

5

CD-ROM

5.1 Overview of preprogrammed methods and analytical procedures

Meth. No.	Parameter	Cat. No.	Measuring range	Blank	Type of test	Type of cell
10	Acid cap. 01758	1.01758.0001	0.40 - 8.00 mmol/l OH	RB	Cell test	16 mm
20	Aluminium 14825	1.14825.0001*	20 - 700 µg/l Al	RB	Cell test	16 mm
21	Aluminium 00594	1.00594.0001	0.05 - 0.50 mg/l Al	RB	Test	24 mm
30	Ammonium 14739	1.14739.0001	10 - 2000 µg/l NH ₄ -N	RB	Cell test	16 mm
31	Ammonium 14558	1.14558.0001	0.20 - 8.00 mg/l NH ₄ -N	RB	Cell test	16 mm
32	Ammonium 14559	1.14559.0001	4.0 - 80.0 mg/l NH ₄ -N	RB	Cell test	16 mm
33	Ammonium 14752	1.14752.0001*	0.02 - 1.30 mg/l NH ₄ -N	RB	Test	24 mm
34	Ammonium 00683	1.00683.0001	1.0 - 50.0 mg/l NH ₄ -N	RB	Test	16 mm
40	AOX 00675	1.00675.0001	0.05 - 2.50 mg/l AOX	RB	Cell test	16 mm
50	Arsenic 01747	1.01747.0001	5 - 100 µg/l As	RB	Test	16 mm
70	BOD 00687	1.00687.0001	0.5 - 3000 mg/l BOD	H ₂ O	Cell test	16 mm
80	Boron 00826	1.00826.0001	0.05 - 2.00 mg/l B	RB	Cell test	16 mm
90	Bromine 00605	1.00605.0001	0.10 - 5.00 mg/l Br ₂	H ₂ O	Test	24 mm
100	Cadmium 14834	1.14834.0001	25 - 1000 µg/l Cd	RB	Cell test	16 mm
101	Cadmium 01745	1.01745.0001	5 - 500 µg/l Cd	RB	Test	24 mm
110	Calcium 00858	1.00858.0001	10 - 250 mg/l Ca	RB	Cell test	16 mm
111	Calcium 14815	1.14815.0001	5 - 160 mg/l Ca	RB	Test	16 mm
120	Chloride 14730	1.14730.0001	5 - 125 mg/l Cl	RB	Cell test	16 mm
121	Chloride 14897	1.14897.0001	10 - 250 mg/l Cl	RB	Test	16 mm
122	Chloride 01804	1.01804.0001	0.5 - 15.0 mg/l Cl	RB	Cell Test	16 mm
123	Chloride 01807	1.01807.0001	0.50 - 5.00 mg/l Cl	RB	Test	24 mm
130	Cl ₂ CT 0.05-5.00	1.00595.0001 (free) 1.00597.0001 (free + total)	0.05 - 5.00 mg/l Cl ₂	H ₂ O	Cell test	16 mm

* in contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled

RB = own reagent blank value

Meth. No.	Parameter	Cat. No.	Measuring range	Blank	Type of test	Type of cell
131	Cl ₂ 0.02-4.50	1.00598.0002 (free) 1.00598.0001 (free) 1.00602.0001 (total) 1.00602.0002 (total) 1.00599.0001 (free + total)	0.02 - 4.50 mg/l Cl ₂	H ₂ O	Test	24 mm
134	Cl ₂ 0.10-6.00	1.00598.0002 (free) 1.00598.0001 (free) 1.00602.0001 (total) 1.00602.0002 (total) 1.00599.0001 (free + total)	0.10 - 6.00 mg/l Cl ₂	H ₂ O	Test	16 mm
132	Cl ₂ LR 0.10-6.00	1.00086.0001 + 1.00087.0001 (free) 1.00086.0001 + 1.00087.0001 + 1.00088.0001 (total)	0.10 - 6.00 mg/l Cl ₂	H ₂ O	Cell test	16 mm
133	Cl ₂ LR 0.02-4.50	1.00086.0001 + 1.00087.0001 (free) 1.00086.0001 + 1.00087.0001 + 1.00088.0001 (total)	0.02 - 4.50 mg/l Cl ₂	H ₂ O	Test	24 mm
140	ClO ₂ 0.05-8.50	1.00608.0001	0.05 - 8.50 mg/l ClO ₂	H ₂ O	Test	24 mm
141	ClO ₂ 0.20-10.00	1.00608.0001	0.20 - 10.00mg/l ClO ₂	H ₂ O	Test	16 mm
150	Chromate 14552	1.14552.0001	0.05 - 2.00 mg/l Cr	H ₂ O	Cell test	16 mm
151	Chromate 14758	1.14758.0001*	10 - 1400 µg/l Cr	H ₂ O	Test	24 mm
210	Cobalt 17244	1.17244.0001	0.05 - 2.00 mg/l Co	RB	Cell test	16 mm
168	COD 01796	1.01796.0001	5.0 - 80.0 mg/l COD	RB	Cell test	16 mm
160	COD 14540	1.14540.0001	10 - 150 mg/l COD	RB	Cell test	16 mm
161	COD 14895	1.14895.0001	15 - 300 mg/l COD	RB	Cell test	16 mm
162	COD 14690	1.14690.0001	50 - 500 mg/l COD	RB	Cell test	16 mm
163	COD 14541	1.14541.0001	25 - 1500 mg/l COD	RB	Cell test	16 mm
164	COD 14691	1.14691.0001	300 - 3500 mg/l COD	RB	Cell test	16 mm
165	COD 14555	1.14555.0001	0.50 -10.00 g/l COD	RB	Cell test	16 mm
169	COD 01797	1.01797.0001	5.00 - 90.00g/l COD	RB	Cell test	16 mm
166	COD 09772	1.09772.0001	10 - 150 mg/l COD	RB	Cell test	16 mm
167	COD 09773	1.09773.0001	100 - 1500 mg/l COD	RB	Cell test	16 mm
570	COD 17058	1.17058.0001	5.0 - 60.0 mg/l COD	RB	Cell test	16 mm
571	COD 17059	1.17059.0001	50 - 3000 mg/l COD	RB	Cell test	16 mm
170	Color	-	25 - 1000 mg/l Pt/Co (Hazen)	H ₂ O	Method	24 mm
180	Copper 14553	1.14553.0001	0.05 - 8.00 mg/l Cu	H ₂ O	Cell test	16 mm
181	Copper 14767	1.14767.0001	0.10 - 6.00 mg/l Cu	H ₂ O	Test	16 mm
192	Cyanide 02531	1.02531.0001	10 - 350 µg/l CN	H ₂ O	Cell test	16 mm
190	Cyanide 14561	1.14561.0001	10 - 350 µg/l CN	H ₂ O	Cell test	16 mm
191	Cyanide 09701	1.09701.0001*	5 - 200 µg/l CN	H ₂ O	Test	24 mm
201	Cyan. acid19253	1.19253.0001	2 - 160 mg/l CyA	SB	Test	24 mm
220	Fluoride 14557	1.14557.0001	0.10 - 1.50 mg/l F	RB	Cell test	16 mm
222	Fluoride 00809	1.00809.0001	0.10 - 1.80 mg/l F	RB	Cell test	16 mm
225	Fluoride 17243	1.17243.0001	0.10 - 2.50 mg/l F	RB	Cell test	16 mm
221	Fluoride 14598	1.14598.0001	0.10 - 2.00 mg/l F	RB	Test	16 mm
223	Fluoride 00822	1.00822.0001	0.08 - 2.00 mg/l F	RB	Test	24 mm
224	Fluoride 17236	1.17236.0001*	0.08 - 2.00 mg/l F	RB	Test	16 mm
230	Hydrazine 09711	1.09711.0001*	10 - 1200 µg/l N ₂ H ₄	RB	Test	24 mm
560	HydroPerox 18789	1.18789.0001	0.02 - 5.50 mg/l H ₂ O ₂	RB	Test	16 mm
240	Iodine 00606	1.00606.0001	0.10 - 5.00 mg/l I ₂	H ₂ O	Test	24 mm
252	Iron 00796	1.00796.0001	0.10 - 5.00 mg/l Fe	H ₂ O	Test	16 mm

* in contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled

RB = own reagent blank value

SB = sample blank value

Meth. No.	Parameter	Cat. No.	Measuring range	Blank	Type of test	Type of cell
250	Iron 14549	1.14549.0001	0.05 - 4.00 mg/l Fe	H ₂ O	Cell test	16 mm
251	Iron 14761	1.14761.0001* 1.14761.0002*	0.01 - 2.00 mg/l Fe	H ₂ O	Test	24 mm
260	Lead 14833	1.14833.0001	0.10 - 5.00 mg/l Pb	RB	Cell test	16 mm
261	Lead 09717	1.09717.0001	0.05 - 5.00 mg/l Pb	RB	Test	24 mm
270	Magnesium 00815	1.00815.0001	5.0 - 75.0 mg/l Mg	RB	Cell test	16 mm
280	Manganese 00816	1.00816.0001	0.10 - 5.00 mg/l Mn	H ₂ O	Cell test	16 mm
281	Manganese 01739	1.01739.0001	0.05 - 1.80 mg/l Mn	RB	Test	24 mm
282	Manganese 14770	1.14770.0001*	0.05 - 6.00 mg/l Mn	H ₂ O	Test	24 mm
283	Manganese 01846	1.01846.0001	0.05 - 1.80 mg/l Mn	RB	Test	24 mm
290	Molybdenum 00860	1.00860.0001	0.02 - 1.00 mg/l Mo	H ₂ O	Cell test	16 mm
291	Molybdenum 19252	1.19252.0001	0.5 - 45.0 mg/l Mo	H ₂ O	Test	24 mm
300	Monochloramine	1.01632.0001	0.10 - 5.00 mg/l Cl ₂	H ₂ O	Test	24 mm
310	Nickel 14554	1.14554.0001	0.10 - 6.00 mg/l Ni	H ₂ O	Cell test	16 mm
311	Nickel 14785	1.14785.0001*	0.05 - 5.00 mg/l Ni	RB	Test	24 mm
320	Nitrate 14542	1.14542.0001	0.5 - 15.0 mg/l NO ₃ -N	RB	Cell test	16 mm
321	Nitrate 14773	1.14773.0001	0.5 - 15.0 mg/l NO ₃ -N	RB	Test	16 mm
322	Nitrate 14556	1.14556.0001	0.10 - 3.00 mg/l NO ₃ -N	RB	Cell test	16 mm
323	Nitrate 01842	1.01842.0001	0.3 - 30.0 mg/l NO ₃ -N	RB	Test	24 mm
330	Nitrite 14547	1.14547.0001	10 - 700 µg/l NO ₂ -N	H ₂ O	Cell test	16 mm
331	Nitrite 14776	1.14776.0001* 1.14776.0002*	5 - 400 µg/l NO ₂ -N	H ₂ O	Test	24 mm
332	Nitrite 00609	1.00609.0001	1.0 - 90.0 mg/l NO ₂ -N	H ₂ O	Cell test	16 mm
340	Nitrogen 14537	1.14537.0001	0.5 - 15.0 mg/l N	RB	Cell test	16 mm
550	Oxygen 14694	1.14694.0001	0.5 - 12.0 mg/l O ₂	H ₂ O	Cell test	16 mm
555	Oxyg. scavengers	119251.0001	20 - 500 µg/l DEHA	RB	Test	24 mm
350	Ozone 0.02-3.00	1.00607.0001 1.00607.0002	0.02 - 3.00 mg/l O ₃	H ₂ O	Test	24 mm
351	Ozone 0.10-4.00	1.00607.0001 1.00607.0002	0.10 - 4.00 mg/l O ₃	H ₂ O	Test	16 mm
360	pH 01744	1.01744.0001	6.4 - 8.8	H ₂ O	Cell test	16 mm
370	Phenol 14551	1.14551.0001	0.10 - 2.50 mg/l C ₆ H ₅ OH	RB	Cell test	16 mm
371	Phenol 00856	1.00856.0001	0.10 - 5.00 mg/l C ₆ H ₅ OH	RB	Test	24 mm
387	Phosphate 00474	1.00474.0001	0.05 - 4.00 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
380	Phosphate 14543	1.14543.0001	0.05 - 4.00 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
388	Phosphate 00475	1.00475.0001	0.5 - 20.0 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
381	Phosphate 14729	1.14729.0001	0.5 - 20.0 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
382	Phosphate 00616	1.00616.0001	3.0 - 100.0 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
389	Phosphate 00673	1.00673.0001	3.0 - 100.0 mg/l PO ₄ -P	H ₂ O	Cell test	16 mm
383	Phosphate 14848	1.14848.0001*	0.01 - 2.50 mg/l PO ₄ -P	H ₂ O	Test	24 mm
384	Phosphate 00798	1.00798.0001	1.0 - 60.0 mg/l PO ₄ -P	H ₂ O	Test	16 mm
385	Phosphate 14842	1.14842.0001	0.5 - 30.0 mg/l PO ₄ -P	RB	Test	16 mm
386	Phosphate 14546	1.14546.0001	0.5 - 25.0 mg/l PO ₄ -P	RB	Cell test	16 mm
400	Potassium 14562	1.14562.0001	5.0 - 50.0 mg/l K	H ₂ O	Cell test	16 mm
401	Potassium 00615	1.00615.0001	30 - 300 mg/l K	H ₂ O	Cell test	16 mm
410	Residual hardness 14683	1.14683.0001	0.50 - 5.00 mg/l Ca	RB	Cell test	16 mm
420	Silicate 14794	1.14794.0001*	0.11 - 8.56 mg/l SiO ₂	H ₂ O	Test	24 mm
421	Silicate 00857	1.00857.0001	11 - 1070 mg/l SiO ₂	H ₂ O	Test	16 mm
422	Silicate 01813	1.01813.0001	0.004 - 0.500mg/l SiO ₂	RB	Test	24 mm
430	Sodium 00885	1.00885.0001	10 - 300 mg/l Na	RB	Cell test	16 mm
444	Sulfate 02532	1.02532.0001	2.0 - 50.0 mg/l SO ₄	RB	Cell test	16 mm
440	Sulfate 14548	1.14548.0001	5 - 250 mg/l SO ₄	H ₂ O	Cell test	16 mm

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Meth. No.	Parameter	Cat. No.	Measuring range		Blank	Type of test	Type of cell
445	Sulfate 02537	1.02537.0001 1.02537.0002	10 - 300	mg/l SO ₄	H ₂ O	Test	16 mm
450	Sulfide 14779	1.14779.0001	0.10 - 1.50	mg/l S	H ₂ O	Test	16 mm
460	Sulfite 14394	1.14394.0001	1.0 - 20.0	mg/l SO ₃	RB	Cell test	16 mm
461	Sulfite 01746	1.01746.0001	1.0 - 60.0	mg/l SO ₃	RB	Test	16 mm
470	Surfact-a 14697	1.14697.0001	0.05 - 2.00	mg/l MBAS	RB	Cell test	16 mm
473	Surfact-a 02552	1.02552.0001	0.10 - 2.00	mg/l SDSA	RB	Cell test	16 mm
471	Surfact-c 01764	1.01764.0001	0.05 - 1.50	mg/l	RB	Cell test	16 mm
472	Surfact-n 01787	1.01787.0001	0.10 - 7.50	mg/l	RB	Cell test	16 mm
480	Susp. solids	-	50 - 750	mg/l	H ₂ O	Method	24 mm
490	Tin 14622	1.14622.0001	0.10 - 2.50	mg/l Sn	H ₂ O	Cell test	16 mm
510	Total hardness 00961	1.00961.0001	5 - 215	mg/l Ca	RB	Cell test	16 mm
520	Turbidity	-	1 - 100	FAU	H ₂ O	Method	24 mm
531	Volatile org. acids	1.01749.0001	50 - 3000	mg/l	RB	Cell test	16 mm
		1.01809.0001	50 - 3000	mg/l	RB	Test	16 mm
540	Zinc 00861	1.00861.0001	25 - 1000	µg/l Zn	RB	Cell test	16 mm
541	Zinc 14566	1.14566.0001	0.20 - 5.00	mg/l Zn	RB	Cell test	16 mm
600	A 430 nm					Absorbance	
610	A 530 nm					Absorbance	
620	A 560 nm					Absorbance	
630	A 580 nm					Absorbance	
640	A 610 nm					Absorbance	
650	A 660 nm					Absorbance	

* in contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled

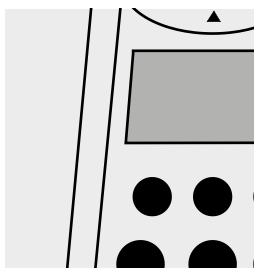
RB = own reagent blank value

Acid Capacity to pH 4.3 (Total Alkalinity)

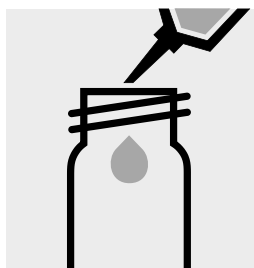
101758

Cell Test

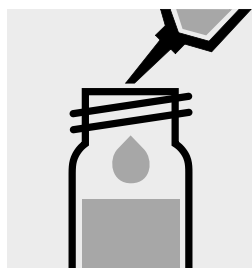
Measuring range: 0.40 – 8.00 mmol/l OH 16-mm cell
20 – 400 mg/l CaCO₃ 16-mm cell



Select method (1)(0).



Pipette 4.0 ml each of **AC-1** into two round cells.



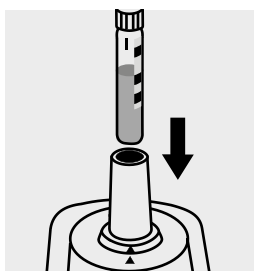
Add to one cell 1.0 ml of the sample with pipette, close with the screw cap, and mix.



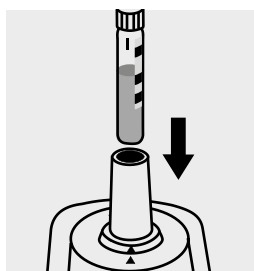
Add to the second cell 1.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Add to each cell 0.50 ml of **AC-2** with pipette, close with the screw cap, and mix.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a sodium hydroxide solution 1.0 mol/l, Cat.No. 109141, can be used after diluting accordingly (see section “Standard solutions”).

Aluminium

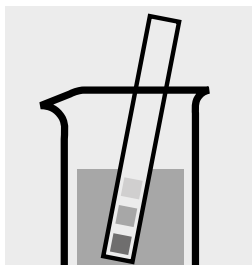
114825

Test

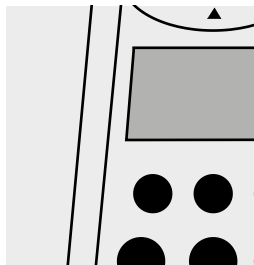
Measuring range: 20 – 700 µg/l Al

24-mm cell

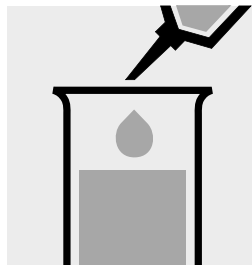
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



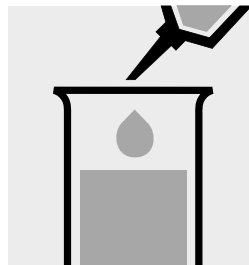
Check the pH of the sample, specified range: pH 3 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



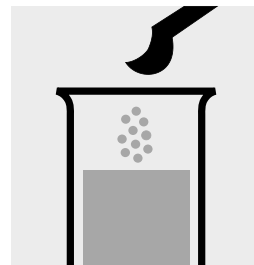
Select method (2)(0).



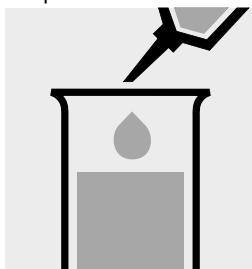
Pipette 10 ml of the sample into a test tube.



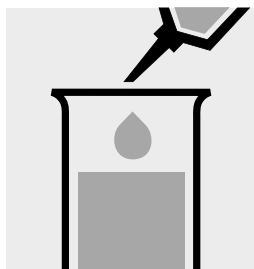
Pipette 10 ml of distilled water into a second test tube.
(Blank)



Add to each test tube 2 level blue microspoons of **Al-1** and dissolve the solid substance.



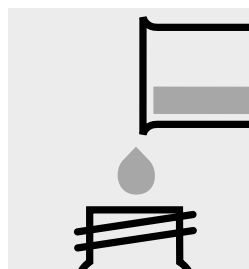
Add to each test tube 2.4 ml of **Al-2** with pipette and mix.



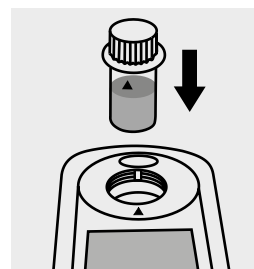
Add to each test tube 0.5 ml of **Al-3** with pipette and mix.



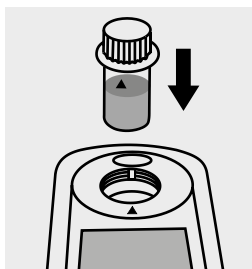
Reaction time: 2 minutes
Press (←) to start the countdown.



Transfer each solution into a separate 24-mm cell, close with the screw caps.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 100, Cat.No. 118701, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132225 and 132226.

The measurement results are expressed in µg/l.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119770, concentration 1000 mg/l Al, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 100) is highly recommended.

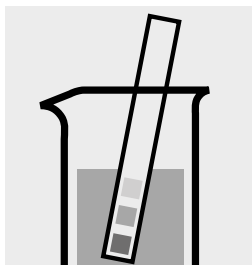
Aluminium

100594

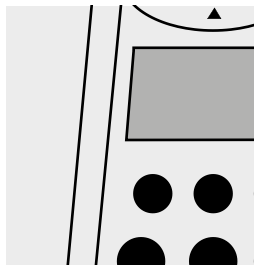
Cell Test

Measuring range: 0.05 – 0.50 mg/l Al

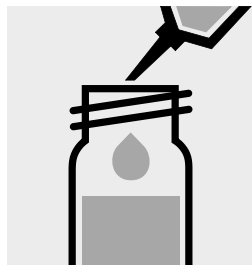
16-mm cell



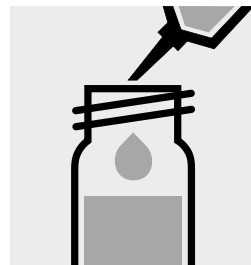
Check the pH of the sample, specified range: pH 3 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ②①.



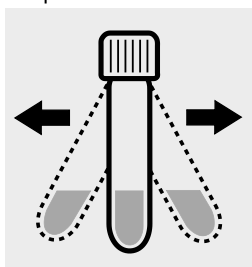
Pipette 6.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



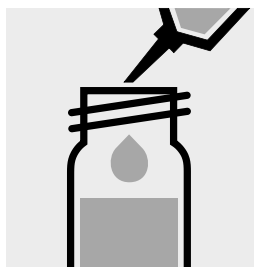
Pipette 6.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



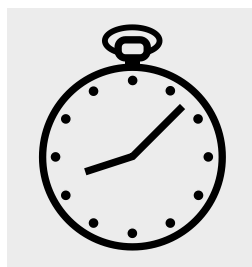
Add to each cell 1 level blue microspoon of **Al-1K**, close with the screw cap.



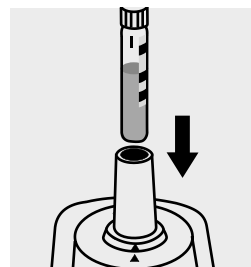
Shake both cells vigorously to dissolve the solid substance.



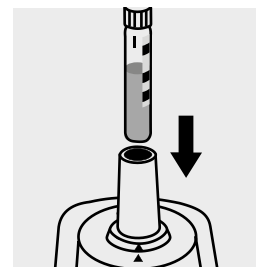
Add to each test tube 0.25 ml of **Al-2K** with pipette, close with the screw cap, and mix.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 100, Cat.No. 118701, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132225 and 132226.

The measurement results are expressed in µg/l.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119770, concentration 1000 mg/l Al, can also be used after diluting accordingly.

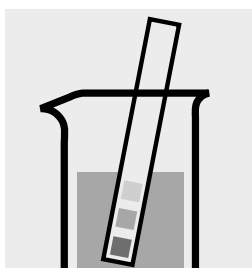
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 100) is highly recommended.

Ammonium

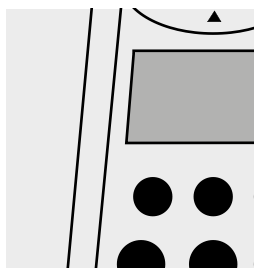
114739

Cell Test

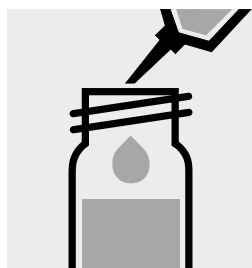
Measuring range: 10 – 2000 µg/l NH ₄ -N	16-mm cell
13 – 2576 µg/l NH ₄	16-mm cell
10 – 2000 µg/l NH ₃ -N	16-mm cell
12 – 2432 µg/l NH ₃	16-mm cell



Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ③①.



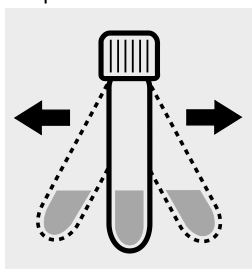
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



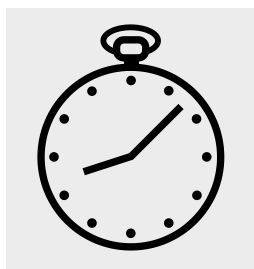
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



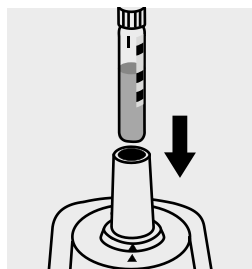
Add to each cell 1 dose of **NH₄-1K** using the blue dose-metering cap, close with the screw cap.



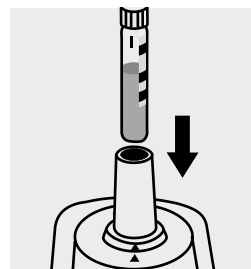
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 15 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high ammonium concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 50, Cat.No. 114695, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125022, 125023, and 132227.
The measurement results are expressed in µg/l.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119812, concentration 1000 mg/l NH₄⁺, can also be used after diluting accordingly.

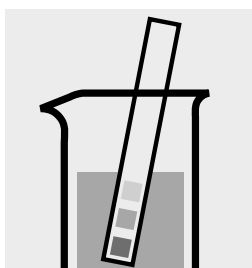
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 50) is highly recommended.

Ammonium

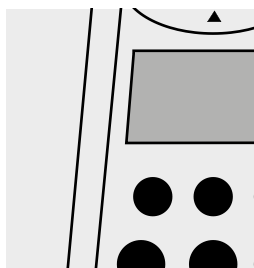
114558

Cell Test

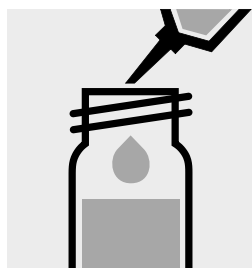
Measuring range:	0.20 – 8.00 mg/l $\text{NH}_4\text{-N}$	16-mm-cell
	0.26 – 10.30 mg/l NH_4	16-mm-cell
	0.20 – 8.00 mg/l $\text{NH}_3\text{-N}$	16-mm-cell
	0.24 – 9.73 mg/l NH_3	16-mm-cell



Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ③①.



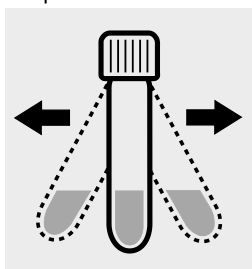
Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



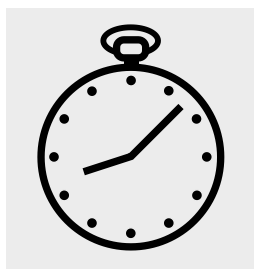
Pipette 1.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



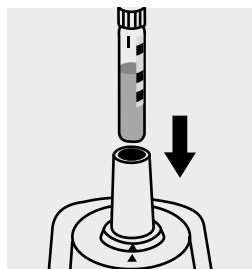
Add to each cell 1 dose of $\text{NH}_4\text{-1K}$ using the blue dose-metering cap, close with the screw cap.



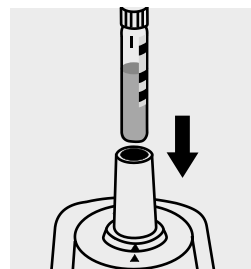
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 15 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high ammonium concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125022, 125023, 125024, and 125025.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119812, concentration 1000 mg/l NH_4^+ , can also be used after diluting accordingly.

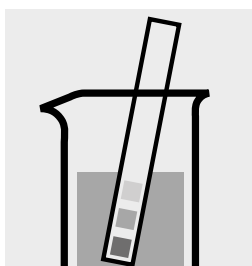
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

Ammonium

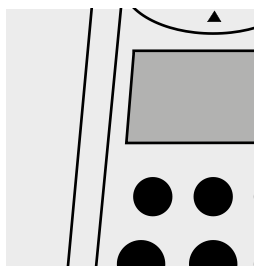
114559

Cell Test

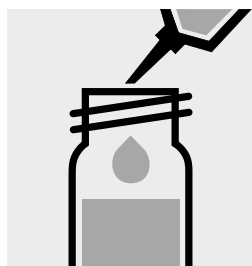
Measuring range: 4.0 – 80.0 mg/l $\text{NH}_4\text{-N}$	16-mm-cell
5.2 – 103.0 mg/l NH_4	16-mm-cell
4.0 – 80.0 mg/l $\text{NH}_3\text{-N}$	16-mm-cell
4.9 – 97.3 mg/l NH_3	16-mm-cell



Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ③②.



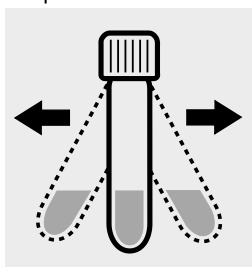
Pipette 0.10 ml of the sample into a reaction cell, close with the screw cap, and mix.



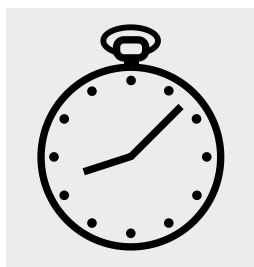
Pipette 0.10 ml of distilled water into a second reaction cell, close with the screw cap, and mix.
(Blank cell)



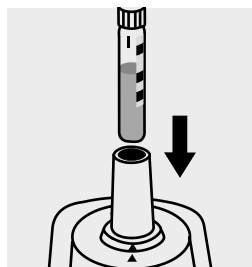
Add to each cell 1 dose of $\text{NH}_4\text{-1K}$ using the blue dose-metering cap, close with the screw cap.



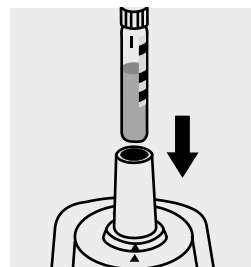
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 15 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high ammonium concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 70, Cat.No. 114689, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125025, 125026, and 125027.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119812, concentration 1000 mg/l NH_4^+ , can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 70) is highly recommended.

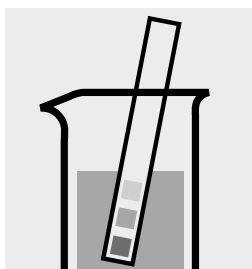
Ammonium

114752

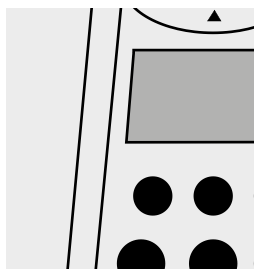
Test

Measuring range: 0.02 – 1.30 mg/l $\text{NH}_4\text{-N}$	24-mm cell
0.03 – 1.67 mg/l NH_4	24-mm cell
0.02 – 1.30 mg/l $\text{NH}_3\text{-N}$	24-mm cell
0.02 – 1.64 mg/l NH_3	24-mm cell

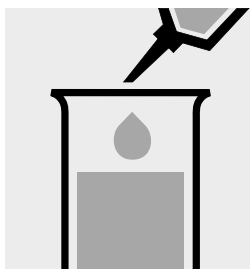
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



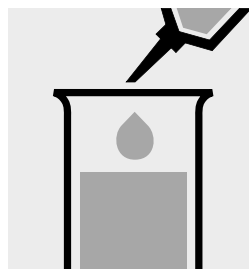
Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



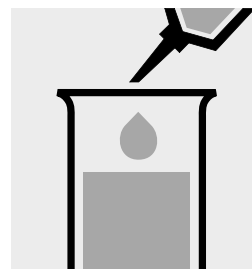
Select method (3)(3).



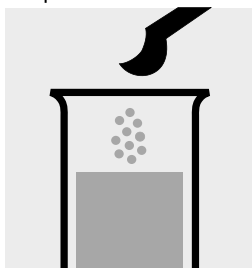
Pipette 10 ml of the sample into a test tube.



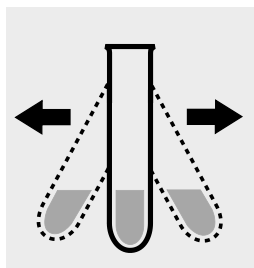
Pipette 10 ml of distilled water into a second test tube. (Blank)



Add to each test tube 1.2 ml of $\text{NH}_4\text{-1}$ with pipette and mix.



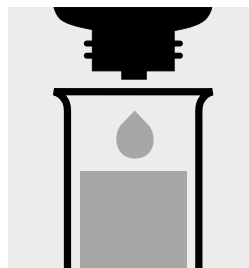
Add to each test tube 2 level blue microspoons of $\text{NH}_4\text{-2}$.



Shake both test tubes vigorously to dissolve the solid substance.



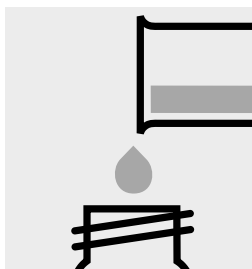
Reaction time: 5 minutes
Press (↺) to start the countdown.



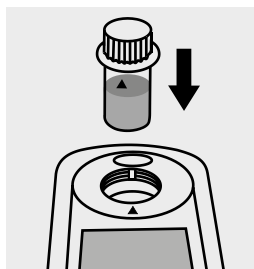
Add to each test tube 8 drops of $\text{NH}_4\text{-3}$ and mix.



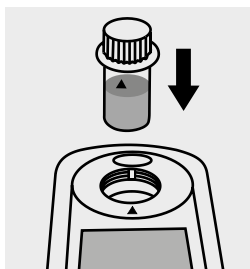
Reaction time: 5 minutes
Press (↺) to start the countdown.



Transfer each solution into a separate 24-mm cell, close with the screw caps.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

Very high ammonium concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 50, Cat.No. 114695, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125022, 125023, and 132227. Use 10 ml R-1 instead of the sample.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119812, concentration 1000 mg/l NH_4^+ , can also be used after diluting accordingly.

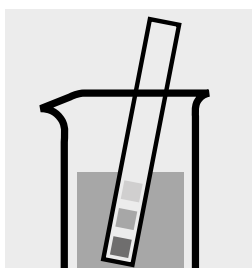
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 50) is highly recommended.
Use 10 ml sample + 0.1 ml R-2.

Ammonium

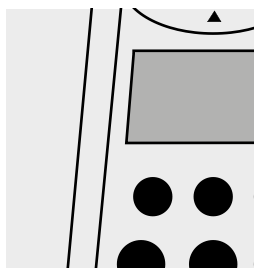
100683

Test

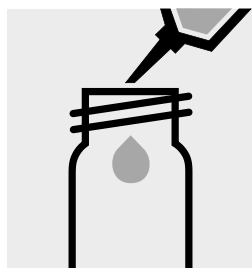
Measuring range: 1.0 – 50.0 mg/l $\text{NH}_4\text{-N}$	16-mm cell
1.3 – 64.4 mg/l NH_4	16-mm cell
1.0 – 50.0 mg/l $\text{NH}_3\text{-N}$	16-mm cell
1.2 – 60.8 mg/l NH_3	16-mm cell



Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (3) (4).



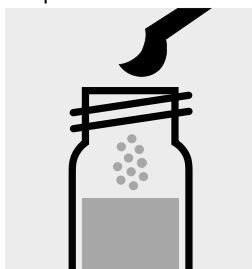
Pipette 5.0 ml each of $\text{NH}_4\text{-1}$ into two 16-mm cells.



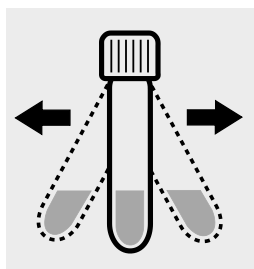
Add to one cell 0.20 ml of the sample with pipette, close with the screw cap, and mix.



Add to the second cell 0.20 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



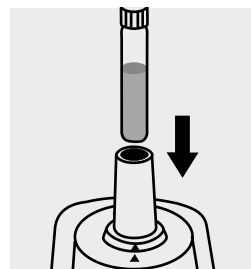
Add to each cell 1 level blue microspoon of $\text{NH}_4\text{-2}$, close with the screw cap.



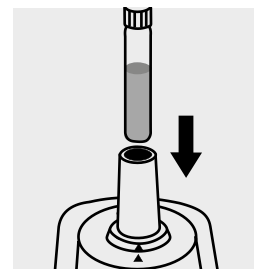
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 15 minutes
Press (Start) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Press (Test).

Important:

Very high ammonium concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 70, Cat.No. 114689, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125025 and 125026.

Ready-to-use ammonium standard solution Certipur®, Cat.No. 119812, concentration 1000 mg/l NH_4^+ , can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 70) is highly recommended.

AOX

Adsorbable Organic Halogens (x)

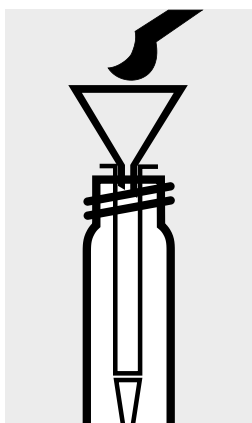
100675

Cell Test

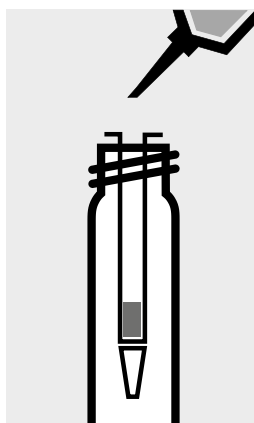
Measuring range: 0.05 – 2.50 mg/l AOX

16-mm cell

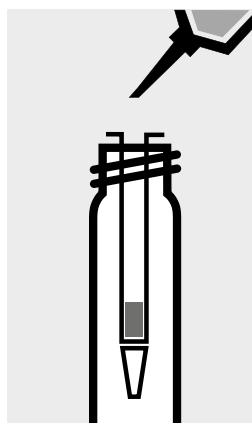
Preparation of the adsorption column:



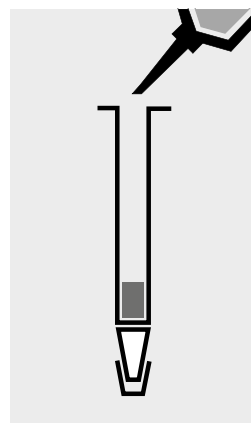
Place the column in an empty cell. Fill 1 level blue microspoon of **AOX-1** into the column using the glass funnel.



Run 3 separate 1-ml portions of **AOX-2** through the column. Discard the wash solution.

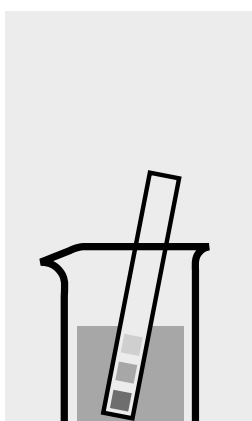


Run 3 separate 1-ml portions of **AOX-3** through the column. Discard the wash solution.

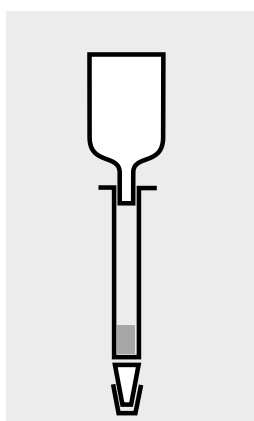


Close the bottom end of the column with the stopper. Apply to the column 1 ml of **AOX-3**. Close the top end of the column with the stopper and swirl to eliminate air bubbles. Remove the stopper on the top end and fill the column to the brim with **AOX-3**.

