MERCK

Undisputed Accuracy for Your Quantitative Results

New ready-to-use Certified Reference Materials for water and wastewater analysis

Supelco®
Analytical Products

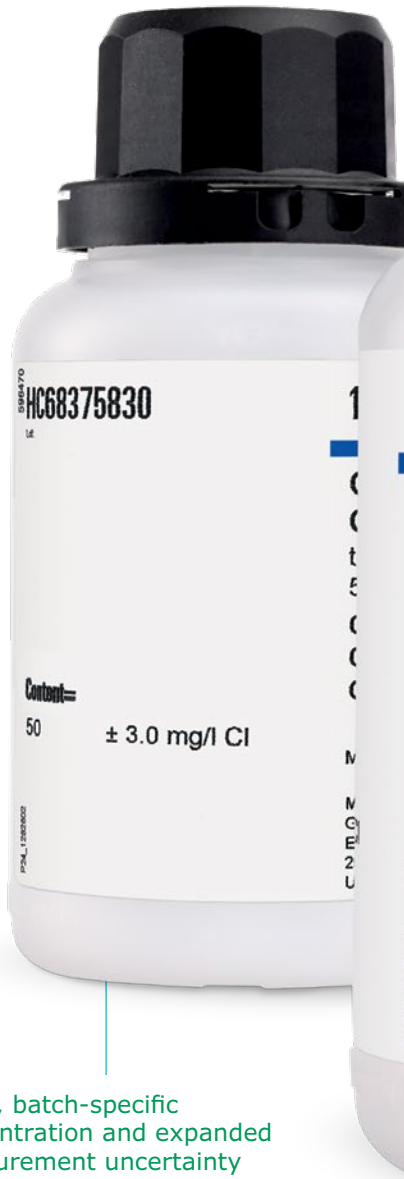
Ready-to-Use Diluted Certified Reference Materials

Experience absolute precision with our ready-to-use diluted certified reference materials (CRMs). Thanks to their exact concentrations, expanded measurement uncertainty, and direct traceability to NIST primary reference materials, our CRMs ensure that your results are correct and comparable worldwide.

PRECISE ANALYTICAL QUALITY CONTROL

DIRECTLY TRACEABLE TO NIST

NO DILUTION NEEDED



Exact, batch-specific concentration and expanded measurement uncertainty

Complete range with all parameters for analytical quality control of wastewater, drinking water and process water

Detailed Certificate of Analysis for each CRM simplifies accreditation.

even better together

The perfect combination for water analysis: use our certified standard solutions with Spectroquant® Prove spectrophotometers.

Compatible with Spectroquant® test kits or those from other suppliers

Ready-to-use, diluted CRMs save time and prevent dilution errors

Long shelf life of up to 24 months

Directly traceable to NIST or USP primary measurement standards

Ideal for validating international norm methods: ISO, EN, APHA and EPA

Ready-to-Use Certified Reference Materials for Photometry and Other Applications

Standard Solutions, traceable to SRM from NIST

		Product	Concentration	Expanded Measurement Uncertainty	Composition	pH Range Solution	Method used for Uncertainty Measurement	Cat. No.
A	NEW	Aluminium Standard Solution	0.0500 mg/L Al^{3+}	±0.0020 mg/L Al^{3+}	$Al(NO_3)_3$ in H_2O	3-5	ICP-OES	**1322260100**
	NEW	Aluminium Standard Solution	0.200 mg/L Al^{3+}	±0.006 mg/L Al^{3+}	$Al(NO_3)_3$ in H_2O	3-5	ICP-OES	**1322250100**
	NEW	Ammonium Standard Solution	0.250 mg/L NH_4^+	±0.011 mg/L NH_4^+	NH_4Cl in H_2O	4-6	Photometry	**1322270100**
		Ammonium Standard Solution	0.400 mg/L NH_4-N	±0.012 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250220100**
		Ammonium Standard Solution	1.00 mg/L NH_4-N	±0.04 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250230100**
		Ammonium Standard Solution	2.00 mg/L NH_4-N	±0.07 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250240100**
		Ammonium Standard Solution	6.00 mg/L NH_4-N	±0.13 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250250100**
		Ammonium Standard Solution	12.0 mg/L NH_4-N	±0.4 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250260100**
		Ammonium Standard Solution	50.0 mg/L NH_4-N	±1.2 mg/L NH_4-N	NH_4Cl in H_2O	4-6	Photometry	**1250270100**
	NEW	Arsenic Standard Solution [1]	1.00 mg/L As(V)	±0.05 mg/L As(V)	H_3AsO_4 in HNO_3	2-3	ICP-OES	**1330020250**
B	NEW	Boron Standard Solution	1.00 mg/L B(III)	±0.06 mg/L B(III)	H_3BO_3 in H_2O	5-7	Photometry	**1330050100**
	NEW	Bromate Standard Solution	0.0100 mg/L BrO_3^-	±0.0006 mg/L BrO_3^-	$KBrO_3$ in H_2O	6-8	IC	**1330060100**
	NEW	Bromate Standard Solution	0.1000 mg/L BrO_3^-	±0.0040 mg/L BrO_3^-	$KBrO_3$ in H_2O	6-8	IC	**1330070100**
C	NEW	Cadmium Standard Solution	0.00500 mg/L Cd^{2+}	±0.00200 mg/L Cd^{2+}	$Cd(NO_3)_2$ in HNO_3	3-4	ICP-OES	**1330080100**
	NEW	Cadmium Standard Solution	0.100 mg/L Cd^{2+}	±0.003 mg/L Cd^{2+}	$Cd(NO_3)_2$ in H_2O	3-5	ICP-OES	**1322280100**
	NEW	Chloride Standard Solution	0.100 mg/L Cl^-	±0.006 mg/L Cl^-	NaCl in H_2O	5-7	IC	**1330090100**
	NEW	Chloride Standard Solution	1.00 mg/L Cl^-	±0.04 mg/L Cl^-	NaCl in H_2O	5-7	IC	**1330100100**
	NEW	Chloride Standard Solution	2.50 mg/L Cl^-	±0.08 mg/L Cl^-	NaCl in H_2O	5-7	Photometry	**1330110100**
	NEW	Chloride Standard Solution	10.0 mg/L Cl^-	±0.5 mg/L Cl^-	NaCl in H_2O	5-7	Photometry	**1322290100**
	NEW	Chloride Standard Solution	50 mg/L Cl^-	±3 mg/L Cl^-	NaCl in H_2O	5-7	Photometry	**1322300100**
	NEW	Chloride Standard Solution	250 mg/L Cl^-	±8 mg/L Cl^-	NaCl in H_2O	5-7	Photometry	**1322310100**
	NEW	Chromium Standard Solution	0.050 mg/L Cr(VI)	±0.002 mg/L Cr(VI)	K_2CrO_4 in H_2O	6-8	ICP-OES	**1330120100**
	NEW	Chromium Standard Solution	1.00 mg/L Cr(VI)	±0.03 mg/L Cr(VI)	K_2CrO_4 in H_2O	6-8	Photometry	**1330130100**
		COD Standard Solution	20.0 mg/L COD	±0.7 mg/L COD	KHP in H_2O	4-6	Photometry	**1250280100**
		COD Standard Solution	100 mg/L COD	±3 mg/L COD	KHP in H_2O	4-6	Photometry	**1250290100**
		COD Standard Solution	200 mg/L COD	±4 mg/L COD	KHP in H_2O	3-5	Photometry	**1250300100**
		COD Standard Solution	400 mg/L COD	±5 mg/L COD	KHP in H_2O	3-5	Photometry	**1250310100**
		COD Standard Solution	1,000 mg/L COD	±11 mg/L COD	KHP in H_2O	3-5	Photometry	**1250320100**
		COD Standard Solution	2,000 mg/L COD	±32 mg/L COD	KHP in H_2O	3-5	Photometry	**1250330100**
		COD Standard Solution	8,000 mg/L COD	±68 mg/L COD	KHP in H_2O	3-5	Photometry	**1250340100**
		COD Standard Solution	50,000 mg/L COD	±894 mg/L COD	KHP in H_2O	3-5	Photometry	**1250350100**
F	NEW	Fluoride Standard Solution	0.200 mg/L F^-	±0.012 mg/L F^-	NaF in H_2O	4-6	Photometry	**1322340100**
	NEW	Fluoride Standard Solution	0.50 mg/L F^-	±0.02 mg/L F^-	NaF in H_2O	4-6	Photometry	**1322330100**
	NEW	Fluoride Standard Solution	1.00 mg/L F^-	±0.03 mg/L F^-	NaF in H_2O	4-6	Photometry	**1322350100**
	NEW	Fluoride Standard Solution	1.50 mg/L F^-	±0.04 mg/L F^-	NaF in H_2O	4-6	Photometry	**1322360100**

