

Certified Reference Materials

Ready-to-use Certipur[®] buffer solutions in Titripac[®] system

Manufacturer:

Merck KGaA, Frankfurter Str. 250,
64293 Darmstadt, Germany,
Tel. +49 (0) 6151 720

Technical data:

- Available pH values: 1 - 12
- Packaging: 4 L and 10 L Titripac[®]
- Shelf life: at minimum two years

Availability of buffer solution CRMs in Titripac[®] system:

Buffer solution CRMs certified at 20 °C

Article	pH	Specification	U_{CRM} *	Titripac [®] 4 L (x.xxxxx.4000)	Titripac [®] 10 L (x.xxxxx.9010)
1.09433	2.00	1.99 – 2.01	± 0.02	x	x
1.09435	4.00	3.99 – 4.01	± 0.02	x	x
1.09475 (red)	4.00	3.99 – 4.01	± 0.02	x	x
1.09437	6.00	5.99 – 6.01	± 0.02	x	
1.09439	7.00	6.99 – 7.01	± 0.02	x	x
1.09477 (green)	7.00	6.99 – 7.01	± 0.02	x	x
1.09460	8.00	7.99 – 8.01	± 0.02	x	
1.09461	9.00	8.99 – 9.01	± 0.02	x	x
1.09476 (blue)	9.00	8.99 – 9.01	± 0.02	x	x
1.09438	10.00	9.98 – 10.02	± 0.02	x	x
1.09400 (yellow)	10.00	9.98 – 10.02	± 0.02	x	x

*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 standard uncertainty u_{CRM} is obtained from the standard uncertainties of characterization, homogeneity and stability.

Buffer solution CRMs certified at 25 °C

Article	pH	Specification	U_{CRM} *	Titripac [®] 4 L (x.xxxxx.4000)
1.09441	1.00	0.99 – 1.01	± 0.02	x
1.09442	2.00	1.99 – 2.01	± 0.02	x
1.09444	3.00	2.99 – 3.01	± 0.02	x
1.09445	4.00	3.99 – 4.01	± 0.02	x
1.99054 (red)	4.00	3.99 – 4.01	± 0.02	x
1.09406	4.01	4.00 – 4.02	± 0.02	x
1.09446	5.00	4.99 – 5.01	± 0.02	x
1.99036	6.00	5.99 – 6.01	± 0.02	x
1.09407	7.00	6.99 – 7.01	± 0.02	x
1.99057 (yellow)	7.00	6.99 – 7.01	± 0.02	x
1.99038	8.00	7.99 – 8.01	± 0.02	x
1.09408	9.00	8.99 – 9.01	± 0.02	x
1.09409	10.00	9.98 – 10.02	± 0.02	x
1.99050 (blue)	10.00	9.98 – 10.02	± 0.02	x
1.99041	11.00	10.98 – 11.02	± 0.03	x
1.99022	12.00	11.98 – 12.02	± 0.03	x

*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 standard uncertainty u_{CRM} is obtained from the standard uncertainties of characterization, homogeneity and stability.

Application of pH buffer solution CRMs:

The pH value of aqueous solutions is a measure of their acidic or alkaline character. The pH scale includes pH values from 0 up to 14. It is subdivided in acidic (pH values 0 up to lower than 7), neutral (pH value of 7) and alkaline (pH values higher than 7 up to 14) regions. Nowadays the pH value is typically measured by using a pH meter. A pH meter compares the measured pH value of any samples to the before carried out calibration by using buffer solution CRMs. To reach consistent results and depending on the needed accuracy it is necessary to calibrate the instrument per working day. It is recommended to take at least three commercially available buffer solution CRMs for calibration. The expected pH value of the following sample measurement should be within the range of the lower and upper selected buffer solution during instrument calibration.

