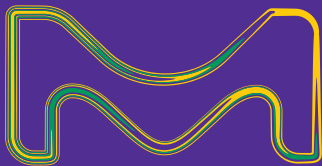


Brighter Titration Titripur[®]

The measure of all things

Volumetric solutions



The life science business of Merck operates as MilliporeSigma in the U.S. and Canada.

Supelco[®]
Analytical Products

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Advantages

- Consistent high level of quality
- Innovative and safe packaging options
- Produced under stringent production processes
- Measured in our DIN EN ISO/IEC 17025 accredited laboratory

Volumetric solutions

Titripur® | Titripac® | Titrisol® | Titriplex®

Sophisticated and precise analyses require precisely adjusted and produced volumetric solutions. Whether you're titrating reducing or oxidizing substances, acids, bases or complexing reagents in either aqueous or non-aqueous solutions: we offer the right solutions for every application.



Titripur[®] – our quality standard in titration

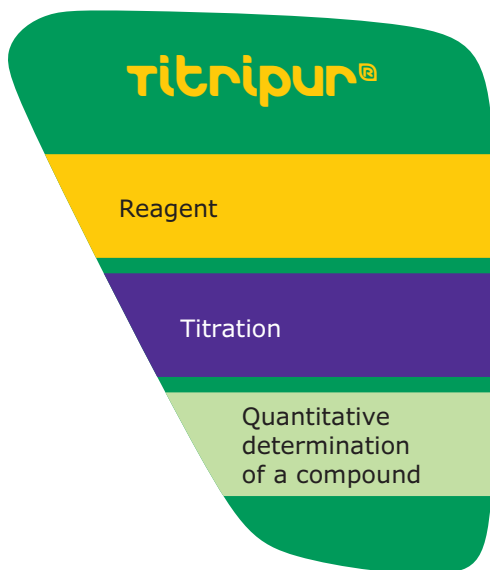
Titripur[®] – precision and quality

Like all products we offer, Titripur[®] volumetric solutions are subject to stringent manufacturing and testing requirements. From the selection of the raw materials and packaging to quality control, the highest demands are placed on purity and quality. All Titripur[®] volumetric solutions are measured in our DIN EN ISO/IEC 17025 accredited laboratory.

Specification / Traceability

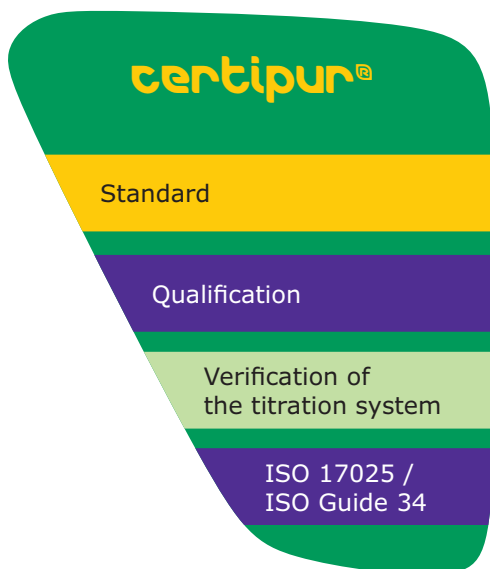
NIST	National Institute of Standards and Technology, Gaithersburg, Maryland, USA
Reag Ph Eur	Reagents according to the reagents part of the European Pharmacopeia
Reag USP	United States Pharmacopoeia requirements for reagents

Titripur® quality for your individual needs



Titripur® | Volumetric solutions

Under the brand name Titripur®, we offer you first-rate volumetric solutions. Additionally, some volumetric solutions are described in the European and US Pharmacopeia; those solutions we offer are in accordance with the reagents chapter of the Pharmacopeias. For each solution, titer determination is performed under optimum and standardized conditions. All volumetric solutions are traceable to certified reference materials, which in turn are directly traceable to standard reference materials from the NIST. Consequently all our volumetric solutions are traceable to NIST standard reference materials and measured in our DIN EN ISO/IEC 17025 accredited Quality Control Laboratory at Merck KGaA, Darmstadt Germany.