[1] 250 mL bottle

		Product	Concentration	Expanded Measurement Uncertainty	Composition	pH Range Solution	Method used for Uncertainty Measurement	Cat. No.
I	NEW	Iron Standard Solution	0.0500 mg/L Fe^{3+}	±0.0015 mg/L Fe^{3+}	$Fe(NO_3)_3$ in HNO_3	2	ICP-OES	**1330140100**
	NEW	Iron Standard Solution	0.1000 mg/L Fe^{3+}	±0.0030 mg/L Fe^{3+}	$Fe(NO_3)_3$ in HNO_3	2	ICP-OES	**1330180100**
	NEW	Iron Standard Solution	0.300 mg/L Fe^{3+}	±0.009 mg/L Fe^{3+}	$Fe(NO_3)_3$ in HNO_3	2	Photometry	**1330190100**
	NEW	Iron Standard Solution	1.00 mg/L Fe^{3+}	±0.04 mg/L Fe^{3+}	$Fe(NO_3)_3$ in HNO_3	2	Photometry	**1330200100**
L	NEW	Lead Standard Solution	0.0500 mg/L Pb^{2+}	±0.0040 mg/L Pb^{2+}	$Pb(NO_3)_2$ in HNO_3	3.5-4.5	ICP-OES	**1330030100**
	NEW	Lead Standard Solution	0.100 mg/L Pb^{2+}	±0.005 mg/L Pb^{2+}	$Pb(NO_3)_2$ in HNO_3	3.5-4.5	ICP-OES	**1330040100**
M	NEW	Manganese Standard Solution	0.050 mg/L Mn^{2+}	±0.004 mg/L Mn^{2+}	$Mn(NO_3)_2$ in H_2O	3-5	Photometry	**1322370100**
	NEW	Manganese Standard Solution	0.200 mg/L Mn^{2+}	±0.005 mg/L Mn^{2+}	$Mn(NO_3)_2$ in H_2O	3-5	Photometry	**1322380100**
	NEW	Manganese Standard Solution	1.00 mg/L Mn^{2+}	±0.03 mg/L Mn^{2+}	$Mn(NO_3)_2$ in H_2O	3-5	Photometry	**1322390100**
N	NEW	Nitrate Standard Solution	1.00 mg/L NO_3^-	±0.03 mg/L NO_3^-	$NaNO_3$ in H_2O	5-7	IC	**1322400100**
	NEW	Nitrate Standard Solution	10.0 mg/L NO_3^-	±0.3 mg/L NO_3^-	$NaNO_3$ in H_2O	5-7	Photometry	**1322410100**
	NEW	Nitrate Standard Solution	50.0 mg/L NO_3-	±2.0 mg/L NO_3^-	$NaNO_3$ in H_2O	5-7	Photometry	**1322420100**
		Nitrate Standard Solution	0.50 mg/L NO_3-N	±0.05 mg/L NO_3-N	$NaNO_3$ in H_2O	5-7	Photometry	**1250360100**
		Nitrate Standard Solution	2.50 mg/L NO_3-N	±0.06 mg/L NO_3-N	$NaNO_3$ in H_2O	5-7	Photometry	**1250370100**
		Nitrate Standard Solution	15.0 mg/L NO_3-N	±0.4 mg/L NO_3-N	$NaNO_3$ in H_2O	5-7	Photometry	**1250380100**
		Nitrate Standard Solution	40.0 mg/L NO_3-N	±1.0 mg/L NO_3-N	$NaNO_3$ in H_2O	5-7	Photometry	**1250390100**
		Nitrate Standard Solution	200 mg/L NO_3-N	±5 mg/L NO_3-N	$NaNO_3$ in H_2O	5-7	Photometry	**1250400100**
	NEW	Nitrite Standard Solution	0.0100 mg/L NO_2^-	±0.0012 mg/L NO_2^-	$NaNO_2$ in NaOH	8.5-9.5	IC	**1330210100**
		Nitrite Standard Solution	0.200 mg/L NO_2-N	±0.009 mg/L NO_2-N	$NaNO_2$ in H_2O	5-7	Photometry	**1250410100**
		Nitrite Standard Solution	40.0 mg/L NO_2-N	±1.3 mg/L NO_2-N	$NaNO_2$ in H_2O	5-7	Photometry	**1250420100**
		Nitrogen (total) Standard Solution	2.50 mg/L N	±0.06 mg/L N	Glycin in H_2O	5-7	Photometry	**1250430100**
		Nitrogen (total) Standard Solution	12.0 mg/L N	±0.3 mg/L N	Glycin in H_2O	5-7	Photometry	**1250440100**
		Nitrogen (total) Standard Solution	100 mg/L N	±3 mg/L N	Glycin in H_2O	5-7	Photometry	**1250450100**
P		Phosphorus Standard Solution	0.400 mg/L P	±0.016 mg/L P	Etidronic Acid in H_2O	4-6	Photometry	**1250460100**
		Phosphorus Standard Solution	4.00 mg/L P	±0.08 mg/L P	Etidronic Acid in H_2O	3-5	Photometry	**1250470100**
		Phosphorus Standard Solution	15.0 mg/L P	±0.4 mg/L P	Etidronic Acid in H_2O	2-4	Photometry	**1250480100**
		Phosphorus Standard Solution	75.0 mg/L P	±1.6 mg/L P	Etidronic Acid in H_2O	2-4	Photometry	**1250490100**