References:

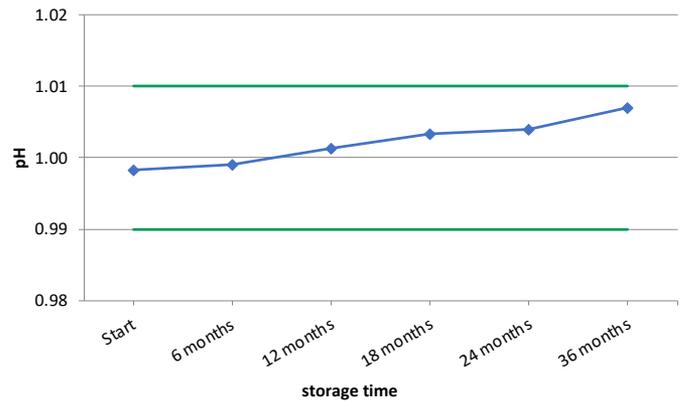
Certipur® buffer solution CRMs are prepared gravimetrically from high purity salts, acids and bases diluted in high purity water. The pH-value is measured with a combined glass electrode after 5-point-calibration according to DIN 19268 with reference buffer solutions according to DIN 19266, IUPAC, NIST, Ph.Eur. and USP.

Stability of buffer solution CRMs in Titripac® system:

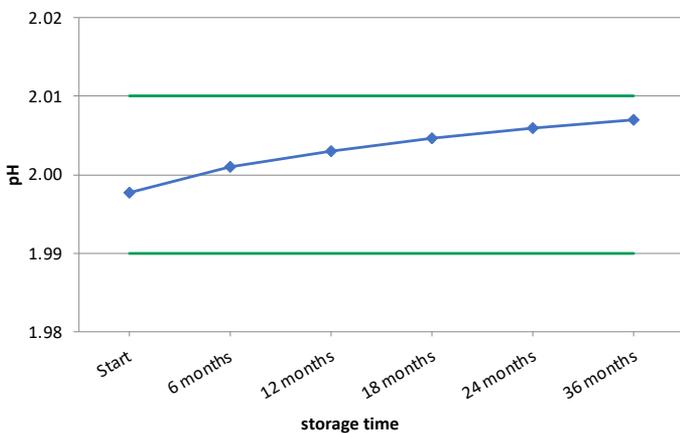
The stability of Ready-to-Use Certipur® pH Buffer solutions in Titripac® systems were tested under daily routine conditions. Every 3- or 6- months, the pH value was measured with a combined glass electrode after 5-point-calibration according to DIN 19268 with reference buffer solutions according to DIN 19266, IUPAC, NIST, Ph.Eur. and USP.

The following diagrams show the measured pH values of the mentioned buffer solution CRMs in the available Titripac® system over the shelf life of each product. All products are stable in the available packaging as shown below.

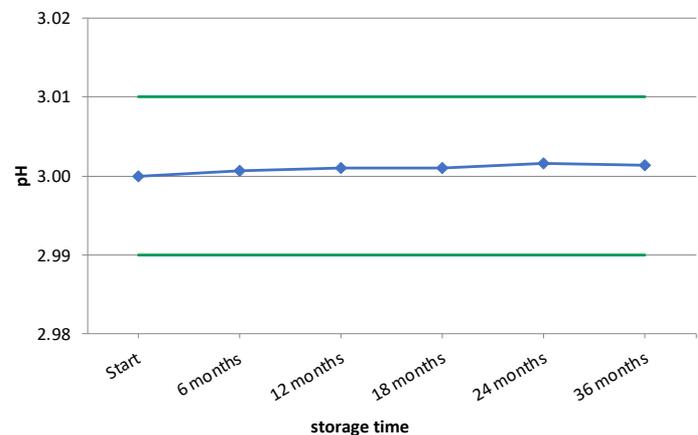
Buffer solution pH 1.00 in 4 L-Titripac® system



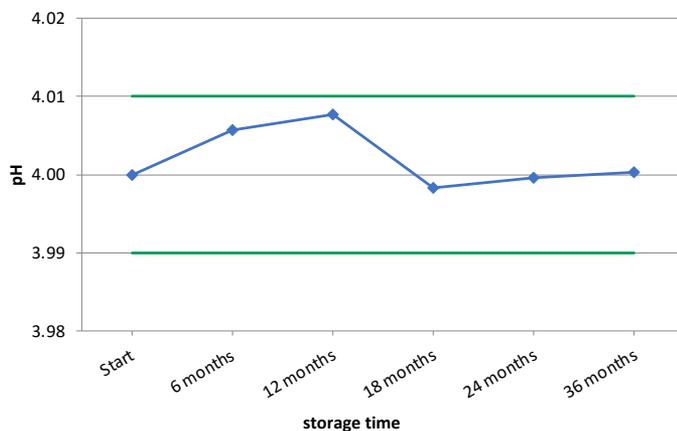
Buffer solution pH 2.00 in 4 L-Titripac® system