Certipur® | Volumetric standards

Volumetric standards are used for the standardization – titer determination – of volumetric solutions and for the qualification of the titration system. Influencing factors such as temperature, instrument variances, different methods of handling, weighing errors etc., as well as the volumetric solution itself can impact the titration result. To compensate for these factors, titer determination under working conditions is necessary in the respective laboratory. Merck KGaA, Darmstadt, Germany is in the scope of the DIN EN ISO/IEC 17025 accreditation for mass fraction of titrimetric standards and qualified a certified reference materials according to ISO Guide 34. All our volumetric Standards are traceable to Standard Reference Materials from NIST (National Institute of Standards and Technology, Gaithersburg, USA)

Titripur® – for reliable quality all the time

The standard for precise titration results



Certificate of Analysis

Batch Nitric acid $c(\text{HNO}_3) = 1 \text{ mol/l}$ (1 N) Titripur®
HC70000001

	Spec. Values	Batch Values	
Form	liquid	liquid	
Amount of substance concentration	0.995-1.005 mol/l	1.000	mol/l
Measurement uncertainty	$\pm 0.003 \text{ mol/L}$	$\pm 0.003 \text{ mol/L}$	
Traceability	NIST SRM	723E	

The concentration is determined by volumetric titration and refers to 20°C.
The certified value is traceable to a primary standard from the National Institute of Standards and Technology, Gaithersburg, USA (NIST SRM 723 Trihydroxymethylaminomethane) by means of volumetric standard Trihydroxymethylaminomethane (Art. 1.02406), certified by the accredited calibration laboratory of Merck KGaA, Darmstadt, Germany according to DIN EN ISO 17025.
The uncertainty is expressed as expanded measurement uncertainty with a coverage factor $k=2$ covering a confidence level of 95%. All measurements are carried out in the laboratory of Merck KGaA, Darmstadt, Germany.

Note: The titer is a correction factor to correct for variations of the volumetric solution, the titration equipment, the temperature and other laboratory conditions. For correct titration results it is recommended to determine a titer with the laboratory specific equipment and under laboratory specific conditions directly after opening a new bottle and at regular time intervals.

Date of release (DD.MM.YYYY) 12.07.2017
Minimum shelf life (DD.MM.YYYY) 31.01.2019

Ayfer Yildirim
Responsible laboratory manager quality control

This document has been produced electronically and is valid without a signature.

That's Titripur®: Quality assurance throughout the entire manufacturing and quality control process

The manufacturing and quality control process for Titripur® solutions meets the highest standards. The Certificate of Analysis contains all the information important for quality management documentation. Furthermore, it includes information on traceability and the batch of the primary standards used from NIST. Additionally, it gives the information about the measurement in the ISO 17025 accredited laboratory.

With the Titripur® grade, you can be sure that your analyses always meet the highest demands.

Titripur® – volumetric solutions in accordance with the reagents part of European and US pharmacopoeias

The Titripur® line also includes volumetric solutions that are used specifically for analytical purposes in the pharmaceutical industry and correspond to the European and US Pharmacopoeia for analytical applications. For available solutions, this is indicated in the certificate.

Titripur® – volumetric solutions made from raw materials in accordance with Ph Eur

The Titripur® line offer includes volumetric solutions made from raw materials in accordance with the European Pharmacopoeia. The relevant information can be found in the certificate.





Titriplex[®] – for complexometric titration

For chelate ligands, we offer the well-known Titriplex[®] brand to determine metal ions by complexometric titration. In addition to solid substances, ready-to-use solutions are also available in PE bottles and Titripac[®].

Innovative packaging – optimized for every application

In order to ensure high product quality, packaging is needed to protect the solution from impurities and contamination. Therefore, we offer a wide range of high-quality packaging options for volumetric solutions and only use glass and plastic grades that do not alter any of the product's characteristics. All our packaging materials have been tested for their quality and atmospheric permeability, thereby ensuring the purity and concentration of the solutions; also during storage up to their minimum shelf life for sealed, original containers.



Titrisol® – concentrates for greater flexibility

For users who regularly perform different types of analysis and need specific concentrations, we also offer most volumetric solutions as Titrisol® concentrates.

Every ampoule contains a precisely defined quantity of substance that is normally filled to a final volume of 1 L. However, any other concentrations can be produced by diluting correspondingly.

Titrisol® advantages

- Space-saving
- Flexible and easy to use
- Individual concentrations can be prepared

Titripur® – reliable and precise ready-to-use solutions

The Titripur® portfolio offers ready-to-use volumetric solutions for daily laboratory analyses. These can be connected directly to a titrator via an adaptor.

Depending on the amount required, volumetric solutions are available in 0.5 L, 1 L, 2.5 L, 5 L, 10 L and 25 L PE bottles or canisters. In addition, volumetric solutions, such as acetic acid that cannot be stored in a stable manner for an extended period of time in PE containers, are available in 1 L and 2.5 L glass bottles.