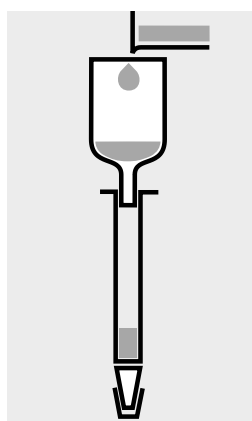
Sample enrichment:



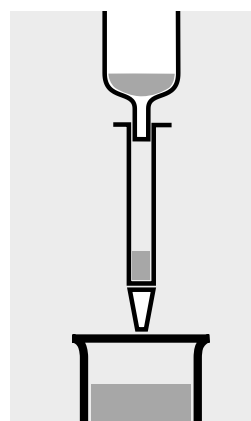
Check the pH of the sample, specified range: pH 6 – 7. If required, add dilute sodium hydroxide solution or nitric acid drop by drop to adjust the pH.



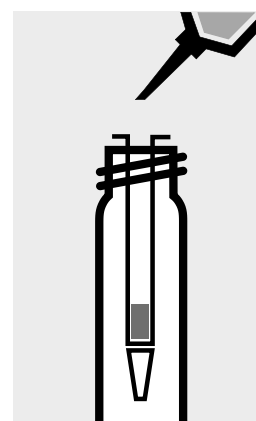
Attach the glass reservoir to the prepared column (closed at the bottom end).



Fill 100 ml of the sample and 6 drops of **AOX-4** into the reservoir.



Remove the stopper from the column outlet and run the sample through completely.



Detach the column from the reservoir. Apply 3 separate 1-ml portions of **AOX-3**. Discard the wash solution.

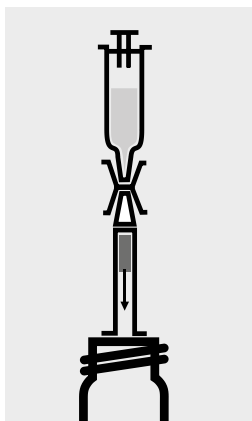
AOX

Adsorbable Organic Halogens (x)

100675

Cell Test

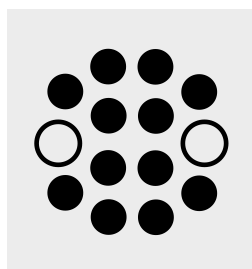
Digestion:



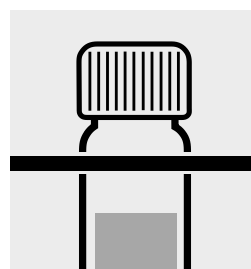
Fill the 10-ml syringe with 10 ml of reagent **AOX-5** and attach the syringe with the column outlet using the connector. Place the top end of the column on an empty cell and rinse the charcoal filling of the column into an empty 16-mm cell.



Add 2 level green microspoons of **AOX-6**, close with the screw cap, and mix.



Heat the cell at 120 °C in the thermoreactor for 30 minutes.

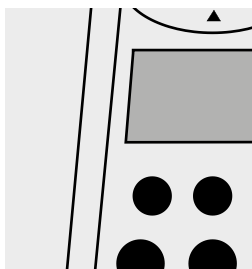


Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



Add 5 drops of **AOX-4**, close the cell, and mix; clear supernatant: **pretreated sample**.

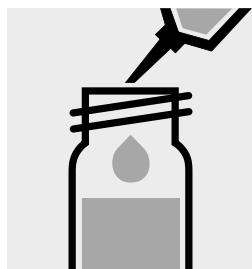
Determination:



Select method (4)0.



Pipette 0.20 ml each of **AOX-1K** into two reaction cells, close with the screw cap, and mix.



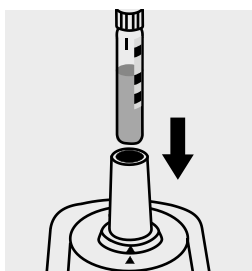
Add to one cell 7.0 ml of **pretreated sample** (without charcoal) with glass pipette, close with the screw cap, and mix.



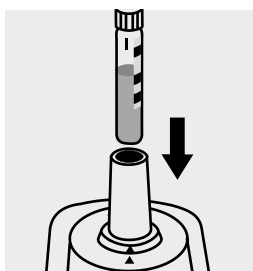
Add to the second cell 7.0 ml distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Reaction time: 15 minutes
Press (⏮) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) Spectroquant® AOX Standard, Cat.No. 100680, concentration 0.2 – 2.0 mg/l can be used.

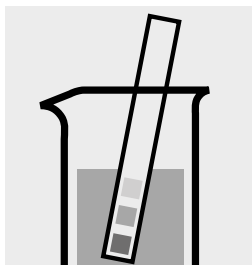
Arsenic

101747

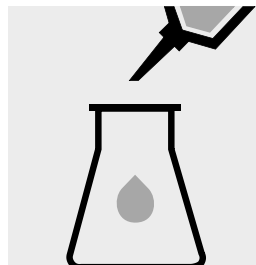
Test

Measuring range: 5 – 100 µg/l As

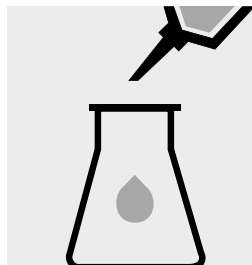
16-mm cell



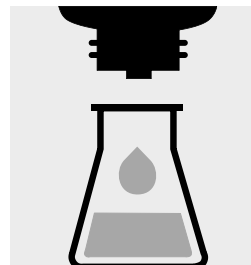
Check the pH of the sample, specified range: pH 0 – 13.



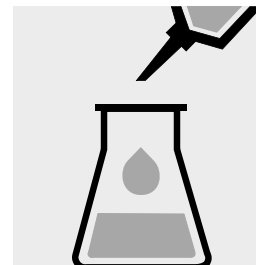
Place 350 ml of the sample into an Erlenmeyer flask with ground joint.



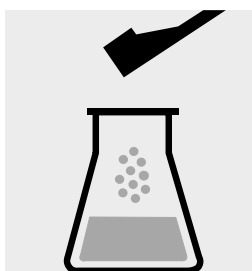
Place 350 ml of distilled water into a second Erlenmeyer flask with ground joint. (Blank)



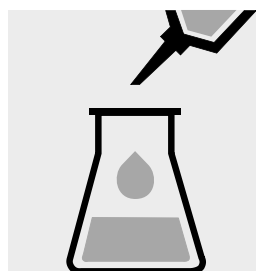
Add to each Erlenmeyer flask 5 drops of **As-1** and mix.



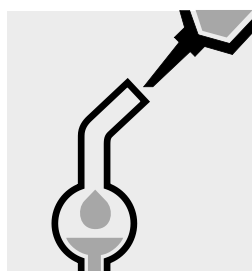
Add to each Erlenmeyer flask 20 ml of **As-2** with pipette and mix.



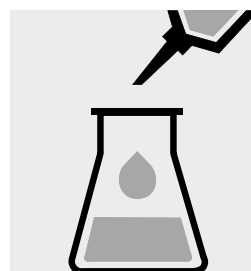
Add to each Erlenmeyer flask 1 level green dosing spoon of **As-3** and dissolve.



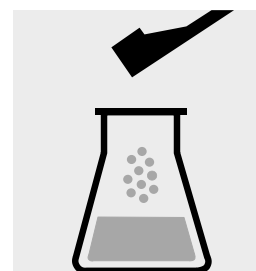
Add to each Erlenmeyer flask 1.0 ml of **As-4** with pipette and mix.



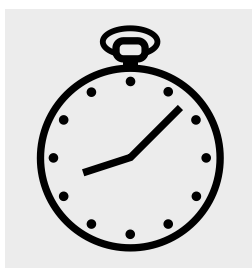
Pipette 5.0 ml each of **As-5** into two absorption tubes.



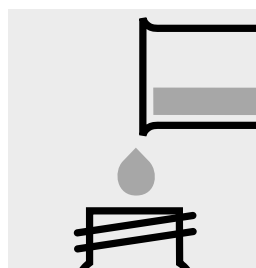
Add to each Erlenmeyer flask 1.0 ml of **As-6** with pipette to the solution in the Erlenmeyer flask and mix.



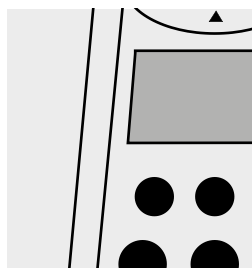
Add to each Erlenmeyer flask 3 level red dosing spoons of **As-7**. **Immediately** attach the absorption tubes to the Erlenmeyer flasks.



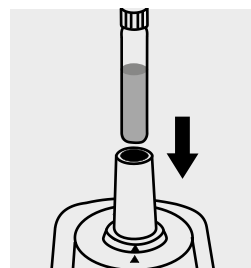
Leave to stand for 2 hours. During this time carefully swirl the flask several times or stir slowly with a magnetic stirrer.



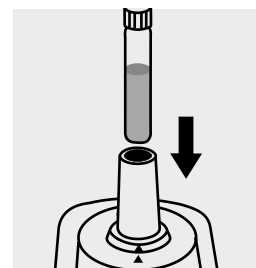
Transfer the solutions from the absorption tubes into two separate 16-mm cell, close with the screw cap.



Select method 50.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use arsenic standard solution Certipur®, Cat.No. 119773, concentration 1000 mg/l As or the Standard solution for photometric applications, CRM, Cat.No. 133002, can be used after diluting accordingly. The measurement results are expressed in µg/l.

BOD

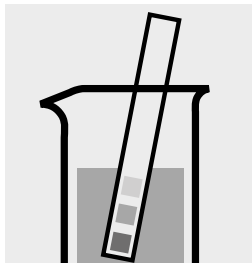
Biochemical Oxygen Demand

100687

Cell Test

Measuring range: 0.5 – 3000¹⁾ mg/l O₂ 16-mm cell¹⁾ after corresponding dilution (details see package insert)

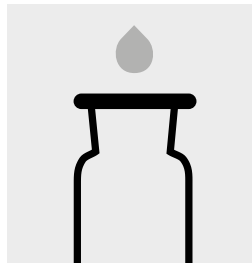
Preparation and incubation:



Check the pH of the sample, specified range: pH 6 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Fill 2 oxygen reaction bottles each with **pretreated sample** and 2 glass beads to overflowing. Close bubble-free with the slanted ground-glass stoppers.



Fill 2 oxygen reaction bottles each with **inoculated nutrient-salt solution** and 2 glass beads to overflowing. Close bubble-free with the slanted ground-glass stoppers.

Measurement of initial oxygen concentration

= **Result 1**
(measurement sample)
= **Result 1**
(blank)



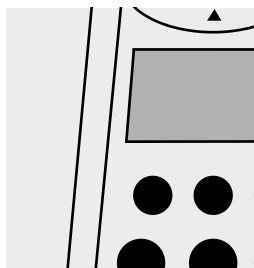
Incubate one bottle of **pretreated sample** and one of **inoculated nutrient-salt solution** closed in a thermostatic incubation cabinet at 20 ± 1°C for 5 days.

Determination:

Measurement of final oxygen concentration

= **Result 2**
(measurement sample)
= **Result 2**
(blank)

After incubation, use one bottle of **pretreated sample** and one of **inoculated nutrient-salt solution** for the measurement of the final oxygen concentration.



Select method (7)0.



Add to each oxygen reaction bottle 5 drops of **BOD-1K** and then 10 drops of **BOD-2K**, close bubble-free, and mix for approx. 10 seconds.



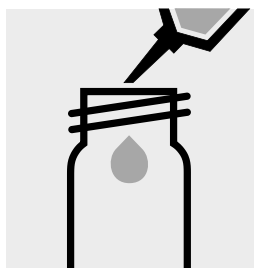
Reaction time:
1 minute



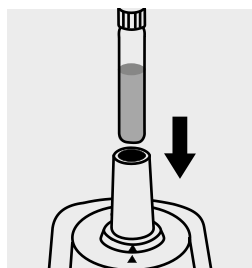
Add to each oxygen reaction bottle 10 drops of **BOD-3K**, reclose, and mix.



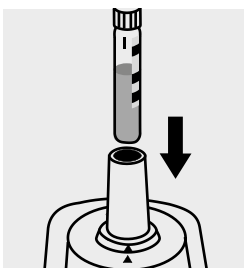
Transfer each solution into a separate 16-mm cell, close with the screw caps.



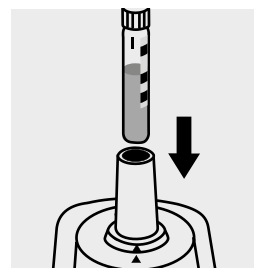
Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press (Zero).



Insert the blank cell (nutrient-salt solution) into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Calculation:

BOD of measurement sample:
Result 1 – Result 2 (measurement sample) = A in mg/l
BOD of blank:
Result 1 – Result 2 (blank) = B in mg/l
BOD of original sample in mg/l = (A - B) • dilution factor

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) Spectroquant BOD Standard (analogous to EN 1899), Cat.No. 100718, can be used.

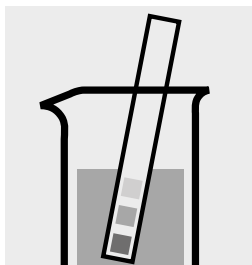
Boron

100826

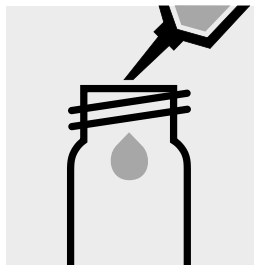
Cell Test

Measuring range: 0.05 – 2.00 mg/l B

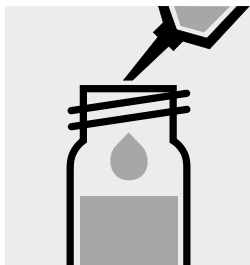
16-mm cell



Check the pH of the sample, specified range: pH 2 – 12. If required, add dilute sodium hydroxide solution or nitric acid drop by drop to adjust the pH.



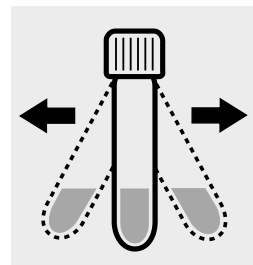
Pipette 1.0 ml each of **B-1K** into two reaction cells, close with the screw cap, and mix.



Add to one cell 4.0 ml of the sample with pipette, close with the screw cap.



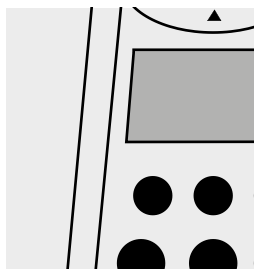
Add to the second cell 4.0 ml of distilled water with pipette, close with the screw cap. (Blank cell)



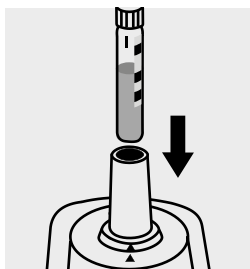
Shake both cells vigorously to dissolve the solid substance.



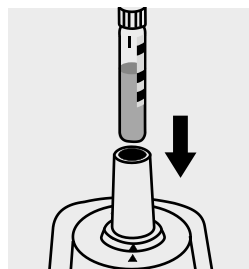
Reaction time:
60 minutes



Select method **80**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use boron standard solution Certipur®, Cat.No. 119500, concentration 1000 mg/l B can also be used after diluting accordingly or also the Standard solution for photometric applications, CRM, Cat.No. 133005.

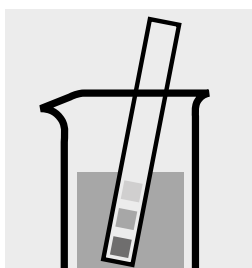
Bromine

100605

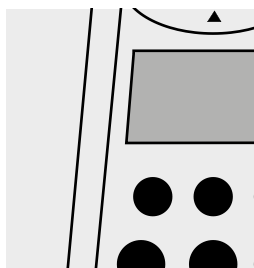
Test

Measuring range: 0.10–5.00 mg/l Br₂

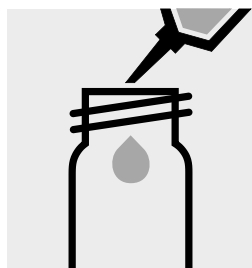
24-mm cell



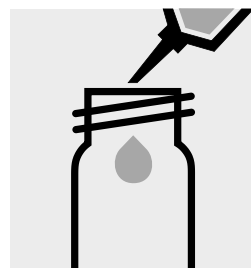
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



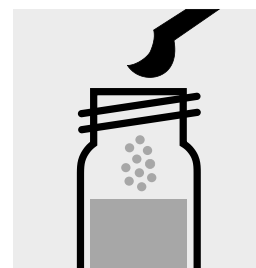
Select method (9)(0).



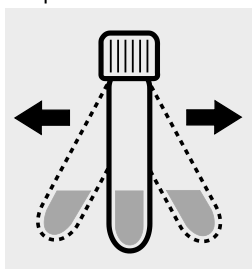
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



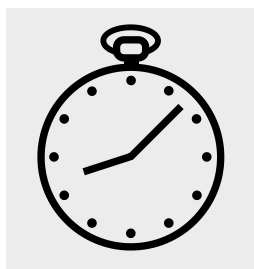
Pipette 10 ml of the sample into a 24-mm cell.



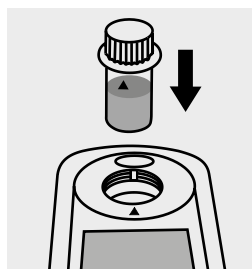
Add 1 level blue micro-spoon of **Br₂-1**, close with the screw cap.



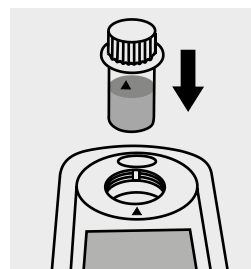
Shake the cell vigorously to dissolve the solid substance.



Reaction time:
1 minute
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

Very high bromine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

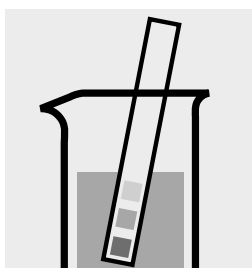
Cadmium

114834

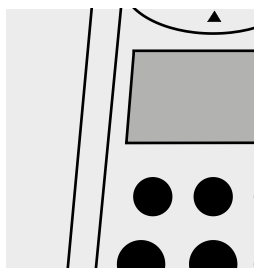
Cell Test

Measuring range: 25 – 1000 µg/l Cd

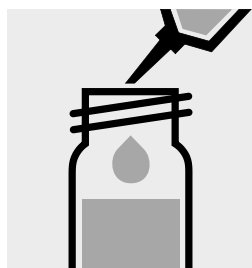
16-mm cell



Check the pH of the sample, specified range: pH 3 – 11.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 1000.



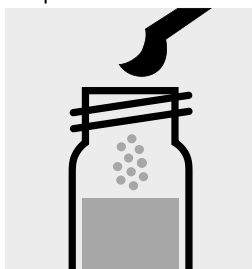
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



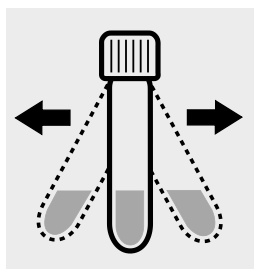
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



Add 0.20 ml each of **Cd-1K** with pipette, close with the screw cap, and mix.



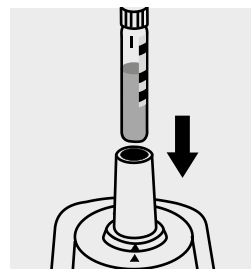
Add to each cell 1 level green microspoon of **Cd-2K**, close with the screw cap.



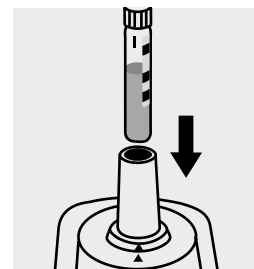
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 2 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total cadmium** a pretreatment with Crack Set 10C, Cat.No. 114688 or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or the Standard solution for photometric applications, CRM, Cat.No. 132228.
The measurement results are expressed in µg/l.

Ready-to-use cadmium standard solution Certipur®, Cat.No. 119777, concentration 1000 mg/l Cd, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

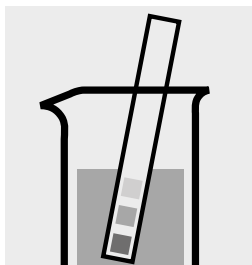
Cadmium

101745

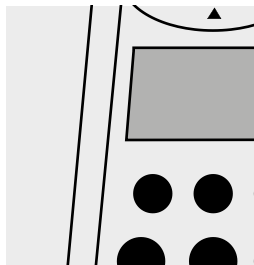
Test

Measuring range: 5 – 500 µg/l Cd

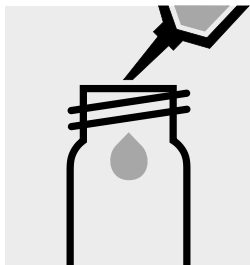
24-mm cell



Check the pH of the sample, specified range: pH 3 – 11.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 101.



Pipette 1.0 ml each of **Cd-1** into two 24-mm cells.



Add to one cell 10 ml of the sample with pipette, close with the screw cap, and mix.



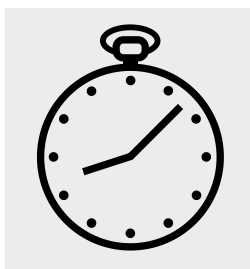
Add to the second cell 10 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



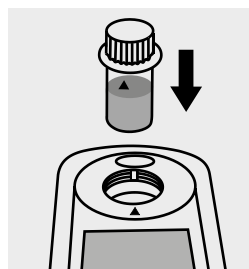
Add to each cell 0.20 ml of **Cd-2** with pipette, close with the screw cap, and mix.



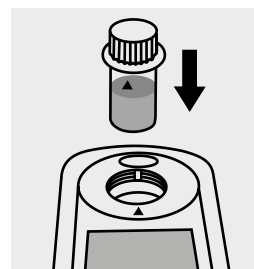
Add to each cell 1 level green microspoon of **Cd-3**, close with the screw cap, and dissolve the solid substance.



Reaction time: 2 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total cadmium** a pretreatment with Crack Set 10C, Cat.No. 114688 or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 90, Cat.No. 118700, or the Standard solution for photometric applications, CRM, Cat. No. 132228.

The measurement results are expressed in µg/l.

Ready-to-use cadmium standard solution Certipur®, Cat.No. 119777, concentration 1000 mg/l Cd, can also be used after diluting accordingly.

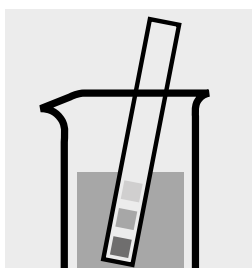
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 90) is highly recommended.

Calcium

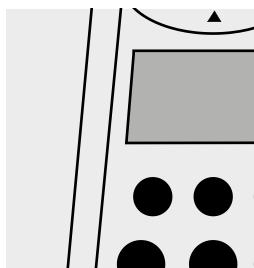
100858

Cell Test

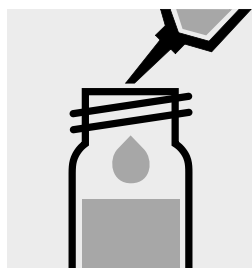
Measuring range: 10 – 250 mg/l Ca	16-mm cell
14 – 350 mg/l CaO	16-mm cell
25 – 625 mg/l CaCO ₃	16-mm cell



Check the pH of the sample, specified range: pH 3 – 9.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method 110.



Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



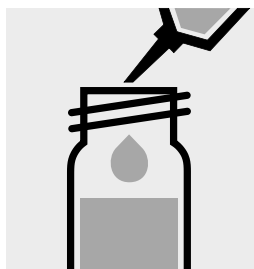
Pipette 1.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



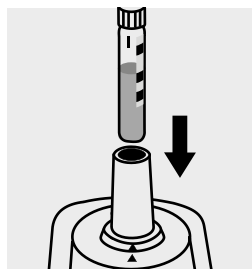
Add to each cell 1.0 ml of **Ca-1K** with pipette, close with the screw cap, and mix.



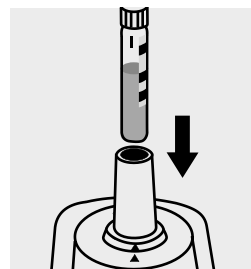
Reaction time: **exactly 3 minutes**
Press to start the countdown.



Add to each cell 0.50 ml of **Ca-2K** with pipette, close with the screw cap, and mix.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

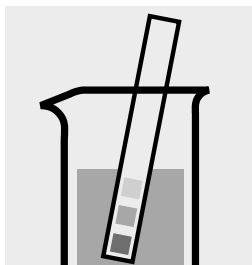
To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Calcium

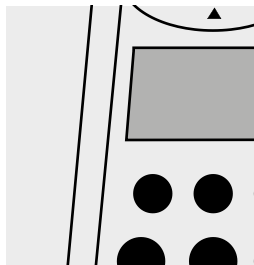
114815

Test

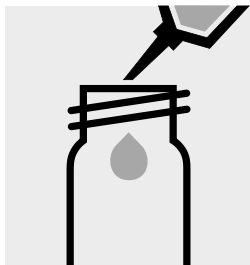
Measuring range:	5 – 160 mg/l Ca	16-mm cell
	7 – 224 mg/l CaO	16-mm cell
	13 – 400 mg/l CaCO ₃	16-mm cell



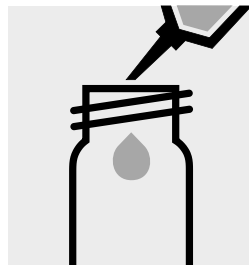
Check the pH of the sample, specified range: pH 4 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method ①①①.



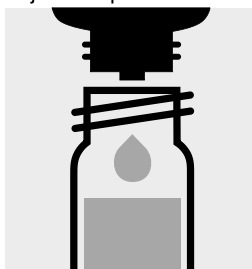
Pipette 0.10 ml of the sample into a 16-mm cell.



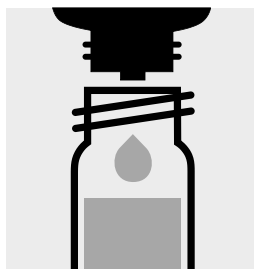
Pipette 0.10 ml of distilled water into a second 16-mm cell. (Blank cell)



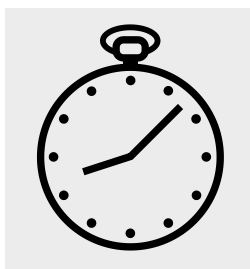
Add to each cell 5.0 ml of **Ca-1** with pipette, close with the screw cap, and mix.



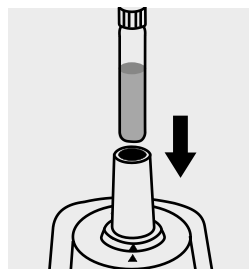
Add to each cell 4 drops of **Ca-2**, close with the screw cap, and mix.



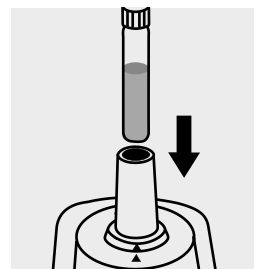
Add to each cell 4 drops of **Ca-3**, close with the screw cap, and mix.



Reaction time: 8 minutes, **measure immediately**. Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use calcium standard solution Certipur®, Cat.No. 119778, concentration 1000 mg/l Ca, can be used after diluting accordingly.

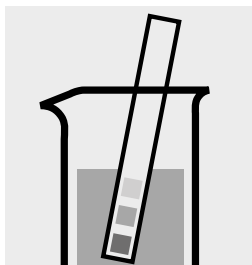
Chloride

114730

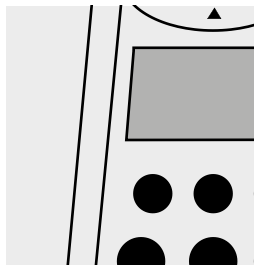
Cell Test

Measuring range: 5–125 mg/l Cl

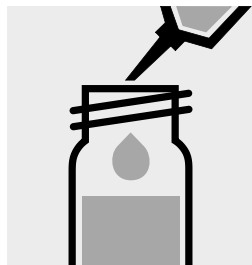
16-mm cell



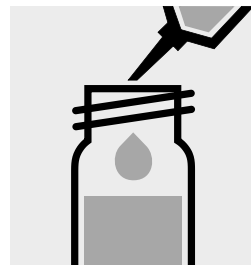
Check the pH of the sample, specified range: pH 1 – 12.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method **1 2 0**.



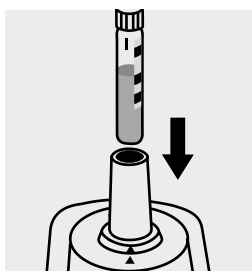
Pipette 0.50 ml each of **Cl-1K** into two reaction cells, close with the screw cap, and mix.



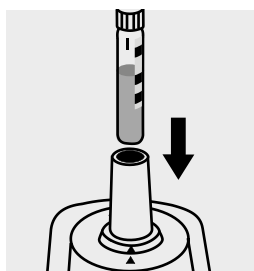
Add to one cell 1.0 ml of the sample with pipette, close with the screw cap, and mix.



Add to the second cell 1.0 ml of distilled water, close with the screw cap, and mix. (Blank cell)



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10 and 20, Cat.Nos. 114676 and 114675, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132229 and 132230.

Ready-to-use chloride standard solution Certipur®, Cat.No. 119897, concentration 1000 mg/l Cl⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

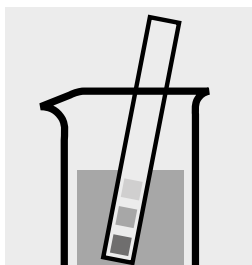
Chloride

114897

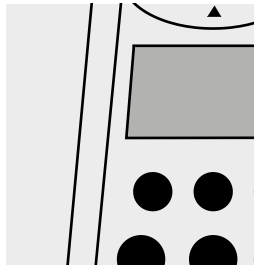
Test

Measuring range: 10 – 250 mg/l Cl

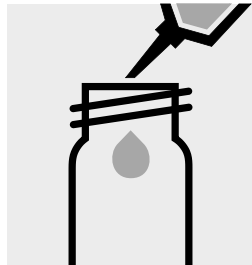
16-mm cell



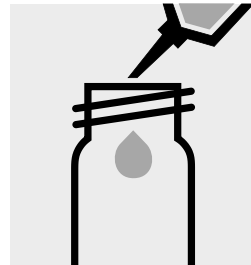
Check the pH of the sample, specified range: pH 1 – 12.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method ①②①.



Pipette 1.0 ml of the sample into a 16-mm cell.



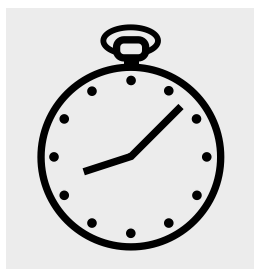
Pipette 1.0 ml of distilled water into a second 16-mm cell. (Blank cell)



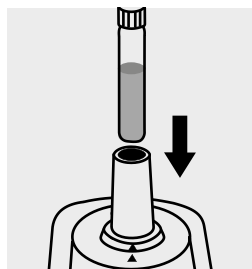
Add to each cell 2.5 ml of **CI-1** with pipette, close with the screw cap, and mix.



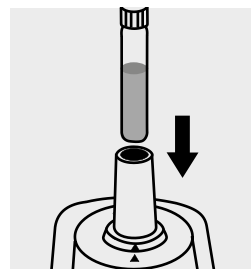
Add to each cell 0.50 ml of **CI-2** with pipette, close with the screw cap, and mix.



Reaction time:
1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 60, Cat.No. 114696, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132229 and 132230.

Ready-to-use chloride standard solution Certipur®, Cat.No. 119897, concentration 1000 mg/l Cl⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 60) is highly recommended.

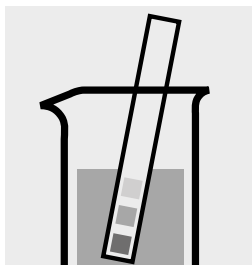
Chloride

101804

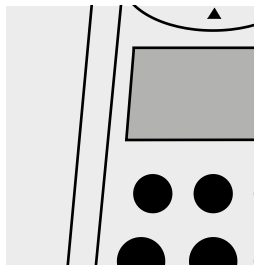
Cell Test

Measuring range: 0.5–15.0 mg/l Cl

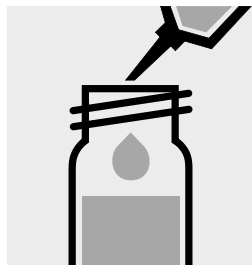
16-mm cell



Check the pH of the sample, specified range: pH 3 – 11.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method **1****2****2**.



Pipette 10 ml of the sample into a reaction cell, close with the screw cap, and mix.



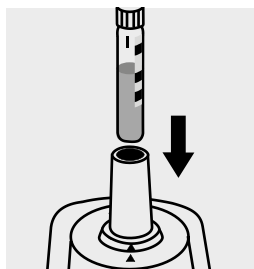
Pipette 10 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



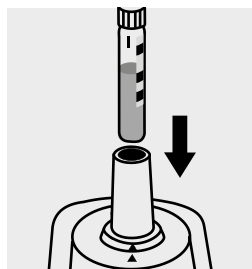
Add 0.25 ml each of **Cl-1K** with pipette, close with the screw cap, and mix.



Reaction time:
10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use chloride standard solution Certipur®, Cat.No. 119897, concentration 1000 mg/l Cl⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132229, 133010 and 133011.

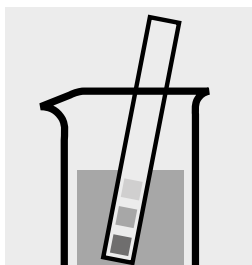
Chloride

101807

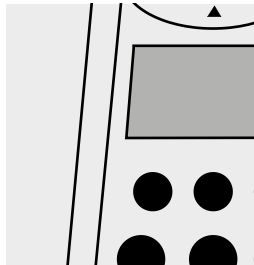
Test

Measuring range: 0.50 – 5.00 mg/l Cl

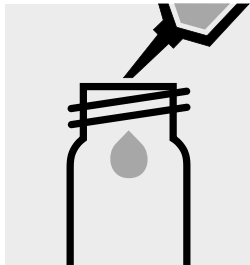
24-mm cell



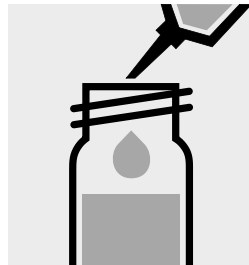
Check the pH of the sample, specified range: pH 3 – 11.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method ①②③.



Pipette 0.20 ml each of **CI-1** into two 24-mm cells.



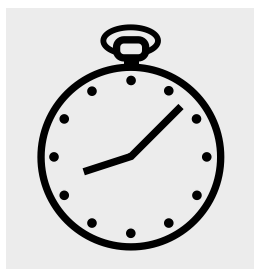
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



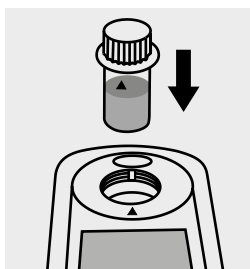
Add to the second cell 10 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) with pipette, close with the screw cap, and mix. (Blank cell)



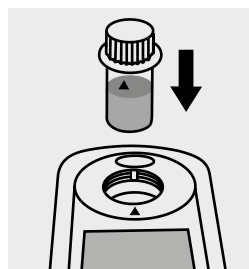
Add to each cell 0.20 ml of **CI-2** with pipette, close with the screw cap, and mix.



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use chloride standard solution Certipur®, Cat.No. 119897, concentration 1000 mg/l Cl⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 133010 and 133011.

Chlorine

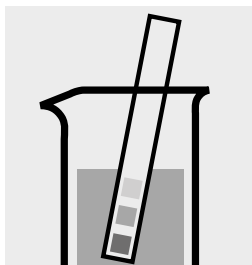
Determination of free chlorine

100595

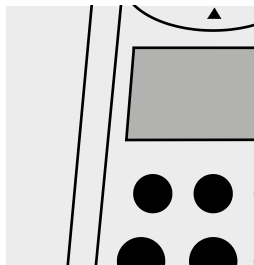
Cell Test

Measuring range: 0.05 – 5.00 mg/l Cl_2

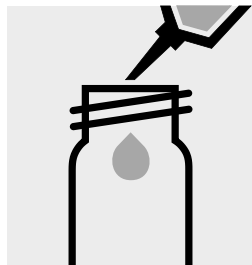
16-mm cell



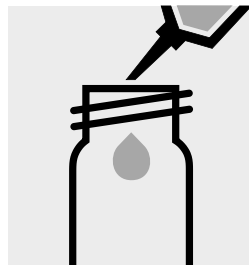
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **130**, select subitem >>free.



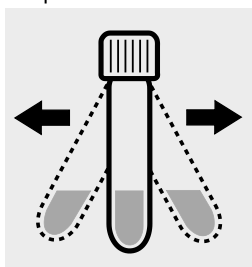
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



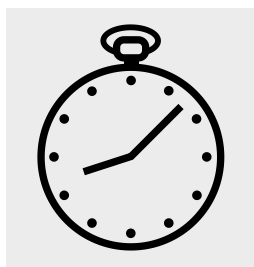
Pipette 5.0 ml of the sample into a round cell.



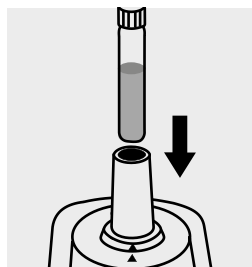
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



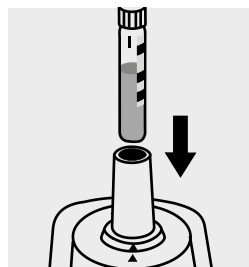
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine

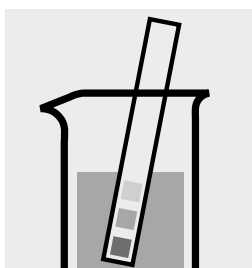
Determination of free chlorine

100597

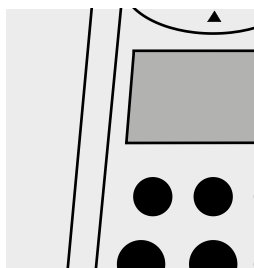
Cell Test

Measuring range: 0.05 – 5.00 mg/l Cl_2

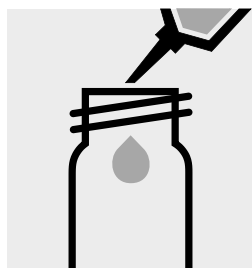
16-mm cell



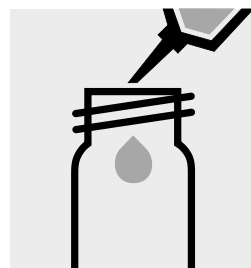
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



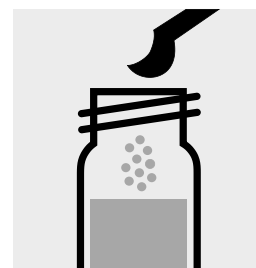
Select method **130**, select subitem >>free.



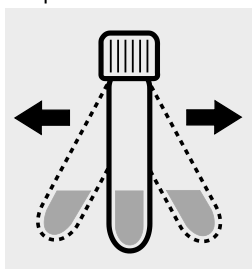
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



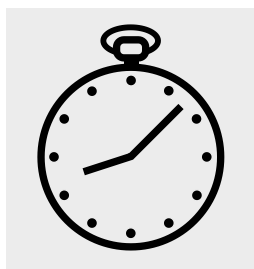
Pipette 5.0 ml of the sample into a round cell.



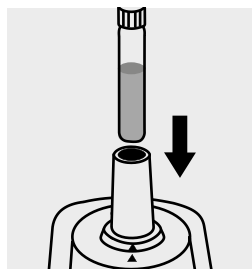
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



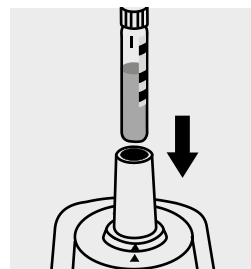
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine

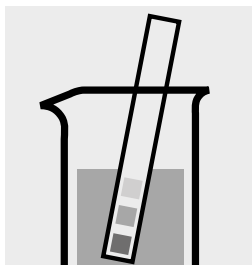
Determination of total chlorine

100597

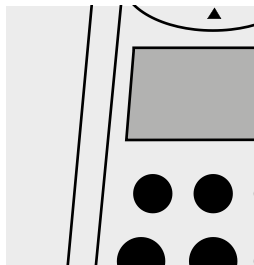
Cell Test

Measuring range: 0.05 – 5.00 mg/l Cl_2

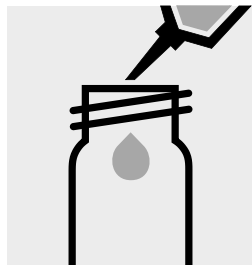
16-mm cell



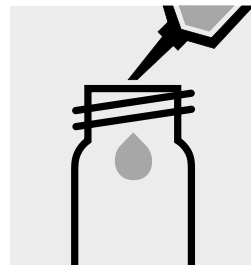
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③①, select subitem >>total.



