34. The stability studies are the basis for the quantification of the minimum shelf life of this reference material for the unopened bottle.

Further information:

Temperature dependence (example):

Temperature [°C]	ΔpH
0	+ 0.24
5	+ 0.16
10	+ 0.11
15	+ 0.05
20	± 0
25	- 0.05
30	- 0.09
35	- 0.12
40	- 0.15
50	- 0.21

For more detailed information please read the certification report on www.merckmillipore.com