Additionally, we offer Titripac® grade ready-to-use solutions in our innovative 4 L and 10 L Titripac® packaging systems.

Polyethylene bottles and canisters

- Packaging diversity for every different requirement
- Unbreakable and contamination-free material
- Direct connection to the titrator
- The stability of the solution is ensured for the entire shelf life in unopened bottles

Glass bottles

- Ensuring the stability of special volumetric solutions
- Direct connection to the titrator
- The stability of the solution is ensured for the entire shelf life in unopened bottles



Titripac® – the innovative packaging: Good for the lab, good for the environment

Titripac® – reliable solution from the first to the last drop

Titripac® is an innovative and safe packaging option for high-quality, ready-to-use volumetric solutions. Its economical and ecological advantages enable you to optimize your working processes. The consistent quality of a volumetric solution is ensured from the first to the last drop. A hermetically sealed package system makes this possible. Contamination caused by air, carbon dioxide or microorganisms is excluded.

Titripac® reduces the time-consuming process of titer determinations, because the solution will not change as well as the cost intensive disposal of contaminated residual amounts. The carton can simply be disposed of together with paper, and the internal liner can be easily folded together prior to disposal.

Titripac® is extremely easy to use. The integrated spout appears simply by pressing on the pack. By opening the tap, liquid can be withdrawn at any time – conveniently and without the risk of contamination. In addition, Titripac® can be connected directly to the titrator via an adaptor.

Thanks to this unique eco-friendly concept, Titripac® is a proud winner of the 2016 Green Good Design Award.

The Titripac® packaging system for volumetric solutions is constructed from a recyclable outer carton and a durable inner bag. The inner bag collapses during withdrawal of reagent through the built-in contamination-proof dispenser tap. Therefore the reagent in the bag cannot be contaminated, and when empty, the outer carton can be fully recycled. The amount of packaging per liter is less than half the weight of alternative packaging options like PE bottles.

Green Good Design - the World's Leading Sustainable Green Design

The Green Good Design program is presented by The European Centre for Architecture Art Design and Urban Studies and The Chicago Athenaeum: Museum of Architecture and Design. It awards innovation in the fields of energy saving, increasing sustainability and recycling.



Titripac® advantages

- No contamination: Hermetically sealed pack
- Easy to use: Integrated withdrawal tap, direct connection to a titrator is possible
- Saves costs and time: No unnecessary titer determinations, no contaminated residual amounts
- Environmentally friendly disposal: Reduced package waste, as carton and internal liner can be disposed of separately



Precise analyses require precisely adjusted volumetric solutions. With Titripac® you can be sure that you've got a consistent solution up to the very last drop. A direct connection to the titrator via an adaptor makes lab work easier and helps to avoid contamination.



Waste of 20 x 1 L PE bottles, 2 x 10 L Titripac®



Exclusive packaging: Internal liner and external carton can be easily disposed of separately.