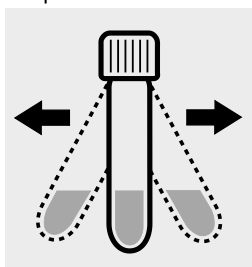
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



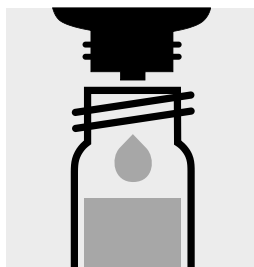
Pipette 5.0 ml of the sample into a round cell.



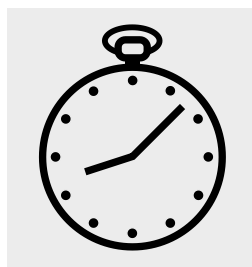
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



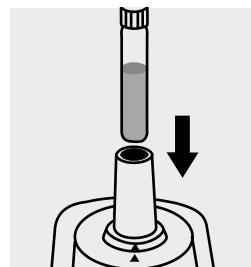
Shake the cell vigorously to dissolve the solid substance.



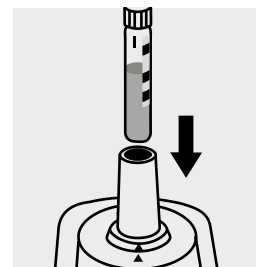
Add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine

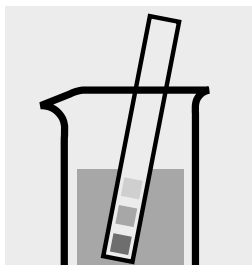
Determination of free chlorine, total chlorine,
and combined chlorine

100597

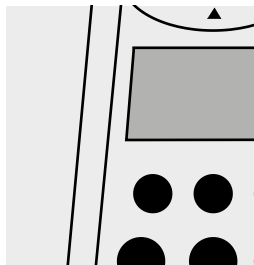
Cell Test

Measuring range: 0.05 – 5.00 mg/l Cl_2

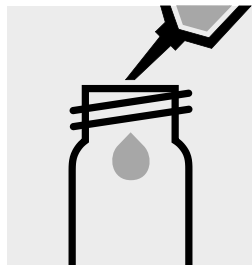
16-mm cell



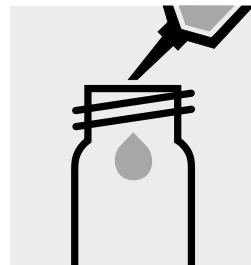
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 130, select subitem >>diff.



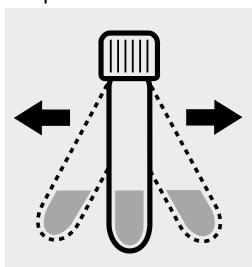
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



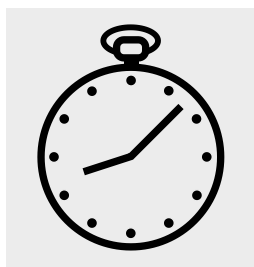
Pipette 5.0 ml of the sample into a round cell.



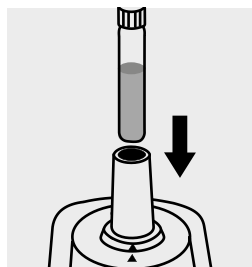
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



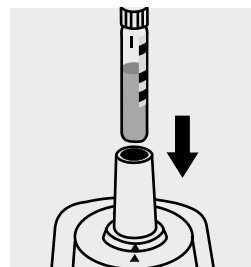
Shake the cell vigorously to dissolve the solid substance.



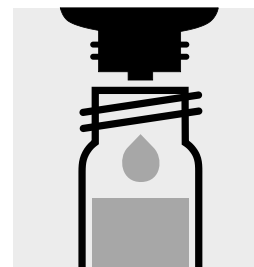
Reaction time: 1 minute
Press to start the countdown.



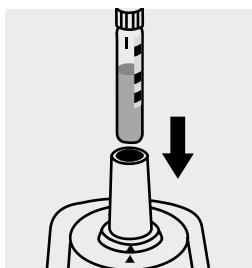
Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**. (= T1)



Remove sample cell from the photometer, open, add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Insert anew the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**. (= T2)

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
For on-the-spot determinations where there are no suitable facilities for rinsing, the cell contents can be transferred to a new 16-mm cell before the addition of reagent Cl_2 -2. Use this second cell **only** for the determination of **total chlorine**!

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine

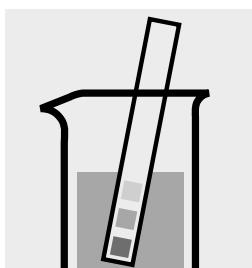
100598

Determination of free chlorine

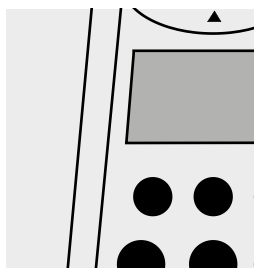
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

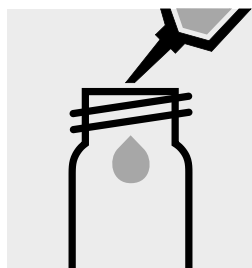
24-mm cell



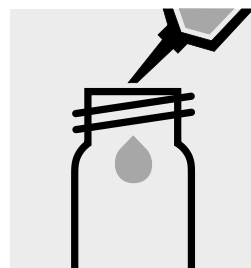
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



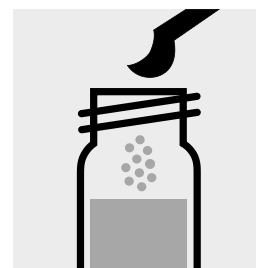
Select method ①③①, select subitem >>free.



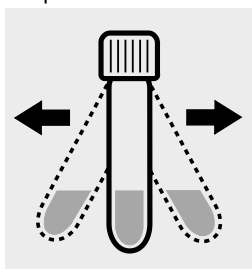
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



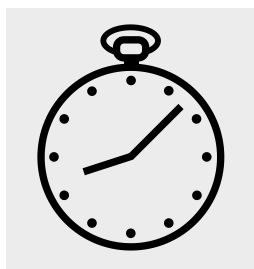
Pipette 10 ml of the sample into a 24-mm cell.



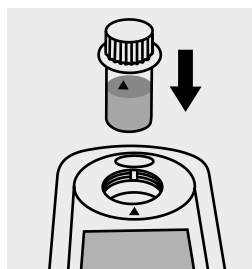
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



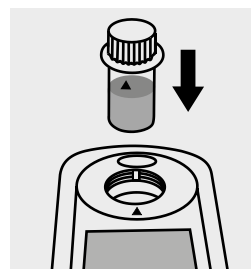
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Chlorine

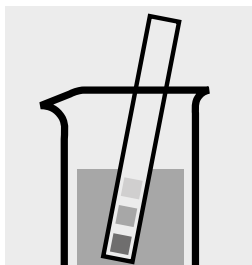
100598

Determination of free chlorine

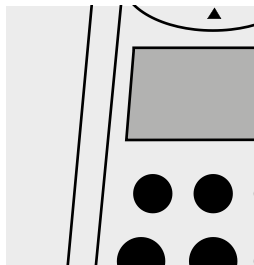
Test

Measuring range: 0.10 – 6.00 mg/l Cl₂

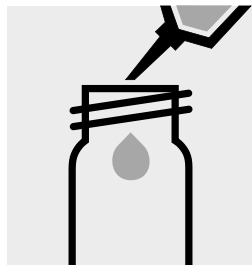
16-mm cell



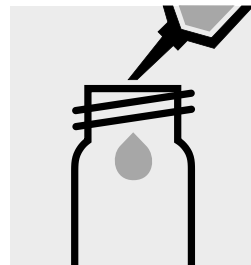
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③④, select subitem >>free.



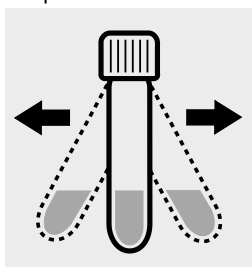
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



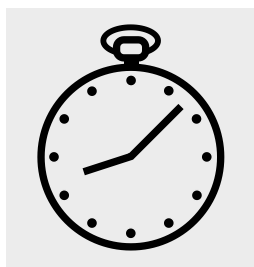
Pipette 10 ml of the sample into a 16-mm cell.



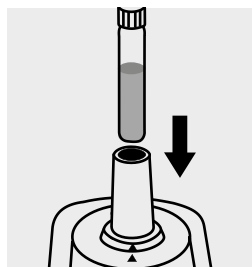
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



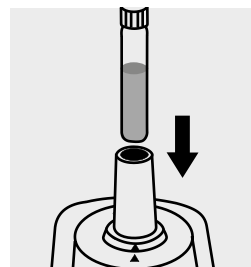
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Chlorine

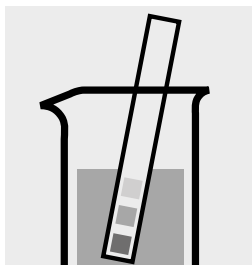
100602

Determinatin of total chlorine

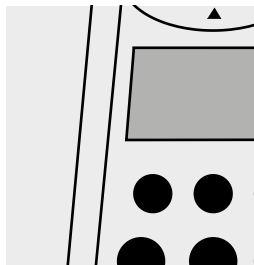
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

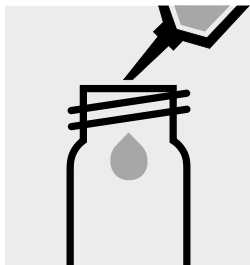
24-mm cell



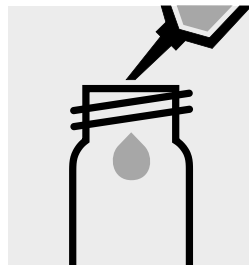
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **131**, select subitem >>total.



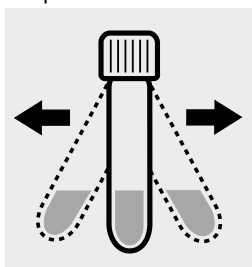
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



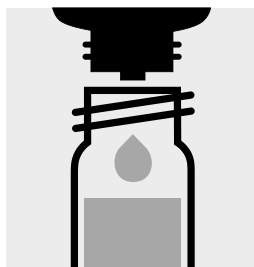
Pipette 10 ml of the sample into a 24-mm cell.



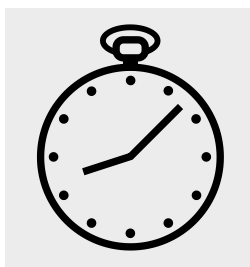
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



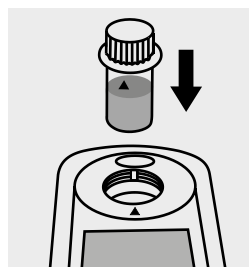
Shake the cell vigorously to dissolve the solid substance.



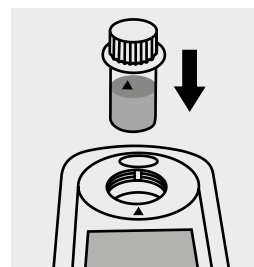
Add 2 drops of **Cl₂-2**, close with the screw cap, and mix.



Reaction time: 1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine

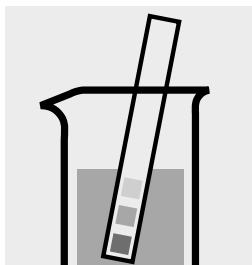
100602

Determinatin of total chlorine

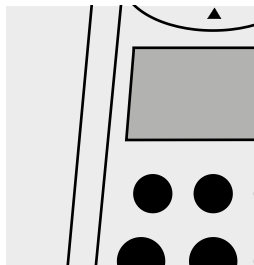
Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

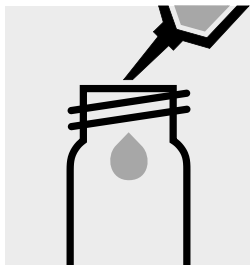
16-mm cell



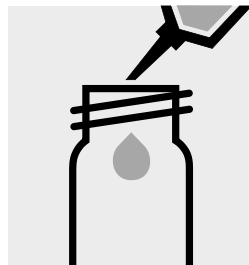
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③④, select subitem >>total.



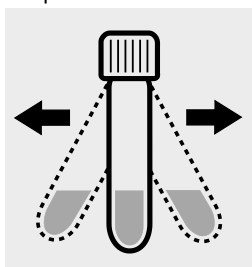
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



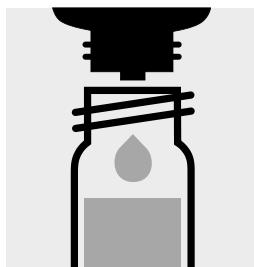
Pipette 10 ml of the sample into a 16-mm cell.



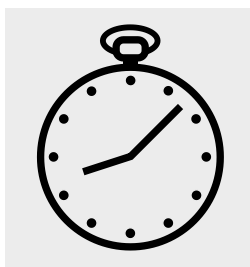
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



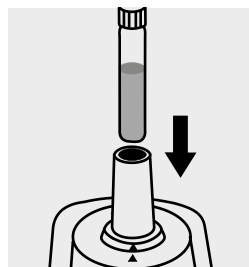
Shake the cell vigorously to dissolve the solid substance.



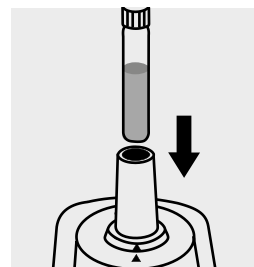
Add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine

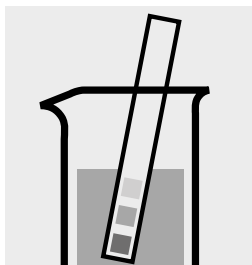
100599

Determination of free chlorine

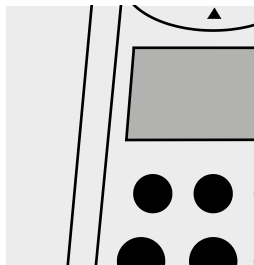
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

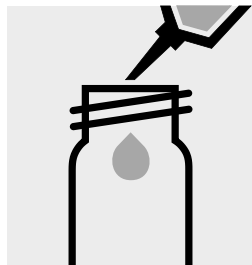
24-mm cell



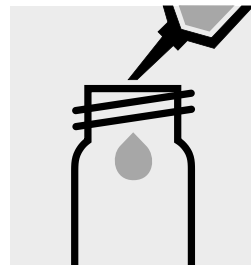
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③①, select subitem >>free.



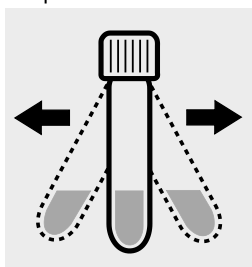
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



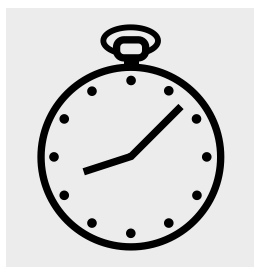
Pipette 10 ml of the sample into a 24-mm cell.



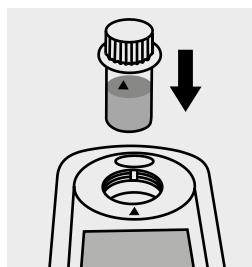
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



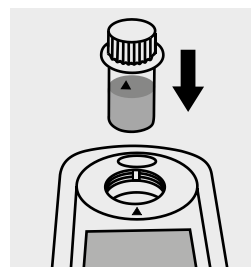
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Chlorine

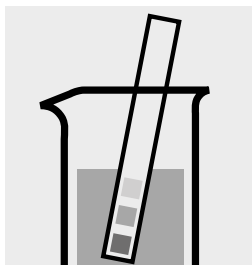
100599

Determination of free chlorine

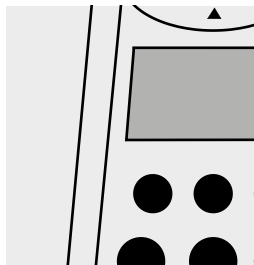
Test

Measuring range: 0.10 – 6.00 mg/l Cl₂

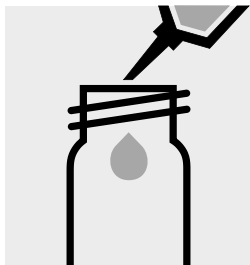
16-mm cell



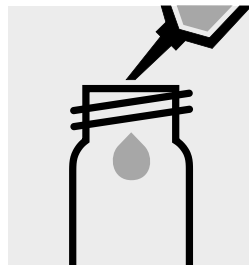
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③④, select subitem >>free.



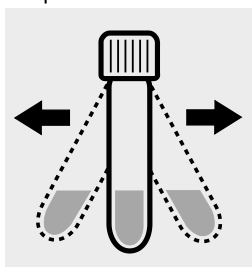
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



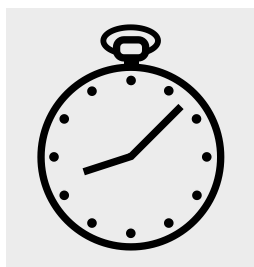
Pipette 10 ml of the sample into a 16-mm cell.



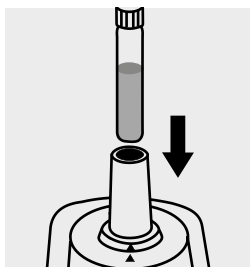
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



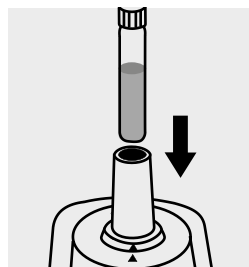
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Chlorine

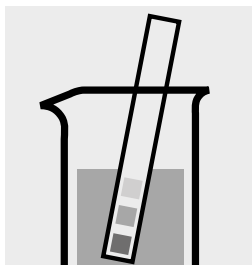
100599

Determination of total chlorine

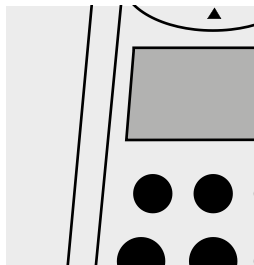
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

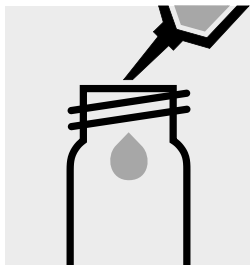
24-mm cell



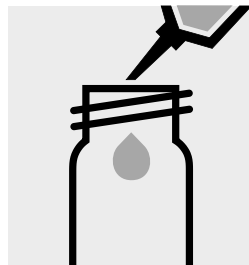
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③①, select subitem >>total.



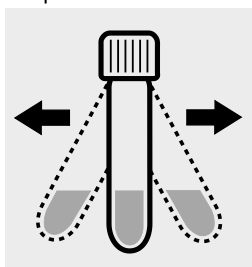
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



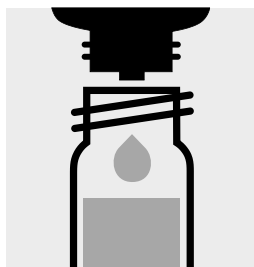
Pipette 10 ml of the sample into a 24-mm cell.



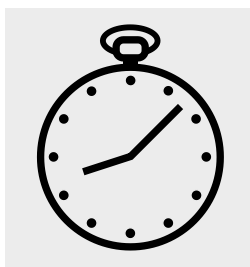
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



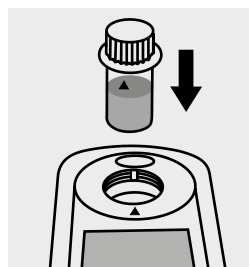
Shake the cell vigorously to dissolve the solid substance.



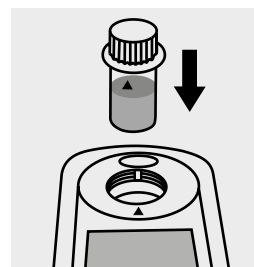
Add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine

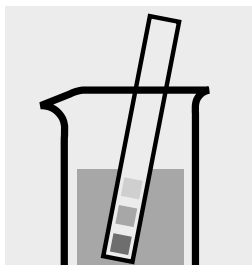
100599

Determination of total chlorine

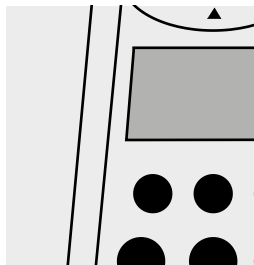
Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

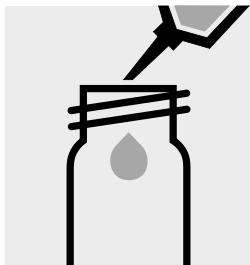
16-mm cell



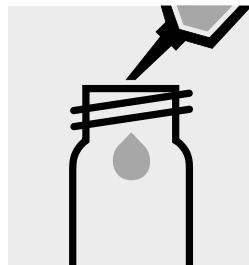
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③④, select subitem >>total.



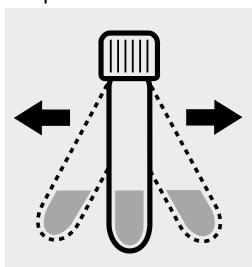
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



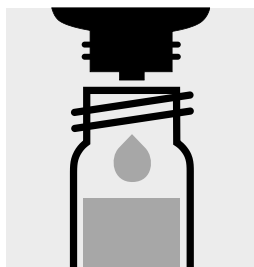
Pipette 10 ml of the sample into a 16-mm cell.



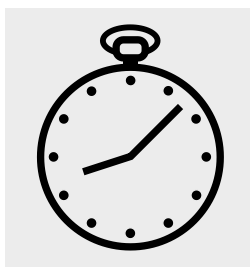
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



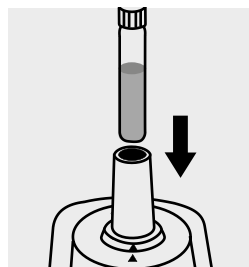
Shake the cell vigorously to dissolve the solid substance.



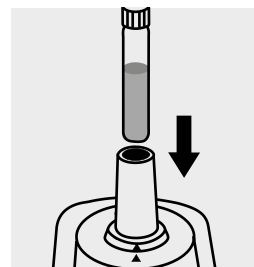
Add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine

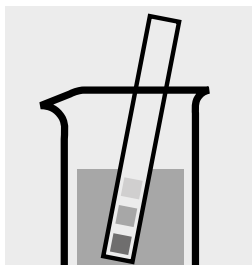
Determination of free chlorine, total chlorine,
and combined chlorine

100599

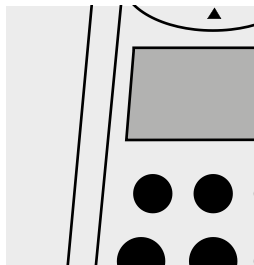
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

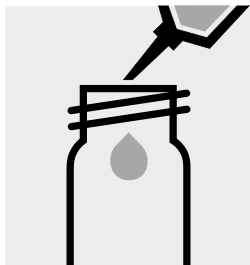
24-mm cell



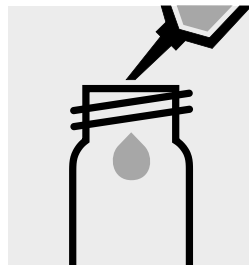
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **131**,
select subitem **>>diff.**



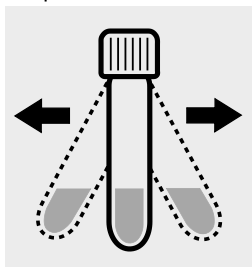
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 10 ml of the sample into a 24-mm cell.



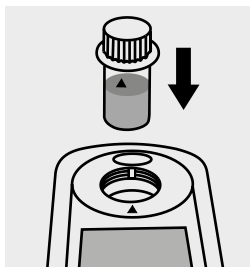
Add 1 level blue micro-spoon of **Cl₂-1**, close with the screw cap.



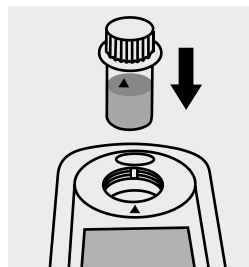
Shake the cell vigorously to dissolve the solid substance.



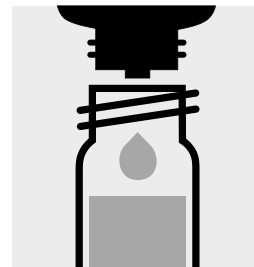
Reaction time:
1 minute
Press **←** to start the countdown.



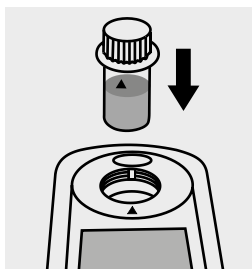
Insert the blank cell into the cell compartment.
Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**. (= T1)



Remove the sample cell from the photometer, open, add 2 drops of **Cl₂-2**, close with the screw cap, and mix.



Insert anew the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**. (= T2)

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
For on-the-spot determinations where there are no suitable facilities for rinsing, the cell contents can be transferred to a new 24-mm cell before the addition of reagent **Cl₂-2**. Use this second cell **only** for the determination of **total chlorine!**

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine

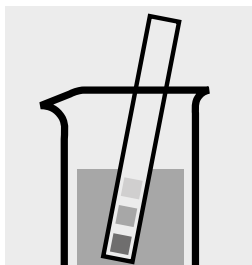
Determination of free chlorine, total chlorine,
and combined chlorine

100599

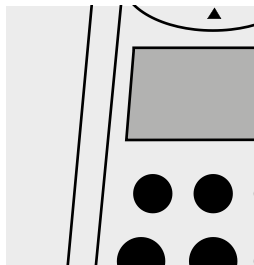
Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

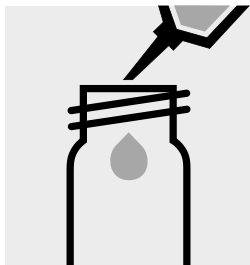
16-mm cell



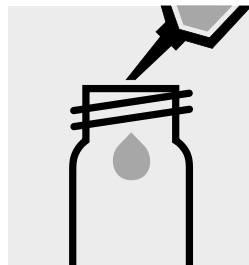
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③④, select subitem >>diff.



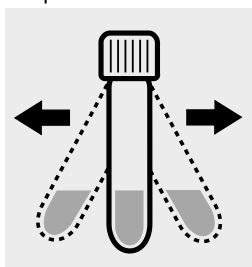
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



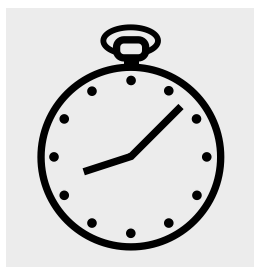
Pipette 10 ml of the sample into a 16-mm cell.



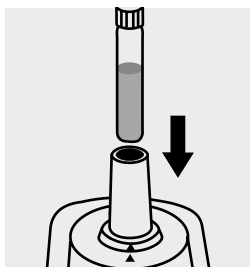
Add 1 level blue micro-spoon of Cl_2 -1, close with the screw cap.



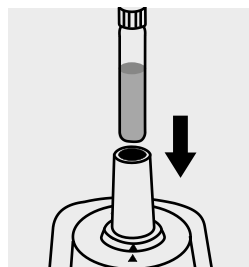
Shake the cell vigorously to dissolve the solid substance.



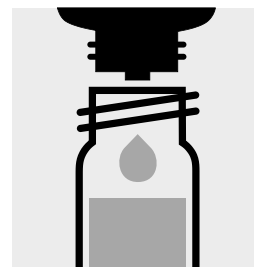
Reaction time:
1 minute
Press to start the countdown.



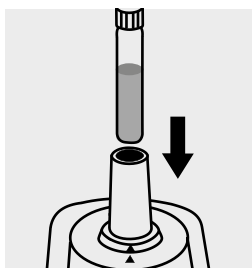
Insert the blank cell into the cell compartment.
Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Press **(Test)**. (= T1)



Remove the sample cell from the photometer, open, add 2 drops of Cl_2 -2, close with the screw cap, and mix.



Insert anew the cell containing the sample into the cell compartment.
Press **(Test)**. (= T2)

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
For on-the-spot determinations where there are no suitable facilities for rinsing, the cell contents can be transferred to a new 24-mm cell before the addition of reagent Cl_2 -2. Use this second cell **only** for the determination of **total chlorine**!

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

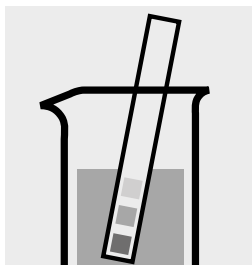
100086/100087

Determination of free chlorine

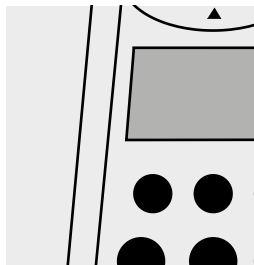
Cell Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

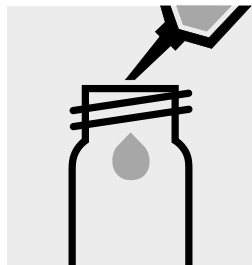
16-mm cell



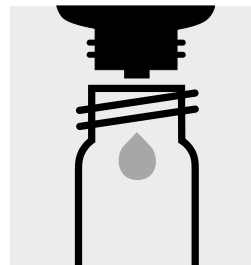
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①③②, select subitem >>free.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



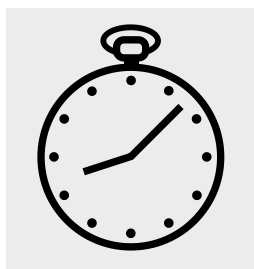
Place 6 drops of $\text{Cl}_2\text{-1}$ into a round cell.



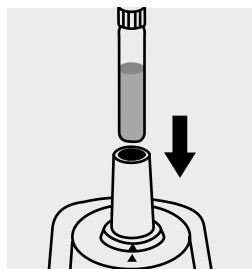
Add 3 drops of $\text{Cl}_2\text{-2}$, close with the screw cap, and mix.



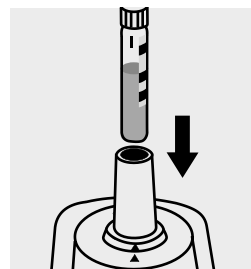
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

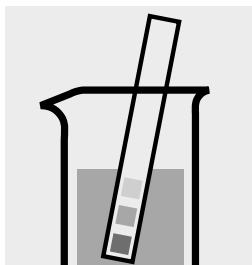
100086/100087

Determination of free chlorine

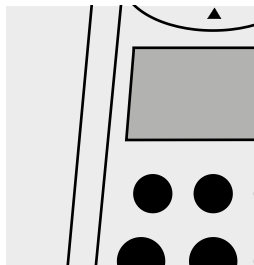
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

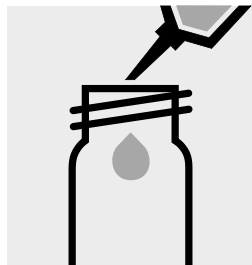
24-mm cell



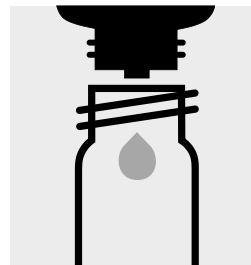
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



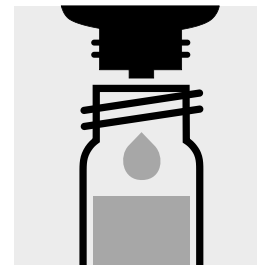
Select method ①③③, select subitem >>free.



Fill approx. 10 ml of distilled water into an empty 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



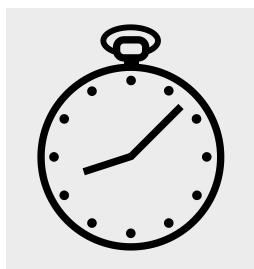
Place 6 drops of Cl_2 -1 into a 24-mm cell.



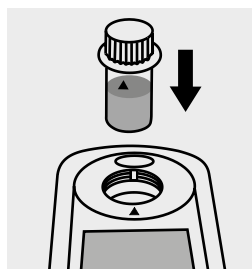
Add 3 drops of Cl_2 -2, close with the screw cap, and mix.



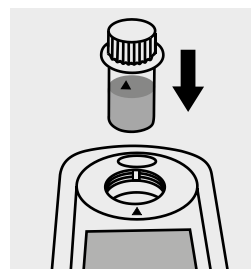
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

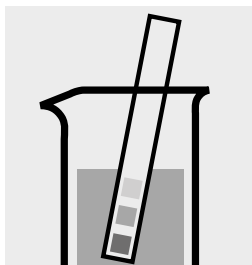
100086/100087/
100088

Determination of total chlorine

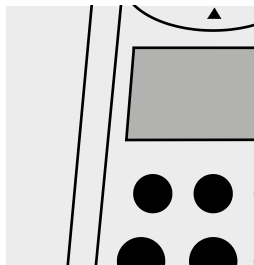
Cell Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

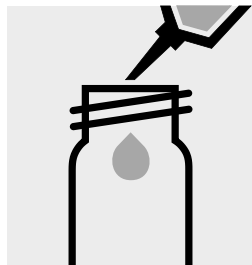
16-mm cell



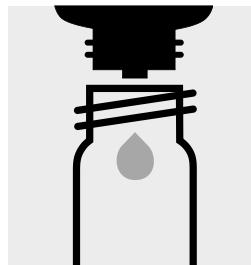
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



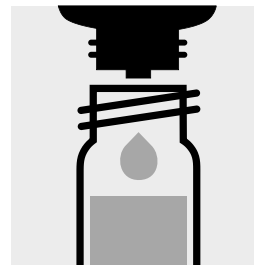
Select method ①③②, select subitem >>total.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



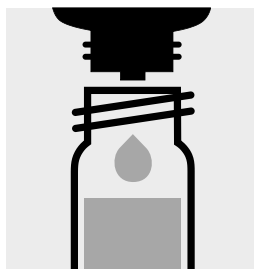
Place 6 drops of $\text{Cl}_2\text{-1}$ into a round cell.



Add 3 drops of $\text{Cl}_2\text{-2}$, close with the screw cap, and mix.



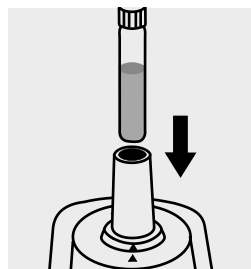
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



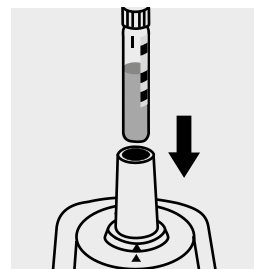
Add 2 drops of $\text{Cl}_2\text{-3}$, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

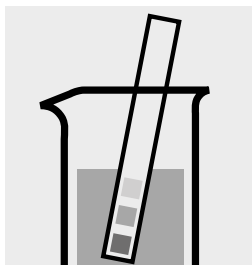
100086/100087/
100088

Determination of total chlorine

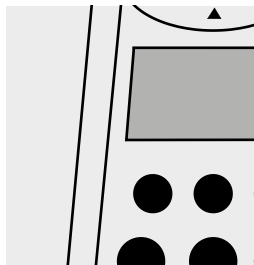
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

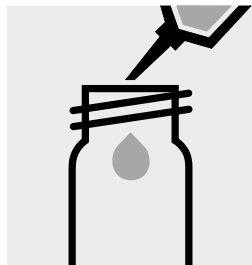
24-mm cell



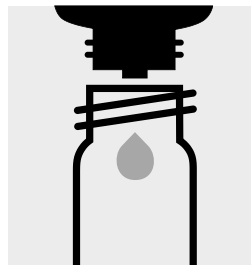
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



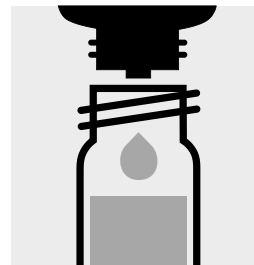
Select method ①③③, select subitem >>total.



Fill approx. 10 ml of distilled water into an empty 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



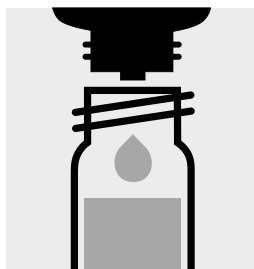
Place 6 drops of Cl_2 -1 into a 24-mm cell.



Add 3 drops of Cl_2 -2, close with the screw cap, and mix.



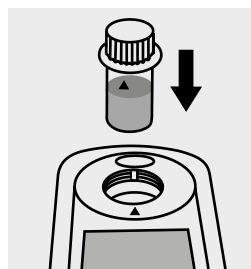
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



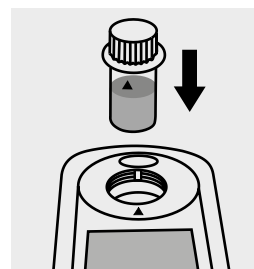
Add 2 drops of Cl_2 -3, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard from Chloramine T GR, Cat.No. 102426, can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

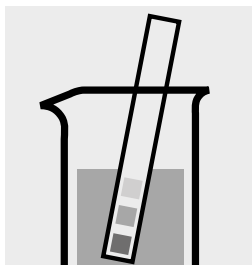
Determination of free chlorine,
total chlorine, and combined chlorine

100086/100087/
100088

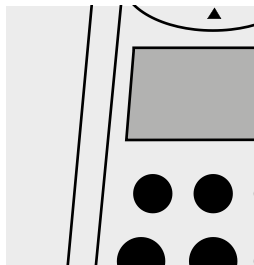
Cell Test

Measuring range: 0.10 – 6.00 mg/l Cl_2

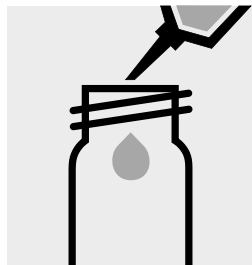
16-mm cell



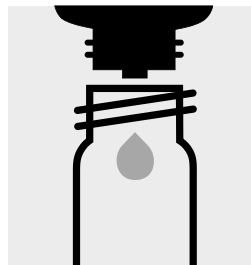
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



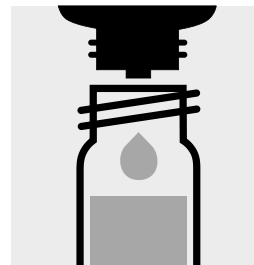
Select method ①③②, select subitem >>diff.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



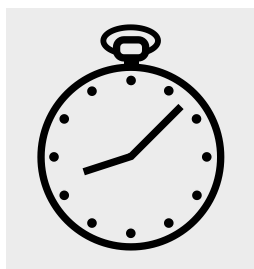
Place 6 drops of Cl_2 -1 into a round cell.



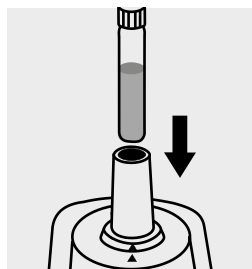
Add 3 drops of Cl_2 -2, close with the screw cap, and mix.



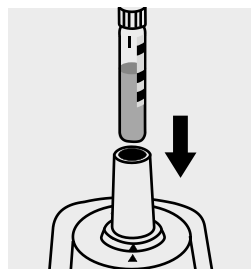
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



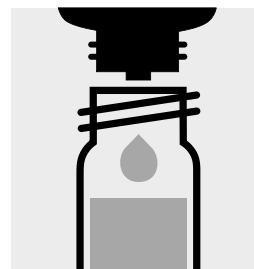
Reaction time: 1 minute
Press to start the countdown.



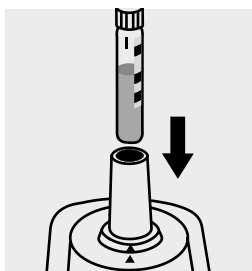
Insert the blank cell into the cell compartment. Press .



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press . (= T1)



Remove the sample cell from the photometer, open, add 2 drops of Cl_2 -3, close with the screw cap, and mix.



Insert anew the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press . (= T2)

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).
After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
For on-the-spot determinations where there are no suitable facilities for rinsing, the cell contents can be transferred to a new 16-mm cell before the addition of reagent Cl_2 -3. Use this second cell **only** for the determination of **total chlorine**!

