

## Specification – Certified Reference Material

### Certipur® Certified secondary standard reference buffer solution pH(S)=6.86<sub>5</sub> (25°C)

Certified Reference Material for pH measurement

#### Accreditation:



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**.

<b>Producer:</b>	Merck KGaA, Frankfurter Str. 250, 64293 Darmstadt, Germany
<b>Product no.:</b>	1.07202.0105
<b>Description of CRM:</b>	Certipur® Certified secondary standard reference buffer solution pH(S)=6.86 <sub>5</sub> (25°C) Certified reference material for pH measurement
<b>Expiry date:</b>	3 years
<b>Storage:</b>	+15°C to +25°C tightly closed in the original container
<b>Composition:</b>	Potassium dihydrogen phosphate / di-sodium hydrogen phosphate in water Formulation in compliance with DIN 19266, IUPAC, NIST, Ph. Eur; USP Molality: 0.025 mol/kg / 0.025 mol/kg

Temperature [°C]	Specification as pH	Associated uncertainty $U_{CRM}=k \cdot u_{CRM}$ ( $k=2$ ) as pH
5.0	6.941 – 6.961	± 0.008
10.0	6.913 – 6.933	± 0.008
15.0	6.890 – 6.910	± 0.008
20.0	6.871 – 6.891	± 0.008
<b>25.0</b>	<b>6.855 – 6.875</b>	<b>± 0.008</b>
30.0	6.843 – 6.863	± 0.008
37.0	6.832 – 6.852	± 0.008
40.0	6.828 – 6.848	± 0.009
45.0	6.825 – 6.845	± 0.009
50.0	6.824 – 6.844	± 0.009

**Metrological traceability:** This certified secondary standard reference material is directly traceable to primary certified reference material potassium dihydrogen phosphate / di-sodium hydrogen phosphate characterised by PTB-PHOA-xxx/xxxxx/xx and NIST 186x +IIX.  
*PTB: Physikalisch Technische Bundesanstalt, Braunschweig, Germany*  
*NIST: National Institute of Standards and Technology, Gaithersburg, USA*



<b>Method of analysis:</b>	The pH value is directly measured by differential potentiometry with the aid of two platinum hydrogen electrodes “quasi without transference” according to IUPAC <sup>1</sup> recommendations against solutions prepared from primary reference materials characterised by PTB and NIST.
<b>Intended use:</b>	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.
<b>Instructions for handling and correct use:</b>	The formulation is compliant to DIN 19266, IUPAC <sup>1</sup> , NIST <sup>2</sup> and Ph. Eur. chapter 2.2.3 and USP chapter<791>.
<b>Health and safety information:</b>	Please refer to the Safety Data Sheet for detailed information about the nature of any hazard and appropriate precautions to be taken.
<b>Preparation:</b>	This certified reference material is prepared gravimetrically from potassium dihydrogen phosphate, di-sodium hydrogen phosphate and high purity water. The formulation is compliant to DIN 19266, IUPAC <sup>1</sup> , NIST <sup>2</sup> , Ph. Eur. chapter 2.2.3. and USP chapter<791>.

#### Associated uncertainty:

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

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

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

<b><math>u_{\text{characterisation}}</math>:</b>	is the uncertainty in accordance with DIN EN ISO/IEC 17025 which includes the contributions of the primary reference material and the measuring system. The characterisation measurements have been conducted by our DAkkS accredited calibration laboratory.
<b><math>u_{\text{homogeneity}}</math>:</b>	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.
<b><math>u_{\text{stability}}</math>:</b>	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.

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

<sup>1</sup> R.P. Buck, et al.: The Measurement of pH – **Definition, Standards and Procedures (IUPAC Recommendations 2002)**, Pure Appl. Chem, Vol 74, No. 11, pp. 2169-2200, 2002

<sup>2</sup> Y. Ch. Wu, W. F. Koch, R. A. Durst: **Standardization of pH Measurements**, NBS Special Publication 260-53, 1988