Ordering information

Titripur® volumetric solutions

		Ready-to-use solutions					
		Titripur®		Titripur®			
Product	Concentration	Titrisol® Ampoules for 1 L solution Order No.	Glass bottles, PE bottles/canisters Order No.	Titripac® Order No.			
A	Acetic acid	0.1 mol/L (0.1 N)	1.09944.0001	1 L: 1.60250.1000	—		
		1 mol/L (1 N)	1.09951.0001	1.60305.1000	—		
		1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	—	25 L: 1.99061.9025	—		
	Ammonium cer(IV)nitrate solution	0.1 mol/L (0.1 N)	—	1 L: 1.02277.1000 ¹	—		
	Ammonium iron(II) sulfate solution	0.1 mol/L (0.1 N)	1.09864.0001	—	—		
	Ammonium thiocyanate solution	0.1 mol/L (0.1 N)	1.09900.0001	1 L: 1.09079.1000 ^{1,2}	—		
B	Barium chloride solution	0.05 mol/L (0.1 N)	1.09962.0001	—	—		
	Barium perchlorate solution	0.005 mol/L in 2-propanol/water (80:20)	—	1 L: 1.09086.1000 ²	—		
	Bromide bromate solution	0.05 mol/L (0.1 N)	1.09905.0001	1 L: 1.60316.1000	—		
C	Cer (IV) sulfate solution	0.1 mol/L (0.1 N)	—	1 L: 1.09092.1000 ^{1,2}	—		
	Copper sulfate solution	0.1 mol/L	—	1 L: 1.02784.1000	—		
	Copper-di-ammonium Titriplex® solution	0.1 mol/L	—	0.5 L: 1.05217.0500	—		
H	Hanus solution (Iodomobromide solution)	0.1 mol/L in acetic acid	—	1 L: 1.09164.1000	—		
	Hyamine, 1622 solution for the determination of anionic tensides	0.004 mol/L	—	1 L: 1.15480.1000	—		
	Hydrochloric acid	0.01 mol/L (0.01 N)	1.09974.0001	1 L: 1.60238.1000	4 L: 1.60238.4000	—	
		0.1 mol/L	1.09973.0001	1 L: 1.09060.1000 ^{1,2}	4 L: 1.09060.4000 ^{1,2}	—	
			—	5 L: 1.09060.5000 ^{1,2}	10 L: 1.09060.9010 ^{1,2}	—	
			—	25 L: 1.09060.9025 ^{1,2}	—		
		0.1 mol/L (0.1 N) in 2-propanol	—	1 L: 1.00326.1000	—		
		0.357 mol/L (1/2.8 N)	—	—	10 L: 1.13136.9010	—	
		0.5 mol/L (0.5 N)	1.09971.0001	1 L: 1.09058.1000 ^{1,2}	4 L: 1.09058.4000 ^{1,2}	—	
			—	5 L: 1.09058.5000 ^{1,2}	—		
			—	25 L: 1.09058.9025 ^{1,2}	—		
		1 mol/L (1 N)	1.09970.0001	1 L: 1.09057.1000 ^{1,2}	4 L: 1.09057.4000 ^{1,2}	—	
			—	2.5 L: 1.09057.2500 ^{1,2}	10 L: 1.09057.9010 ^{1,2}	—	
			—	5 L: 1.09057.5000 ^{1,2}	—		
			—	25 L: 1.09057.9025 ^{1,2}	—		
	1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	—	25 L: 1.99070.9025	—			
	2 mol/L (2 N)	—	1 L: 1.09063.1000	—			
		—	25 L: 1.09063.9025	—			
	3.571 mol/L (1/0.28 N)	—	—	10 L: 1.13134.9010	—		
	5 mol/L (5 N)	—	1 L: 1.09911.1000	—			
I	Iodide-iodate solution	1/128 mol/L I 2 (1/64 N)	1.09914.0001	—	—		
	Iodine solution	0.05 mol/L (0.1 N)	1.09910.0001	1 L: 1.09099.1000 ^{1,2}	—		
		0.5 mol/L (1 N)	—	1 L: 1.09098.1000 ¹	—		
M	Mercury(II)nitrate solution	0.05 mol/L (0.1 N)	—	1 L: 1.09143.1000 ²	—		

¹Solution in accordance with the reagents chapter of Pharm. Eur (European Pharmacopoeia)

²Solution in accordance with the reagents chapter of USP (United States Pharmacopoeia)