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

Chlorine (with liquid reagents)

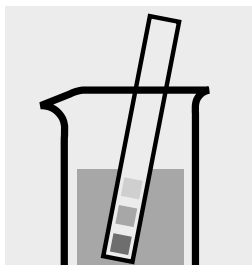
Determination of free chlorine,
total chlorine, and combined chlorine

100086/100087/
100088

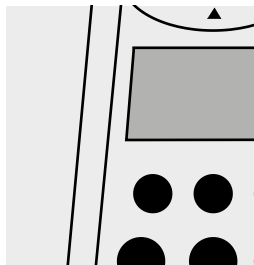
Test

Measuring range: 0.02 – 4.50 mg/l Cl_2

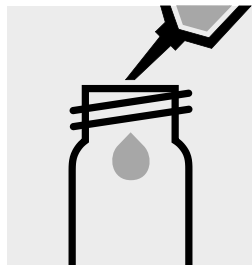
24-mm cell



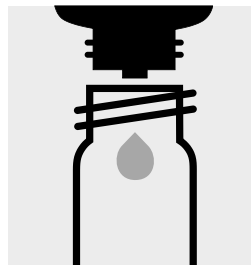
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



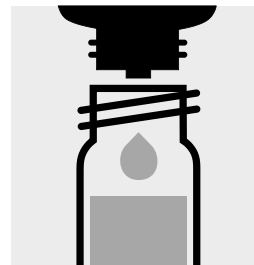
Select method ①③③, select subitem >>diff.



Fill approx. 10 ml of distilled water into an empty 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



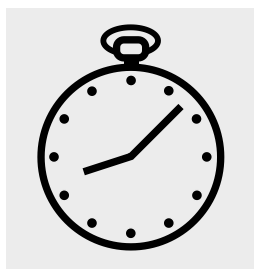
Place 6 drops of Cl_2 -1 into a 24-mm cell.



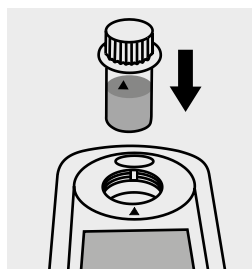
Add 3 drops of Cl_2 -2, close with the screw cap, and mix.



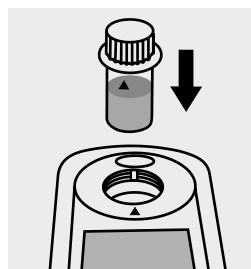
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



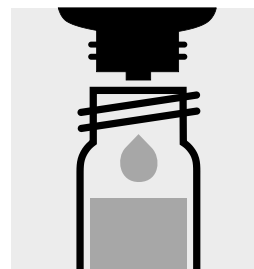
Reaction time: 1 minute
Press to start the countdown.



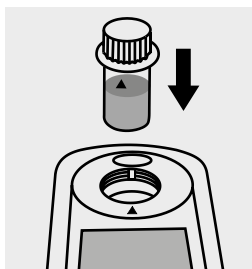
Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press .



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press . (= T1)



Remove the sample cell from the photometer, open, add 2 drops of Cl_2 -3, close with the screw cap, and mix.



Insert anew the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press . (= T2)

Important:

Very high chlorine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.

For on-the-spot determinations where there are no suitable facilities for rinsing, the cell contents can be transferred to a new 24-mm cell before the addition of reagent Cl_2 -3. Use this second cell **only** for the determination of **total chlorine!**

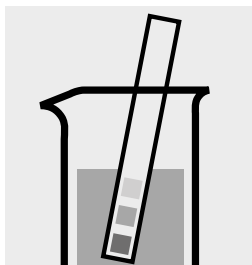
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section "Standard solutions").

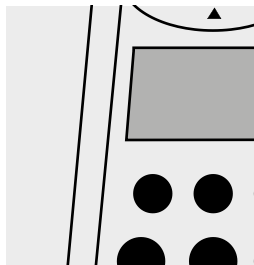
Chlorine Dioxide

100608

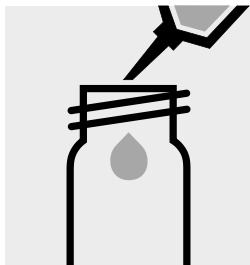
Test

Measuring range: 0.05 – 8.50 mg/l ClO_2 24-mm cell

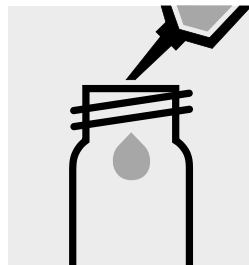
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



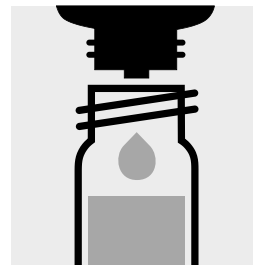
Select method ①④①.



Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 10 ml of the sample into a 24-mm cell.



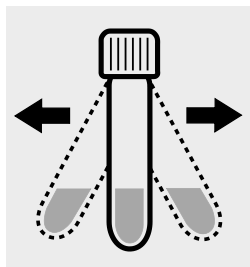
Add 2 drops of ClO_2 -1, close with the screw cap, and mix.



Reaction time:
2 minutes
Press to start the countdown.



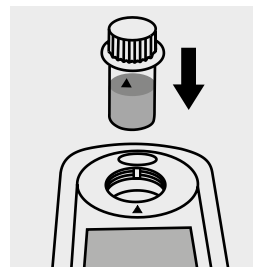
Add 1 level blue micro-spoon of ClO_2 -2, close with the screw cap.



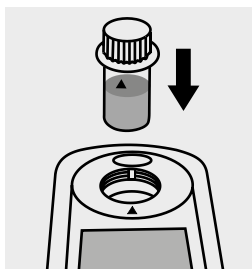
Shake the cell vigorously to dissolve the solid substance.



Reaction time:
1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high chlorine dioxide concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

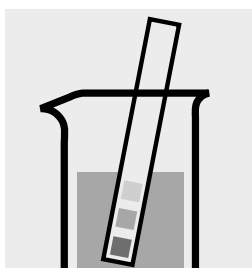
To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Chlorine Dioxide

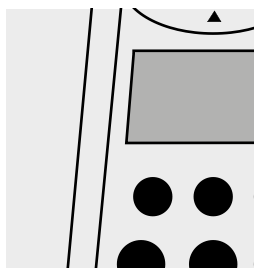
100608

Test

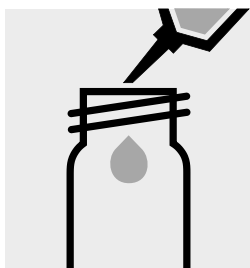
Measuring range: 0.20 – 10.00 mg/l ClO_2 16-mm cell



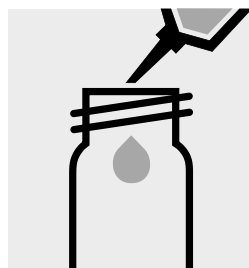
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



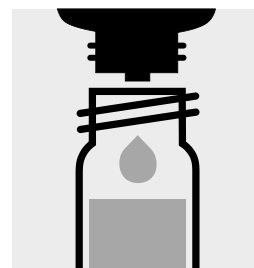
Select method ①④①.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Pipette 10 ml of the sample into a 16-mm cell.



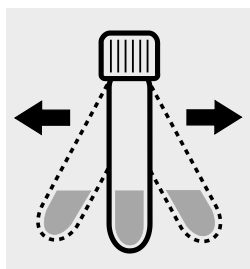
Add 2 drops of ClO_2 -1, close with the screw cap, and mix.



Reaction time: 2 minutes
Press to start the countdown.



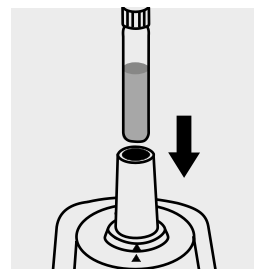
Add 1 level blue micro-spoon of ClO_2 -2, close with the screw cap.



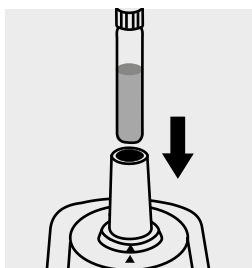
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press .



Insert the cell containing the sample into the cell compartment. Press .

Important:

Very high chlorine dioxide concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

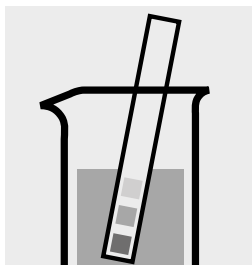
Chromate

114552

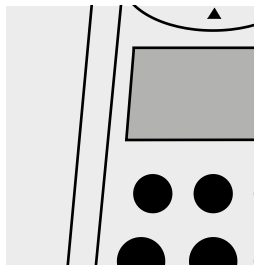
Determination of chromium(VI)

Cell Test

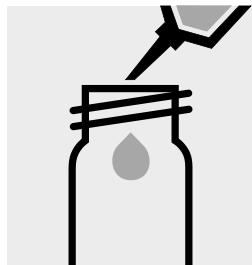
Measuring range: 0.05 – 2.00 mg/l Cr	16-mm cell
0.11 – 4.46 mg/l CrO ₄	16-mm cell



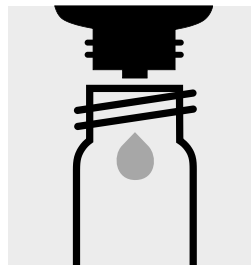
Check the pH of the sample, specified range: pH 1 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



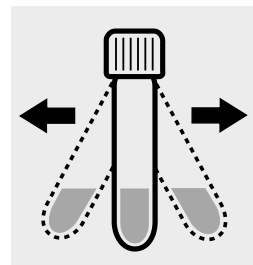
Select method ①⑤①.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



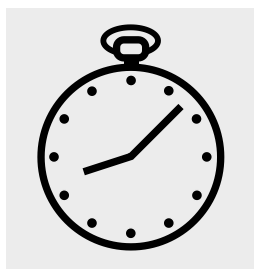
Add 6 drops of **Cr-3K** into a reaction cell, close with the screw cap.



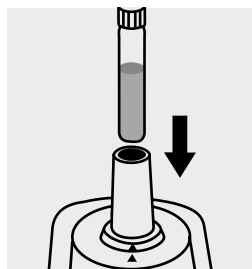
Shake the cell vigorously to dissolve the solid substance and leave to stand for **1 minute**.



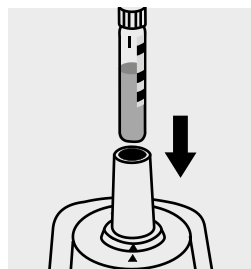
Add 5.0 ml of the sample with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use chromate standard solution Certipur®, Cat.No. 119780, concentration 1000 mg/l CrO₄²⁻, can be used after diluting accordingly or also the Standard solution for photometric applications, CRM, Cat.No. 133013.

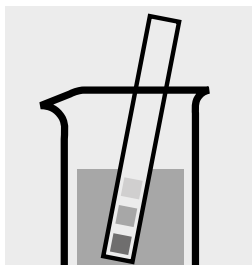
Chromate

Determination of total chromium
= sum of chromium(VI) and chromium(III)

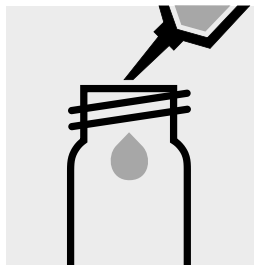
114552

Cell Test

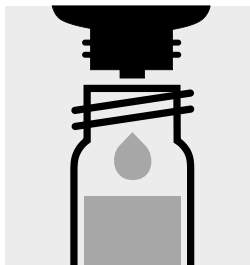
Measuring range: 0.05 – 2.00 mg/l Cr	16-mm cell
0.11 – 4.46 mg/l CrO ₄	16-mm cell



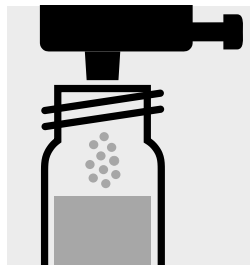
Check the pH of the sample, specified range: pH 1 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



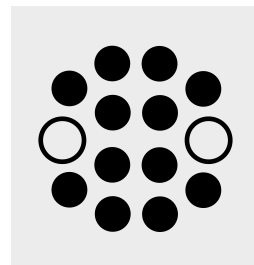
Pipette 10 ml of the sample into an empty 16-mm cell.



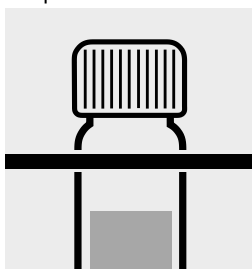
Add 1 drop of **Cr-1K**, close with the screw cap, and mix.



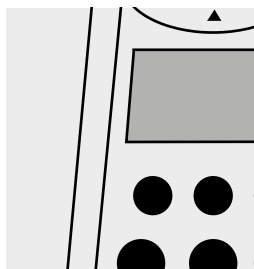
Add 1 dose of **Cr-2K** using the blue dose-metering cap, close the reaction cell with the screw cap.



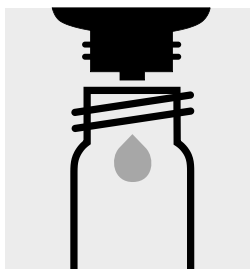
Heat the cell in the thermoreactor at 120 °C (100 °C) for 1 hour.



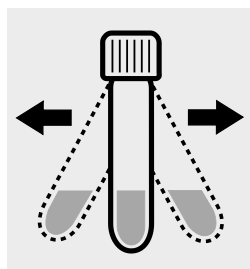
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature: **pretreated sample**.



Select method ①⑤①.



Add 6 drops of **Cr-3K** into a reaction cell, close with the screw cap.



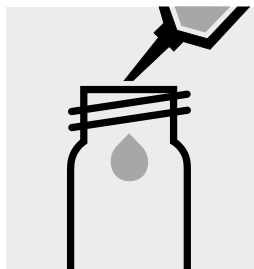
Shake the cell vigorously to dissolve the solid substance and leave to stand for **1 minute**.



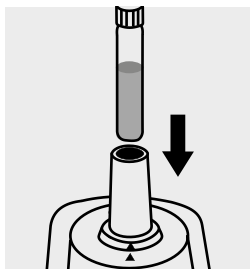
Add 5.0 ml of the **pretreated sample** with pipette, close with the screw cap, and mix.



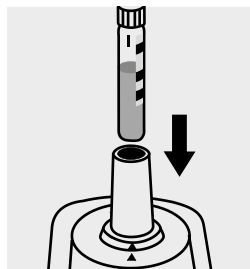
Reaction time: 1 minute
Press to start the countdown.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

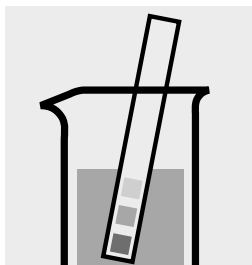
To check the measurement system (test reagents, measurement device, and handling) ready-to-use chromate standard solution Certipur®, Cat.No. 119780, concentration 1000 mg/l CrO₄²⁻, can be used after diluting accordingly or also the Standard solution for photometric applications, CRM, Cat.No. 133013.

Chromate

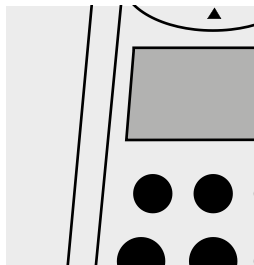
114758

Determination of chromium(VI)

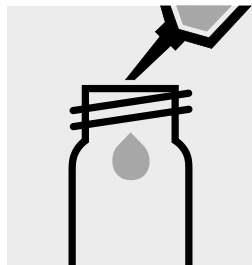
Test

Measuring range: 10 – 1400 µg/l Cr 24-mm cell22 – 3123 µg/l CrO₄ 24-mm cell**Attention:** In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.

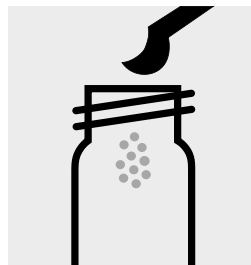
Check the pH of the sample, specified range: pH 1 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



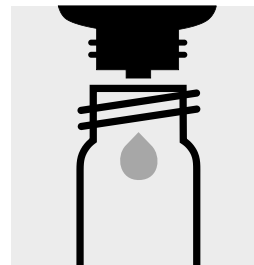
Select method ①⑤①.



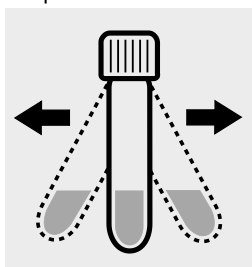
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



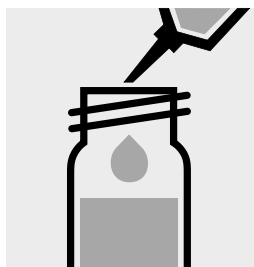
Place 2 level grey microspoons of **Cr-1** into a dry 24-mm cell.



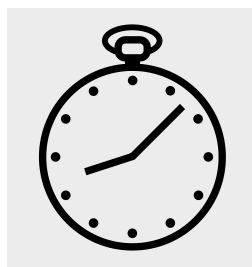
Add 12 drops of **Cr-2**, close with the screw cap.



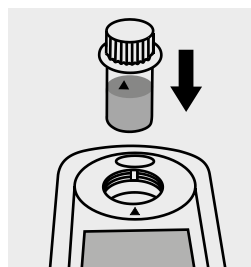
Shake the cell vigorously to dissolve the solid substance.



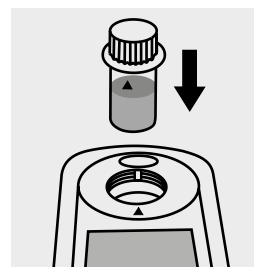
Add 10 ml of the sample with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Important:

For the determination of **total chromium = sum of chromium(VI) and chromium(III)** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use chromate standard solution Certipur®, Cat.No. 119780, concentration 1000 mg/l CrO₄²⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 133012 and 133013. The measurement results are expressed in µg/l.

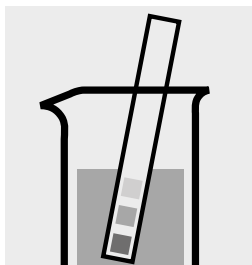
Cobalt

117244

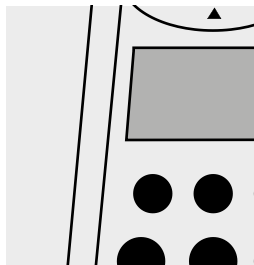
Cell Test

Measuring range: 0.05 – 2.00 mg/l Co

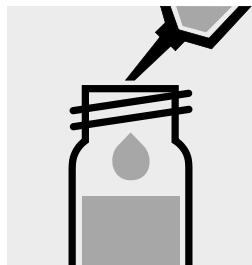
16-mm cell



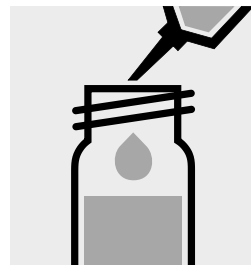
Check the pH of the sample, specified range: pH 2.5 – 7.5.
If required, add dilute sodium hydroxide solution or nitric acid drop by drop to adjust the pH.



Select method **(2)(1)(0)**.



Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



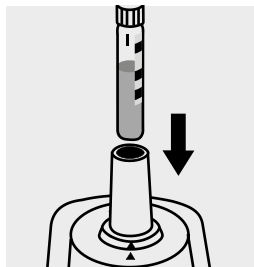
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix.
(Blank cell)



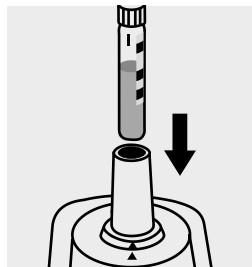
Add to each cell 0.50 ml of **Co-1K** with pipette, close with the screw cap, and mix.



Reaction time:
10 minutes
Press **(←)** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use cobalt standard solution Certipur®, Cat.No. 119785, concentration 1000 mg/l Co, can be used after diluting accordingly.

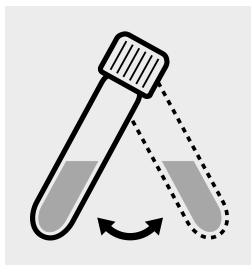
COD

Chemical Oxygen Demand

101796

Cell Test

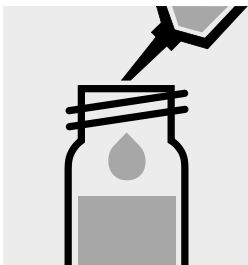
Measuring range: 5.0–80.0 mg/l COD or O₂ 16-mm cell



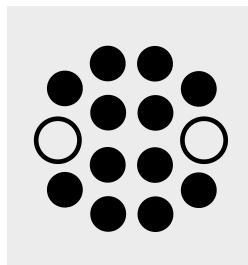
Suspend the bottom sediment in two cells by swirling.



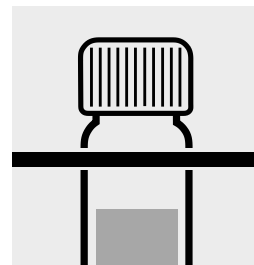
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



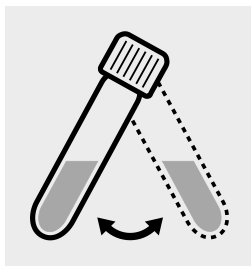
Carefully pipette 2.0 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



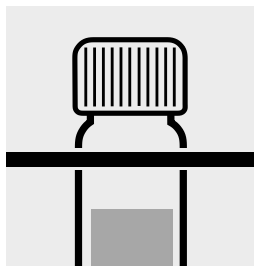
Heat both cells in the thermoreactor at 148 °C for 2 hours.



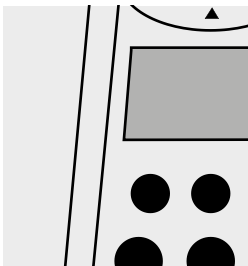
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



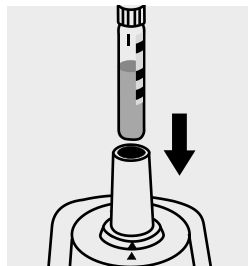
Swirl both cells after 10 minutes.



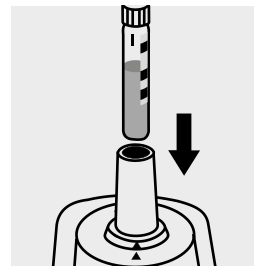
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **168**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 50, Cat.No. 114695, or the Standard solution for photometric applications, CRM, Cat.No. 125028.

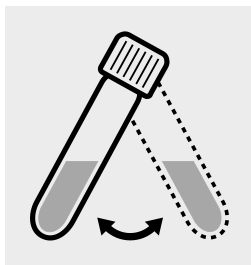
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 50) is highly recommended.

COD

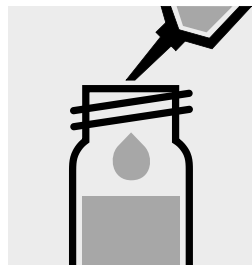
Chemical Oxygen Demand

114540

Cell Test

Measuring range: 10–150 mg/l COD or O₂ 16-mm cell

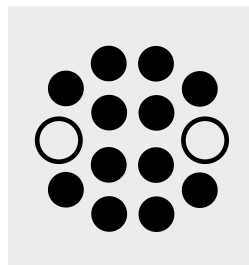
Suspend the bottom sediment in two cells by swirling.



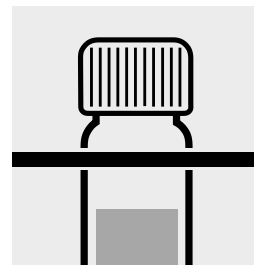
Carefully pipette 3.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



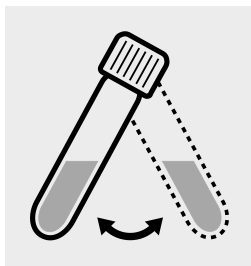
Carefully pipette 3.0 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



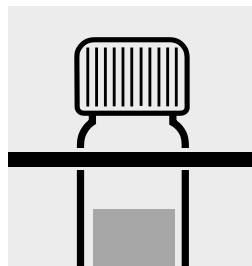
Heat both cells in the thermoreactor at 148 °C for 2 hours.



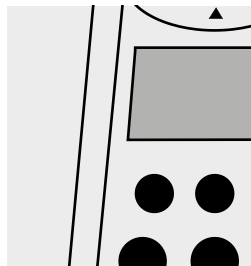
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



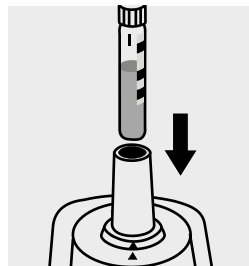
Swirl both cells after 10 minutes.



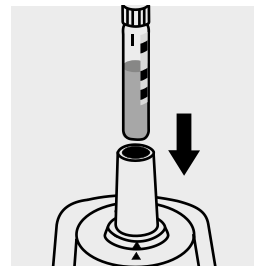
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **160**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solution for photometric applications, CRM, Cat.No. 125029.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

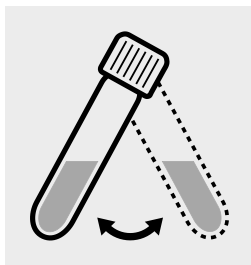
COD

Chemical Oxygen Demand

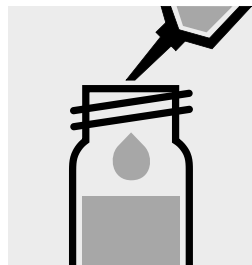
114895

Cell Test

Measuring range: 15–300 mg/l COD or O₂ 16-mm cell



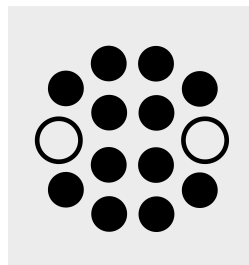
Suspend the bottom sediment in two cells by swirling.



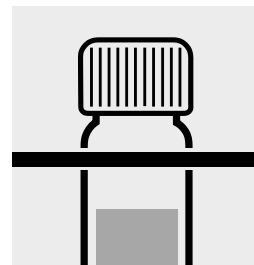
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



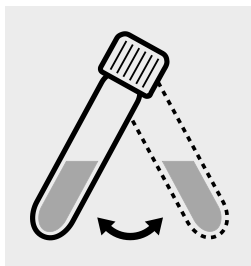
Carefully pipette 2.0 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



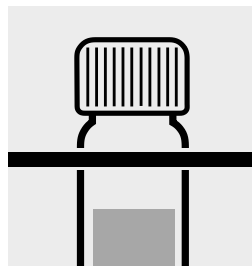
Heat both cells in the thermoreactor at 148 °C for 2 hours.



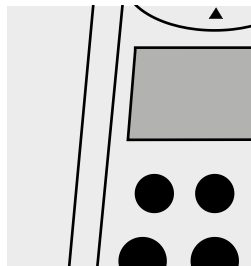
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



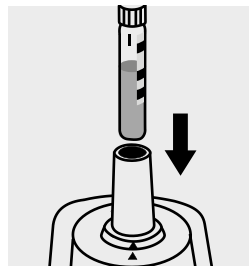
Swirl both cells after 10 minutes.



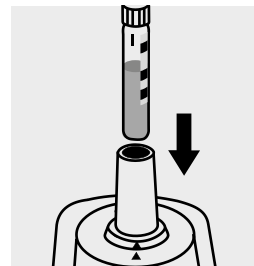
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method ①⑥①.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 60, Cat.No. 114696, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125029 and 125030.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 60) is highly recommended.

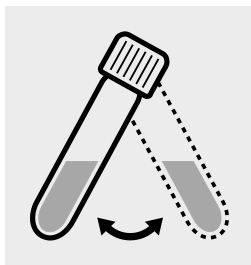
COD

Chemical Oxygen Demand

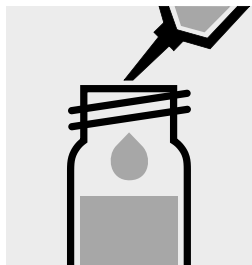
114690

Cell Test

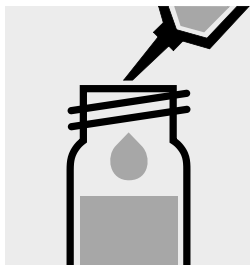
Measuring range: 50–500 mg/l COD or O₂ 16-mm cell



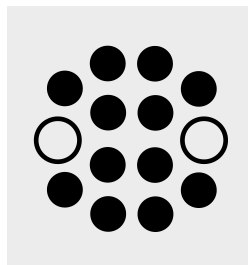
Suspend the bottom sediment in two cells by swirling.



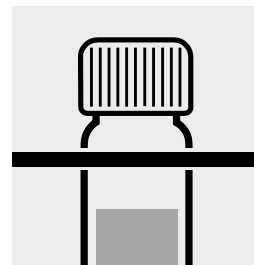
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



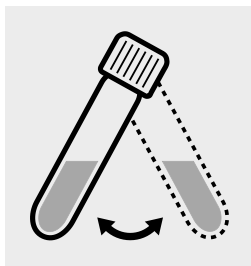
Carefully pipette 2.0 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



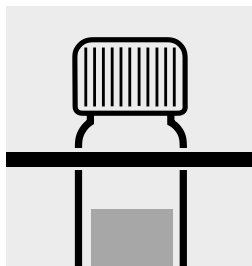
Heat both cells in the thermoreactor at 148 °C for 2 hours.



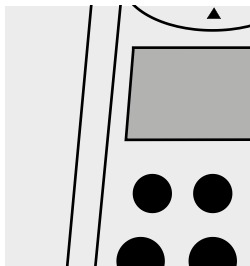
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



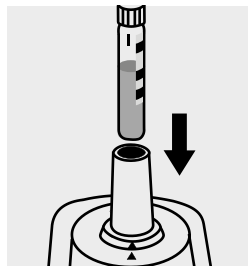
Swirl both cells after 10 minutes.



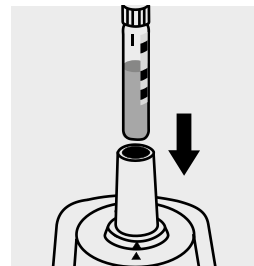
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **①⑥②**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 60, Cat.No. 114696, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125029, 125030, and 125031.

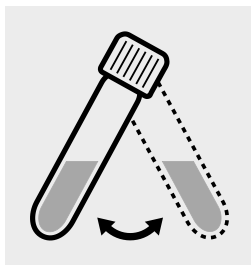
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 60) is highly recommended.

COD

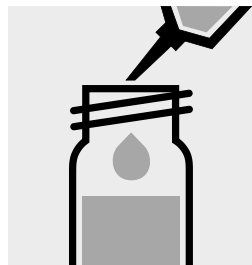
Chemical Oxygen Demand

114541

Cell Test

Measuring range: 25–1500 mg/l COD or O₂ 16-mm cell

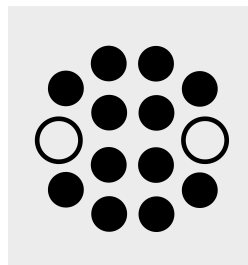
Suspend the bottom sediment in two cells by swirling.



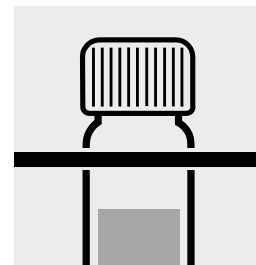
Carefully pipette 3.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



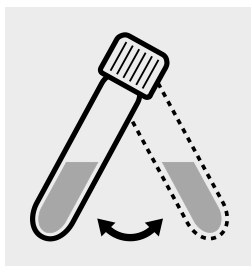
Carefully pipette 3.0 ml of distilled water into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**
(Blank cell)



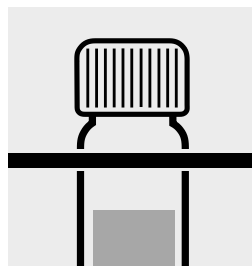
Heat both cells in the thermoreactor at 148 °C for 2 hours.



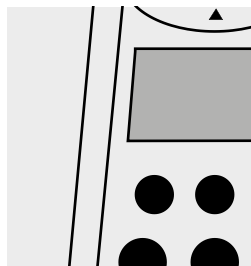
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



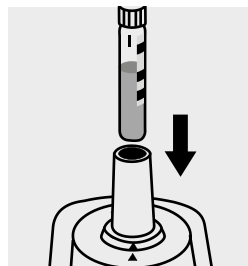
Swirl both cells after 10 minutes.



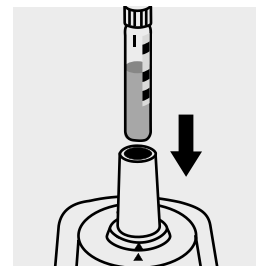
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method ①⑥③.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20, Cat.No. 114675, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125029, 125030, 125031, and 125032.

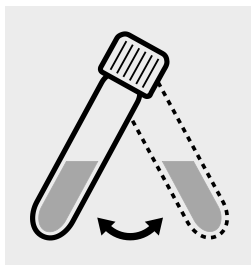
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 20) is highly recommended.

COD

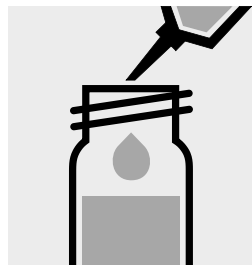
Chemical Oxygen Demand

114691

Cell Test

Measuring range: 300–3500 mg/l COD or O₂ 16-mm cell

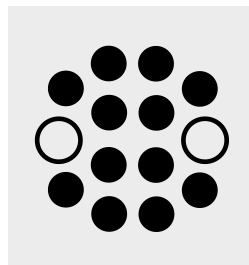
Suspend the bottom sediment in two cells by swirling.



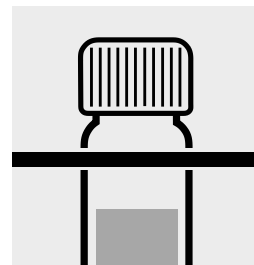
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



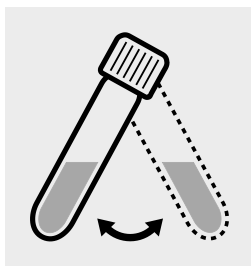
Carefully pipette 2.0 ml of distilled water into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**
(Blank cell)



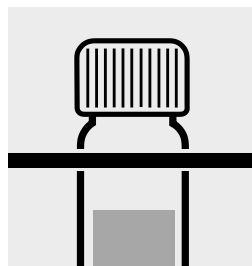
Heat both cells in the thermoreactor at 148 °C for 2 hours.



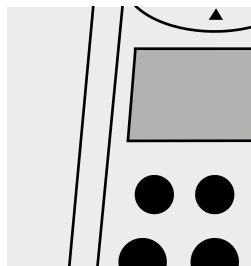
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



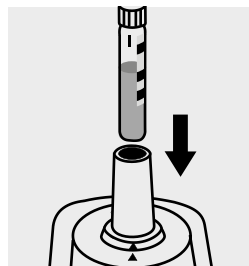
Swirl both cells after 10 minutes.



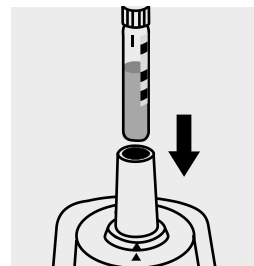
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **164**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 80, Cat.No. 114738, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125031, 125032, and 125033.

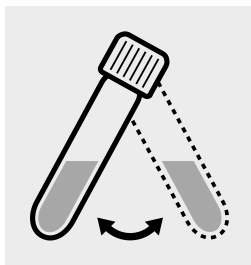
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 80) is highly recommended.

COD

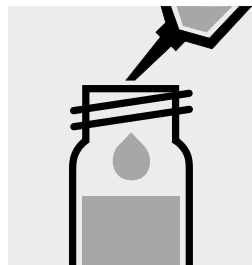
Chemical Oxygen Demand

114555

Cell Test

Measuring range: 0.50–10.00 g/l COD or O₂ 16-mm cell

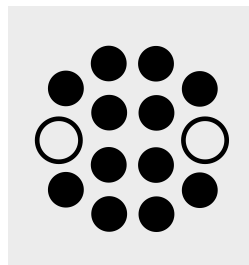
Suspend the bottom sediment in two cells by swirling.



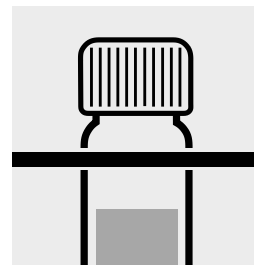
Carefully pipette 1.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



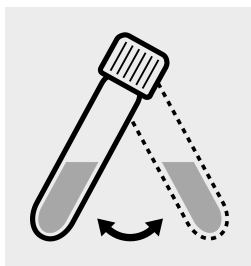
Carefully pipette 1.0 ml of distilled water into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**
(Blank cell)



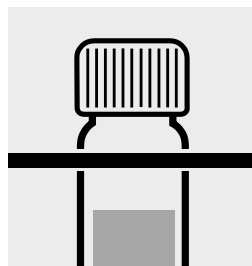
Heat both cells in the thermoreactor at 148 °C for 2 hours.



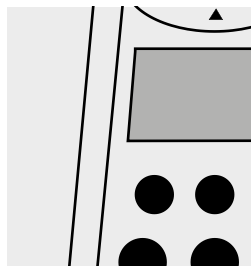
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



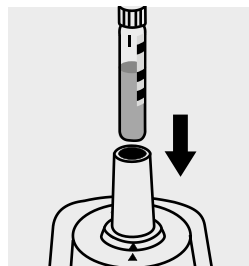
Swirl both cells after 10 minutes.



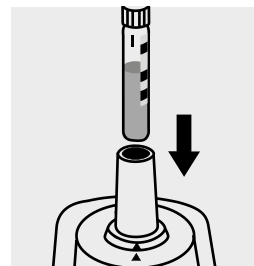
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **①⑥⑤**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 70, Cat.No. 114689, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125032, 125033, and 125034.

The measurement results are expressed in g/l COD.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 70) is highly recommended.

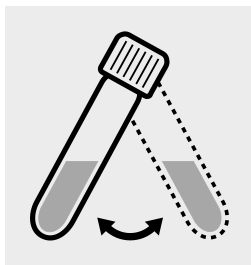
COD

Chemical Oxygen Demand

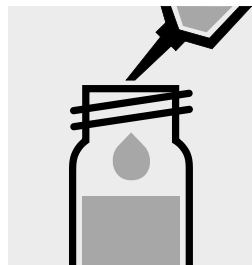
101797

Cell Test

Measuring range: 5.00–90.00 g/l COD or O₂ 16-mm cell



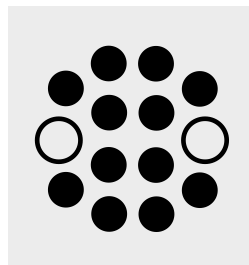
Suspend the bottom sediment in two cells by swirling.



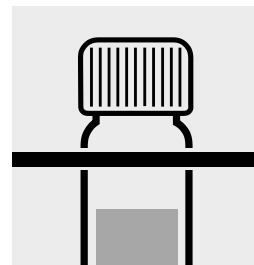
Carefully pipette 0.10 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



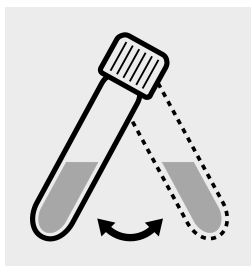
Carefully pipette 0.10 ml of distilled water into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**
(Blank cell)



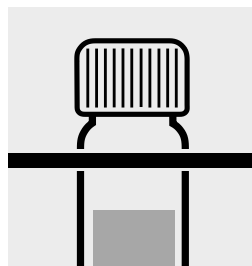
Heat both cells in the thermoreactor at 148 °C for 2 hours.



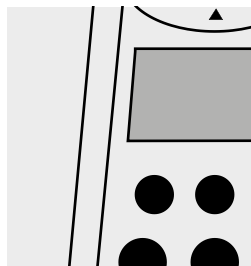
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



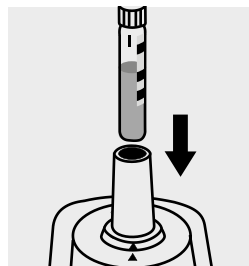
Swirl both cells after 10 minutes.



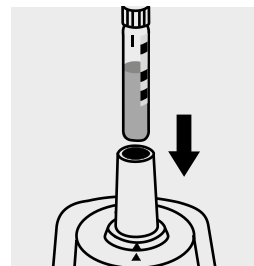
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method ①⑥⑨.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use the Standard solutions for photometric applications, CRM, Cat.Nos. 125034 and 125035.

The measurement results are expressed in g/l COD.

To check for sample-dependent effects the use of addition solutions is highly recommended.