Free CoA

Certificates of Analysis (CoA) for all our standard solutions can be downloaded free of charge.

		Product	Concentration	Expanded Measurement Uncertainty	Composition	pH Range Solution	Method used for Uncertainty Measurement	Cat. No.
S	NEW	Silicate Standard Solution	0.1000 mg/L SiO_2	±0.0040 mg/L SiO_2	SiO_2 in H_2O	6-8	Photometry	**1322440100**
	NEW	Silicate Standard Solution	0.500 mg/L SiO_2	±0.025 mg/L SiO_2	SiO_2 in H_2O	6-8	Photometry	**1322430100**
	NEW	Silicate Standard Solution	1.000 mg/L SiO_2	±0.030 mg/L SiO_2	SiO_2 in H_2O	6-8	Photometry	**1322450100**
		Sulfate Standard Solution	40 mg/L SO_4^{2-}	±6 mg/L SO_4^{2-}	Na_2SO_4 in H_2O	4-6	Photometry	**1250500100**
		Sulfate Standard Solution	125 mg/L SO_4^{2-}	±6 mg/L SO_4^{2-}	Na_2SO_4 in H_2O	4-6	Photometry	**1250510100**
		Sulfate Standard Solution	400 mg/L SO_4^{2-}	±20 mg/L SO_4^{2-}	Na_2SO_4 in H_2O	4-6	Photometry	**1250520100**
		Sulfate Standard Solution	800 mg/L SO_4^{2-}	±27 mg/L SO_4^{2-}	Na_2SO_4 in H_2O	4-6	Photometry	**1250530100**
	NEW	Surfactants nonionic Standard Solution [2]	1.00 mg/L Triton® X-100	±0.16 mg/L Triton® X-100	Triton® X-100 in H_2O	4-6	Photometry	**1330220100**
	NEW	Surfactants nonionic Standard Solution [2]	5.00 mg/L Triton® X-100	±0.30 mg/L Triton® X-100	Triton® X-100 in H_2O	4-6	Photometry	**1330230100**
	NEW	Surfactants nonionic Standard Solution [2]	10.00 mg/L Triton® X-100	±0.60 mg/L Triton® X-100	Triton® X-100 in H_2O	4-6	Photometry	**1330240100**
T	NEW	TOC Standard Solution	5.00 mg/L TOC	±0.10 mg/L TOC	KHP in H_2O	4-6	TOC-Analyzer	**1322460100**
	NEW	TOC Standard Solution	10.0 mg/L TOC	±0.2 mg/L TOC	KHP in H_2O	4-6	TOC-Analyzer	**1322470100**
	NEW	TOC Standard Solution	25.0 mg/L TOC	±0.5 mg/L TOC	KHP in H_2O	4-6	TOC-Analyzer	**1322480100**
	NEW	TOC Standard Solution	50.0 mg/L TOC	±1.0 mg/L TOC	KHP in H_2O	3-5	TOC-Analyzer	**1322490100**
	NEW	TOC Standard Solution	100 mg/L TOC	±2 mg/L TOC	KHP in H_2O	3-5	TOC-Analyzer	**1322510100**
	NEW	TOC Standard Solution	200 mg/L TOC	±4 mg/L TOC	KHP in H_2O	3-5	TOC-Analyzer	**1322520100**
	NEW	TOC Standard Solution	500 mg/L TOC	±10 mg/L TOC	KHP in H_2O	3-5	TOC-Analyzer	**1322530100**

[2] Traceable to USP

Guideline for Calculating your Working Tolerance

According to ISO 17025, every lab needs to calculate its working tolerance. Here are some hints for this procedure.

To help determine the individual measurement-uncertainty estimation, every laboratory that works according to the ISO 17025 standard should prepare a control chart for each reference material and for every lab operator. When it comes to defining the lab's working tolerance, the recommended procedure is as follows:

- Calculate the standard deviation of the measurements of the standard
- Define the lab's own error tolerances that are to be strived for

Here, the user should consider the confidence interval that is usually used. Two-fold standard deviation yields a 95% confidence interval, and three-fold standard deviation a 99% confidence interval. The defined confidence interval should be marked on the control chart as the upper and lower limit.

The standard should be measured regularly, if not on a day-to-day basis. The instructions can be taken from the corresponding standards or the internal specifications. Wherever applicable, in the case that the method covers a larger measuring range, two or more standards in the range of the normal results should also be determined.