		Ready-to-use solutions			
		Titripur®		Titripac®	
Product	Concentration	Titrisol® Ampoules for 1 L solution Order No.	Glass bottles, PE bottles/canisters Order No.	Titripac® Order No.	
N Nitric acid	0.1 mol/L	1.09964.0001	1 L: 1.60236.1000	—	
	1 mol/L (1 N)	1.09966.0001	1 L: 1.60307.1000	—	
	10 mol/L (10 N)	—	1 L: 1.00630.1000	—	
O Oxalic acid solution	0.005 mol/L (0.01 N)	1.09932.0001	—	—	
	0.05 mol/L (0.1 N)	1.09965.0001	—	—	
P Perchloric acid	0.1 mol/L (0.1 N) in water-free acetic acid	—	1 L: 1.09065.1000 ^{1,2}	—	
Potassium bromate solution	1/60 mol/L (0.1 N)	1.09925.0001	1 L: 1.60308.1000	—	
Potassium dichromate solution	1/60 mol/L (0.1 N)	1.09928.0001	—	—	
	1/24 mol/L (0.25 N)	—	1 L: 1.09118.1000	—	
	0.020 mol/L	—	1 L: 1.09119.1000	—	
Potassium hydroxide solution	0.1 mol/L (0.1 N)	1.09921.0001	1 L: 1.09112.1000 ¹	—	
	0.1 mol/L (0.1 N) in ethanol	—	1 L: 1.09115.1000 ^{1,2}	—	
		—	2.5 L: 1.09115.2500 ^{1,2}	—	
	0.1 mol/L (0.1 N) in methanol	—	1 L: 1.11587.1000	—	
	0.1 mol/L (0.1 N) in 2-propanol	—	1 L: 1.05544.1000	—	
	0.5 mol/L (0.5 N)	1.09919.0001	5 L: 1.11586.5000 ²	—	
	0.5 mol/L (0.5 N) in ethanol	—	1 L: 1.09114.1000 ^{1,2}	—	
		—	2.5 L: 1.09114.2500 ^{1,2}	—	
	0.5 mol/L (0.5 N) in methanol	—	1 L: 1.09351.1000	—	
	1 mol/L (1 N)	1.09918.0001	1 L: 1.09108.1000 ^{1,2}	—	
1 mol/L (1 N) max. 0.4 ppm Ca	—	1 L: 1.09107.1000	—		
2.0 mol/L (2 N) in methanol	—	2.5 L: 1.11787.2500 ²	—		
Potassium iodate solution	1/60 mol/L (0.1 N)	1.09917.0001	—	—	
Potassium permanganate solution	0.002 mol/L (0.01 N)	1.09930.0001	—	—	
	0.02 mol/L (0.1 N)	1.09935.0001	—	—	
	0.02 mol/L (0.1 N) standardized with sodium thiosulfate	—	1 L: 1.09121.1000 ¹	—	
	0.02 mol/L (0.1 N) standardized with oxalate	—	1 L: 1.09122.1000 ²	—	
	0.05 mol/L (0.25 N)	—	2.5 L: 4.80160.2500	—	
S Silver nitrate solution	0.05 mol/L (0.05 N)	—	1 L: 1.11718.1000	—	
	0.1 mol/L (0.1 N)	1.09990.0001	1 L: 1.09081.1000 ^{1,2}	4 L: 1.09081.4000 ^{1,2}	—
		—	2.5 L: 1.09081.2500 ^{1,2}	10 L: 1.09081.9010 ^{1,2}	—
1 mol/L (1 N)	—	1 L: 1.09080.1000	—		
Sodium arsenite solution	0.05 mol/L (0.1 N)	—	1 L: 1.06277.1000 ²	—	
Sodium carbonate solution	0.05 mol/L (0.1 N)	1.09940.0001	1 L: 1.60310.1000	—	
Sodium chloride solution	0.1 mol/L (0.1 N)	1.09945.0001	—	—	

¹Solution in accordance with the reagents chapter of Pharm. Eur (European Pharmacopoeia)

²Solution in accordance with the reagents chapter of USP (United States Pharmacopoeia)