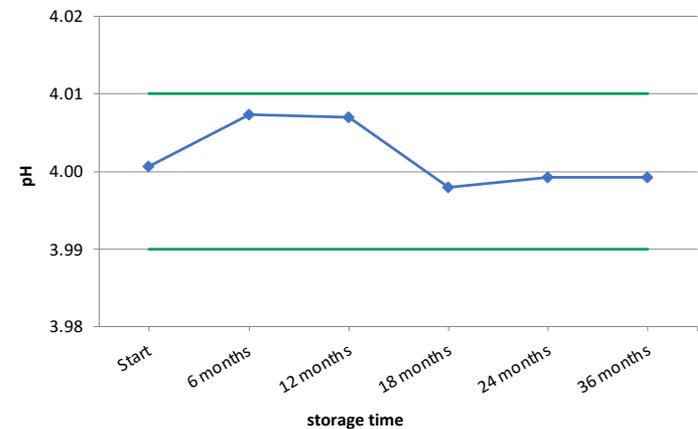
Buffer solution pH 3.00 in 4 L-Titripac® system

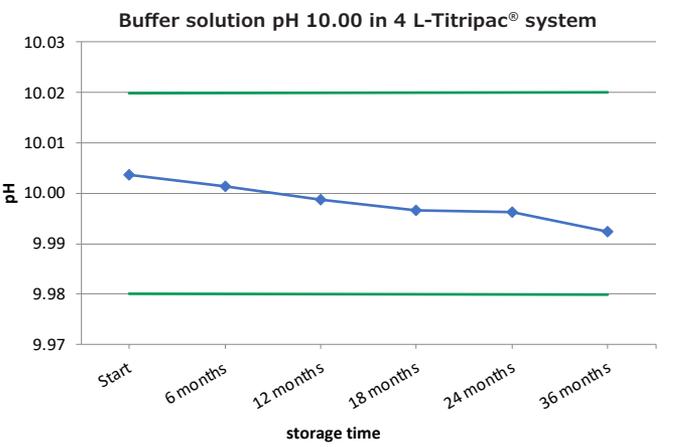
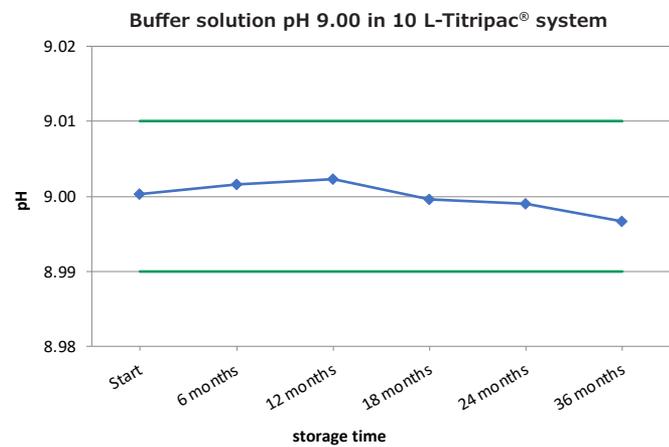
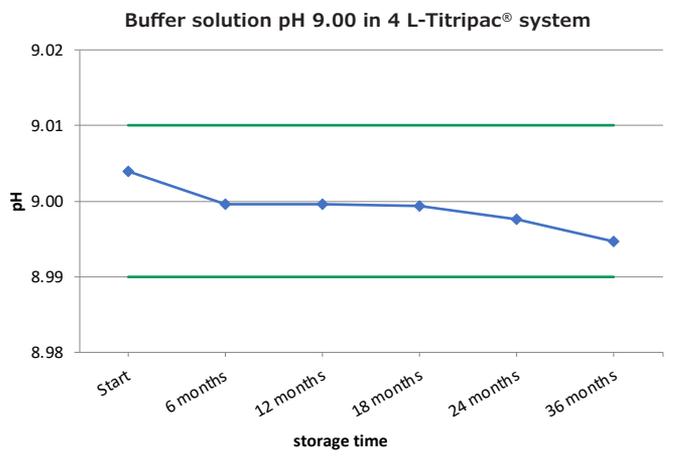