In the Spectroquant® test kits, we state the accuracy of the respective method on the Certificate of Quality. This can be used to facilitate the estimation of the working tolerance. The working tolerance naturally also depends on the optical path length of the cells that are used.

The accuracy is calculated on the basis of the mean value of the 95% confidence interval of the respective test; this has been calculated over many years of experience along with the specified blank error. The blank error is stated in the batch certificate of each batch of the respective test kit for the reference cell.

These reference materials can be used to check all photometric methods (both standards and test kits). The reference materials can however, also be used for non-photometric methods. In this case, the user must perform their own measurement-uncertainty estimation. Guidelines or working tolerances of the type that we offer for our test kits are not available for other methods. The same applies for test kits supplied by other manufacturers.

Important Definitions for Certified Reference Materials

Traceability

"Property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty." ISO Guide 99:2007; International Vocabulary of Metrology — Basic and General Concepts and Associated Terms (VIM)

Certified Reference Material (CRM)

"Reference Material (RM) characterized by a metrologically valid procedure for one or more specified properties, accompanied by an RM certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability." ISO/Guide 30:2015; Reference Materials — Selected Terms and Definitions

Primary measurement standard

"Measurement standard that is designated or widely acknowledged as having the highest metrological qualities and whose property value is accepted without reference to other standards of the same property or quantity, within a specified context." ISO/Guide 30:2015; Reference Materials — Selected Terms and Definitions

Secondary measurement standard

"Measurement standard whose property value is assigned by comparison with a primary measurement standard of the same property or quantity." ISO/Guide 30:2015; Reference Materials — Selected Terms and Definitions

Measurement uncertainty

Non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used.

ISO Guide 99:2007; International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)

Expanded measurement uncertainty

Product of a combined standard measurement uncertainty and a factor larger than the number one NOTE: The term "factor" in this definition refers to a coverage factor.

ISO Guide 99:2007; International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)

Conversion tables

Ammonium	mg/L (ppm) NH_4-N	mg/L (ppm) NH_4^+	mg/L (ppm) NH_3-N	mg/L (ppm) NH_3
1 mg/L (ppm) NH_4-N	1	1.28784	1	1.21429
1 mg/L (ppm) NH_4^+	0.77649	1	0.77649	0.94413
1 mg/L (ppm) NH_3-N	1	1.28784	1	1.21429
1 mg/L (ppm) NH_3	0.82245	1.05918	0.82245	1

Chromate	mg/L (ppm) Cr	mg/L (ppm) CrO_4
1 mg/L (ppm) Cr	1	2.23082
1 mg/L (ppm) CrO_4	0.448265	1

Nitrate	mg/L (ppm) NO_3-N	mg/L (ppm) NO_3
1 mg/L (ppm) NO_3-N	1	4.42681
1 mg/L (ppm) NO_3	0.225896	1

Nitrite	mg/L (ppm) NO_2-N	mg/L (ppm) NO_2
1 mg/L (ppm) NO_2-N	1	3.28457
1 mg/L (ppm) NO_2	0.304453	1

Phosphate	mg/L (ppm) PO_4-P	mg/L (ppm) PO_4	mg/L (ppm) P_2O_5
1 mg/L (ppm) PO_4-P	1	3.06617	2.29137
1 mg/L (ppm) PO_4	0.326139	1	0.747307
1 mg/L (ppm) P_2O_5	0.436419	1.33813	1

Silicate	mg/L (ppm) Si	mg/L (ppm) SiO_2
1 mg/L (ppm) Si	1	2.13932
1 mg/L (ppm) SiO_2	0.467437	1

Photometric, Ready-to-Use, Multi-Parameter Standards and Spiking Solutions - Spectroquant® CombiCheck

CombiCheck contains multi-parameter standard solutions for checking the overall system—from test kits and instruments to individual working procedures. Each pack contains one standard solution and one addition solution, both of which are directly traceable to NIST primary standards.

When the specified concentration of the standard solution is achieved, the entire analytical system works properly. If there are deviations from the stated value, use the addition solution to identify errors due to interfering substances in the sample matrix. In case the recovery rate is insufficient (beyond specified tolerances), analyze and eliminate the cause through appropriate countermeasures, such as sample pre-treatment.

Spectroquant® CombiCheck 10 — **Cat. No. 1.14676.0001**

Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	
Ammonium	4.00	±0.30 mg/L NH_4-N	1.14558.0001	1.0	96	**Standard Solution Reagent R-1**
Chloride	25	±6 mg/L Cl^-	1.14730.0007	1.0	96	
COD	80	±12 mg/L COD	1.14540.0007	3.0	32	
	80	±12 mg/L COD	1.18751.0007	2.0	48	
Nitrate	2.50	±0.25 mg/L NO_3-N	1.14556.0001	2.0	48	
	2.50	±0.25 mg/L NO_3-N	1.14773.0001 [2]	1.5	64	
	2.50	±0.25 mg/L NO_3-N	1.09713.0001 [3]	1.0	96	
Phosphate [4]	0.80	±0.08 mg/L PO_4-P	1.00474.0007	5.0	19	
	0.80	±0.08 mg/L PO_4-P	1.14543.0007	5.0	19	
	0.80	±0.08 mg/L PO_4-P	1.14848.0007/ .0008 [2]	5.0	19	
	0.80	±0.08 mg/L PO_4-P	1.14848.0007 [3]/ .0008 [3]	10.0	9	
Sulfate	100	±15 mg/L SO_4^{2-}	1.14548.0001	5.0	19	
	100	±15 mg/L SO_4^{2-}	1.00617.0001	2.0	48	
	100	±15 mg/L SO_4^{2-}	1.14791.0001	2.5	38	
	100	±15 mg/L SO_4^{2-}	1.02537.0001	5.0	19	
Ammonium	3.00	±0.25 mg/L NH_4-N	1.14558.0001	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
Chloride	25	±6 mg/L Cl^-	1.14730.0007	0.10	280	
COD	30	±8 mg/L COD	1.14540.0007	0.10	280	
	45	±8 mg/L COD	1.18751.0007	0.10	280	
Nitrate	1.50	±0.20 mg/L NO_3-N	1.14556.0001	0.10	280	
	2.00	±0.40 mg/L NO_3-N	1.14773.0001 [2]	0.10	280	
	3.00	±0.50 mg/L NO_3-N	1.09713.0001 [3]	0.10	280	
	6.0	±1.0 mg/L NO_3-N	1.09713.0001 [1,2]	0.10	280	
Phosphate [4]	0.60	±0.07 mg/L PO_4-P	1.00474.0007	0.10	280	
	0.60	±0.07 mg/L PO_4-P	1.14543.0007	0.10	280	
	0.30	±0.05 mg/L PO_4-P	1.14848.0007/ .0008 [3]	0.10	280	
Sulfate	40	±5 mg/L SO_4^{2-}	1.14548.0001	0.10	280	
	100	±15 mg/L SO_4^{2-}	1.00617.0001	0.10	280	
	80	±10 mg/L SO_4^{2-}	1.14791.0001 [1]	0.10	280	
	40	±5 mg/L SO_4^{2-}	1.02537.0001	0.10	280	