COD (Hg-free)

Chemical Oxygen Demand

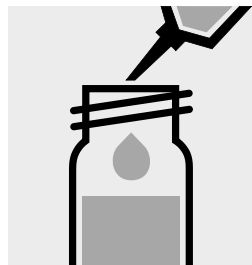
109772

Cell Test

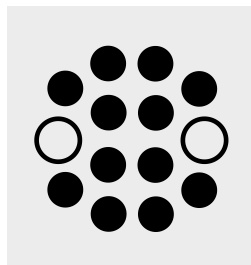
Measuring range: 10–150 mg/l COD or O₂ 16-mm cell



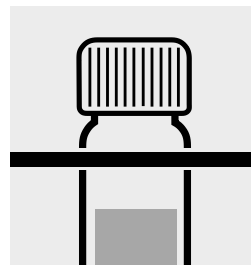
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



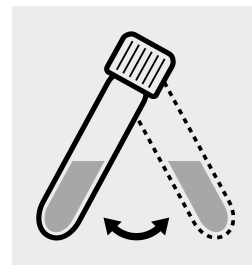
Carefully pipette 2.0 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



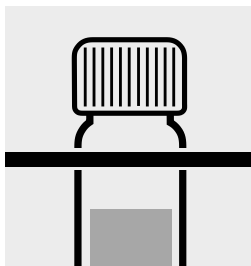
Heat both cells in the thermoreactor at 148 °C for 2 hours.



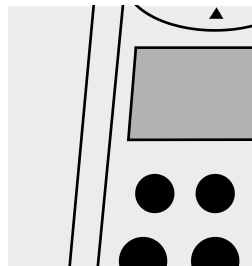
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



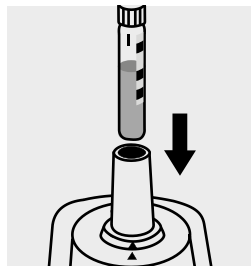
Swirl both cells after 10 minutes.



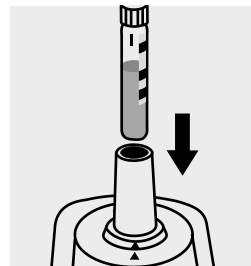
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method ①⑥⑥.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use the Standard solutions for photometric applications, CRM, Cat.Nos. 125028 and 125029.

To check for sample-dependent effects the use of addition solutions is highly recommended.

COD (Hg-free)

Chemical Oxygen Demand

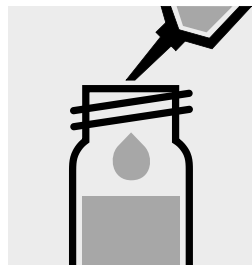
109773

Cell Test

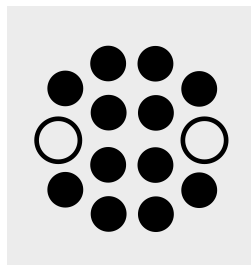
Measuring range: 100–1500 mg/l COD or O₂ 16-mm cell



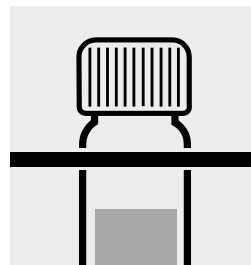
Carefully pipette 2.0 ml of the sample into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!**



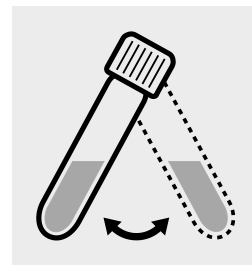
Carefully pipette 2.0 ml of distilled water into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes very hot!** (Blank cell)



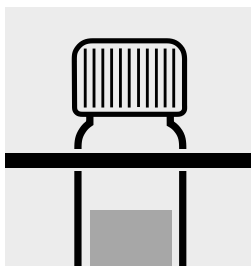
Heat both cells in the thermoreactor at 148 °C for 2 hours.



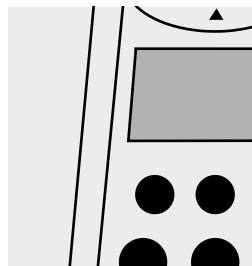
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



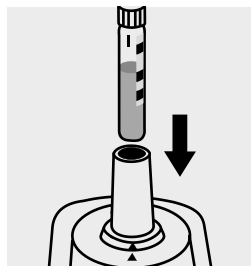
Swirl both cells after 10 minutes.



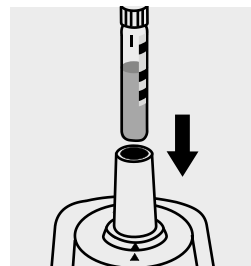
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method ①⑥⑦.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use the Standard solutions for photometric applications, CRM, Cat.Nos. 125029, 125030, 125031, and 125032.

To check for sample-dependent effects the use of addition solutions is highly recommended.

COD

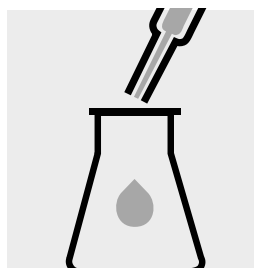
Chemical Oxygen Demand
for seawater / high chloride contents

117058

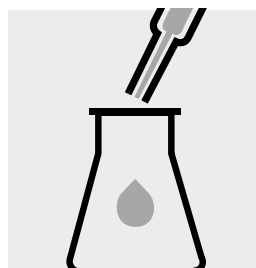
Cell Test

Measuring range: 5.0–60.0 mg/l COD or O₂ 16-mm cell

Chloride depletion:



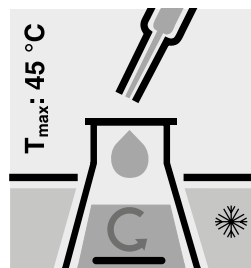
Pipette with glass pipette 20 ml of the sample into a 300-ml Erlenmeyer flask with NS 29/32.



Pipette with glass pipette 20 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second 300-ml Erlenmeyer flask with NS 29/32.



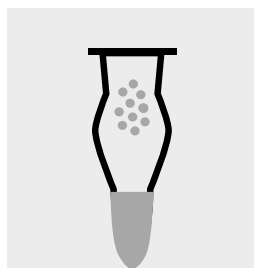
Add to each a magnetic stirring rod, and cool in the ice bath.



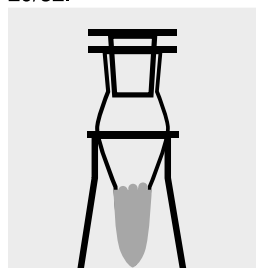
Add **slowly** to each Erlenmeyer flask 25 ml of **Sulfuric acid for the determination of COD** (Cat. No. 117048) with glass pipette **under cooling and stirring**.



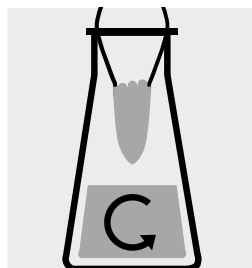
Cool both Erlenmeyer flasks to room temperature in the ice bath.



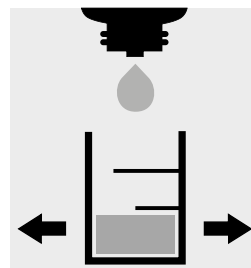
Fill 6 - 7 g each of **Sodalime with indicator** (Cat. No. 106733) into two absorption tubes (Cat. No. 115955).



Close the absorption tubes with the glass stoppers, and attach to the top of the Erlenmeyer flasks.



Stir at 250 rpm for 2 h at room temperature: depleted sample / depleted blank



Check the chloride content of the depleted sample using MColortest™ Chloride Test (Cat. No. 111132) according to the application (see the web-site):
Specified value
<2000 mg/l Cl⁻.

Chloride determination (acc. the application instructions - abridged version):

Fill 5.0 ml of sodium hydroxide solution 2 mol/l, Cat. No. 109136, into the test vessel of the MColortest™ Chloride Test, Cat. No. 111132.

Carefully allow to run from the pipette 0.5 ml of depleted sample down the inside of the tilted test vessel onto the sodium hydroxide solution and mix (**Wear eye protection! The cell becomes hot!**).

Add 2 drops of reagent Cl-1 and swirl. The sample directly turns yellow in color. (Reagent Cl-2 is not required.)

Holding the reagent bottle vertically, slowly add reagent Cl-3 dropwise to the sample while swirling until its color changes from yellow to blue-violet. Shortly before the color changes, wait a few seconds after adding each drop.

Result in mg/l chloride = number of drops x 250

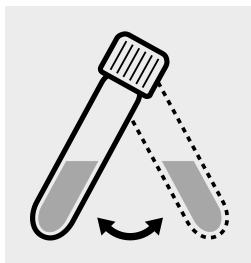
COD

Chemical Oxygen Demand
for seawater / high chloride contents

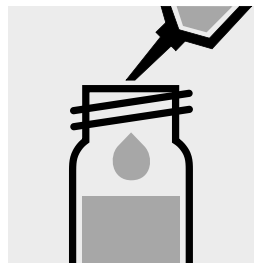
117058

Cell Test

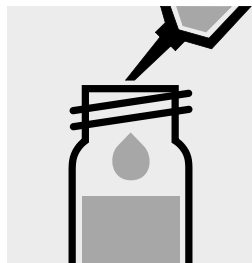
Determination:



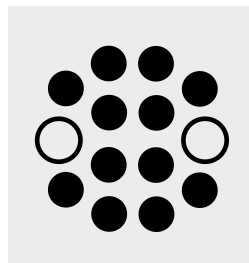
Suspend the bottom sediment in two cells by swirling.



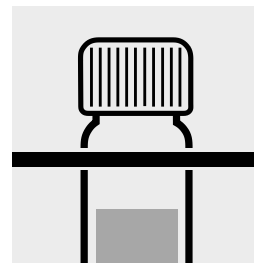
Carefully pipette 5.0 ml of the **depleted sample** into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes hot!**



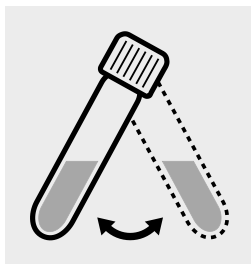
Carefully pipette 5.0 ml of the **depleted blank** into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes hot!**
(Blank cell)



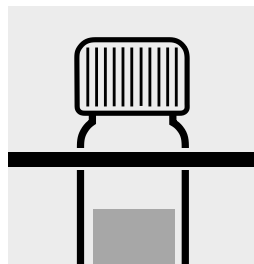
Heat both cells in the thermoreactor at 148 °C for 2 hours.



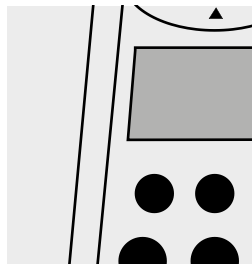
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



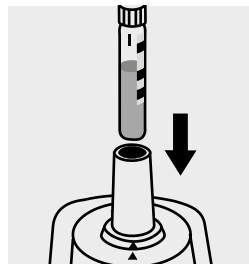
Swirl both cells after 10 minutes.



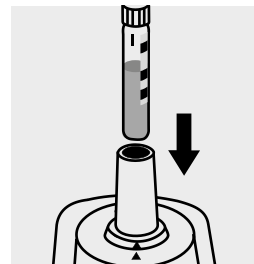
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **570**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a COD/chloride standard solution must be prepared from Potassium hydrogen phthalate, Cat.No. 102400 and Sodium chloride, Cat.No. 106406 (see section "Standard solutions").

COD

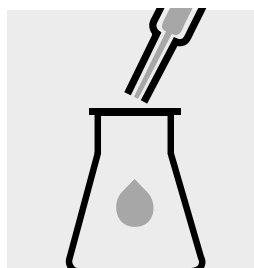
Chemical Oxygen Demand
for seawater / high chloride contents

117059

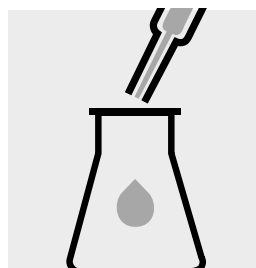
Cell Test

Measuring range: 50–3000 mg/l COD or O₂ 16-mm cell

Chloride depletion:



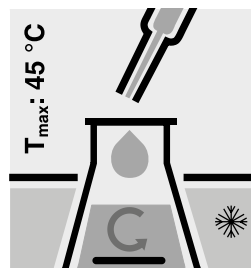
Pipette with glass pipette 20 ml of the sample into a 300-ml Erlenmeyer flask with NS 29/32.



Pipette with glass pipette 20 ml of distilled water (Water for chromatography LiChrosolv®, Cat.No. 115333, is recommended) into a second 300-ml Erlenmeyer flask with NS 29/32.



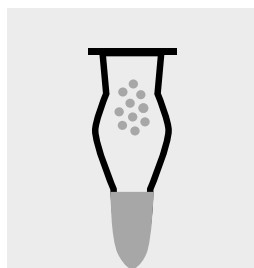
Add to each a magnetic stirring rod, and cool in the ice bath.



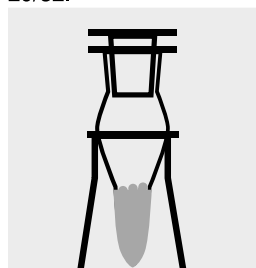
Add **slowly** to each Erlenmeyer flask 25 ml of **Sulfuric acid for the determination of COD** (Cat. No. 117048) with glass pipette **under cooling and stirring**.



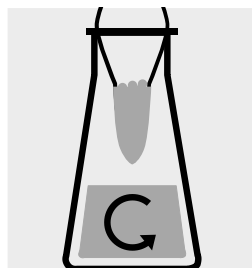
Cool both Erlenmeyer flasks to room temperature in the ice bath.



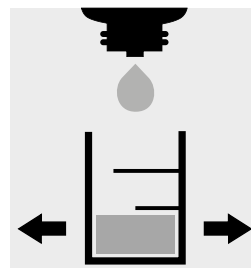
Fill 6 - 7 g each of **Sodalime with indicator** (Cat. No. 106733) into two absorption tubes (Cat. No. 115955).



Close the absorption tubes with the glass stoppers, and attach to the top of the Erlenmeyer flasks.



Stir at 250 rpm for 2 h at room temperature: depleted sample / depleted blank



Check the chloride content of the depleted sample using the MColortest™ Chloride Test (Cat. No. 111132) as per the application instructions (see the website): specified value <250 mg/l Cl⁻.

Chloride determination (acc. the application instructions - abridged version):

Fill 5.0 ml of sodium hydroxide solution 2 mol/l, Cat. No. 109136, into the test vessel of the MColortest™ Chloride Test, Cat. No. 111132.

Carefully allow to run from the pipette 0.5 ml of depleted sample down the inside of the tilted test vessel onto the sodium hydroxide solution and mix (**Wear eye protection! The cell becomes hot!**).

Add 2 drops of reagent Cl-1 and swirl. The sample directly turns yellow in color. (Reagent Cl-2 is not required.)

Holding the reagent bottle vertically, slowly add reagent Cl-3 dropwise to the sample while swirling until its color changes from yellow to blue-violet. Shortly before the color changes, wait a few seconds after adding each drop.

Result in mg/l chloride = number of drops x 250

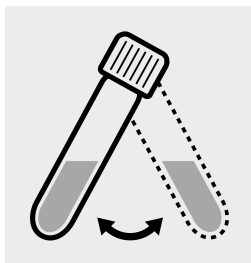
COD

Chemical Oxygen Demand
for seawater / high chloride contents

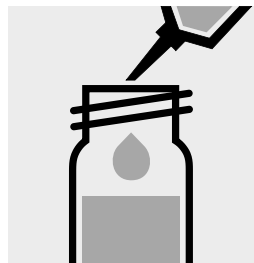
117059

Cell Test

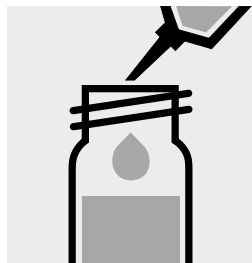
Determination:



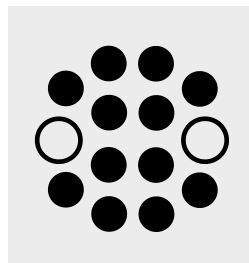
Suspend the bottom sediment in two cells by swirling.



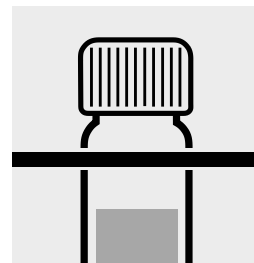
Carefully pipette 3.0 ml of the **depleted sample** into a reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes hot!**



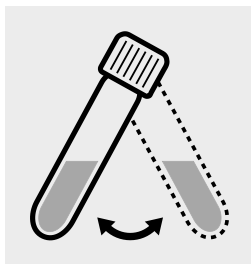
Carefully pipette 3.0 ml of the **depleted blank** into a second reaction cell, close tightly with the screw cap, and mix vigorously. **Caution, the cell becomes hot!**
(Blank cell)



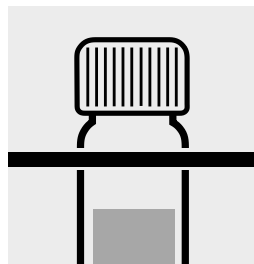
Heat both cells in the thermoreactor at 148 °C for 2 hours.



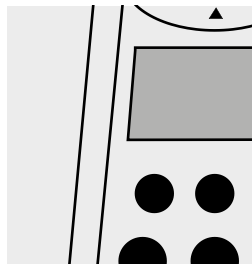
Remove both cells from the thermoreactor and place in a test-tube rack to cool.



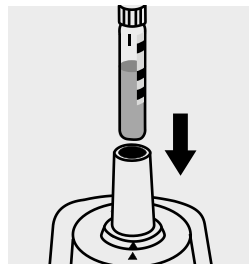
Swirl both cells after 10 minutes.



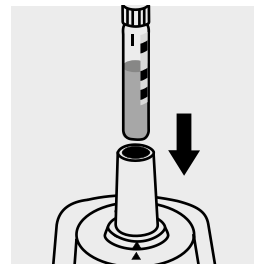
Replace both cells in the rack for complete cooling to room temperature. **(Very important!)**



Select method **571**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a COD/chloride standard solution must be prepared from Potassium hydrogen phthalate, Cat.No. 102400 and Sodium chloride, Cat.No. 106406 (see section "Standard solutions").

Color

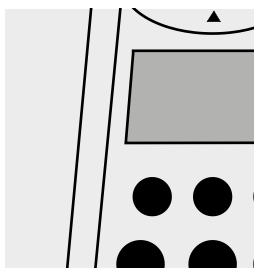
(Platinum-Cobalt Standard Method)

analogous to DIN EN ISO 6271:2015, Water Research Vol. 30, No. 11, 2771-2775, 1996

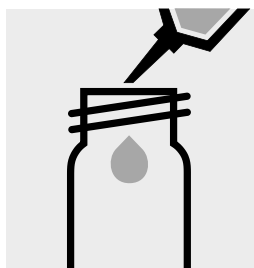
Measuring range: 25 – 1000 mg/l Pt/Co (Hazen)

430 nm

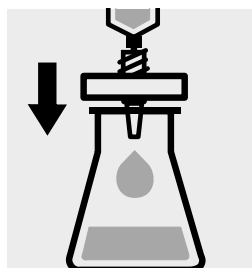
24-mm cell



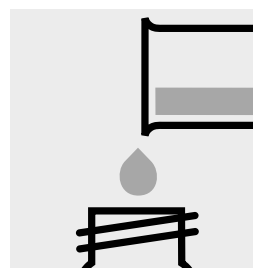
Select method 170.



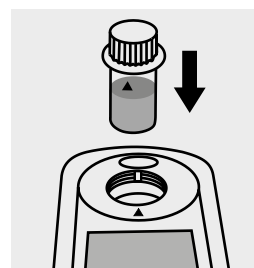
Fill approx. 10 ml of distilled water into a 24-mm cell, close with the screw cap. (Blank cell)



Filter sample solution through a membrane filter with 0.45 µm pore size.



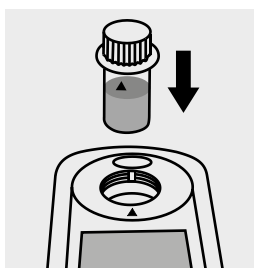
Transfer the solution into a 24-mm cell, close with the screw cap.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.

Notes:

Filtered sample = true color.
Unfiltered sample = apparent color.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (measurement device, handling) ready-to-use Platinum Cobalt Color Reference Solution (Hazen 500) Certipur®, Cat.No. 100246, concentration 500 mg/l Pt, can be used.

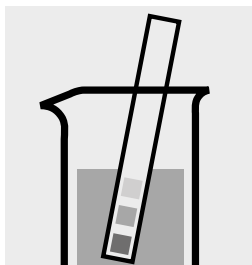
Copper

114553

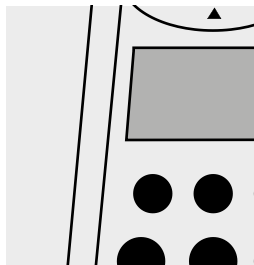
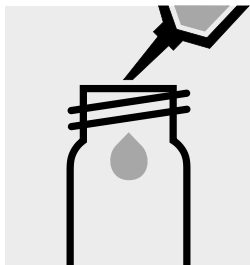
Cell Test

Measuring range: 0.05–8.00 mg/l Cu

16-mm cell



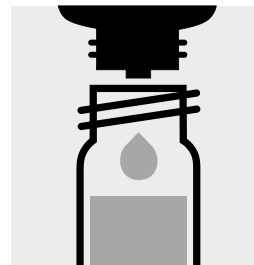
Check the pH of the sample, specified range: pH 4 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.

Select method **180**.

Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



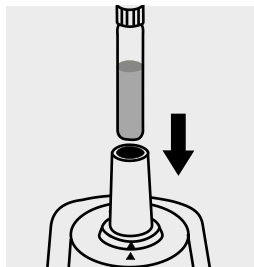
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



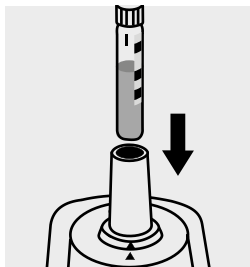
Add 5 drops of **Cu-1K**, close with the screw cap, and mix.



Reaction time:
5 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment.
Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press **Test**.

Important:

Very high copper concentrations in the sample produce turquoise-colored solutions (measurement solution should be blue) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

For the determination of **total copper** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700.

Ready-to-use copper standard solution Certipur®, Cat.No. 119786, concentration 1000 mg/l Cu, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

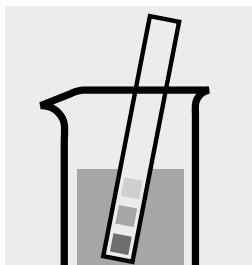
Copper

114767

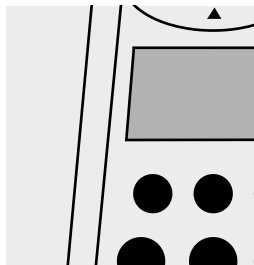
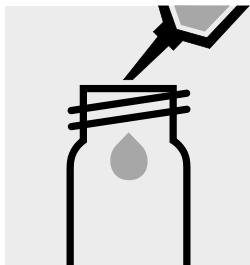
Test

Measuring range: 0.10 – 6.00 mg/l Cu

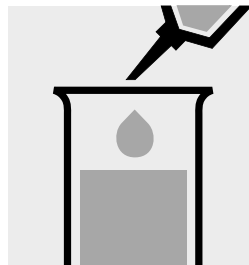
16-mm cell



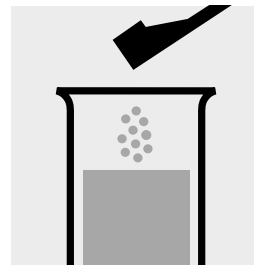
Check the pH of the sample, specified range: pH 4 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.

Select method **181**.

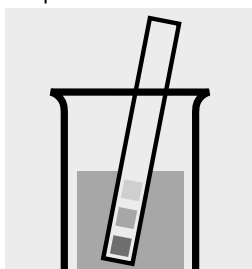
Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 5.0 ml of the sample into a test tube.



Add 1 green dosing spoon of **Cu-1** and dissolve the solid substance.



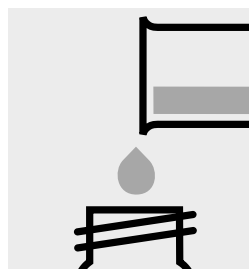
Check the pH of the sample, specified range: pH 7.0 – 9.5.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



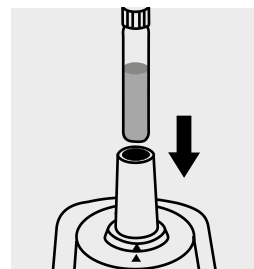
Add 5 drops of **Cu-2** and mix.



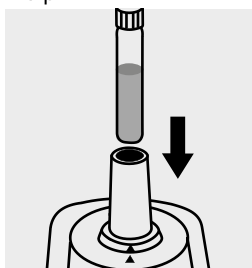
Reaction time: 5 minutes
Press **Start** to start the countdown.



Transfer the solution into a 16-mm cell, close with the screw cap.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high copper concentrations in the sample produce turquoise-colored solutions (measurement solution should be blue) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

For the determination of **total copper** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700.

Ready-to-use copper standard solution Certipur®, Cat.No. 119786, concentration 1000 mg/l Cu, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Cyanide

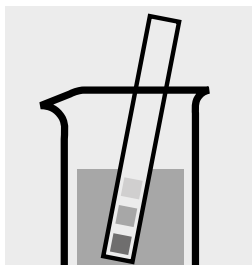
102531

Determination of free cyanide

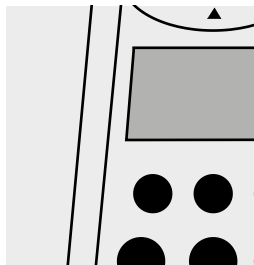
Cell Test

Measuring range: 10 – 350 µg/l CN

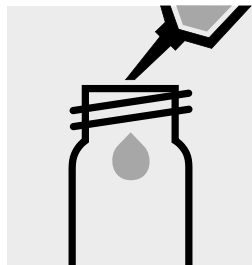
16-mm cell



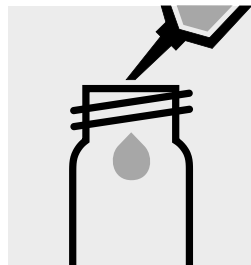
Check the pH of the sample, specified range: pH 4.5 – 8.0. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①⑨②.



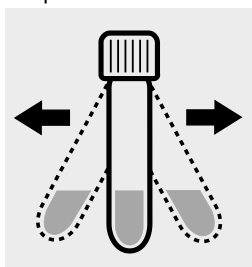
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



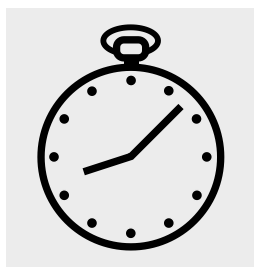
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and dissolve the solid substance.



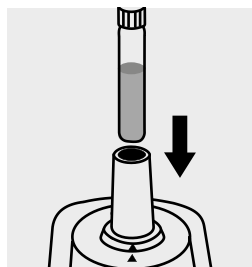
Add 1 level blue micro-spoon of **CN-1K**, close with the screw cap.



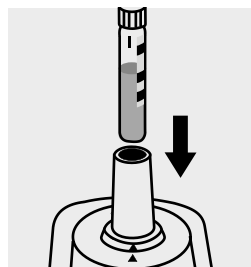
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use cyanide standard solution Certipur®, Cat.No. 119533, concentration 1000 mg/l CN⁻, can be used after diluting accordingly. The measurement results are expressed in µg/l.

Cyanide

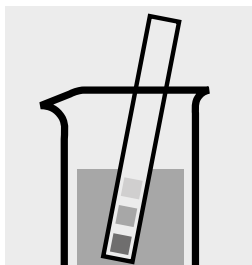
114561

Determination of free cyanide

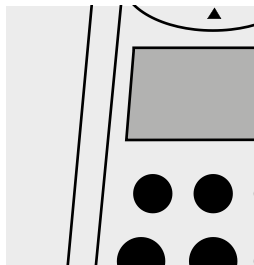
Cell Test

Measuring range: 10 – 350 µg/l CN

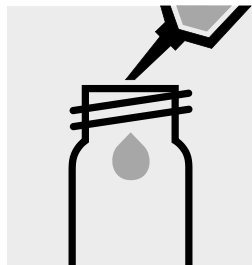
16-mm cell



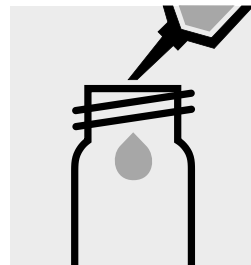
Check the pH of the sample, specified range: pH 4.5 – 8.0. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **190**.



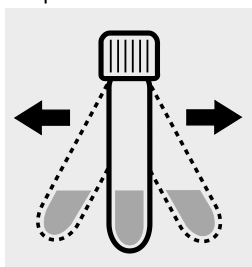
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



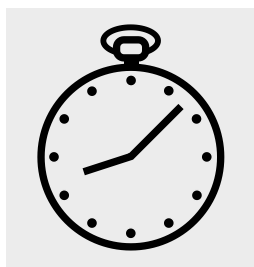
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and dissolve the solid substance.



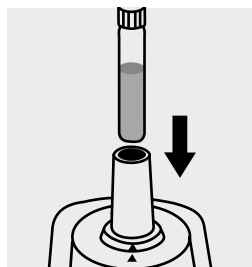
Add 1 level blue micro-spoon of **CN-3K**, close with the screw cap.



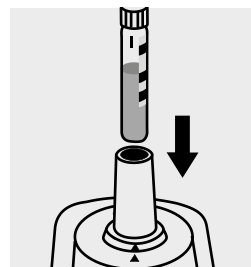
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use cyanide standard solution Certipur®, Cat.No. 119533, concentration 1000 mg/l CN⁻, can be used after diluting accordingly. The measurement results are expressed in µg/l.

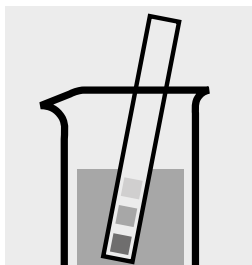
Cyanide

114561

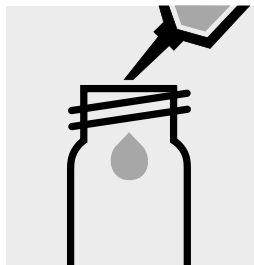
Determination of readily liberated cyanide

Cell Test**Measuring range:** 10 – 350 µg/l CN

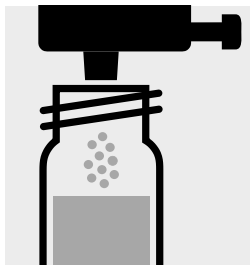
16-mm cell



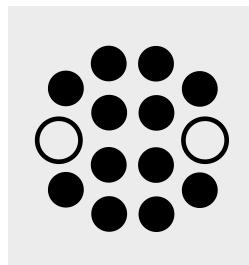
Check the pH of the sample, specified range: pH 4.5 – 8.0. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



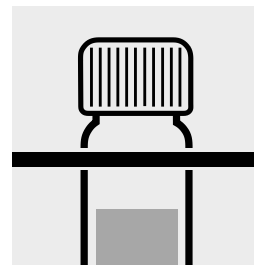
Pipette 10 ml of the sample into an empty 16-mm cell.



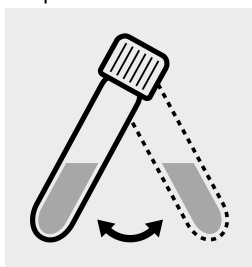
Add 1 dose of **CN-1K** using the green dose-metering cap, close with the screw cap.



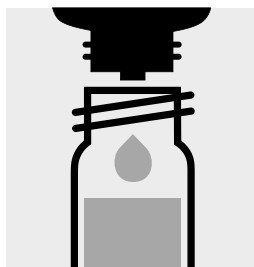
Heat the cell in the thermoreactor at 120 °C (100 °C) for 30 minutes.



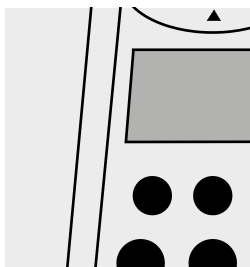
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



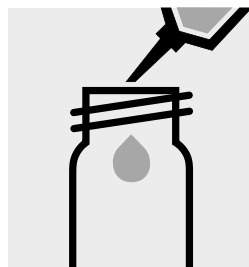
Swirl the cell before opening.



Add 3 drops of **CN-2K**, close with the screw cap, and mix: **pretreated sample**.



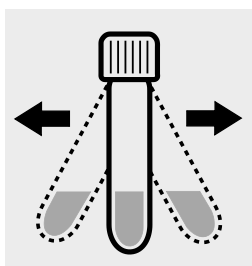
Select method ①⑨①①.



Pipette 5.0 ml of the **pretreated sample** into a reaction cell, close with the screw cap, and dissolve the solid substance.



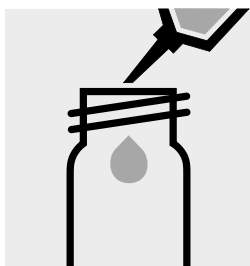
Add 1 level blue micro-spoon of **CN-3K**, close with the screw cap.



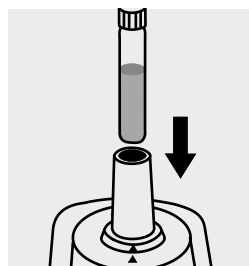
Shake the cell vigorously to dissolve the solid substance.



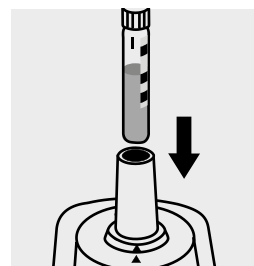
Reaction time: 10 minutes
Press (←) to start the countdown.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use cyanide standard solution Certipur®, Cat.No. 119533, concentration 1000 mg/l CN⁻, can be used after diluting accordingly. The measurement results are expressed in µg/l.

Cyanide

109701

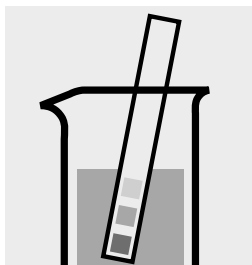
Determination of free cyanide

Test

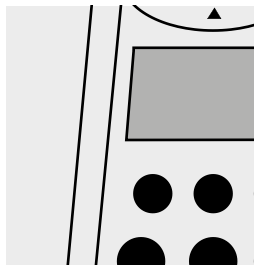
Measuring range: 5–200 µg/l CN

24-mm cell

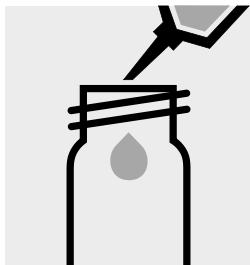
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



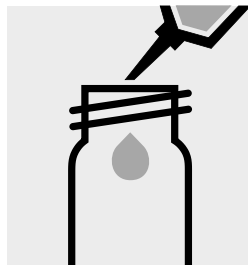
Check the pH of the sample, specified range: pH 4.5 – 8.0. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ①⑨①.



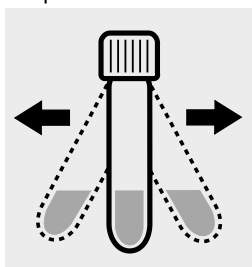
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Pipette 10 ml of the sample into a 24-mm cell.



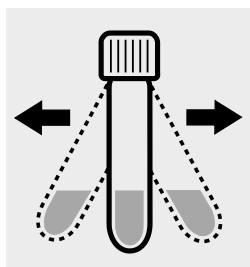
Add 2 level green microspoons of **CN-3**, close with the screw cap.



Shake the cell vigorously to dissolve the solid substance.



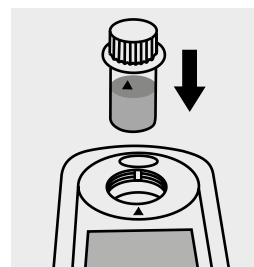
Add 2 level blue microspoons of **CN-4**, close with the screw cap.



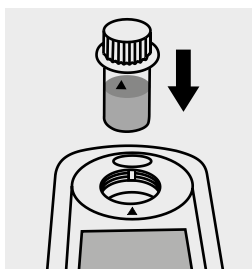
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 10 minutes
Press  to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use cyanide standard solution Certipur®, Cat.No. 119533, concentration 1000 mg/l CN⁻, can be used after diluting accordingly. The measurement results are expressed in µg/l.

Cyanide

109701

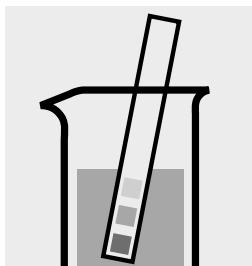
Determination of readily liberated cyanide

Test

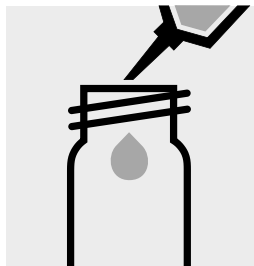
Measuring range: 5–200 µg/l CN

24-mm cell

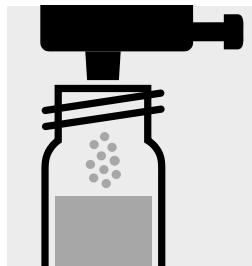
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



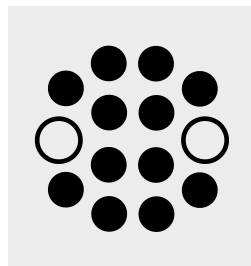
Check the pH of the sample, specified range: pH 4.5 – 8.0. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



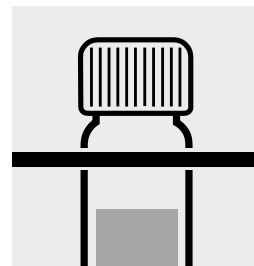
Pipette 10 ml of the sample into a 16-mm cell.



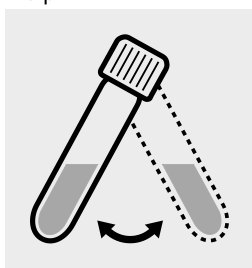
Add 1 dose of **CN-1** using the green dose-metering cap, close with the screw cap.



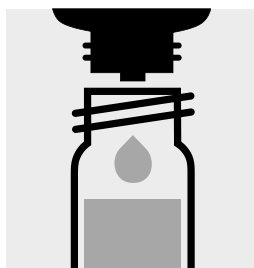
Heat the cell in the thermoreactor at 120 °C (100 °C) for 30 minutes.



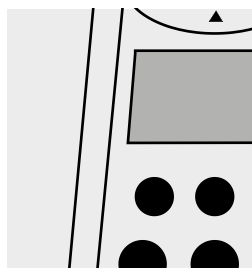
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



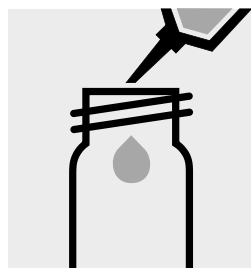
Swirl the cell before opening.



Add 3 drops of **CN-2K**, close with the screw cap, and mix: **pretreated sample**.



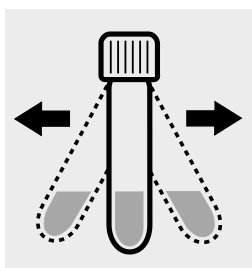
Select method ①⑨①.



Transfer the **pretreated sample** into a 24-mm cell.



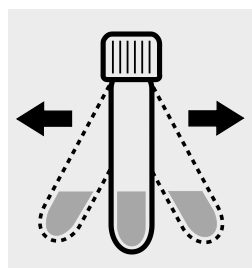
Add 2 level green microspoons of **CN-3**, close with the screw cap.



Shake the cell vigorously to dissolve the solid substance.



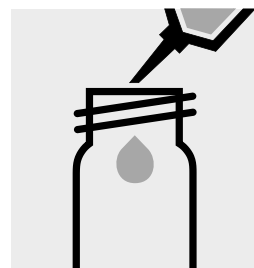
Add 2 level blue microspoons of **CN-4**, close with the screw cap.



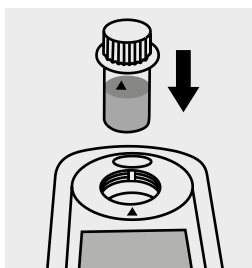
Shake the cell vigorously to dissolve the solid substance.



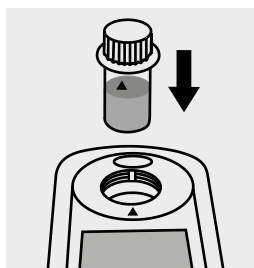
Reaction time: 10 minutes
Press (←) to start the countdown.



Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

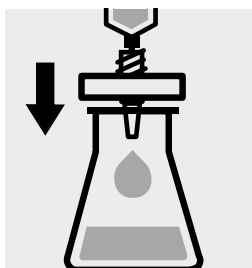
To check the measurement system (test reagents, measurement device, and handling) ready-to-use cyanide standard solution Certipur®, Cat.No. 119533, concentration 1000 mg/l CN⁻, can be used after diluting accordingly. The measurement results are expressed in µg/l.