Titripur® volumetric solutions

		Ready-to-use solutions			
		Titripur®		Titripur®	
Product	Concentration	Titrisol® Ampoules for 1 L solution Order No.	Glass bottles, PE bottles/canisters Order No.	Titripac® Order No.	
S Sodium hydroxide solution	0.005 mol/L (0.005 N) in methanol	—	10 L: 4.80621.9010	—	
	0.01 mol/L (0.01 N)	1.09961.0001	1 L: 1.60309.1000	4 L: 1.60309.4000	
	0.02 mol/L (0.02 N)	—	0.5 L: 1.09142.0500	—	
	0.1 mol/L (0.1 N)	1.09959.0001	1 L: 1.09141.1000 ^{1,2}	4 L: 1.09141.4000 ^{1,2}	
			—	5 L: 1.09141.5000 ^{1,2}	10 L: 1.09141.9010 ^{1,2}
			—	25 L: 1.09141.9025 ^{1,2}	—
	0.111 mol/L (0.111 N)	—	25 L: 1.10822.9025	—	
	0.2 mol/L (0.2 N)	—	1 L: 1.09140.1000	10 L: 1.09140.9010	
	0.25 mol/L (0.25 N)	1.09958.0001	1 L: 1.09139.1000	10 L: 1.09139.9010	
	0.33 mol/L (0.33 N)	—	1 L: 1.05595.1000	10 L: 1.05595.9010	
	0.5 mol/L (0.5 N)	1.09957.0001	1 L: 1.09138.1000	4 L: 1.09138.4000	
			—	25 L: 1.09138.9025	10 L: 1.09138.9010
	1 mol/L (1 N)	1.09956.0001	1 L: 1.09137.1000 ^{1,2}	4 L: 1.09137.4000 ^{1,2}	
			—	2.5 L: 1.09137.2500 ^{1,2}	10 L: 1.09137.9010 ^{1,2}
	—	—	25 L: 1.09137.9025 ^{1,2}	—	
	1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	—	25 L: 1.99060.9025	—	
	2 mol/L (2 N)	—	1 L: 1.09136.1000	—	
			—	25 L: 1.09136.9025	
	4 mol/L (4 N)	—	5 L: 1.11584.5000	—	
	5 mol/L (5 N)	—	1 L: 1.09913.1000	—	
6 mol/L (1 N) prepared from raw materials acc. to Ph Eur	—	25 L: 1.99062.9025	—		
Sodium thiosulfate solution	0.01 mol/L (0.01 N)	1.09909.0001	1 L: 1.60318.1000	—	
	0.05 mol/L (0.05 N)	—	1 L: 1.60311.1000	—	
	0.1 mol/L (0.1 N)	1.09950.0001	1 L: 1.09147.1000 ^{1,2}	4 L: 1.09147.4000 ^{1,2}	
			—	25 L: 1.09147.9025 ^{1,2}	10 L: 1.09147.9010 ^{1,2}
1 mol/L (1 N)	—	1 L: 1.60312.1000	—		
Sulfuric acid	0.005 mol/L (0.01 N)	1.09982.0001	1 L: 1.60314.1000	—	
	0.05 mol/L (0.1 N)	1.09984.0001	1 L: 1.09074.1000 ¹	4 L: 1.09074.4000 ¹	
			—	5 L: 1.09074.5000 ¹	10 L: 1.09074.9010 ¹
	0.25 mol/L (0.5 N)	—	1 L: 1.09073.1000	4 L: 1.09073.4000	
			—	—	10 L: 1.09073.9010
	0.5 mol/L (1 N)	1.09981.0001	1 L: 1.09072.1000 ^{1,2}	4 L: 1.09072.4000 ^{1,2}	
			—	5 L: 1.09072.5000 ^{1,2}	10 L: 1.09072.9010 ^{1,2}
	1 mol/L (2 N)	—	1 L: 1.160313.1000	—	
2.5 mol/L (5 N)	1.09912.0001	1 L: 4.80364.1000	—		
		—	25 L: 4.80364.9025	—	
5 mol/L (10 N)	—	1 L: 1.160315.1000	—		

¹Solution in accordance with the reagents chapter of Pharm. Eur (European Pharmacopoeia)

²Solution in accordance with the reagents chapter of USP (United States Pharmacopoeia)

Ready-to-use solutions					
		Titrisol®		Titripur®	
Product	Concentration	Titrisol® Ampoules for 1 L solution Order No.	Glass bottles, PE bottles/ canisters Order No.	Titripac® Order No.	
T	Tetra-n-butyl-ammonium hydroxide solution	0.1 mol/L (0.1 N) in 2-propanol/methanol	—	0.5 L: 1.09162.0500 ^{1,2}	—
			—	1 L: 1.09162.1000 ^{1,2}	—
	Tetramethylammonium hydroxide solution	0.1 mol/L (0.1 N) in 2-propanol/methanol	—	0.25 L: 1.08124.0250 ²	—
			—	1 L: 1.08124.1000	—
	Titriplex® solution A	50 mg CaO/L = 1 mL	—	1 L: 1.08419.1000	—
	Titriplex® solution B	10 mg CaO/L = 1 mL	—	1 L: 1.08420.1000	10 L: 1.08420.9010
			—	5 L: 1.08420.5000	—
			—	1 L: 1.60320.1000	—
	Titriplex® III solution (Na ₂ -EDTA)	0.05 mol/L (0.05 N)	—	1 L: 1.60319.1000	—
		0.01 mol/L	1.08446.0001	1 L: 1.60319.1000	—
		0.1 mol/L	1.09992.0001	1 L: 1.08431.1000 ¹	4 L: 1.08431.4000 ¹
			—	—	10 L: 1.08431.9010 ¹
	Trifluoromethanesulfonic acid in anhydrous acetic acid	0.1 mol/L	—	1 L: 1.08050.1000	—
	Titriplex® IV solution (Na ₂ -DCTA)	0.1 mol/L	—	1 L: 1.08447.1000	4 L: 1.08447.4000
W	Wijs solution (iodomonochloride in acetic acid)	0.1 mol/L	—	1 L: 1.09163.1000	—
			—	2.5 L: 1.09163.2500	—
Z	Zinc sulfate solution	0.1 mol/L	1.09991.0001	1 L: 1.08879.1000 ¹	—

¹ Solution in accordance with the reagents chapter of Pharm. Eur (European Pharmacopoeia)

² Solution in accordance with the reagents chapter of USP (United States Pharmacopoeia)

Titripur® – made from raw materials in accordance with the European Pharmacopoeia

For some pharmaceutical industry applications, it's important to work with solutions made from raw materials in accordance with the European Pharmacopoeia (Ph. Eur). Even the water³ used for this purpose has been tested in accordance with European Pharmacopoeia. The relevant information can be found in the certificate.