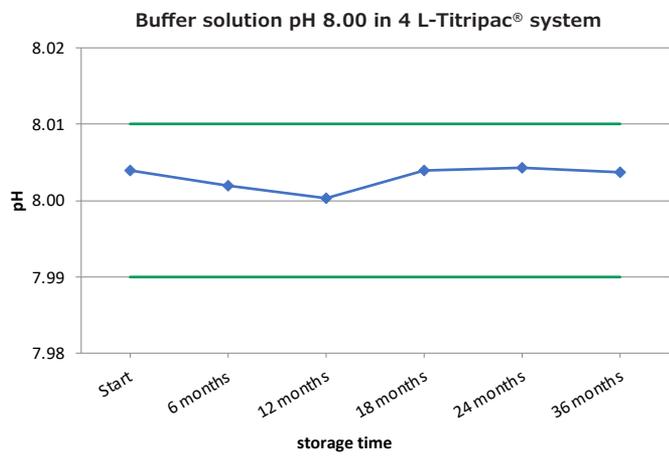
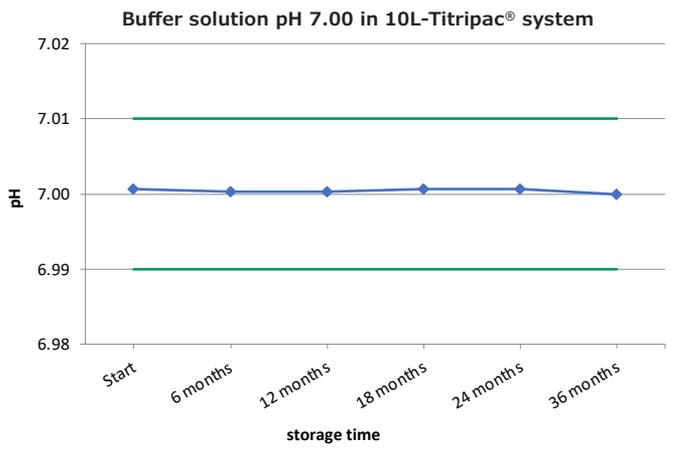
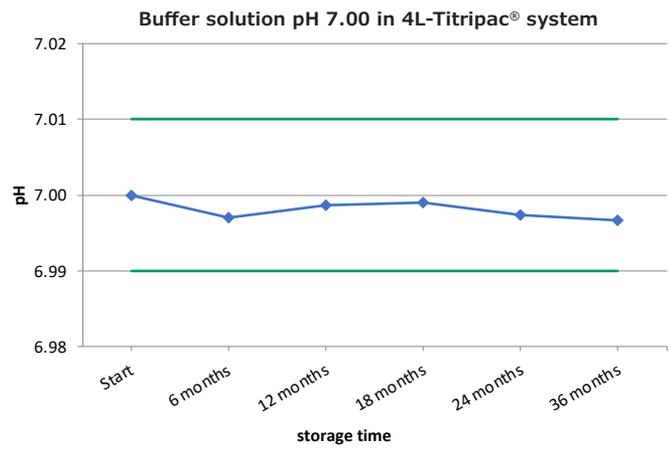
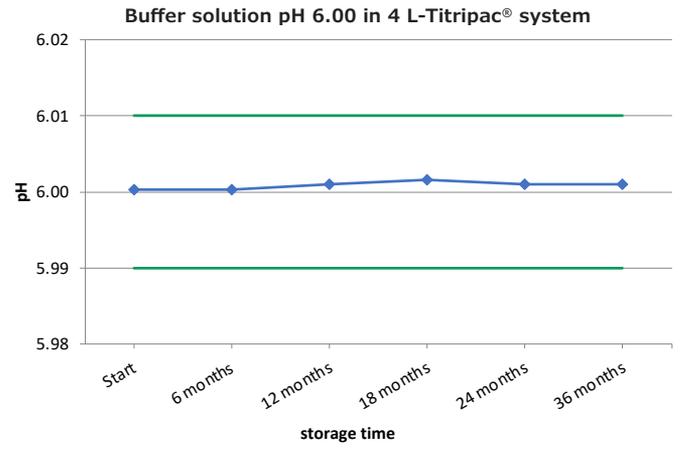
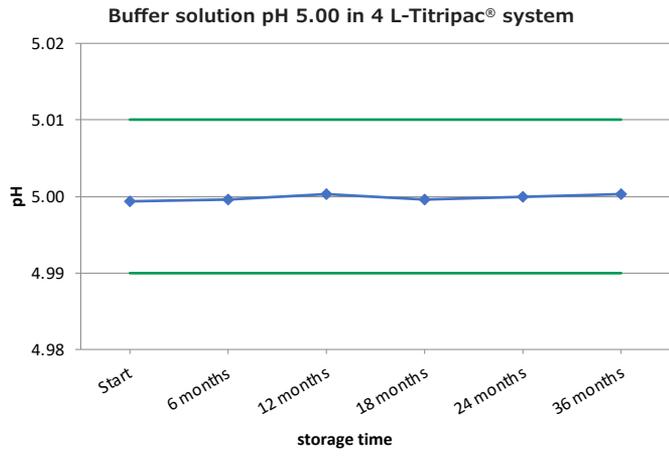