Cyanuric Acid

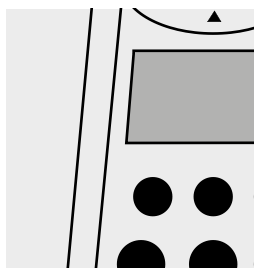
119253

Test

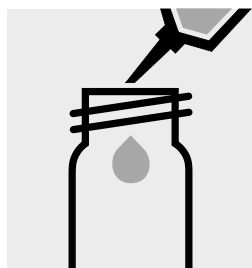
Measuring range: 2 – 160 mg/l cyanuric acid 24-mm cell



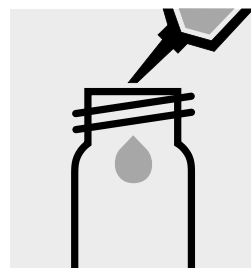
Filter turbid samples.



Select method (2)(0)(1).



Pipette **5.0 ml of distilled water** (Water for analysis EMSURE®, Cat.No. 116754, is recommended) + **5.0 ml of the sample** into a 24-mm cell (**do not add any reagents!**), close with the screw cap, and mix. (Blank cell)



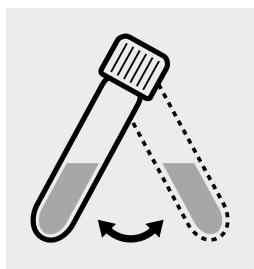
Pipette 5.0 ml of the sample into a 24-mm cell.



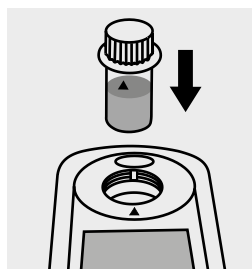
Add **5.0 ml of distilled water** (Water for analysis EMSURE®, Cat.No. 116754, is recommended) with pipette, close with the screw cap, and mix.



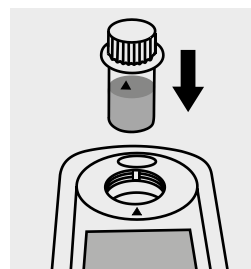
Add 1 reagent tablet **Cyanuric Acid**, crush with stirring rod, and close with the screw cap.



Swirl the cell to dissolve the solid substance.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a cyanuric acid standard solution must be prepared from Cyanuric acid, Cat.No. 820358 (see section "Standard solutions").

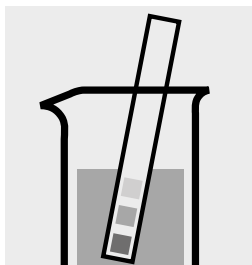
Fluoride

114557

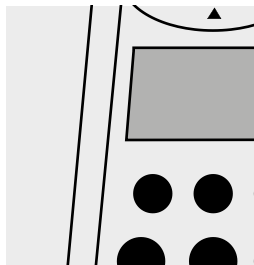
Cell Test

Measuring range: 0.10 – 1.50 mg/l F

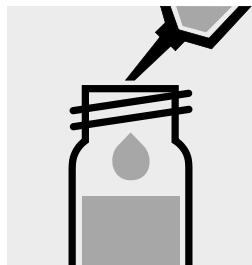
16-mm cell



Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 220.



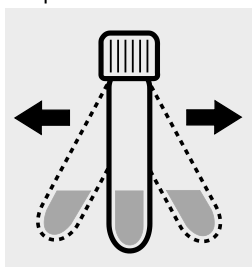
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



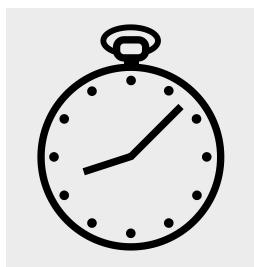
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



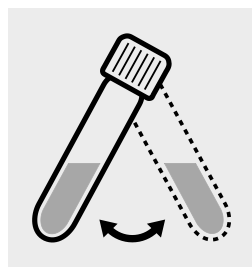
Add to each cell 1 dose of **F-1K** using the blue dose-metering cap, close with the screw cap.



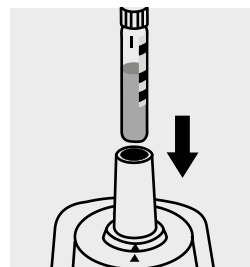
Shake both cells vigorously to dissolve the solid substance.



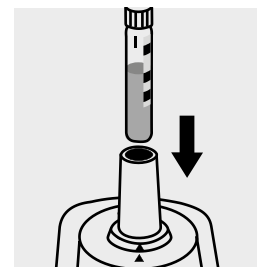
Reaction time: 5 minutes.
Press to start the countdown.



Swirl both cells before measurement.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high fluoride concentrations in the sample produce brown-colored solutions (measurement solution should be violet) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly.

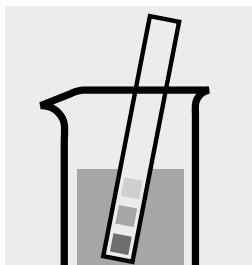
Fluoride

100809

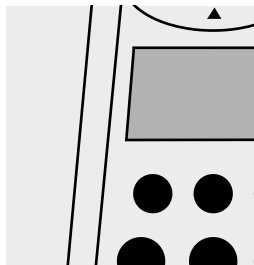
Cell Test

Measuring range: 0.10 – 1.80 mg/l F

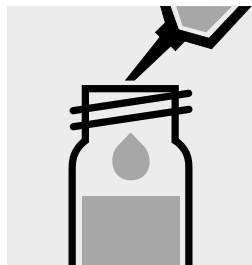
16-mm cell



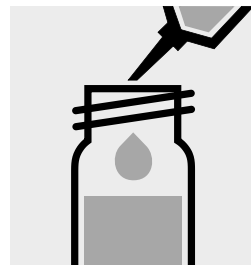
Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (2)(2)(2).



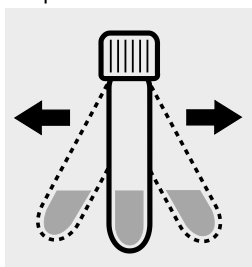
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



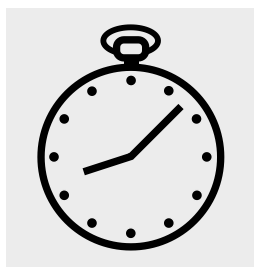
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



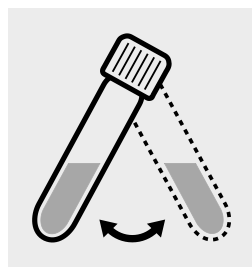
Add to each cell 1 level blue microspoon of **F-1K**, close with the screw cap.



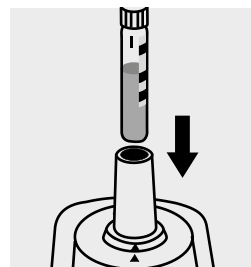
Shake both cells vigorously to dissolve the solid substance.



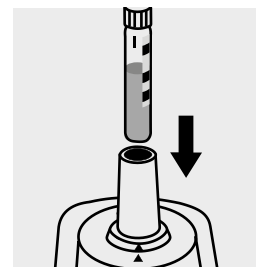
Reaction time: 15 minutes
Press (←) to start the countdown.



Swirl both cells before measurement.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

Very high fluoride concentrations in the sample produce brown-colored solutions (measurement solution should be violet) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132233, 132234, 132235 and 132236.

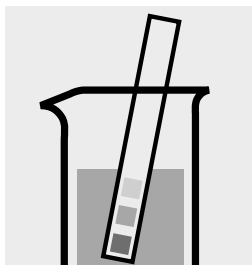
Fluoride

117243

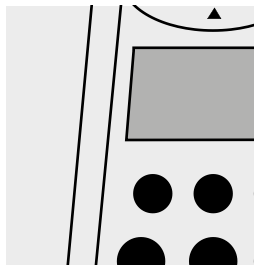
Cell Test

Measuring range: 0.10–2.50 mg/l F

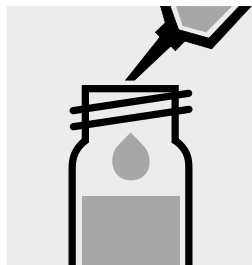
16-mm cell



Check the pH of the sample, specified range: pH 2 – 12.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method **225**.



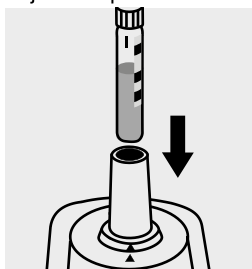
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



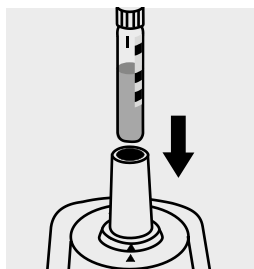
Pipette 5.0 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) into a second reaction cell, close with the screw cap, and mix. (Blank cell)



Reaction time:
1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132233, 132234, 132235 and 132236.

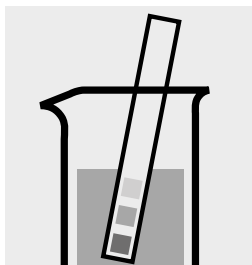
Fluoride

114598

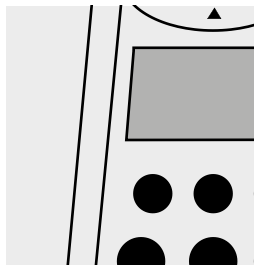
Test

Measuring range: 0.10 – 2.00 mg/l F

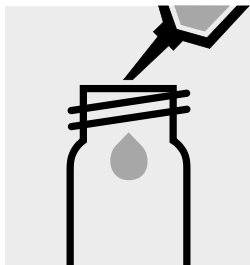
16-mm cell



Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ②②①.



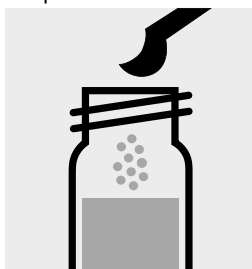
Pipette 2.0 ml each of **F-1** into two 16-mm cells.



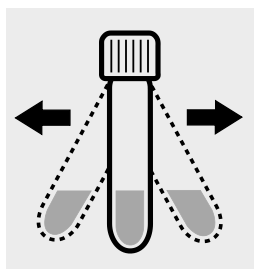
Add to one cell 5.0 ml of the sample with pipette, close with the screw cap, and mix.



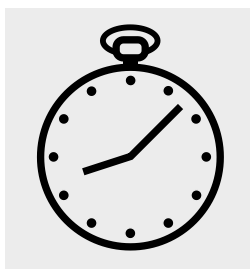
Add to the second cell 5.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



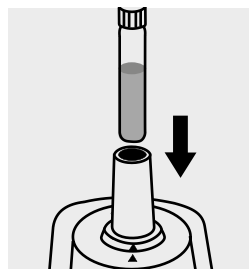
Add to each cell 1 level blue microspoon of **F-2**, close with the screw cap.



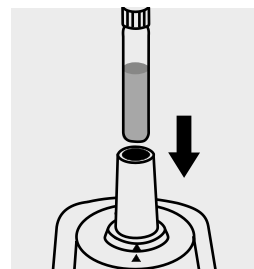
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

Very high fluoride concentrations in the sample produce brown-colored solutions (measurement solution should be violet) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132233, 132234, 132235 and 132236.

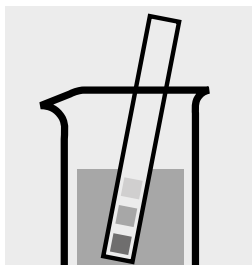
Fluoride

100822

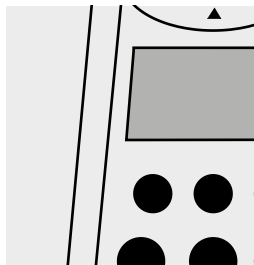
Test

Measuring range: 0.08 – 2.00 mg/l F

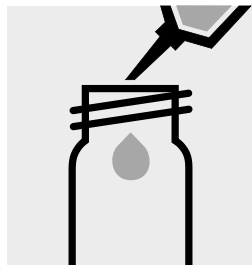
24-mm cell



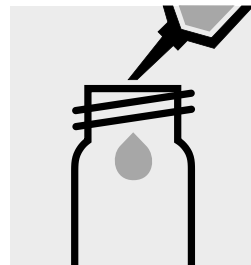
Check the pH of the sample, specified range: pH 1 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **223**.



Pipette 10 ml of the sample into a 24-mm cell.



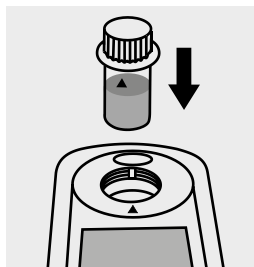
Pipette 10 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) into a second 24-mm cell.
(Blank cell)



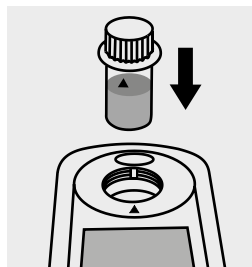
Add to each cell 2.0 ml of **F-1** with pipette, close with the screw cap, and mix.



Reaction time:
1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132233, 132234, 132235 and 132236.

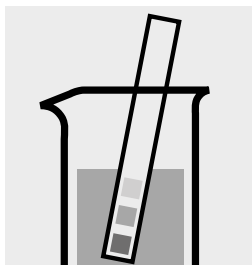
Fluoride

117236

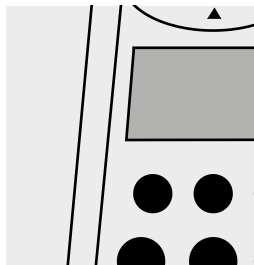
Test

Measuring range: 0.05 – 1.50 mg/l F

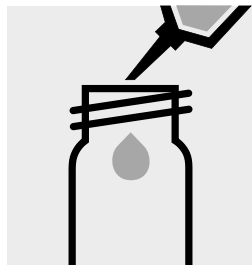
24-mm cell



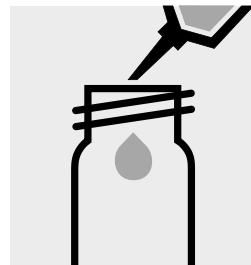
Check the pH of the sample, specified range: pH 2 – 12.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method **224**.



Pipette 10 ml of the sample into a 24-mm cell.



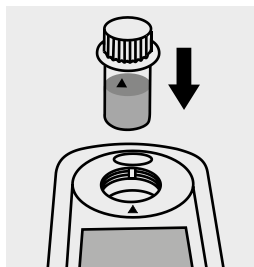
Pipette 10 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) into a second 24-mm cell.
(Blank cell)



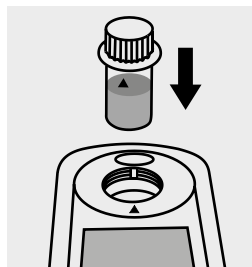
Add to each cell 2.0 ml of **F-1** with pipette, close with the screw cap, and mix.



Reaction time:
1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

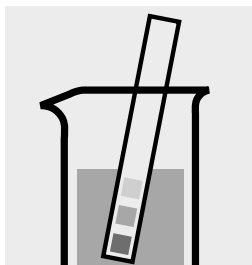
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use fluoride standard solution Certipur®, Cat.No. 119814, concentration 1000 mg/l F⁻, can be used after diluting accordingly or also the Standard solutions for photometric applications, CRM, Cat.Nos. 132233, 132234, 132235 and 132236.

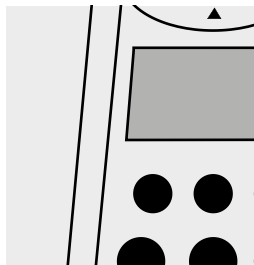
Hydrazine

109711

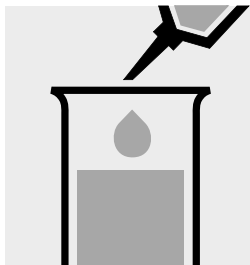
Test

Measuring range: 10– 1200 µg/l N₂H₄ 24-mm cell**Attention:** In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.

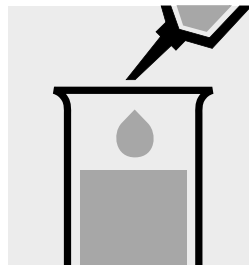
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



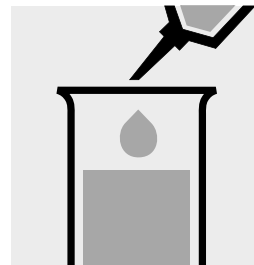
Select method (2)(3)(0).



Pipette 10 ml of the sample into a test tube.



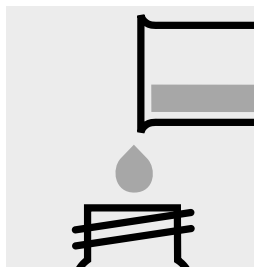
Pipette 10 ml of distilled water into a second test tube.
(Blank)



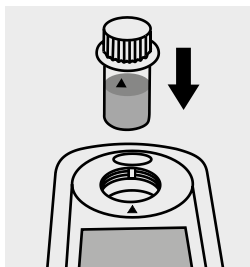
Add to each test tube 4.0 ml of **Hy-1** with pipette and mix.



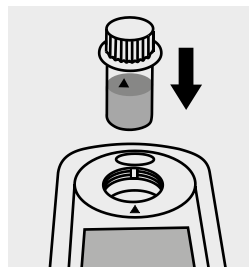
Reaction time:
5 minutes
Press (←) to start the countdown.



Transfer each solution into a separate 24-mm cell, close with the screw caps.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

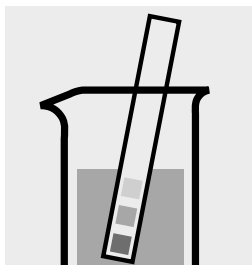
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a hydrazine standard solution must be prepared from Hydrazinium sulfate GR, Cat.No. 104603 (see section “Standard solutions”). The measurement results are expressed in µg/l.

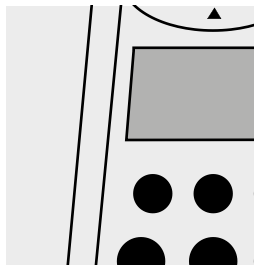
Hydrogenperoxide

118789

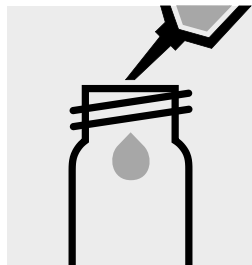
Test

Measuring range: 0.02 – 5.50 mg/l H_2O_2 16-mm cell

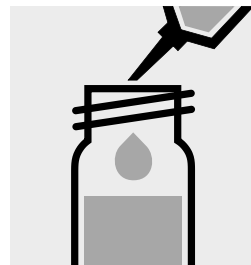
Check the pH of the sample, specified range: pH 4 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **560**.



Pipette 0.50 ml each of **H₂O₂-1** into two 16-mm cells.



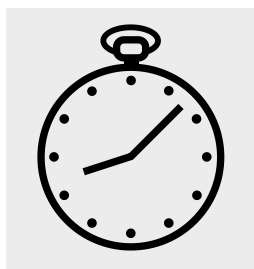
Add to one cell 8.0 ml of the sample with pipette, close with the screw cap, and mix.



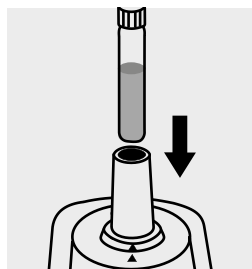
Add to the second cell 8.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



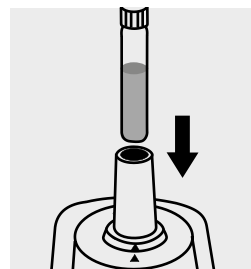
Add to each cell 0.50 ml of **H₂O₂-2** with pipette, close with the screw cap, and mix.



Reaction time: 10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a hydrogenperoxide standard solution must be prepared from Perhydrol® 30 % H_2O_2 GR, Cat.No. 107209 (see section "Standard solutions").

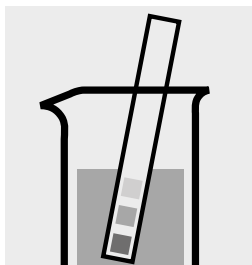
Iodine

100606

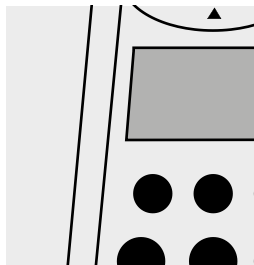
Test

Measuring range: 0.10–5.00 mg/I₂

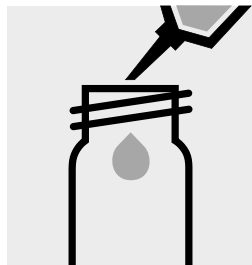
24-mm cell



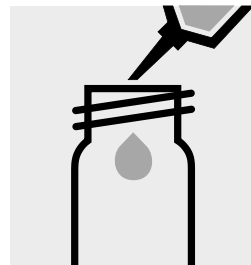
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **240**.



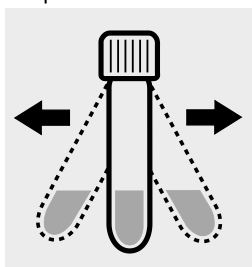
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



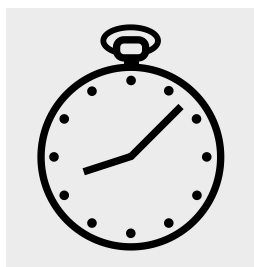
Pipette 10 ml of the sample into a 24-mm cell.



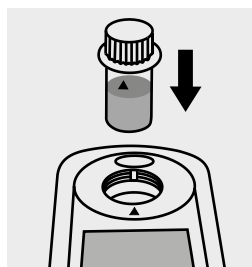
Add 1 level blue micro-spoon of **I₂-2**, close with the screw cap.



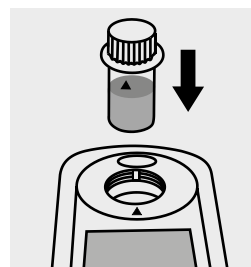
Shake the cell vigorously to dissolve the solid substance.



Reaction time:
1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high iodine concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

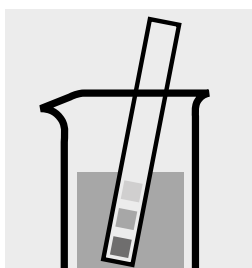
Iron

114549

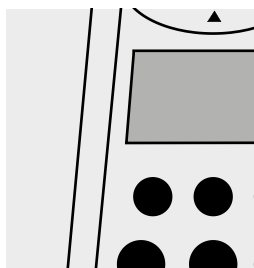
Cell Test

Measuring range: 0.05 – 4.00 mg/l Fe

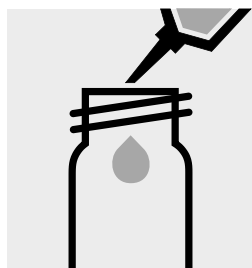
16-mm cell



Check the pH of the sample, specified range: pH 1 – 10. If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



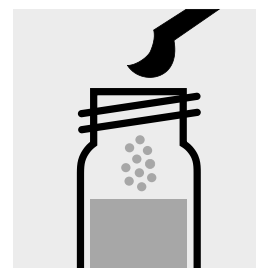
Select method **250**.



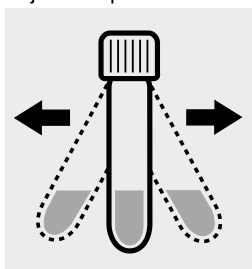
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



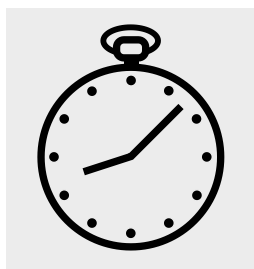
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



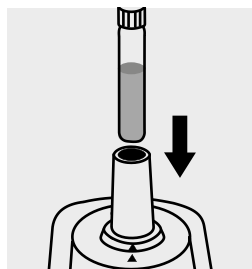
Add 1 level blue micro-spoon of **Fe-1K**, close with the screw cap.



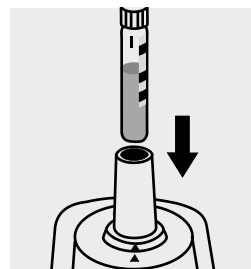
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 3 minutes. Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total iron** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or also the Standard solutions for photometric applications, CRM, Cat.Nos. 133018, 133019 and 133020.

Ready-to-use iron standard solution Certipur®, Cat.No. 119781, concentration 1000 mg/l Fe, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Iron

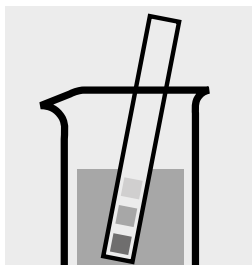
114761

Test

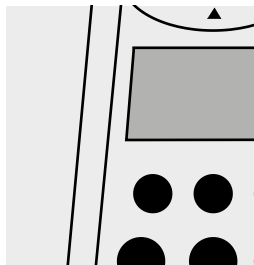
Measuring range: 0.01–2.00 mg/l Fe

24-mm cell

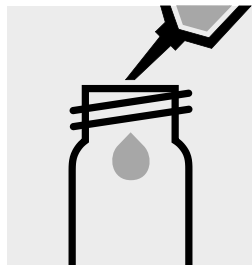
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



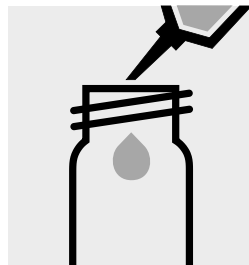
Check the pH of the sample, specified range: pH 1 – 10. If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



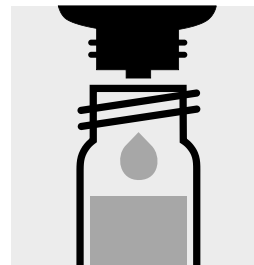
Select method (2)(5)(1).



Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



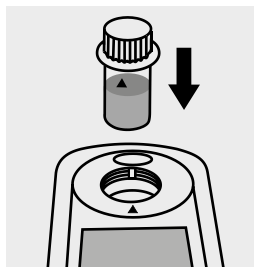
Pipette 10 ml of the sample into a 24-mm cell.



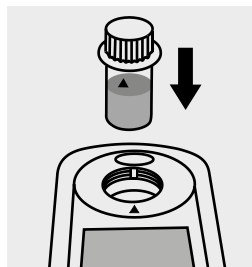
Add 6 drops of **Fe-1**, close with the screw cap, and mix.



Reaction time: 3 minutes. Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

For the determination of **total iron** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or also the Standard solutions for photometric applications, CRM, Cat.Nos. 133014, 133018, 133019 and 133020.

Ready-to-use iron standard solution Certipur®, Cat.No. 119781, concentration 1000 mg/l Fe, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Iron

100796

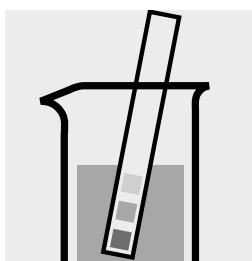
Determination of iron(II) and iron(III)

Test

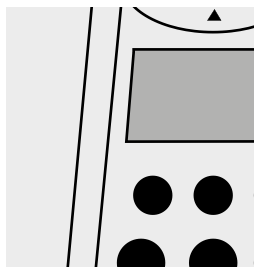
Measuring range: 0.10–5.00 mg/l Fe

16-mm cell

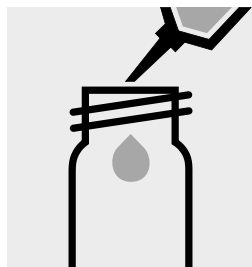
Determination of iron(II)



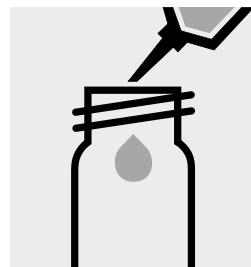
Check the pH of the sample, specified range: pH 2 – 8.
If required, add dilute sodium hydroxide solution or nitric acid drop by drop to adjust the pH.



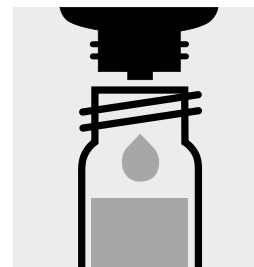
Select method 2(5)2.



Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



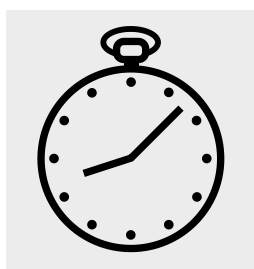
Pipette 8.0 ml of the sample into a 16-mm cell.



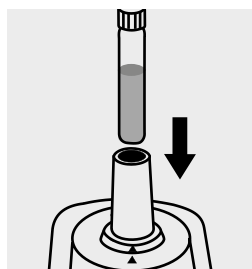
Add 1 drop of **Fe-1**, close with the screw cap, and mix.



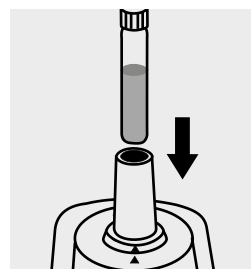
Add 0.50 ml of **Fe-2** with pipette, close with the screw cap, and mix.



Reaction time: 5 minutes
Press to start the countdown.



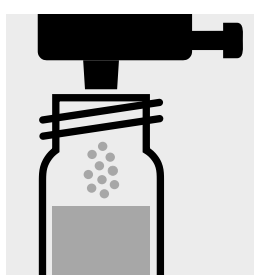
Insert the blank cell into the cell compartment. Press **(Zero)**.



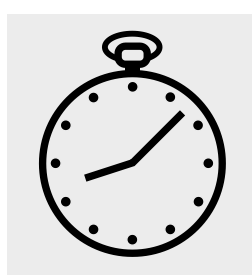
Insert the cell containing the sample into the cell compartment. Press **(Test)**.

Determination of iron(II) + (III)

Same preparation as described above. After adding of **Fe-2** continue with **Fe-3**.



Add 1 dose of **Fe-3** using the blue dose-metering cap, close with the screw cap, and dissolve the solid substance.



Reaction time: 10 minutes, then measure.

Calculation of iron(III)

$$\begin{aligned} &\text{Result B (Fe II+III)} \\ &- \text{Result A (Fe II)} \\ &= \text{mg/l Fe(III)} \end{aligned}$$

Important:

For the determination of **total iron** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or also the Standard solutions for photometric applications, CRM, Cat.Nos. 133018, 133019 and 133020.

Ready-to-use iron standard solution Certipur®, Cat.No. 119781, concentration 1000 mg/l Fe(III), can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Lead

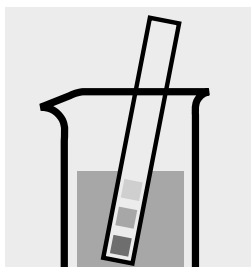
114833

Cell Test

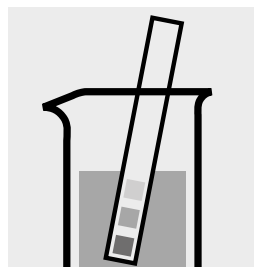
Measuring range: 0.10–5.00 mg/l Pb

16-mm cell

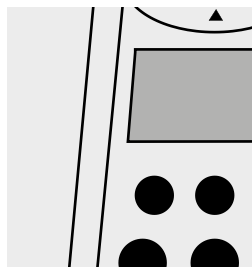
Samples of total hardness 0–10°d



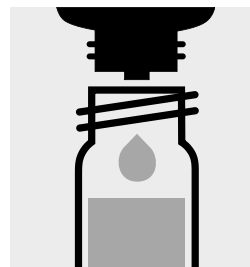
Check the total hardness of the sample



Check the pH of the sample, specified range: pH 3 – 6.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method (2)(6)(0).



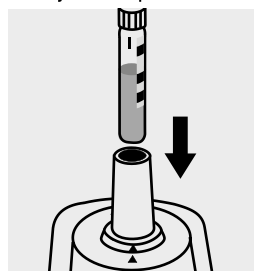
Add 5 drops each of **Pb-1K** into two reaction cells, close with the screw cap, and mix.



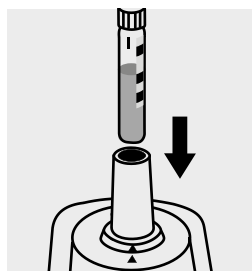
Add to one cell 5.0 ml of the sample with pipette, close with the screw cap, and mix.



Add to the second cell 5.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



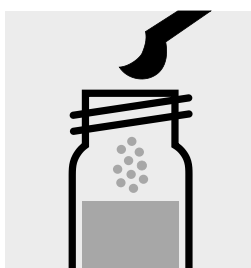
Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



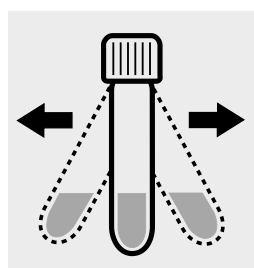
Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

= Result A

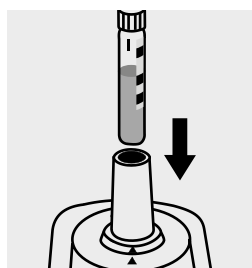
Samples of total hardness > 10°d



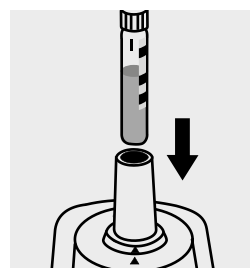
Add 1 level grey microspoon each of **Pb-2K** to the already measured cells, close with the screw cap.



Shake both cells vigorously to dissolve the solid substance.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

= Result B

Result A
– Result B
= mg/l Pb

Important:

For the determination of **total lead** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 40 and 100, Cat.Nos. 114692 and 118701.

Ready-to-use lead standard solution Certipur®, Cat.No. 119776, concentration 1000 mg/l Pb, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

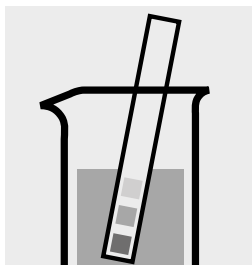
Lead

109717

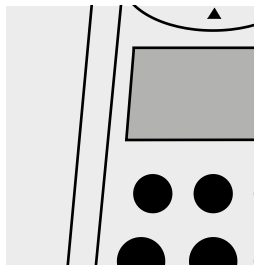
Test

Measuring range: 0.05 – 5.00 mg/l Pb

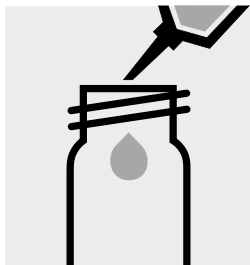
24-mm cell



Check the pH of the sample, specified range: pH 3 – 6.
If required, add dilute ammonia solution or nitric acid drop by drop to adjust the pH.



Select method (2)(6)(1).



Pipette 0.50 ml each of **Pb-1** into two 24-mm cells.



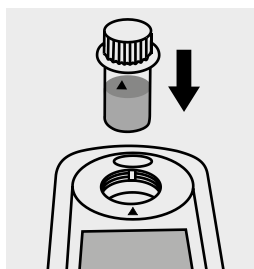
Add to each cell 0.50 ml **Pb-2** with pipette, close with the screw cap, and mix.



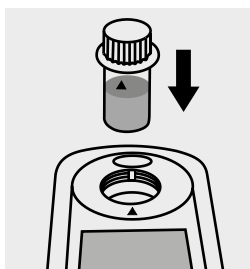
Add to one cell 8.0 ml of the sample with pipette, close with the screw cap, and mix.



Add to the second cell 8.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

For the determination of **total lead** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 40 and 100, Cat.Nos. 114692 and 118701, or the Standard solution for photometric applications, CRM, Cat.No. 133002.

Ready-to-use lead standard solution Certipur®, Cat.No. 119776, concentration 1000 mg/l Pb, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

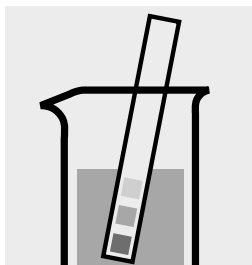
Magnesium

100815

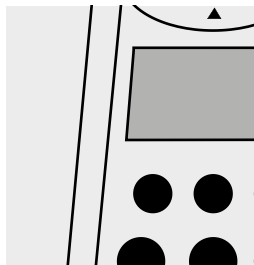
Cell Test

Measuring range: 5.0–75.0 mg/l Mg

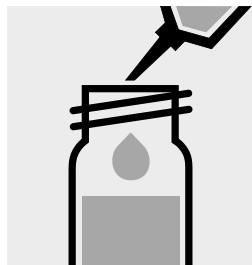
16-mm cell



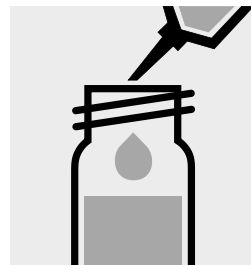
Check the pH of the sample, specified range: pH 3 – 9.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method (2)(7)(0).



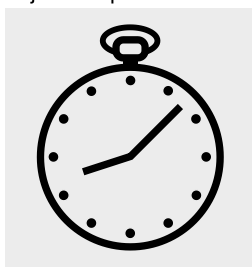
Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



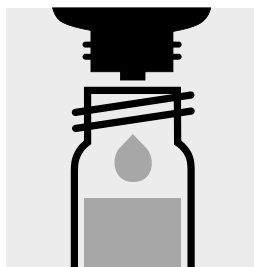
Pipette 1.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



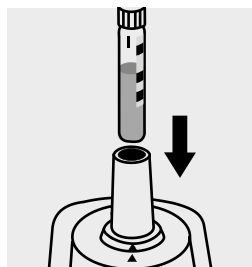
Add to each cell 1.0 ml of **Mg-1K** with pipette, close with the screw cap, and mix.



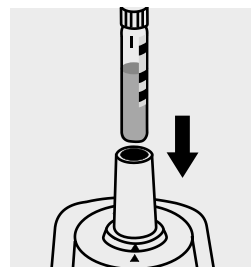
Reaction time:
exactly 3 minutes
Press (←) to start the countdown.



Add to each cell 3 drops of **Mg-2K**, close with the screw cap, and mix.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

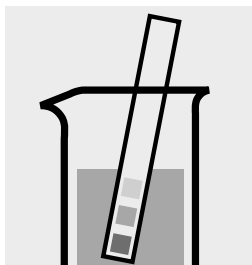
Manganese

100816

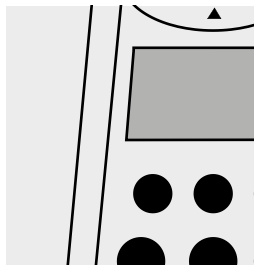
Cell Test

Measuring range: 0.10–5.00 mg/l Mn

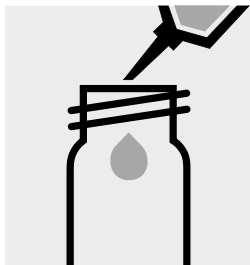
16-mm cell



Check the pH of the sample, specified range: pH 2 – 7.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



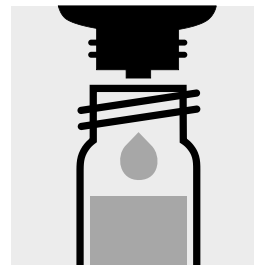
Select method 280.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



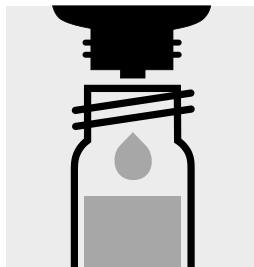
Pipette 7.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



Add 2 drops of **Mn-1K**, close with the screw cap, and mix.



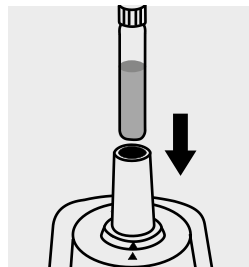
Reaction time: 2 minutes
Press to start the countdown.



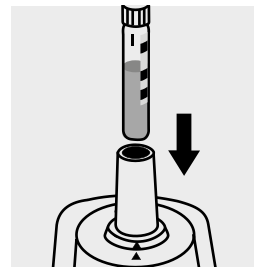
Add 3 drops of **Mn-2K**, close with the screw cap, and mix.



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press .



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press .

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132238 and 132239.

Ready-to-use manganese standard solution Certipur®, Cat.No. 119789, concentration 1000 mg/l Mn, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

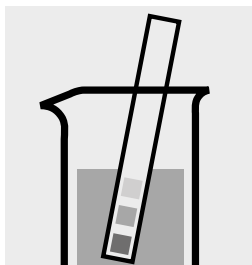
Manganese

101739

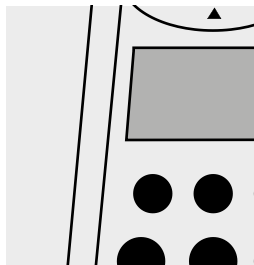
Test

Measuring range: 0.05–1.80 mg/l Mn

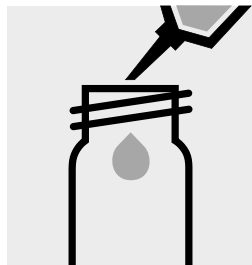
24-mm cell



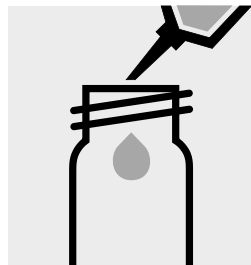
Check the pH of the sample, specified range: pH 3 – 10. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ②⑧①.