Ordering information

Titripur® prepared from raw materials acc. to Ph. Eur

		Ready-to-use solutions	
Product	Concentration	Glass bottles, PE bottles/canisters Order No.	
A Acetic acid	1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	25 L: 1.99061.9025	
H Hydrochloric acid	1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	25 L: 1.99070.9025	
S Sodium hydroxide solution	1 mol/L (1 N) prepared from raw materials acc. to Ph Eur	25 L: 1.99060.9025	
	6 mol/L (1 N) prepared from raw materials acc. to Ph Eur	25 L: 1.99062.9025	

Other volumetric solutions made from raw materials in accordance with Pharm. Eur are available on request.

³Purified water

Titriplex® solid substances

	Product	Content	Packaging	Ord. No.
I	Titriplex® I for analysis (nitrilotriacetic acid)	250 g	Plastic bottle	1.08416.0250
II	Titriplex® II for analysis (ethylenedinitrilotetraacetic acid, EDTA) ACS, Reag. Ph Eur	100 g	Plastic bottle	1.08417.0100
		250 g	Plastic bottle	1.08417.0250
		1 kg	Plastic bottle	1.08417.1000
		5 kg	Plastic bottle	1.08417.5000
III	Titriplex® III for analysis (ethylenedinitrilotetraacetic acid disodium salt dihydrate, EDTA disodiumsalt dihydrate) ACS, ISO, Reag. Ph Eur	100 g	Plastic bottle	1.08418.0100
		250 g	Plastic bottle	1.08418.0250
		1 kg	Plastic bottle	1.08418.1000
		5 kg	Plastic bottle	1.08418.5000
		10 kg	Plastic bottle	1.08418.9010
IV	Titriplex® IV for analysis (1,2-cyclohexylenedinitrilotetraacetic acid monohydrate)	25 g	Plastic bottle	1.08424.0025
		100 g	Plastic bottle	1.08424.0100
		250 g	Plastic bottle	1.08424.0250
V	Titriplex® V for analysis (diethylenetriaminepentaacetic acid)	100 g	Plastic bottle	1.08426.0100
VI	Titriplex® VI for analysis (3,6 -Dioxaoctamethylenedinitriloacetic acid)	25 g	Plastic bottle	1.08435.0025
		100 g	Plastic bottle	1.08435.0100

Additional products for Titration

	Product	Content	Packaging	Ord. No.
	Ammonia Buffer Solution (for Complexometry (ammonium chloride/ammonia) pH = 10-11 Titripur®)	1 L	Plastic bottle	1.09478.1000
	Ammonium buffer solution for complexometry pH = 10 – 11	1 L	Plastic bottle	1.09478.1000
	Indicator buffer tablets for determination of water hardness with Titriplex® solutions	500 tabs	Plastic can	1.08430.0500
		1,000 tabs	Plastic can	1.08430.1000
	Nitric acid 25% for argentometric titration	0.5 L	Glass bottle	1.60317.0500
	Sodium hydroxide on support to prevent alkaline solutions from absorbing carbondioxide	250 g	Plastic bottle	1.01564.1000
		1 kg	Plastic bottle	1.01564.1000

Certipur® volumetric standards

Reference materials for reliable standardization

Certipur® secondary reference materials for volumetric titration

Merck KGaA, Darmstadt, Germany has a DIN EN ISO/IEC 17015 accredited laboratory for mass fraction. All our Certipur® volumetric standards are qualified in this accredited lab. Additionally, all our volumetric standards are traceable to standard reference material from NIST (National Institute of Standards and Technology, Gaithersburg, Maryland, United States). Proper titer determination is an important prerequisite for accurate and comparable analysis in the titration laboratory. Influential factors such as temperature, instrument variances, different methods of handling, weighing errors, etc. and the volumetric solution itself can impact the titration results. To compensate for these factors, titer determination under working conditions is necessary in the respective laboratory. This is where Certipur® – secondary reference materials (volumetric standards) comes in. These are very pure, high-grade and stable solid substances. To ensure their high standard of quality, they are manufactured under the strictest control and measured with the highest possible precision in our accredited laboratory according to DIN EN ISO/IEC 17025. All our volumetric standards are now in accordance to the ISO Guide 34 Accreditation.