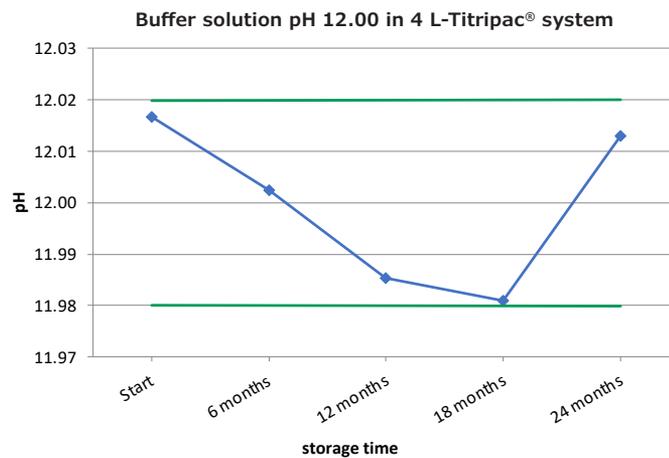
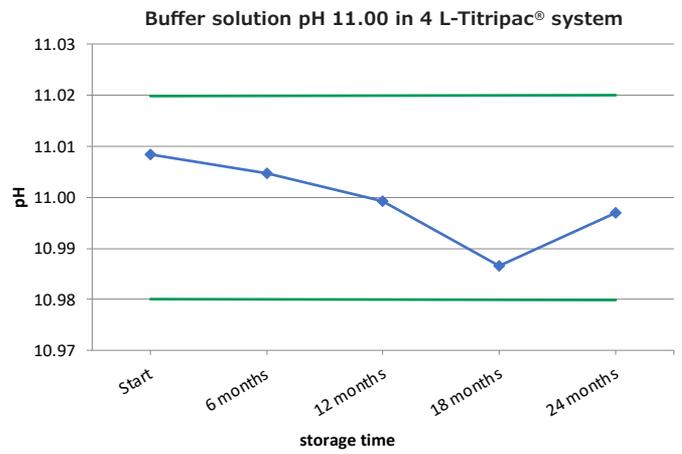
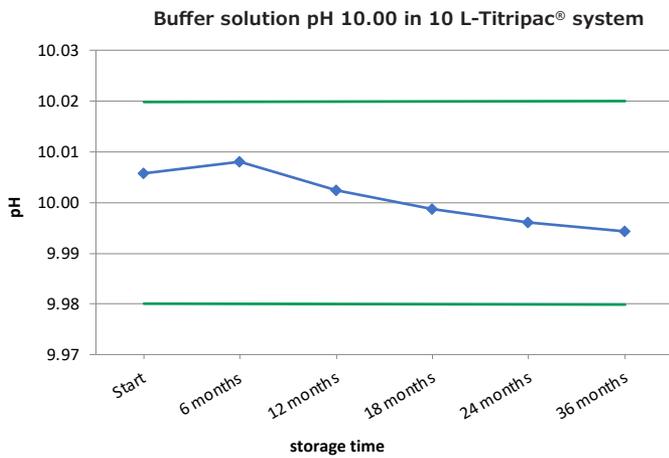
Buffer solution pH 4.00 in 4 L-Titripac® system



Buffer solution pH 4.00 in 10 L-Titripac® system







Instructions for use of a Titripac® system:

Open the Titripac® packaging system by pressing on the precutted area.

(Do not use a knife for opening because you can easily damage the inner bag of the Titripac® packaging system.)

Take the installed tap out of the box and fix it by closing the precutted area.

By opening the tap, solution can be withdrawn without the risk of contamination.

Hose and adapter can be ordered under item number 1.88075.0001

Merck KGaA
Frankfurter Strasse 250
64293 Darmstadt, Germany