[1] Using a 10 mm rectangular cell, Cat. No. 1.14946.0001
[2] Using a 20 mm rectangular cell, Cat. No. 1.14947.0001
[3] Using a 50 mm rectangular cell, Cat. No. 1.14944.0001
[4] Only the determination of ortho-phosphate can be checked

Spectroquant® CombiCheck 20						Cat. No. 1.14675.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	Standard Solution Reagent R-1
Ammonium	12.0	±1.0 mg/L NH_4-N	1.14544.0001	0.50	192	
Chloride	60	±10 mg/L Cl^-	1.14730.0007	1.0	96	
COD	750	±75 mg/L COD	1.14541.0007	3.0	32	
	750	±75 mg/L COD	1.18752.0007	2.0	48	
Nitrate	9.0	±0.9 mg/L NO_3-N	1.14563.0001	1.0	96	
	9.0	±0.9 mg/L NO_3-N	1.14542.0001	1.5	64	
	9.0	±0.9 mg/L NO_3-N	1.09713.0001/ .0002 [1]	0.50	192 [1]	
	9.0	±0.9 mg/L NO_3-N	1.14773.0001 [1]	1.5	64	
	9.0	±0.9 mg/L NO_3-N	1.14942.0001	1.0	96	
Phosphate [4]	8.0	±0.7 mg/L PO_4-P	1.00475.0007	1.0	96	
	8.0	±0.7 mg/L PO_4-P	1.14729.0007	1.0	96	
Sulfate	500	±75 mg/L SO_4^{2-}	1.14564.0001	1.0	96	
Ammonium	8.0	±0.8 mg/L NH_4-N	1.14544.0001	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
Chloride	40	±7 mg/L Cl^-	1.14730.0007	0.10	280	
COD	200	±40 mg/L COD	1.14541.0007	0.10	280	
	300	±40 mg/L COD	1.18752.0007	0.10	280	
Nitrate	7.5	±0.8 mg/L NO_3-N	1.14563.0001	0.10	280	
	5.0	±0.6 mg/L NO_3-N	1.14542.0001	0.10	280	
	15.0	±1.5 mg/L NO_3-N	1.09713.0001/ .0002	0.10	280	
	5.0	±0.6 mg/L NO_3-N	1.14773.0001 [1]	0.10	280	
	7.5	±0.8 mg/L NO_3-N	1.14942.0001 [1]	0.10	280	
Phosphate [4]	5.0	±0.5 mg/L PO_4-P	1.00475.0007	0.10	280	
	5.0	±0.5 mg/L PO_4-P	1.14729.0007	0.10	280	
Sulfate	150	±30 mg/L SO_4^{2-}	1.14564.0001	0.10	280	

Spectroquant® CombiCheck 50						Cat. No. 1.14695.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	Standard Solution Reagent R-1
Ammonium	1.000	±0.100 mg/L NH_4-N	1.14739.0001	5.0	19	
	1.00	±0.10 mg/L NH_4-N	1.14752.0002/ .0001 [1]	5.0	19	
COD	20.0	±4.0 mg/L COD	1.14560.0007	3.0	32	
	20.0	±4.0 mg/L COD	1.01796.0007	2.0	48	
	20.0	±4.0 mg/L COD	1.18750.0007	2.0	48	
Nitrogen	5.0	±0.7 mg/L N	1.00613.0001	10	9	
	5.0	±0.7 mg/L N	1.14537.0001	10	9	
Ammonium	1.000	±0.100 mg/L NH_4-N	1.14739.0001	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
	1.00	±0.10 mg/L NH_4-N	1.14752.0002/ .0001 [1]	0.10	280	
COD	10.0	±3.0 mg/L COD	1.14560.0007	0.10	280	
	15.0	±3.0 mg/L COD	1.01796.0007	0.10	280	
	15.0	±3.0 mg/L COD	1.18750.0007	0.10	280	
Nitrogen	3.0	±0.5 mg/L N	1.00613.0001	0.10	280	
	3.0	±0.5 mg/L N	1.14537.0001	0.10	280	

[1] Using a 10 mm rectangular cell, Cat. No. 1.14946.0001
[2] Using a 20 mm rectangular cell, Cat. No. 1.14947.0001
[3] Using a 50 mm rectangular cell, Cat. No. 1.14944.0001
[4] Only the determination of ortho-phosphate can be checked

Spectroquant® CombiCheck Analytical Quality Assurance

Spectroquant® CombiCheck 60						Cat. No. 1.14696.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	**Standard Solution Reagent R-1**
Chloride	125	±13 mg/L Cl^-	1.14897.0007/ .0008	1.0	96	
COD	250	±25 mg/L COD	1.14690.0001	2.0	48	
	250	±20 mg/L COD	1.14895.0001	2.0	48	
Chloride	50	±7 mg/L Cl^-	1.14897.0007/ .0008	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
COD	75	±15 mg/L COD	1.14690.0001	0.10	280	
	75	±10 mg/L COD	1.14895.0001	0.10	280	