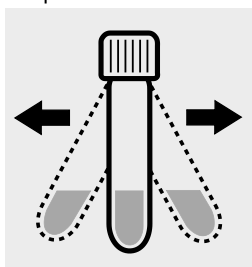
Pipette 8.0 ml of the sample into a 24-mm cell.



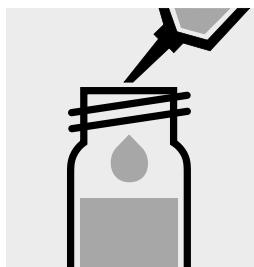
Pipette 8.0 ml of distilled water into a second 24-mm cell. (Blank cell)



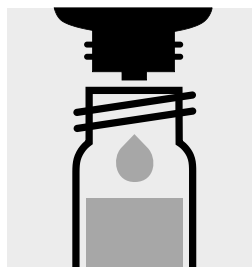
Add to each cell 1 level grey microspoon of **Mn-1**, close with the screw cap.



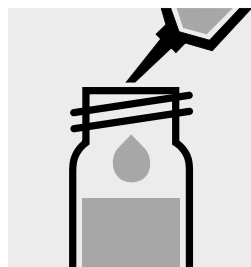
Shake both cells vigorously to dissolve the solid substance.



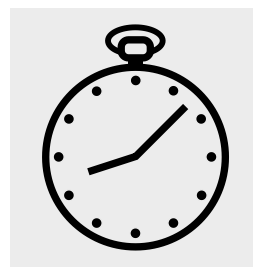
Add to each cell 2.0 ml of **Mn-2** with pipette, close with the screw cap, and mix.



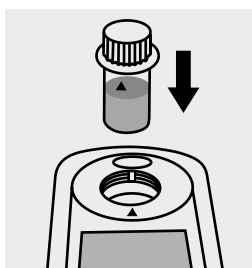
Add to each cell 3 drops of **Mn-3**, close with the screw cap, and mix.



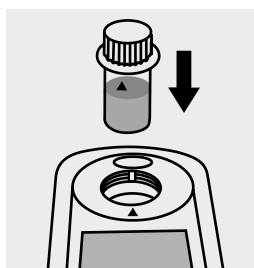
Add **swiftly** to each cell 0.25 ml of **Mn-4** with pipette, close with the screw cap, and mix **immediately**.



Reaction time: 10 minutes. Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use manganese standard solution Certipur®, Cat.No. 119789, concentration 1000 mg/l Mn, can be used after diluting accordingly.

Manganese

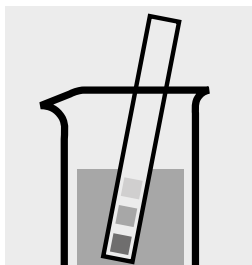
114770

Test

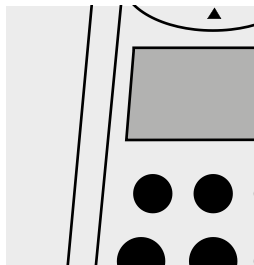
Measuring range: 0.05–6.00 mg/l Mn

24-mm cell

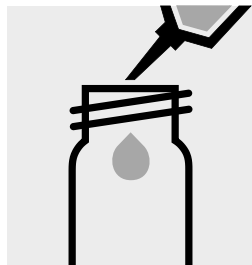
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



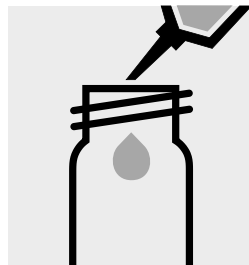
Check the pH of the sample, specified range: pH 2 – 7.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



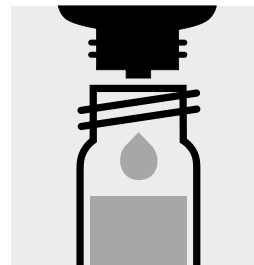
Select method (2)(8)(2).



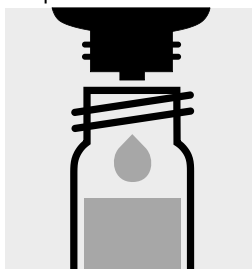
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



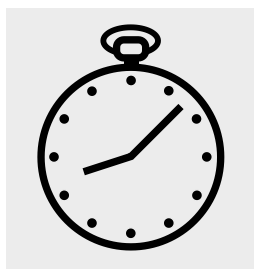
Pipette 10 ml of the sample into a 24-mm cell.



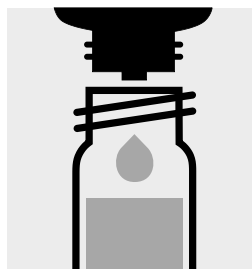
Add 8 drops of **Mn-1**, close with the screw cap, and mix. Check the pH, specified pH: approx. 11.5.



Add 4 drops of **Mn-2**, close with the screw cap, and mix. Check the pH, specified pH: approx. 11.5.



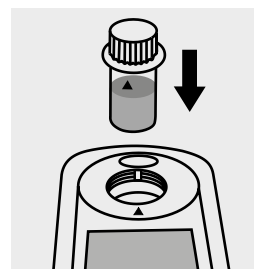
Reaction time: 2 minutes
Press (↶) to start the countdown.



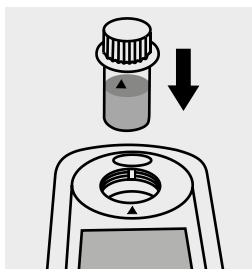
Add 4 drops of **Mn-3**, close with the screw cap, and mix.



Reaction time: 10 minutes
Press (↶) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 30 and 90, Cat.Nos. 114677 and 118700, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132238 and 132239. Use 10 ml R-1 instead of the sample.

Ready-to-use manganese standard solution Certipur®, Cat.No. 119789, concentration 1000 mg/l Mn, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended. Use 10 ml sample + 0.1 ml R-2.

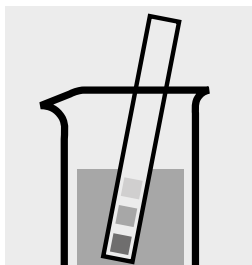
Manganese

101846

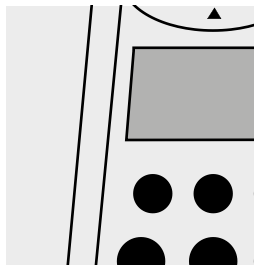
Test

Measuring range: 0.05–1.80 mg/l Mn

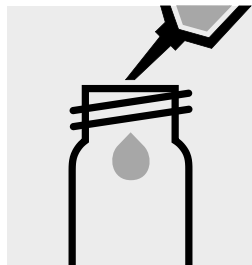
24-mm cell



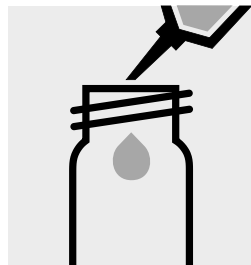
Check the pH of the sample, specified range: pH 3 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ②⑧③.



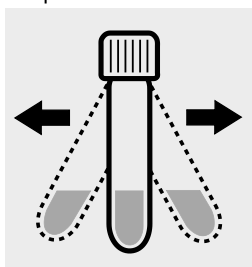
Pipette 8.0 ml of the sample into a 24-mm cell.



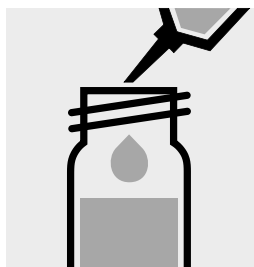
Pipette 8.0 ml of distilled water into a second 24-mm cell.
(Blank cell)



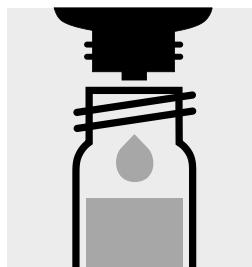
Add to each cell 1 level grey microspoon of **Mn-1**, close with the screw cap.



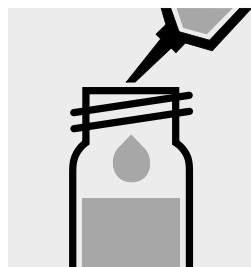
Shake both cells vigorously to dissolve the solid substance.



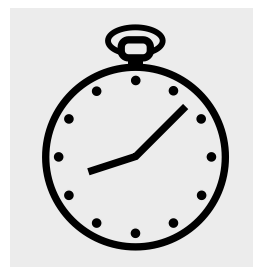
Add to each cell 2.0 ml of **Mn-2** with pipette, close with the screw cap, and mix.



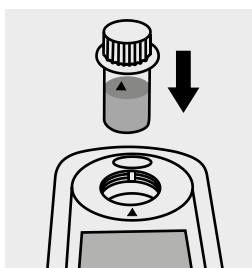
Add **carefully** to each cell 3 drops of **Mn-3**, close with the screw cap, and mix.



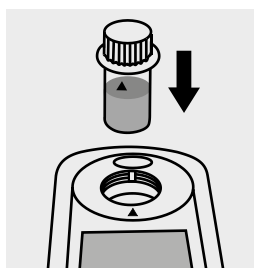
Add to each cell 0.25 ml of **Mn-4** with pipette, close with the screw cap, and mix **carefully** (Foams! Wear eye protection!).



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 90, Cat.No. 118700, or the Standard solutions for photometric applications, CRM, Cat.Nos. 132237, 132238 and 132239.

Ready-to-use manganese standard solution Certipur®, Cat.No. 119789, concentration 1000 mg/l Mn, can also be used after diluting accordingly.

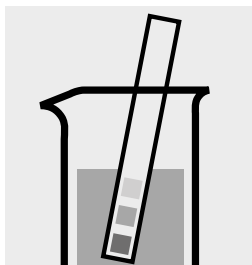
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 90) is highly recommended..

Molybdenum

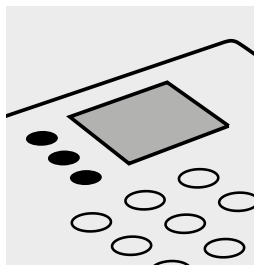
100860

Cell Test

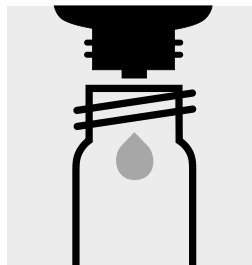
Measuring range: 0.02 – 1.00 mg/l Mo	16-mm cell
0.03 – 1.67 mg/l MoO ₄	16-mm cell
0.04 – 2.15 mg/l Na ₂ MoO ₄	16-mm cell



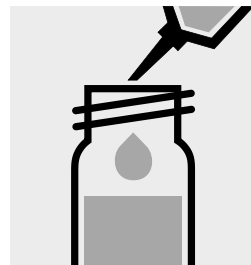
Check the pH of the sample, specified range: pH 1 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (2)(9)(0).



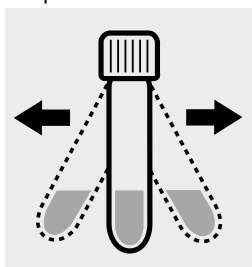
Add 2 drops each of **Mo-1K** to two reaction cells and mix.



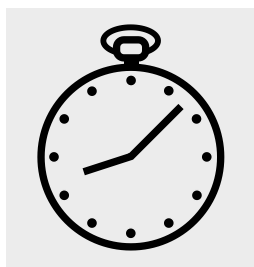
Add to one cell 10 ml of the sample with pipette, close with the screw cap.



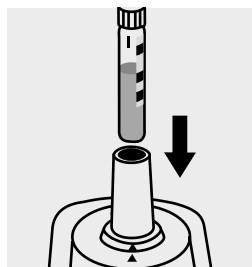
Add to the second cell 10 ml of distilled water with pipette, close with the screw cap. (Blank cell)



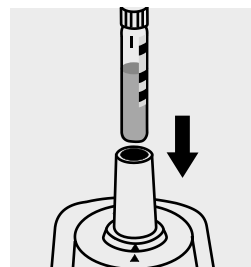
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 2 minutes.
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

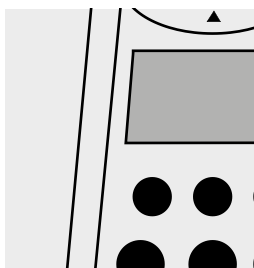
To check the measurement system (test reagents, measurement device, and handling) a ready-to-use molybdenum standard solution Certipur®, Cat.No. 170227, concentration 1000 mg/l Mo, can be used after diluting accordingly.

Molybdenum

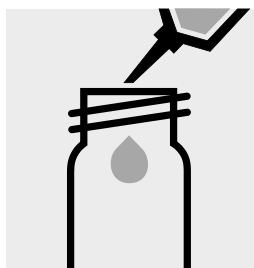
119252

Test

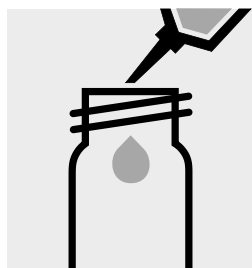
Measuring range: 0.5 – 45.0 mg/l Mo	24-mm cell
0.8 – 75.0 mg/l MoO ₄	24-mm cell
1.1 – 96.6 mg/l Na ₂ MoO ₄	24-mm cell



Select method (2)(9)(1).



Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Pipette 10 ml of the sample into a 24-mm cell.



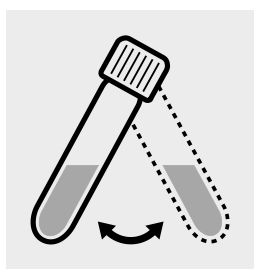
Add 1 powder pack of **Molybdenum HR1**, close with the screw cap, and dissolve the solid substance.



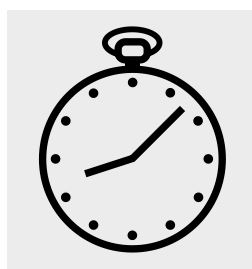
Add 1 powder pack of **Molybdenum HR2**, close with the screw cap, and dissolve the solid substance.



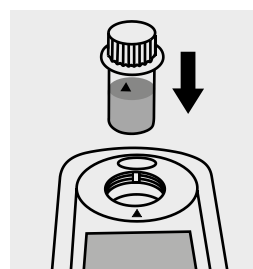
Add 1 powder pack of **Molybdenum HR3** and close with the screw cap.



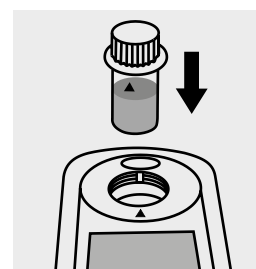
Swirl the cell to dissolve the solid substance.



Reaction time: 5 minutes, **measure immediately**. Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

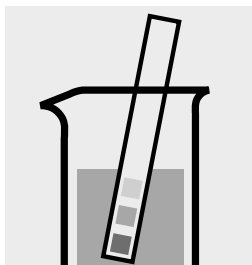
To check the measurement system (test reagents, measurement device, and handling) a ready-to-use molybdenum standard solution Certipur®, Cat.No. 170227, concentration 1000 mg/l Mo, can be used after diluting accordingly.

Monochloramine

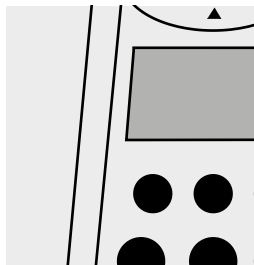
101632

Test

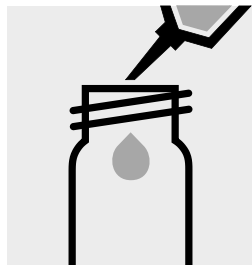
Measuring range: 0.10–5.00 mg/l Cl_2	24-mm cell
0.07–3.63 mg/l NH_2Cl	24-mm cell
0.02–0.99 mg/l $\text{NH}_2\text{Cl-N}$	24-mm cell



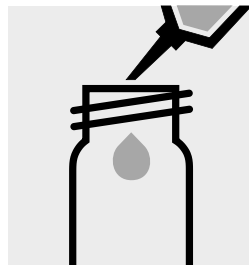
Check the pH of the sample, specified range: pH 4 – 13.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 300.



Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



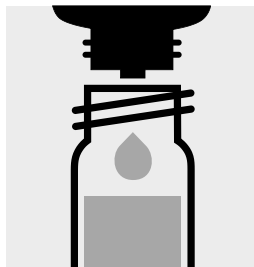
Pipette 10 ml of the sample into a 24-mm cell.



Add 0.60 ml of **MCA-1** with pipette, close with the screw cap, and mix.



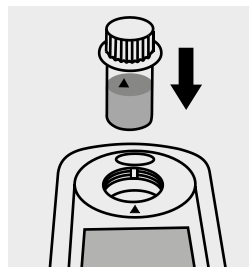
Reaction time:
5 minutes
Press **Enter** to start the countdown.



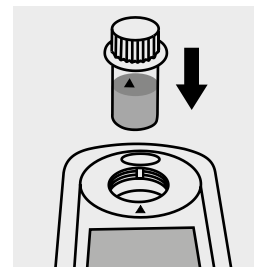
Add 4 drops of **MCA-2**, close with the screw cap, and mix.



Reaction time:
10 minutes
Press **Enter** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high monochloramine concentrations in the sample produce turquoise-colored solutions (measurement solution should be yellow-green to green) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a standard solution must be prepared (see section “Standard solutions”).

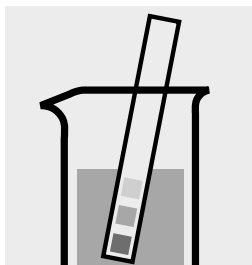
Nickel

114554

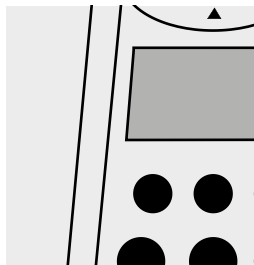
Cell Test

Measuring range: 0.10–6.00 mg/l Ni

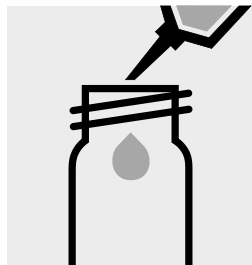
16-mm cell



Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ③①①①.



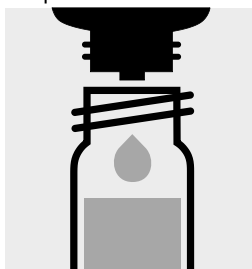
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



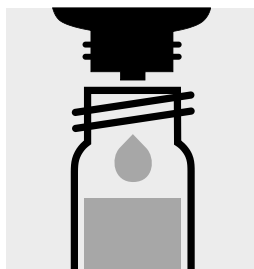
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



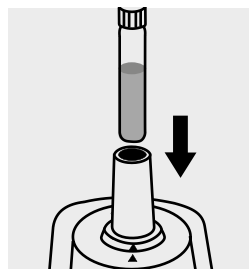
Add 2 drops of **Ni-1K**, close with the screw cap, and mix. Check the pH of the solution, specified range: pH 10 – 12



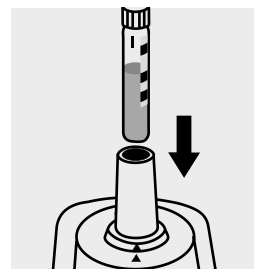
Add 2 drops of **Ni-2K**, close with the screw cap, and mix.



Reaction time: 2 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total nickel** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 40 and 100, Cat.Nos. 114692 and 118701.

A nickel standard solution Titrisol®, Cat.No. 109989, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Nickel

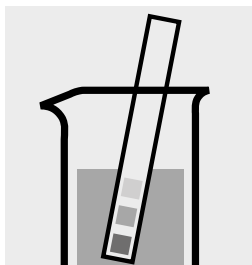
114785

Test

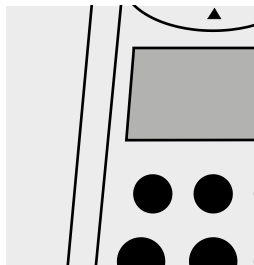
Measuring range: 0.05 – 5.00 mg/l Ni

24-mm cell

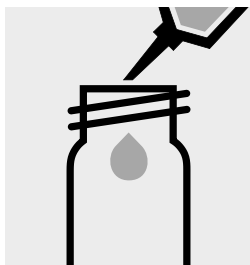
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



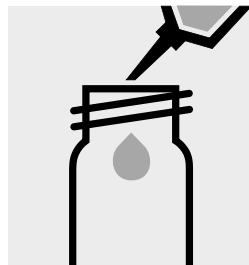
Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



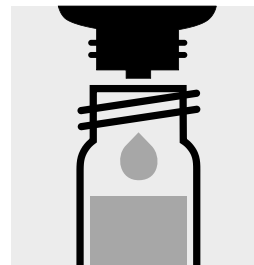
Select method **311**.



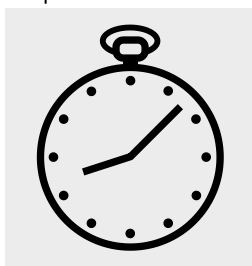
Pipette 10 ml of the sample into a 24-mm cell.



Pipette 10 ml of distilled water into a second 24-mm cell.
(Blank cell)



Add to each cell 2 drops of **Ni-1**, close with the screw cap, and mix. If the color disappears, continue adding drop by drop until a slight yellow coloration persists.



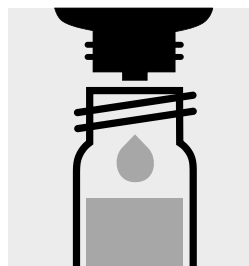
Reaction time:
1 minute
Press **←** to start the countdown.



Add to each cell 4 drops of **Ni-2**, close with the screw cap, and mix.



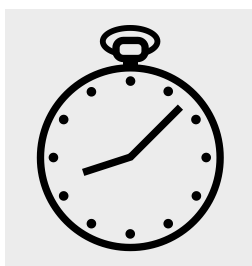
Check the pH, specified range: pH 10 – 12



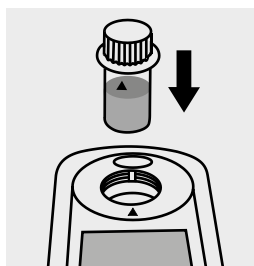
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



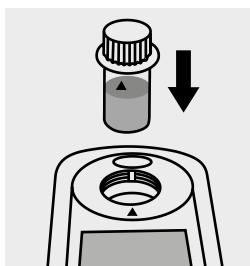
Add to each cell 4 drops of **Ni-3**, close with the screw cap, and mix.



Reaction time:
2 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total nickel** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687 and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 40 and 100, Cat.Nos. 114692 and 118701.

Use 10 ml R-1 instead of the sample.

A nickel standard solution Titrisol®, Cat.No. 109989, can also be used after diluting accordingly.

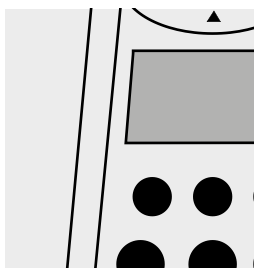
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended. Use 10 ml sample + 0.2 ml R-2.

Nitrate

114542

Cell Test

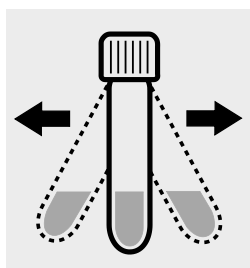
Measuring range: 0.5 – 15.0 mg/l NO ₃ -N	16-mm cell
2.2 – 66.4 mg/l NO ₃	16-mm cell



Select method **320**.



Add 1 level microspoon each of **NO₃-1K** into two reaction cells, close with the screw cap.



Shake both cells **vigorously for 1 minute** to dissolve the solid substance.



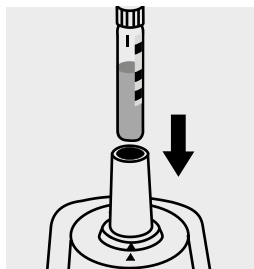
Add to one cell very slowly 1.5 ml of the sample with pipette, close with the screw cap, and mix **briefly**. **Caution, cell becomes very hot!**



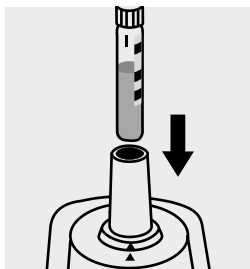
Add to the second cell very slowly 1.5 ml of distilled water with pipette, close with the screw cap, and mix **briefly**. **Caution, cell becomes very hot!**
(Blank cell)



Reaction time:
10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20, Cat.No. 114675, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125037, 132241 and 132242.

Ready-to-use nitrate standard solution Certipur®, Cat.No. 119811, concentration 1000 mg/l NO₃⁻, can also be used after diluting accordingly.

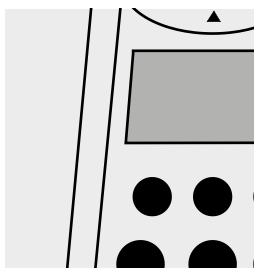
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 20) is highly recommended.

Nitrate

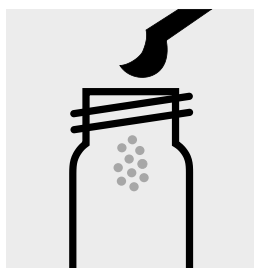
114773

Test

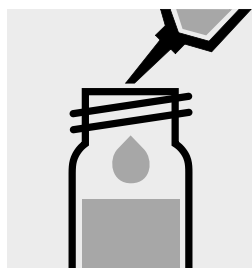
Measuring range: 0.5 – 15.0 mg/l $\text{NO}_3\text{-N}$	16-mm cell
2.2 – 66.4 mg/l NO_3	16-mm cell



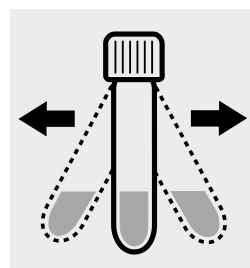
Select method ③②①.



Place 1 level micro-spoon each of $\text{NO}_3\text{-1}$ into two dry 16-mm cells.



Add to each cell 5.0 ml of $\text{NO}_3\text{-2}$ with pipette, close with the screw cap



Shake both cells vigorously for 1 minute to dissolve the solid substance.



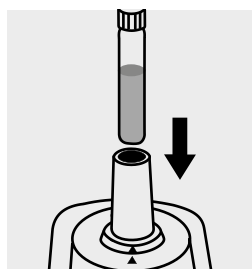
Add to one cell very slowly 1.5 ml of the sample with pipette, close with the screw cap, and mix **briefly**. **Caution, cell becomes very hot!**



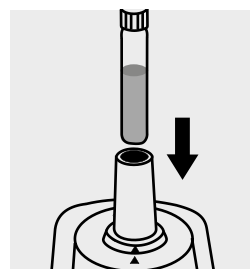
Add to the second cell very slowly 1.5 ml of distilled water with pipette, close with the screw cap, and mix **briefly**. **Caution, cell becomes very hot!**
(Blank cell)



Reaction time: 10 minutes
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10 and 20, Cat.No. 114676 and 114675, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125036, 125037, 132241 and 132242.

Ready-to-use nitrate standard solution Certipur®, Cat.No. 119811, concentration 1000 mg/l NO_3^- , can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

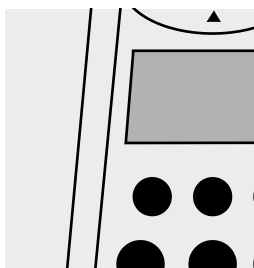
Nitrate

in seawater

114556

Cell Test

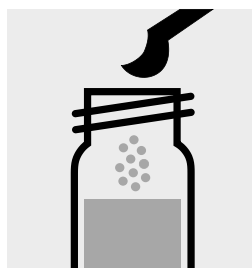
Measuring range: 0.10 – 3.00 mg/l $\text{NO}_3\text{-N}$	16-mm cell
0.4 – 13.3 mg/l NO_3	16-mm cell



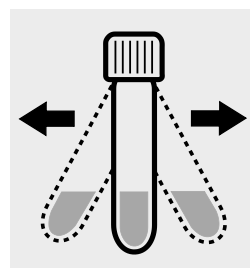
Select method (3)(2)(2).



Pipette 2.0 ml of distilled water into a reaction cell, **do not mix**. (Blank cell)



Add 1 level blue micro-spoon of $\text{NO}_3\text{-1K}$, **immediately** close the blank cell tightly with the screw cap. **Caution, foams strongly (eye protection, protective gloves)!**



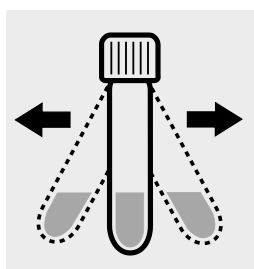
Shake the blank cell **vigorously for 5 seconds** to dissolve the solid substance.



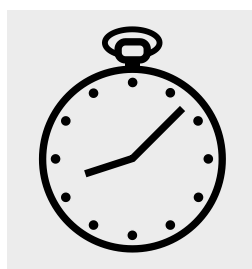
Pipette 2.0 ml of the sample into a second reaction cell, **do not mix**. (Sample cell)



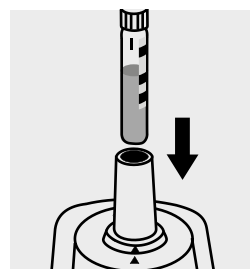
Add 1 level blue micro-spoon of $\text{NO}_3\text{-1K}$, **immediately** close the sample cell tightly with the screw cap. **Caution, foams strongly (eye protection, protective gloves)!**



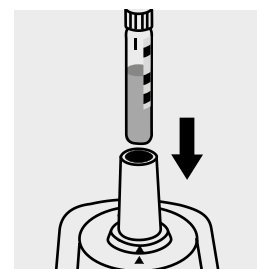
Shake the sample cell **vigorously for 5 seconds** to dissolve the solid substance.



Reaction time: 30 minutes
Press (Start) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125036, 125037, 132240 and 132241.

Ready-to-use nitrate standard solution Certipur®, Cat.No. 119811, concentration 1000 mg/l NO_3^- , can also be used after diluting accordingly.

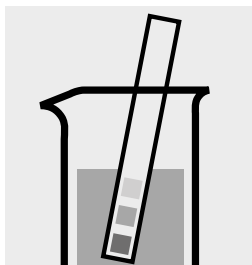
To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

Nitrate

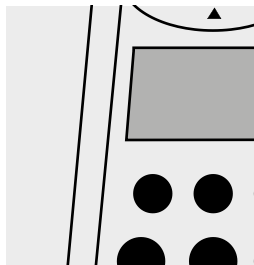
101842

Test

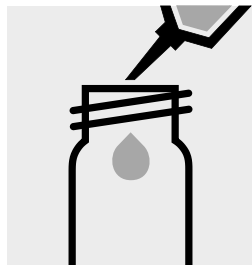
Measuring range: 0.3–30.0 mg/l NO ₃ -N	24-mm cell
1.3–132.8 mg/l NO ₃	24-mm cell



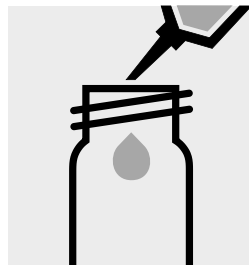
Check the pH of the sample, specified range: pH 3 – 9.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method ③②③.



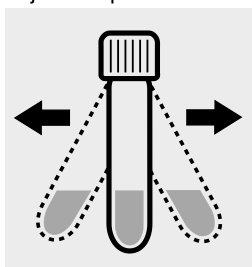
Pipette 10 ml of the sample into a 24-mm cell.



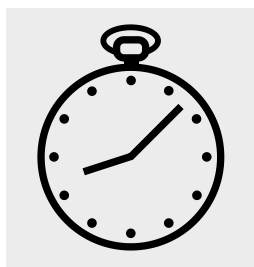
Pipette 10 ml of distilled water into a second 24-mm cell.
(Blank cell)



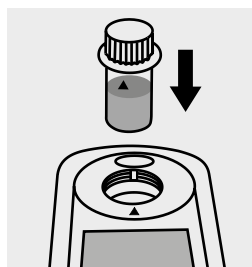
Add to each cell 1 level blue microspoon of **NO₃-1**, **immediately** close tightly with the screw cap.



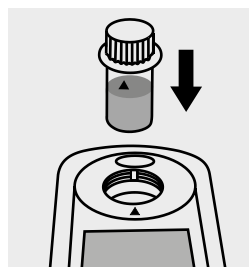
Shake both cells **vigorously for 1 minute** to dissolve the solid substance.



Reaction time: 5 minutes, **measure immediately**.
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

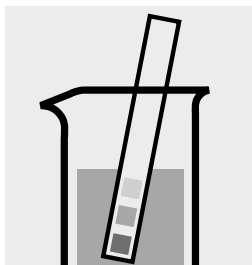
To check the measurement system (test reagents, measurement device, and handling) a ready-to-use nitrate standard solution Certipur®, Cat.No. 119811, concentration 1000 mg/l NO₃⁻, can be used after diluting accordingly.

Nitrite

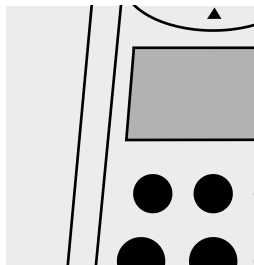
114547

Cell Test

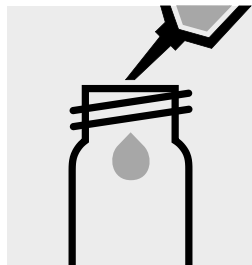
Measuring range: 10 – 700 µg/l NO ₂ -N	16-mm cell
33 – 2299 µg/l NO ₂	16-mm cell



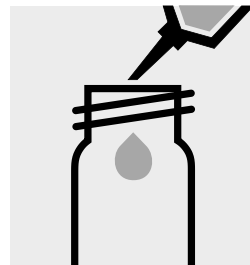
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



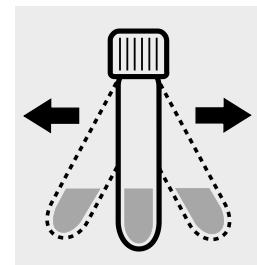
Select method **330**.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



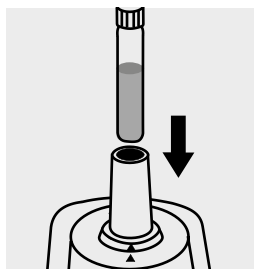
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap.



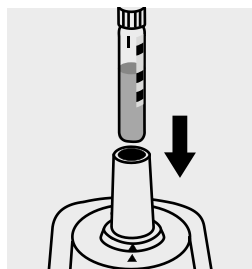
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment.
Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press **Test**.

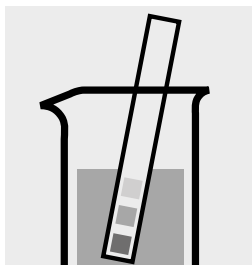
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use nitrite standard solution Certipur®, Cat.No. 119899, concentration 1000 mg/l NO₂⁻, can be used after diluting accordingly as well as the Standard solution for photometric applications, CRM, Cat.No. 125041.

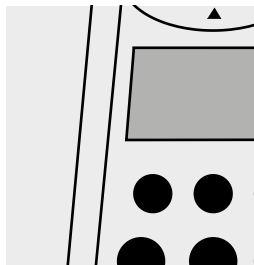
Nitrite

114776

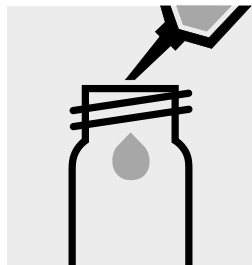
Test

Measuring range: 5 – 400 µg/l NO₂-N 24-mm cell16 – 1313 µg/l NO₂ 24-mm cell**Attention:** In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.

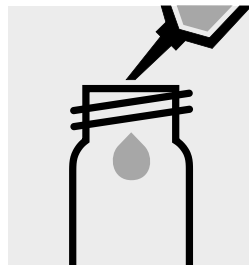
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



Select method ③③①.



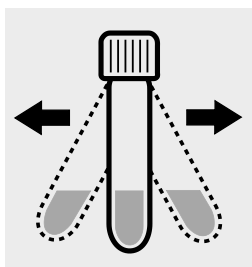
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 10 ml of the sample into a 24-mm cell.



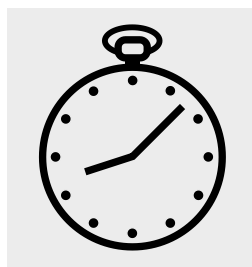
Add 2 level blue micro-spoons of **NO₂-1**, close with the screw cap.



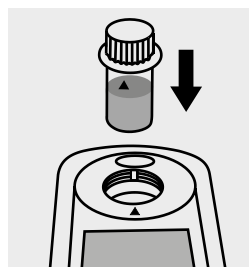
Shake the cell vigorously to dissolve the solid substance.



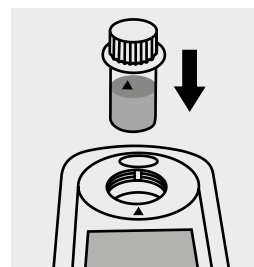
Check the pH, specified range: pH 2.0 – 2.5.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use nitrite standard solution Certipur®, Cat.No. 119899, concentration 1000 mg/l NO₂⁻, can be used after diluting accordingly as well as the Standard solution for photometric applications, CRM, Cat.No. 125041.

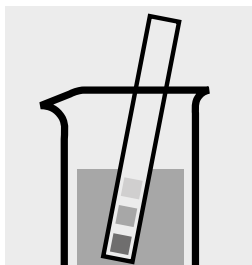
The measurement results are expressed in µg/l.

Nitrite

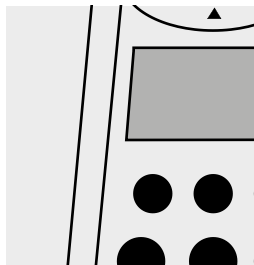
100609

Cell Test

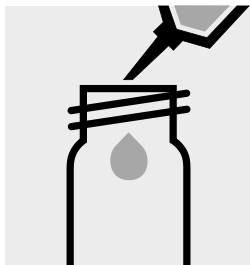
Measuring range: 1.0 – 90.0 mg/l NO ₂ -N	16-mm cell
3.3 – 295.2 mg/l NO ₂	16-mm cell



Check the pH of the sample, specified range: pH 1 – 12.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



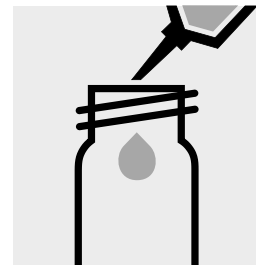
Select method ③③②.



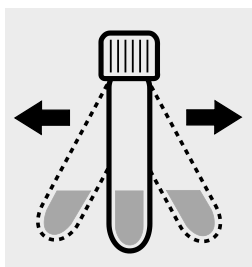
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



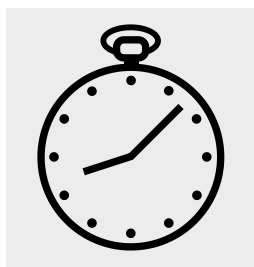
Add 2 level blue microspoons of **NO₂-1K** into a reaction cell.



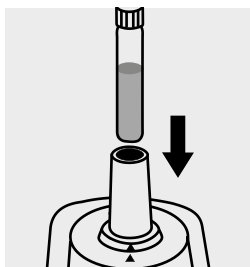
Add 8.0 ml of the sample with pipette and close with the screw cap.



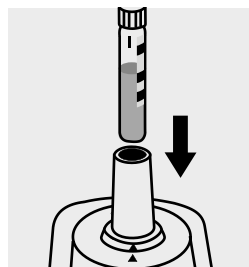
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 20 minutes, **measure immediately**.
Press to start the countdown.
Do not shake or swirl the cell before the measurement.



Insert the blank cell into the cell compartment. Press .



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press .

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use nitrite standard solution Certipur®, Cat.No. 119899, concentration 1000 mg/l NO₂⁻, can be used after diluting accordingly as well as the Standard solution for photometric applications, CRM, Cat.No. 125042.

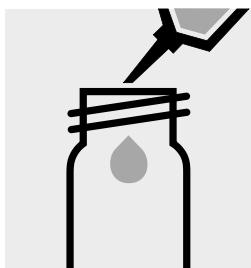
Nitrogen (total)

114537

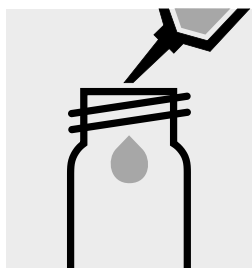
Cell Test

Measuring range: 0.5–15.0 mg/l N

16-mm cell



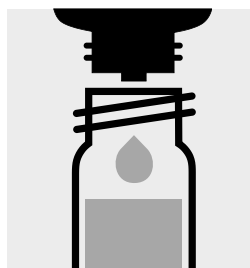
Pipette 10 ml of the sample into an empty 16-mm cell.