Volumetric standards

Analysis	Designation	Package size	Ord. No.
Acidimetry	Sodium carbonate ¹	80 g	1.02405.0080
	Tris(hydroxymethyl)aminomethane ²	80 g	1.02408.0080
Alkalimetry	Potassium hydrogen phthalate ^{1,2}	80 g	1.02400.0080
	Benzoic acid ^{1,2}	60 g	1.02401.0060
Argentometry	Sodium chloride ^{1,2}	80 g	1.02406.0080
Complexometry	Zinc ¹	100 g	1.02409.0100
	Calcium carbonate ²	50 g	1.02410.0050
Iodometry	Potassium iodate	100 g	1.02404.0100
Redox titration	Iron(II)ethylenediammonium sulfate	80 g	1.02402.0080
	Potassium dichromate ²	80 g	1.02403.0080
	di-Sodium oxalate ²	60 g	1.02407.0060

¹Solution according to Reag. Ph. Eur

²Solution according to the reagents chapter of USP



Advantages

- Reference material for accurate titer determination
- Highly pure materials traceable to NIST
- In accordance to the reagents part of Pharmacopoeias
- Measured in the ISO 17025 accredited laboratory
- Certified Reference Material according to ISO Guide 34

The right indicator for every titration!

The corresponding indicators for different titrations are available to users who prefer to work manually with burettes. Extensive analysis accompanied by the high standard of quality of our indicators ensure reproducible results.

Ordering information

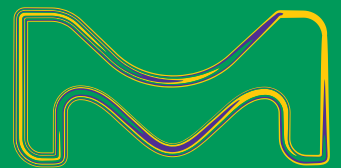
Indicators

Analysis	Product	Color Change	Package size	Ord. No.
Acidimetry	Bromcresol green	blue – yellow	1 g	1.08121.0001
			5 g	1.08121.0005
			25 g	1.08121.0025
	Thymol blue	yellow – blue	5 g	1.08176.0005
			25 g	1.08176.0025
	Mixed indicator (4.5) acc. to Mortimer	blue – red	250 mL	1.01359.0250
Alkalimetry	Bromphenol blue	blue – yellow	8 g	1.08122.0005
			25 g	1.08122.0025
	Bromphenol blue	blue – yellow	5 g	1.03026.0005
			25 g	1.03026.0025
			500 g	1.03026.0500
	Congo red	red – blue	25 g	1.01340.0025

Indicators

Analysis	Product	Color Change	Package size	Ord. No.
Argentometry	Bromkresol purple	purple – teal	5 g	1.03025.0005
			25 g	1.03025.0025
			500 g	1.03025.0500
	Potassium chromate	yellow – brown – red	250 g	1.04952.0250
			1,000 g	1.04952.1000
	Fluorescein sodium	fluorescent green – rose	50 g	1.03887.0050
			250 g	1.03887.0250
Neutral red	red violet – orange	25 g	1.01369.0025	
		100 g	1.01369.0100	
Complexometry	Methylthymol blue	blue – yellow	1 g	1.06084.0001
			5 g	1.06084.0005
	Erichrome black T	ruby colored – blue	25 g	1.03170.0025
			100 g	1.03170.0100
	Calconcarboxylic acid	ruby colored – blue	5 g	1.04595.0005
			25 g	1.04595.0025
Indicator buffer tablets	red – green	500 tabs	1.08430.0500	
		1,000 tabs	1.08430.1000	
Non aqueous titration	Oracet blue 2 R	rose – blue	5 g	1.01487.0005
	1-Naphtholbenzein	yellow – green	5 g	1.06202.0005
Redox titration	Diphenyl amine	blue violet – colorless	100 g	1.09193.0100
			500 g	1.09193.0500
	Ferroin solution (1.10 Phenantroline iron(II) salt)	blue – orange – red	100 g	1.09193.0100
			500 g	1.09193.0500
	Indigocarmine	blue – yellowish	25 g	1.04724.0025

More indicators can be found on our online catalog.



For further information, please contact your local VWR organization or have a look at the VWR webpages: **vwr.com**