Spectroquant® CombiCheck 70						Cat. No. 1.14689.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	**Standard Solution Reagent R-1**
Ammonium	50.0	±5.0 mg/L NH_4-N	1.14559.0001	0.10	960	
Ammonium (2.0 – 75.0 mg/L)	50.0	±5.0 mg/L NH_4-N	1.00683.0001 [1,5]	0.20	480	
Ammonium (5 – 150 mg/L)	50	±5 mg/L NH_4-N	1.00683.0001 [1,5]	0.10	960	
COD	5,000	±400 mg/L COD	1.14555.0007	1.0	96	
	5,000	±400 mg/L COD	1.18753.0007	0.20	480	
Nitrogen	50	±7 mg/L N	1.14763.0001	1.0	96	
Ammonium	20.0	±2.0 mg/L NH_4-N	1.14559.0001	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
Ammonium (2.0 – 75.0 mg/L)	10.0	±1.0 mg/L NH_4-N	1.00683.0001 [1,5]	0.10	280	
Ammonium (5 – 150 mg/L)	20	±2 mg/L NH_4-N	1.00683.0001 [1,5]	0.10	280	
COD	2,000	±200 mg/L COD	1.14555.0007	0.10	280	
Nitrogen	20	±6 mg/L N	1.14763.0001	0.10	280	

Spectroquant® CombiCheck 80						Cat. No. 1.14738.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	**Standard Solution Reagent R-1**
COD	1,500	±150 mg/L COD	1.14691.0007	2.0	48	
Nitrate	25.0	±2.5 mg/L NO_3-N	1.14764.0001	0.50	190	
Phosphate [4]	15.0	±1.0 mg/L PO_4-P	1.00475.0007	1.0	96	
	15.0	±1.0 mg/L PO_4-P	1.14729.0007	1.0	96	
COD	1,000	±100 mg/L COD	1.14691.0007	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
Nitrate	10.0	±1.5 mg/L NO_3-N	1.14764.0001	0.10	280	
Phosphate [4]	5.0	±0.5 mg/L PO_4-P	1.00475.0007	0.10	280	
	5.0	±0.5 mg/L PO_4-P	1.14729.0007	0.10	280	

[1] Using a 10 mm rectangular cell, Cat. No. 1.14946.0001
[2] Using a 20 mm rectangular cell, Cat. No. 1.14947.0001
[3] Using a 50 mm rectangular cell, Cat. No. 1.14944.0001
[4] Only the determination of ortho-phosphate can be checked
[5] When using AutoSelector, measuring range 5 - 150 mg/L NH_4-N is used

NEW
The CombiCheck 90 replaces the CombiCheck 30

Spectroquant® CombiCheck 90						Cat. No. 1.18700.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	Standard Solution Reagent R-1
Cadmium	0.250	±0.030 mg/L Cd	1.01745.0001 [1]	10.0	9	
	0.250	±0.030 mg/L Cd	1.14834.0001	5.0	19	
Iron	1.00	±0.15 mg/L Fe	1.14549.0001	5.0	19	
	1.00	±0.15 mg/L Fe	1.14761.0001 [1]	5.0	19	
	1.00	±0.15 mg/L Fe	1.00796.0007 [1]	8.0	12	
Copper	2.00	±0.20 mg/L Cu	1.14553.0001	5.0	19	
	2.00	±0.20 mg/L Cu	1.14767.0001 [1]	5.0	19	
Manganese	1.00	±0.15 mg/L Mn	1.00816.0007	7.0	13	
	1.00	±0.15 mg/L Mn	1.14770.0007 [3]	10.0	9	
	1.00	±0.15 mg/L Mn	1.01846.0007 [1]	8.0	12	
Cadmium	0.100	±0.015 mg/L Cd	1.01745.0001 [1]	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
	0.200	±0.030 mg/L Cd	1.14834.0001	0.10	280	
Iron	3.00	±0.30 mg/L Fe	1.14549.0001	0.10	280	
	3.00	±0.30 mg/L Fe	1.14761.0001 [1]	0.10	280	
	1.88	±0.20 mg/L Fe	1.00796.0007 [1]	0.10	280	
Copper	3.00	±0.30 mg/L Cu	1.14553.0001	0.10	280	
	3.00	±0.30 mg/L Cu	1.14767.0001 [1]	0.10	280	
Manganese	1.43	±0.15 mg/L Mn	1.00816.0007	0.10	280	
	1.00	±0.15 mg/L Mn	1.14770.0007 [3]	0.10	280	
	1.25	±0.15 mg/L Mn	1.01846.0007 [1]	0.10	280	

NEW
The CombiCheck 100 replaces the CombiCheck 40

Spectroquant® CombiCheck 100						Cat. No. 1.18701.0001
Parameter	Concentration [mL] and working tolerance		Compatible with test kits Cat. No.	Standard solution [mL]	Number of quality checks	Standard Solution Reagent R-1
Aluminium	0.40	±0.05 mg/L Al	1.00594.0001	6.0	16	
	0.40	±0.05 mg/L Al	1.14825.0001 [1]	5.0	19	
Lead	2.00	±0.20 mg/L Pb	1.14833.0001	5.0	19	
	2.00	±0.20 mg/L Pb	1.09717.0001 [1]	8.0	11	
Nickel	2.00	±0.20 mg/L Ni	1.14554.0001	5.0	19	
	2.00	±0.20 mg/L Ni	1.14785.0007 [1]	5.0	19	
Zinc	0.750	±0.150 mg/L Zn	1.00861.0007	10.0	9	
	0.75	±0.15 mg/L Zn	1.14832.0001	5.0	19	
Aluminium	0.20	±0.03 mg/L Al	1.00594.0001	0.10	280	**Addition Solution Reagent R-2** (for spiking of samples)
	0.24	±0.04 mg/L Al	1.14825.0001 [1]	0.10	280	
Lead	1.00	±0.15 mg/L Pb	1.14833.0001	0.10	280	
	0.63	±0.10 mg/L Pb	1.09717.0001 [1]	0.10	280	
Nickel	2.00	±0.20 mg/L Ni	1.14554.0001	0.10	280	
	2.00	±0.20 mg/L Ni	1.14785.0007 [1]	0.10	280	
Zinc	0.250	±0.050 mg/L Zn	1.00861.0007	0.10	280	
	0.50	±0.10 mg/L Zn	1.14832.0001	0.10	280	

[1] Using a 10 mm rectangular cell, Cat. No. 1.14946.0001
[2] Using a 20 mm rectangular cell, Cat. No. 1.14947.0001
[3] Using a 50 mm rectangular cell, Cat. No. 1.14944.0001
[4] Only the determination of ortho-phosphate can be checked
[5] When using AutoSelector, measuring range 5 - 150 mg/L NH_4-N is used

Certipur® and *Trace*CERT® Certified Reference Material Standard Solutions

If you need to prepare your own solution according to your lab-specific concentrations, rely on the exceptional quality of our Certipur® and *Trace*CERT® Certified Reference Material Standard Solutions.

Certipur® solutions		*Trace*CERT® solutions
Anionic solution	Cationic solution	Anionic and cationic solutions
Concentrations: 1000 mg/L		
Unique level of accuracy and lot-specific value		
		Produced according to ISO 17034
	Analyzed in our ISO 17025 accredited lab	
Directly traceable to the corresponding NIST CRMs		Traceable to at least two independent references (NIST, BAM or SI unit kg)
Sophisticated packaging* and comprehensive documentation including proper uncertainty calculation, expiry date and storage information		

* All standards are supplied in HDPE bottles except for the *Trace*CERT® Mercury solution, which is bottled in 100 mL borosilicate white glass bottle

Ion	Matrix	Pack size	Certipur® Cat. no	Pack size	*Trace*CERT® Cat. no
Aluminium	HNO_3	100 mL	**1.19770.0100**	250 mL	**39435**
Ammonium	H_2O	500 mL	**1.19812.0500**	100 mL	**59755**
Antimony	HNO_3	100 mL	**1.70204.0100**	250 mL	**94117**
Arsenic	HNO_3	100 mL	**1.19773.0100**	250 mL	**39436**
Barium	HNO_3	100 mL	**1.19774.0100**	250 mL	**90092**
Boron	H_2O	100 mL	**1.19500.0100**	250 mL	**40591**
Cadmium	HNO_3	100 mL	**1.19777.0100**	250 mL	**51994**
Calcium	HNO_3	100 mL	**1.19778.0100**	250 mL	**69349**
Chloride	H_2O	500 mL	**1.19897.0500**	100 mL	**39883**
Chromate	H_2O	500 mL	**1.19780.0500**	100 mL	**40121**
Chromium	HNO_3	100 mL	**1.19779.0100**	250 mL	**02733**
Cobalt	HNO_3	100 mL	**1.19785.0100**	250 mL	**05202**
Copper	HNO_3	100 mL	**1.19786.0100**	250 mL	**38996**
Cyanide	H_2O	500 mL	**1.19533.0500**	100 mL	**90157**
Fluoride	H_2O	500 mL	**1.19814.0500**	100 mL	**77365**
Gold	HCl	100 mL	**1.70216.0100**	100 mL	**08269**
Iron	HNO_3	100 mL	**1.19781.0100**	250 mL	**16596**
Lead	HNO_3	100 mL	**1.19776.0100**	250 mL	**16595**
Magnesium	HNO_3	100 mL	**1.19788.0100**	250 mL	**42992**
Manganese	HNO_3	100 mL	**1.19789.0100**	250 mL	**77036**
Mercury	HNO_3	100 mL	**1.70226.0100**	100 mL	**16482**
Molybdenum	H_2O	100 mL	**1.70227.0100**	250 mL	**67210**
Nickel	HNO_3	100 mL	**1.19792.0100**	250 mL	**42242**
Nitrate	H_2O	500 mL	**1.19811.0500**	100 mL	**74246**
Nitrite	H_2O	500 mL	**1.19899.0500**	100 mL	**67276**
Palladium	HNO_3	100 mL	**1.14282.0100**	100 mL	**78437**
Phosphate	H_2O	500 mL	**1.19898.0500**	100 mL	**38364**
Platinum	HCl	100 mL	**1.70219.0100**	100 mL	**47037**
Potassium	HNO_3	100 mL	**1.70230.0100**	250 mL	**96665**
Silver	HNO_3	100 mL	**1.19797.0100**	250 mL	**39361**
Silicon	NaOH	100 mL	**1.70236.0100**	250 mL	**16259**
Sulfate	H_2O	500 mL	**1.19813.0500**	100 mL	**90071**
Tin	HCl	100 mL	**1.70242.0100**	250 mL	**74244**
Vanadium	HNO_3	100 mL	**1.19809.0100**	250 mL	**02334**
Zinc	HNO_3	100 mL	**1.19806.0100**	250 mL	**18827**

Analytical Instrument Qualification of Photometric Equipment

UV/Vis Certified Reference Material (CRM) and Certipur® Reference Material Solutions (RM)

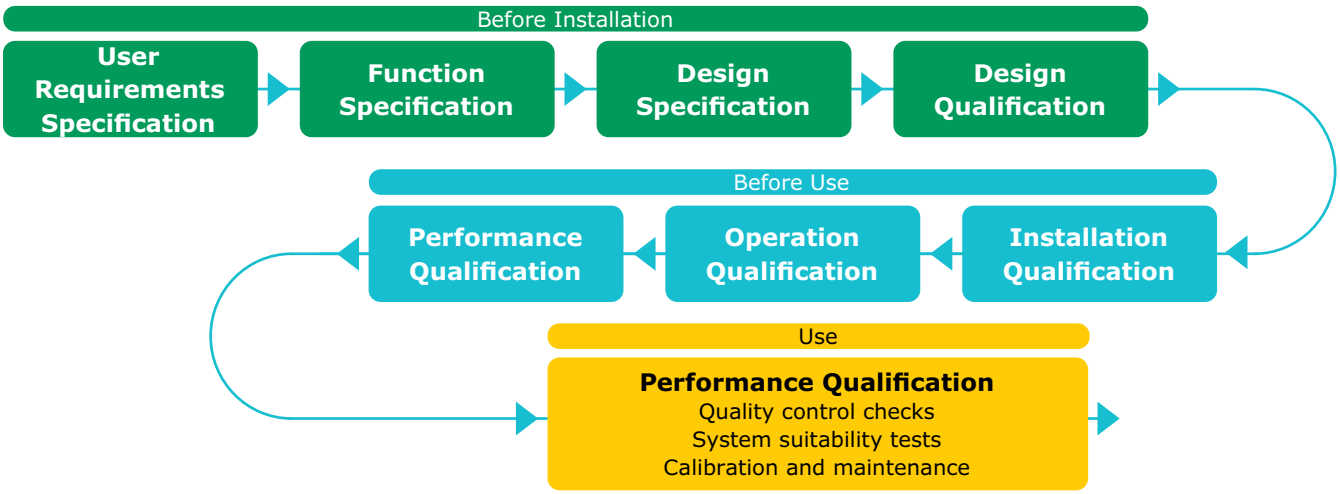
Using our UV/Vis solutions, the consistent and correct function of your UV/Vis spectrophotometer can be checked throughout the whole timeline of Analytical Instrument Qualification (AIQ).

Our product program consists of certified solutions acc. to ISO 17025 and we follow the guidance of ISO 17034. Certipur® reference solutions are double-certified. The solutions are either manufactured acc. to Ph.Eur. or USP<857>.

See the following table for an overview of the application possibilities and features of our UV/Vis solutions

	Certified Reference Material Solutions	Certipur® Reference Solutions
Application	**During the qualification process** • At instrument installation (new, old or existing unqualified instrument) • After installation or major repair of an instrument • Periodically at specified intervals for each instrument	**During operation** • For quality control checks • For system suitability tests • For calibration and maintenance
Features	**Manufactured acc. to Ph.Eur.**	
	Manufactured acc. to USP<857>	
	Ready-to-use solutions	
Parameters detected	• Absorbance • Stray light • Spectral resolution • Wavelength accuracy	

Qualification Processes



Certified Reference Material Solutions

Product	Description	Cat. No
UV Photometric Accuracy Standards acc. to Ph.Eur.	Standard: 2x10 mL $K_2Cr_2O_7$ – 60.06 mg/L in H_2SO_4/ 0.01N Blank: 1x10 mL H_2SO_4/ 0.01N	**Z804452**
UV Resolution Standard acc. to Ph.Eur.	Standard: 1x10 mL 0.02%(v/v) toluene in n-Hexane Blank: 1x10 mL n-Hexane	**Z894568**
UV Stray Light Standards acc. to Ph.Eur.	Standard: 1x10 mL KCl 12 g/L in H_2O Blank: 1x10 mL H_2O	**Z804665**
UV Spec Qualification Kit	Contains Z804452, Z804568, Z804665	**Z804789**
UV5, UV25 for testing wavelength accuracy, UV5 for 240-650nm; UV25 for 730-870nm acc. to USP <857>	Holmium in perchloric acid (667-UV5: Calibration standard, consisting of a standard cell containing 40g/L Ho_2O_3 in 10% $HClO_4$. The cell is permanently sealed.) Didymium in perchloric acid (667-UV25: Calibration standard, consisting of a standard cell containing Didymium (Neodymium & Praseodymium) in 10% $HClO_4$. The cell is permanently sealed.)	**Z804800**
UV1, UV1H for testing stray light from 190-205nm acc. to USP <857>	Potassium chloride in purified water (667-UV1: wavelength [nm] 200 (cut-off), pathlength 10 mm) Potassium chloride in purified water, reference filter (667-UV1H: wavelength [nm] 200 (cut-off), pathlength 5 mm)	**Z805459**
UV10, UV10H for testing stray light from 210-259nm acc. to USP <857>	Sodium iodide in purified water (667-UV10: wavelength [nm] 259 (cut-off), pathlength 10 mm) Sodium iodide in purified water reference filter (667-UV10H: wavelength [nm] 259 (cut-off), pathlength 5 mm)	**Z805564**
UV11, UV11H for testing stray light from 300-385nm acc. to USP <857>	Sodium nitrite in purified water (667-UV11: wavelength [nm] 385 (cut-off), pathlength 10 mm) Sodium nitrite in purified water reference filter (667-UV11H: wavelength [nm] 385 (cut-off), pathlength 5 mm)	**Z805661**
UV19, UV19H testing stray light from 205-320nm acc. to USP <857>	Acetone (667-UV19: wavelength [nm] 325 (cut-off), pathlength 10 mm) Acetone reference filter (667-UV19H: wavelength [nm] 25 (cut-off), pathlength 5 mm)	**Z805785**
UV1, UV1H, UV10, UV10H, UV11, UV11H, UV19, UV19H testing stray light acc. to USP <857>	Set of Z805459, Z805564, Z805661, Z805785	**Z805890**

Certipur® Reference Solutions

Product	Description	Cat. No
UV/Vis Standard 1 – Potassium dichromate for absorbance acc. to Ph.Eur.	2x10 mL $K_2Cr_2O_7$ 60.06 mg/L in H_2SO_4/ 0.01N and 6x10 mL H_2SO_4/ 0.01N	**1.08160.0001**
UV/Vis Standard 1A Potassium dichromate solution for the absorbance at 430 nm acc. to Ph.Eur.	2x10 mL $K_2Cr_2O_7$ 606.6 mg/L in H_2SO_4/ 0.01N and 6x10 mL H_2SO_4/ 0.01N	**1.04660.0001**
UV/Vis Standard 2 Sodium nitrite solution for straylight testing acc. to Ph.Eur.	3x10 mL $NaNO_2$ 50g/L in H_2O	**1.08161.0001**
UV/Vis Standard 3 Sodium iodide solution for straylight testing acc. to Ph.Eur.	3x10 mL NaI 10 g/L in H_2O	**1.08163.0001**
UV/Vis Standard 4 Potassium chloride solution for straylight testing acc. Ph.Eur.	3x10 mL KCl 12 g/L in H_2O	**1.08164.0001**
UV/Vis Standard 5 Toluene solution in hexane for testing the resolution acc. to Ph.Eur.	2x10 mL 0.02% (v/v) toluene in n-hexane and 6x10 mL n-hexane	**1.08165.0001**
UV/Vis Standard 6 Holmium oxide solution reference material for wavelength accuracy	3x10 mL Ho_2O_3 40 g/L in $HClO_4$ (10% v/v)	**1.08166.0001**

Supelco®
Analytical Products

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