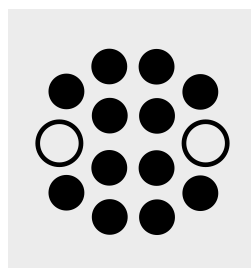
Pipette 10 ml of distilled water into a second empty 16-mm cell. (Blank)



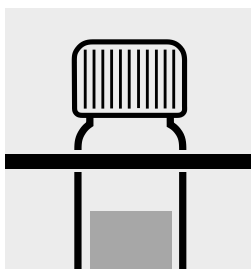
Add to each cell 1 level blue microspoon of **N-1K**.



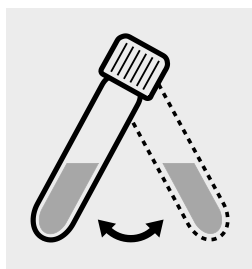
Add to each cell 6 drops of **N-2K**, close with the screw cap, and mix



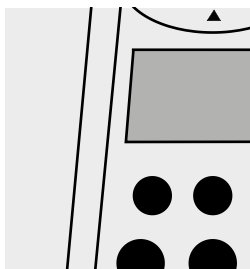
Heat both cells in the thermoreactor at 120 °C (100 °C) for 1 hour.



Remove both cells from the thermoreactor and place in a test-tube rack to cool to room temperature:
pretreated sample / blank.



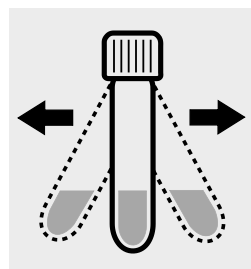
Swirl both cells after 10 minutes.



Select method **③④①**.



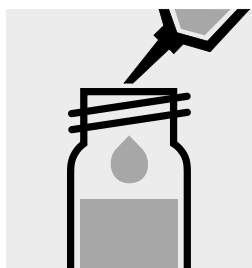
Add 1 level microspoon each of **N-3K** into two reaction cells, close with the screw cap.



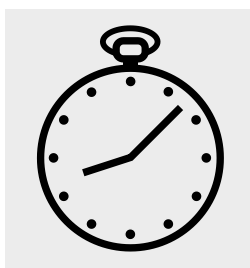
Shake both cells **vigorously for 1 minute** to dissolve the solid substance.



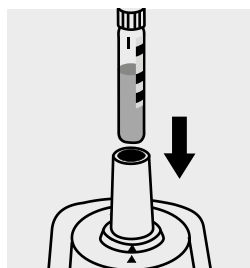
Add to one cell very slowly 1.5 ml of the **pretreated sample** with pipette, close with the screw cap, and mix **briefly**.
Caution, cell becomes very hot!



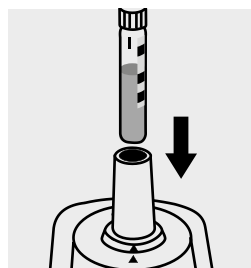
Add to the second cell very slowly 1.5 ml of the **pretreated blank** with pipette, close with the screw cap, and mix **briefly**.
Caution, cell becomes very hot!
(Blank cell)



Reaction time: 10 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 50, Cat.No. 114695, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125043 and 125044.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 50) is highly recommended.

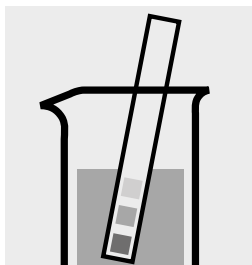
Oxygen

114694

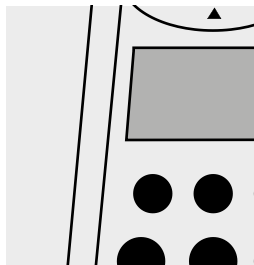
Cell Test

Measuring range: 0.5– 12.0 mg/l O₂

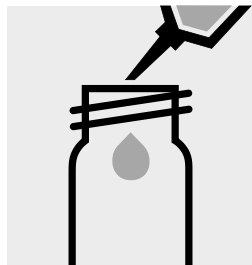
16-mm cell



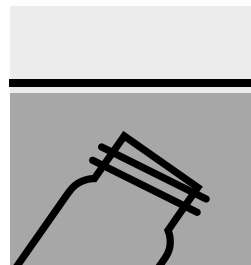
Check the pH of the sample, specified range: pH 6 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 550.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Fill watersample into a reaction cell to overflowing and make sure, that no air bubbles are present.



Place the filled cell in a test-tube rack.



Add with microspoon 1 glass bead.



Add 5 drops of O₂-1K.



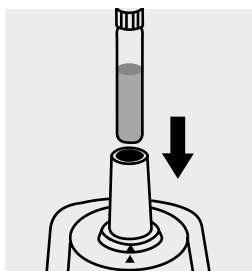
Add 5 drops of O₂-2K, close the cell with the screw cap, and shake for 10 seconds.



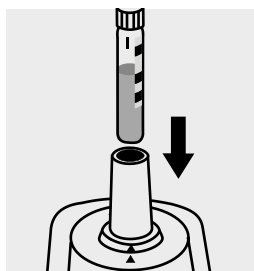
Reaction time: 1 minute
Press to start the countdown.



Add 10 drops of O₂-3K, close the cell with the screw cap, mix, and clean from outside.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

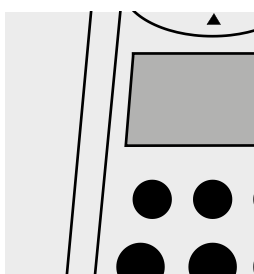
To check the measurement system (test reagents, measurement device, and handling) a oxygen standard solution must be prepared (application see the website).

Oxygen Scavengers

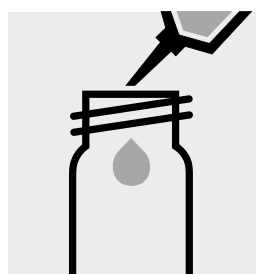
119251

Test

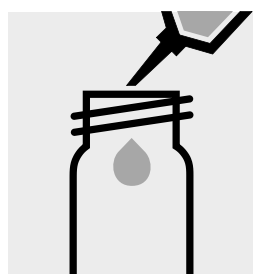
Measuring range: 20 – 500 µg/l DEHA*	24-mm cell
* N,N-diethylenhydroxylamine	
27 – 667 µg/l Carbohy*	24-mm cell
* carbohydrazide	
53 – 1315 µg/l Hydro*	24-mm cell
* hydroquinone	
78 – 1950 µg/l ISA*	24-mm cell
* isoascorbic acid	
87 – 2170 µg/l MEKO*	24-mm cell
* methylethylketoxime	



Select method (5)(5)(5).



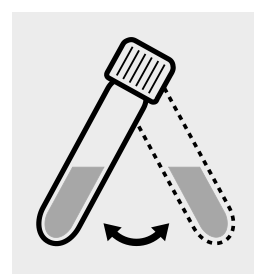
Pipette 10 ml of the sample into a 24-mm cell.



Pipette 10 ml of distilled water into a second 24-mm cell. (Blank cell)



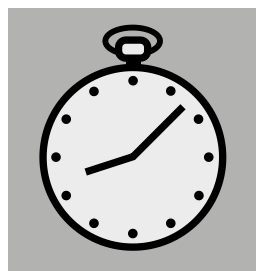
Add to each cell 1 powder pack of **Oxyscav 1** and close with the screw cap.



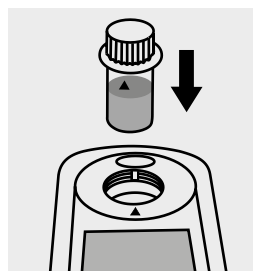
Swirl both cells to dissolve the solid substance.



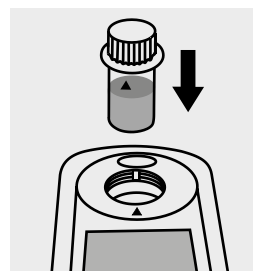
Add to each cell 0.20 ml of **Oxyscav 2** with pipette, close with the screw cap, and mix.



Reaction time: 10 minutes, **protect from light in the process, measure immediately.** Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) an oxygen scavengers standard solution must be prepared from N,N-diethylhydroxylamine, Cat.No. 818473 (see section "Standard solutions"). The measurement results are expressed in µg/l.

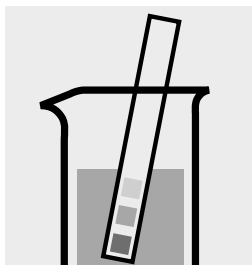
Ozone

100607

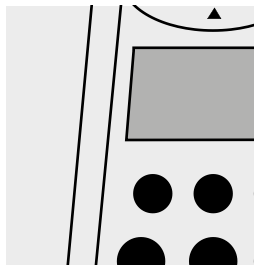
Test

Measuring range: 0.02–3.00 mg/l O₃

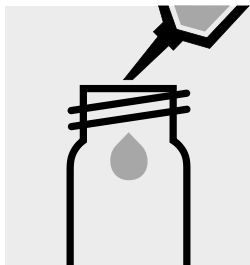
24-mm cell



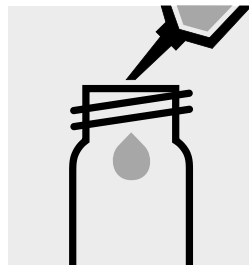
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



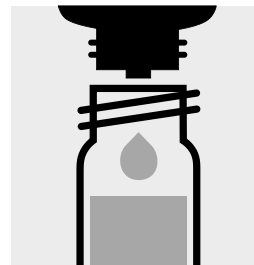
Select method ③⑤①.



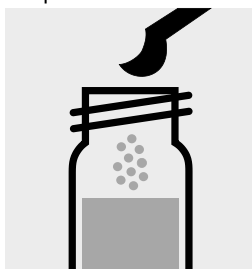
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



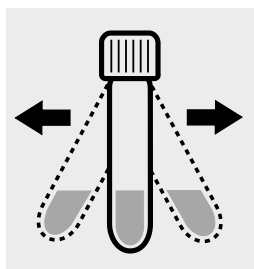
Pipette 10 ml of the sample into a 24-mm cell.



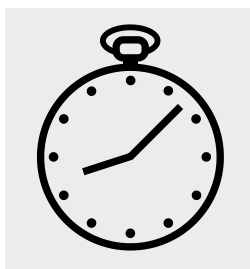
Add 2 drops of O₃-1, close with the screw cap, and mix.



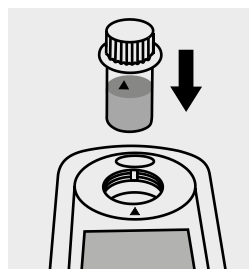
Add 1 level blue micro-spoon of O₃-2, close with the screw cap.



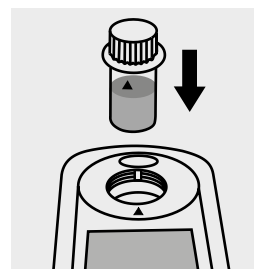
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high ozone concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

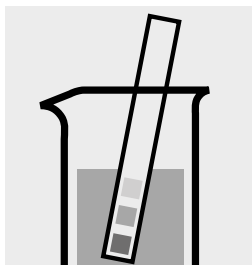
Ozone

100607

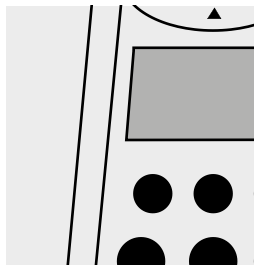
Test

Measuring range: 0.10 – 4.00 mg/l O₃

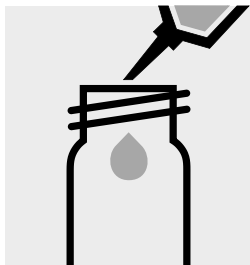
16-mm cell



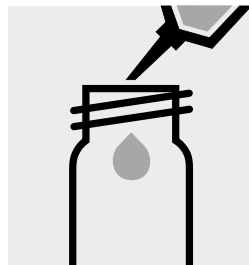
Check the pH of the sample, specified range: pH 4 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



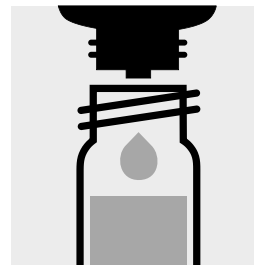
Select method ③⑤①.



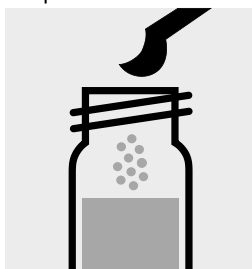
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



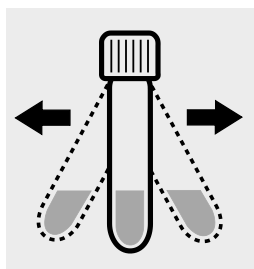
Pipette 10 ml of the sample into a 16-mm cell.



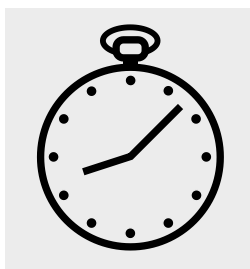
Add 2 drops of O₃-1, close with the screw cap, and mix.



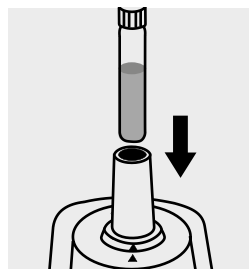
Add 1 level blue micro-spoon of O₃-2, close with the screw cap.



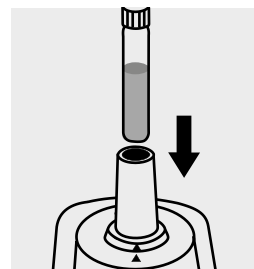
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

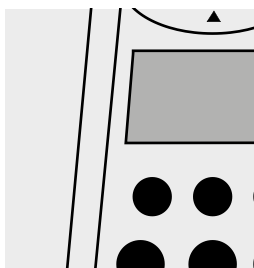
Very high ozone concentrations in the sample produce yellow-colored solutions (measurement solution should be red) and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

Quality assurance:

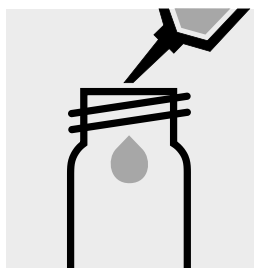
To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Measuring range: pH 6.4 – 8.8

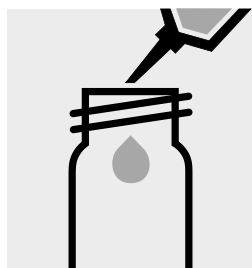
16-mm cell



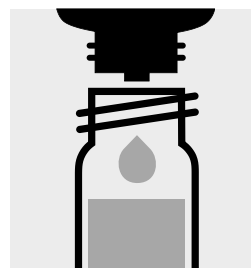
Select method 360.



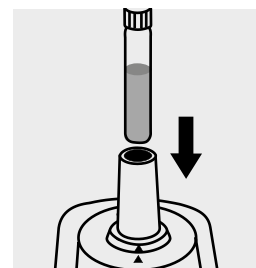
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



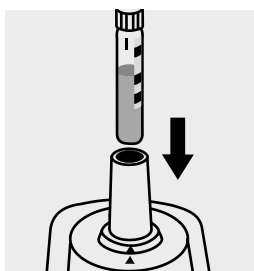
Pipette 10 ml of the sample into a round cell.



Add 4 drops of **pH-1**, close with the screw cap, and mix. **Attention!** The reagent bottle must be held **vertically by all means!**



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

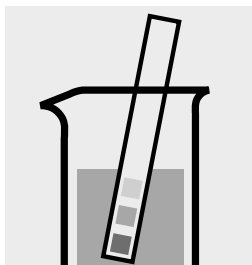
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) buffer solution pH 7.00 Certipur®, Cat.No. 109407, can be used.

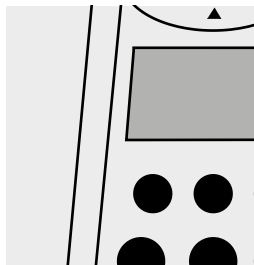
Phenol

114551

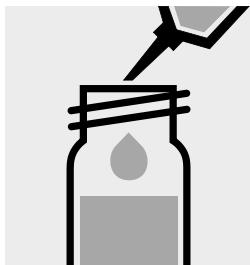
Cell Test

Measuring range: 0.10 – 2.50 mg/l C₆H₅OH 16-mm cell

Check the pH of the sample, specified range: pH 2 – 11.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method **③⑦①**.



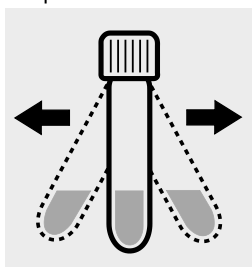
Pipette 10 ml of the sample into a reaction cell, close with the screw cap, and mix.



Pipette 10 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



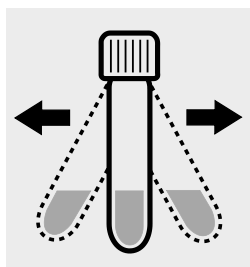
Add to each cell 1 level grey microspoon of **Ph-1K**, close with the screw cap.



Shake both cells vigorously to dissolve the solid substance.



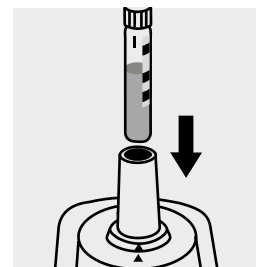
Add to each cell 1 level green microspoon of **Ph-2K**, close with the screw cap.



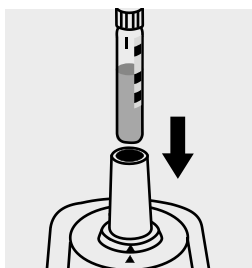
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 1 minute
Press **⏮** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

Very high phenol concentrations in the sample result in a weakening of the color and false-low readings are yielded. In such cases the sample must be diluted (plausibility check).

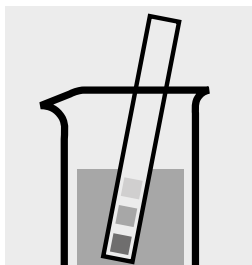
Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a phenol standard solution must be prepared from Phenol GR, Cat.No. 100206 (see section "Standard solutions").

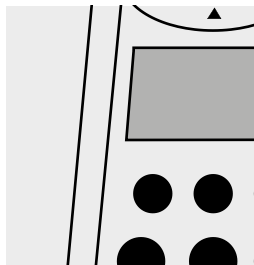
Phenol

100856

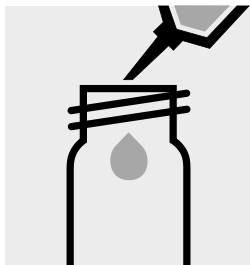
Test

Measuring range: 0,10 – 5,00 mg/l C_6H_5OH 24-mm cell

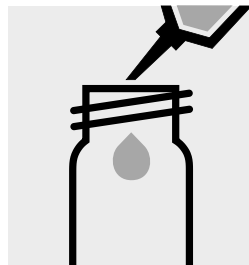
Check the pH of the sample, specified range: pH 2 – 11.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ③⑦①.



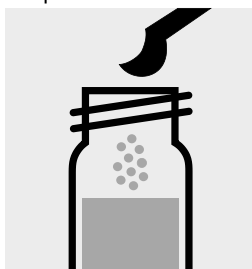
Pipette 10 ml of the sample into a 24-mm cell.



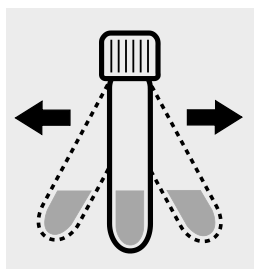
Pipette 10 ml of distilled water into a second 24-mm cell.
(Blank cell)



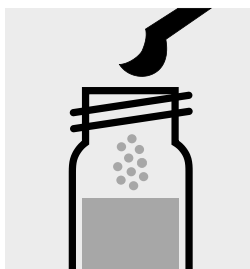
Add to each cell 1.0 ml of **Ph-1** with pipette, close with the screw cap, and mix.



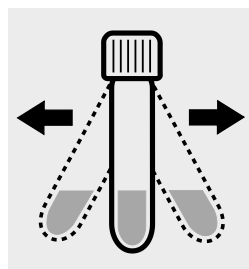
Add to each cell 1 level grey microspoon of **Ph-2**, close with the screw cap, and mix.



Shake both cells vigorously to dissolve the solid substance.



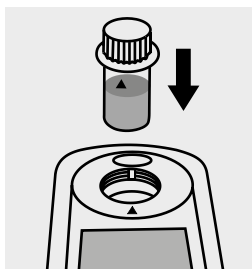
Add to each cell 1 level grey microspoon of **Ph-3**, close with the screw cap, and mix.



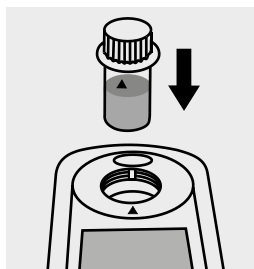
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 10 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a phenol standard solution must be prepared from Phenol GR, Cat.No. 100206 (see section "Standard solutions").

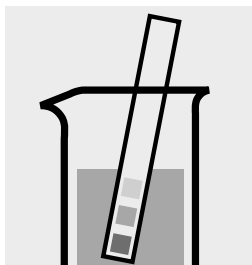
Phosphate

100474

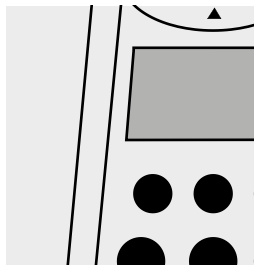
Determination of orthophosphate

Cell Test

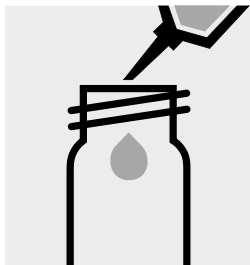
Measuring range: 0.05 – 4.00 mg/l $\text{PO}_4\text{-P}$	16-mm cell
0.15 – 12.26 mg/l PO_4	16-mm cell
0.11 – 9.17 mg/l P_2O_5	16-mm cell



Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



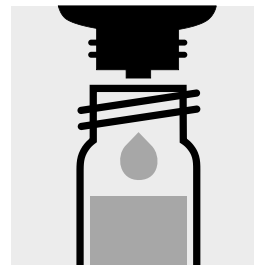
Select method ③⑧⑦.



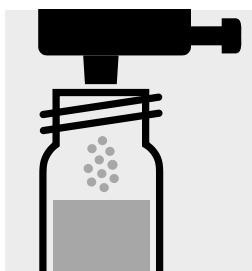
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



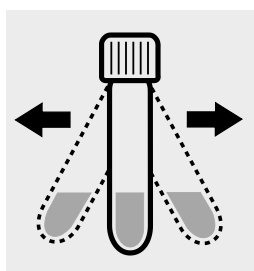
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



Add 5 drops of **P-1K**, close with the screw cap, and mix.



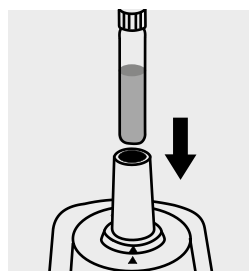
Add 1 dose of **P-2K** using the blue dose-metering cap, close with the screw cap.



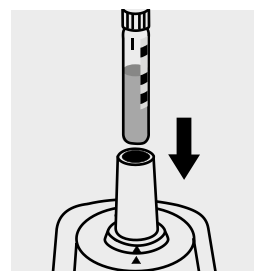
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO_4^{3-} , can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

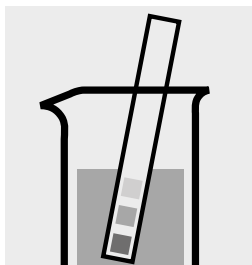
Phosphate

114543

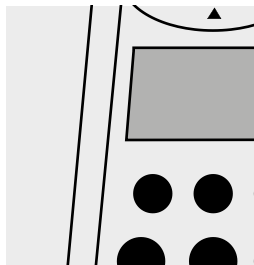
Determination of orthophosphate

Cell Test

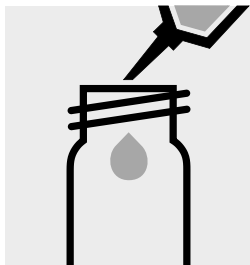
Measuring range: 0.05 – 4.00 mg/l PO ₄ -P	16-mm cell
0.15 – 12.26 mg/l PO ₄	16-mm cell
0.11 – 9.17 mg/l P ₂ O ₅	16-mm cell



Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



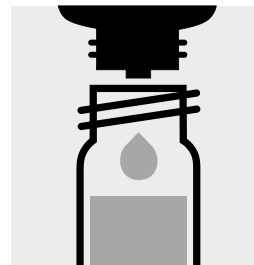
Select method 380.



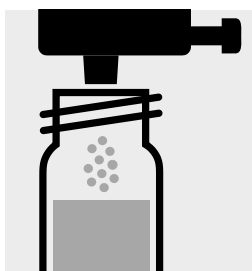
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



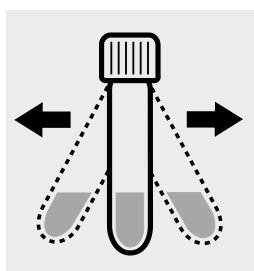
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



Add 5 drops of **P-2K**, close with the screw cap, and mix.



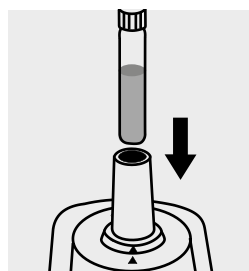
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



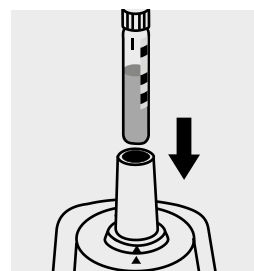
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press **Zero** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

Phosphate

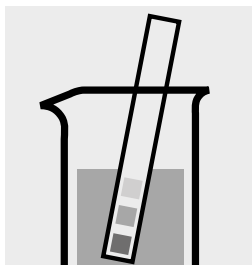
Determination of total phosphorus

= sum of orthophosphate, polyphosphate, and organophosphate

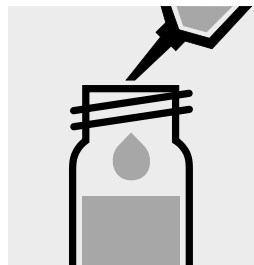
114543

Cell Test

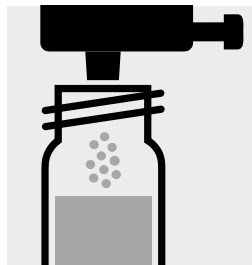
Measuring range: 0.05 – 4.00 mg/l P	16-mm cell
0.15 – 12.26 mg/l PO ₄	16-mm cell
0.11 – 9.17 mg/l P ₂ O ₅	16-mm cell



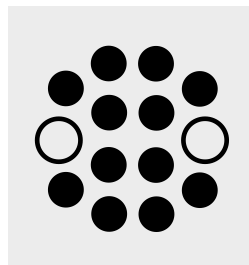
Check the pH of the sample, specified range: pH 0 – 10. If required, add dilute sulfuric acid drop by drop to adjust the pH.



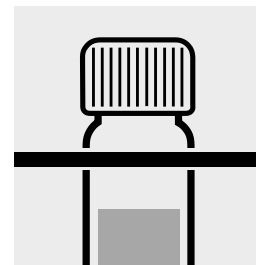
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



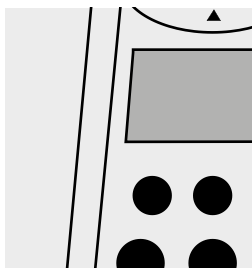
Add 1 dose of **P-1K** using the green dose-metering cap, close with the screw cap.



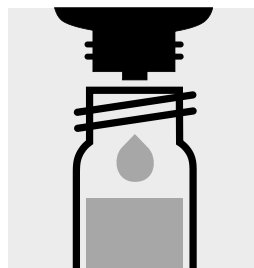
Heat the cell in the thermoreactor at 120 °C (100 °C) for 30 minutes.



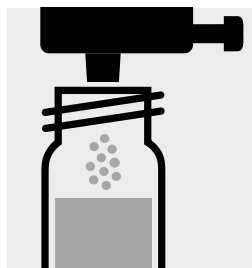
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



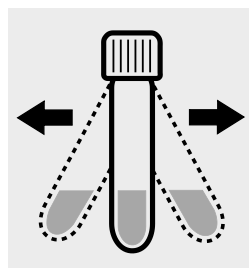
Select method **380**.



Add 5 drops of **P-2K**, close with the screw cap, and mix.



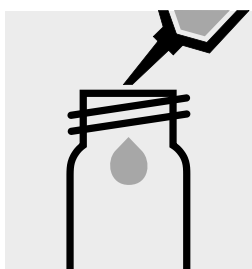
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



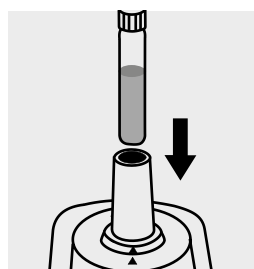
Shake the cell vigorously to dissolve the solid substance.



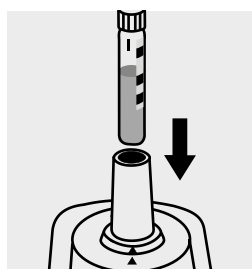
Reaction time: 5 minutes. Press **←** to start the countdown.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solution for photometric applications, CRM, Cat.No. 125046.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

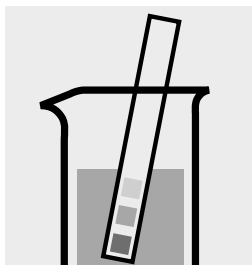
Phosphate

100475

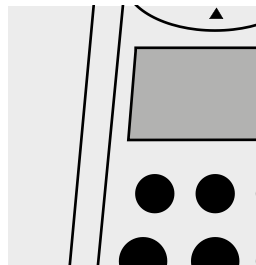
Determination of orthophosphate

Cell Test

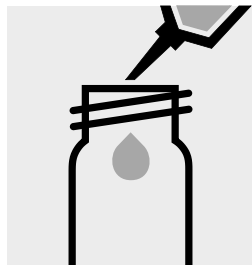
Measuring range: 0.5–20.0 mg/l PO ₄ -P	16-mm cell
1.5–61.3 mg/l PO ₄	16-mm cell
1.1–45.8 mg/l P ₂ O ₅	16-mm cell



Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



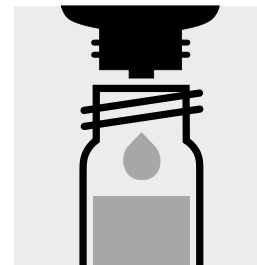
Select method ③⑧⑧.



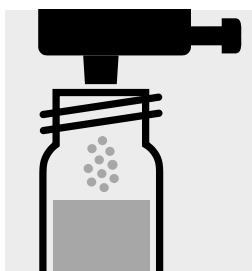
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



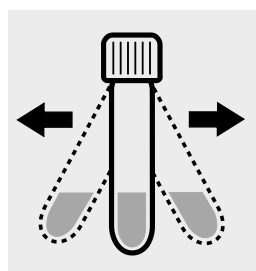
Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



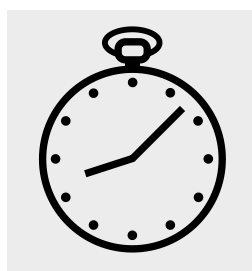
Add 5 drops of **P-1K**, close with the screw cap, and mix.



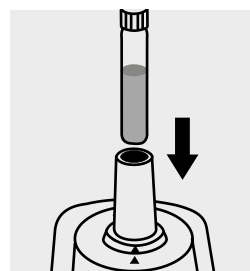
Add 1 dose of **P-2K** using the blue dose-metering cap, close with the screw cap.



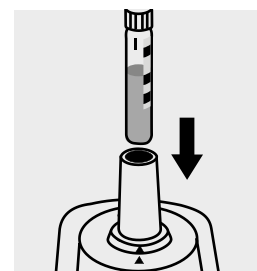
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20 and 80, Cat.Nos. 114675 and 114738.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

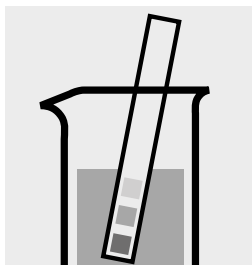
Phosphate

114729

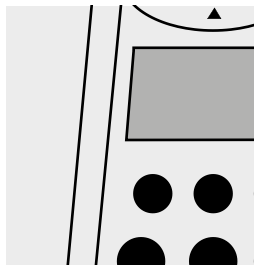
Determination of orthophosphate

Cell Test

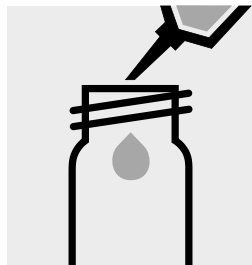
Measuring range: 0.5–20.0 mg/l PO ₄ -P	16-mm cell
1.5–61.3 mg/l PO ₄	16-mm cell
1.1–45.8 mg/l P ₂ O ₅	16-mm cell



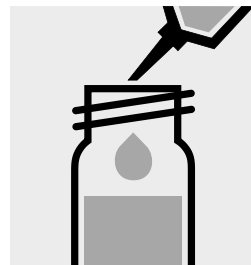
Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



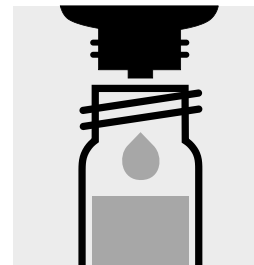
Select method ③⑧①.



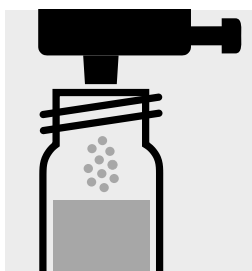
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



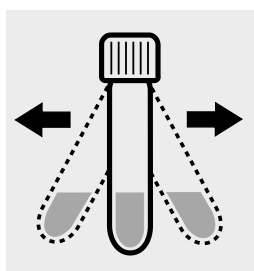
Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



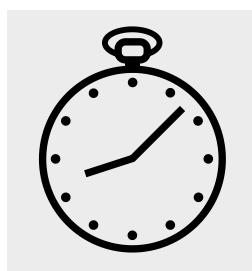
Add 5 drops of **P-2K**, close with the screw cap, and mix.



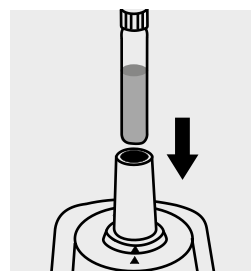
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



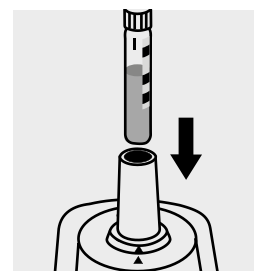
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20 and 80, Cat.Nos. 114675 and 114738.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

Phosphate

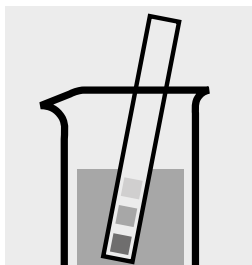
Determination of total phosphorus

= sum of orthophosphate, polyphosphate, and organophosphate

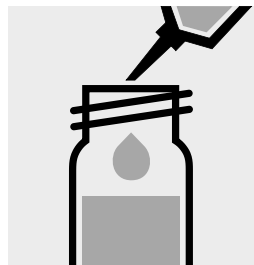
114729

Cell Test

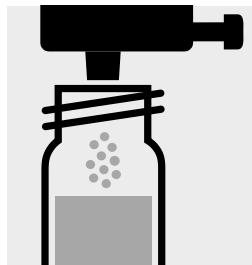
Measuring range: 0.5–20.0 mg/l P	16-mm cell
1.5–61.3 mg/l PO ₄	16-mm cell
1.1–45.8 mg/l P ₂ O ₅	16-mm cell



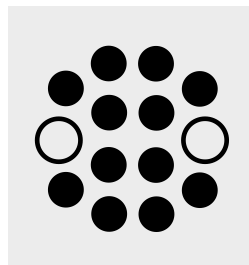
Check the pH of the sample, specified range: pH 0 – 10. If required, add dilute sulfuric acid drop by drop to adjust the pH.



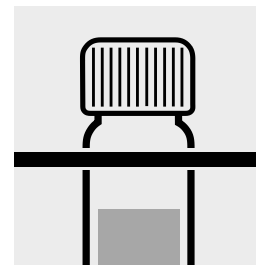
Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



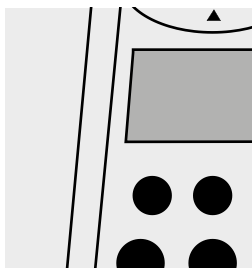
Add 1 dose of **P-1K** using the green dose-metering cap, close with the screw cap.



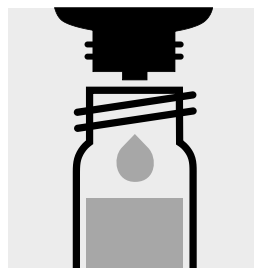
Heat the cell in the thermoreactor at 120 °C (100 °C) for 30 minutes.



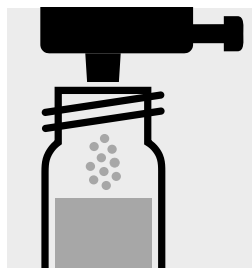
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



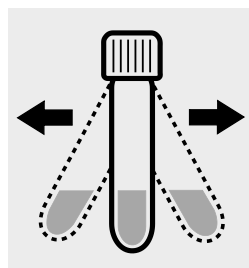
Select method **381**.



Add 5 drops of **P-2K**, close with the screw cap, and mix.



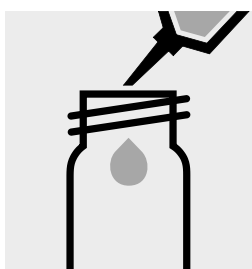
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



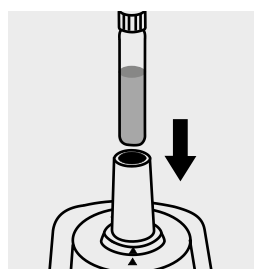
Shake the cell vigorously to dissolve the solid substance.



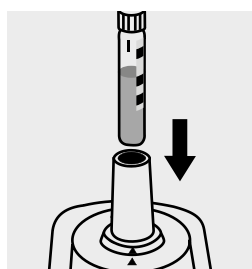
Reaction time: 5 minutes. Press **Start** to start the countdown.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20 and 80, Cat.Nos. 114675 and 114738, or as well as the Standard solutions for photometric applications, CRM, Cat.Nos. 125047 and 125048.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck) is highly recommended.

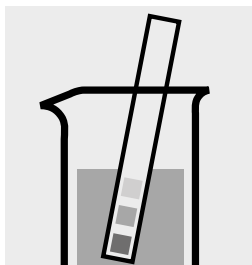
Phosphate

Determination of orthophosphate

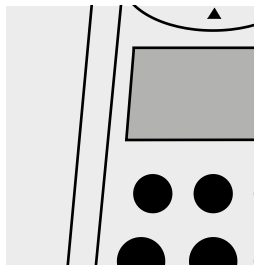
100616

Cell Test

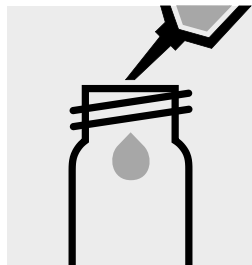
Measuring range: 3.0 – 100.0 mg/l PO ₄ -P	16-mm cell
9 – 307 mg/l PO ₄	16-mm cell
7 – 229 mg/l P ₂ O ₅	16-mm cell



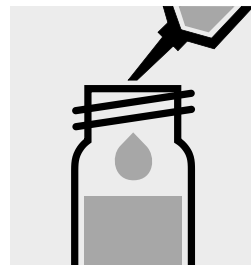
Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



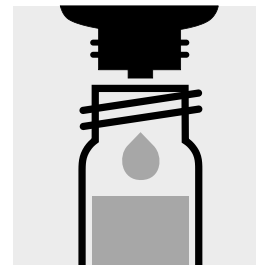
Select method ③⑧②.



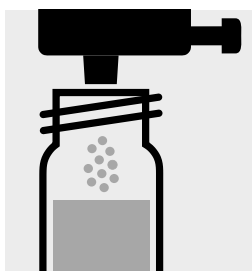
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



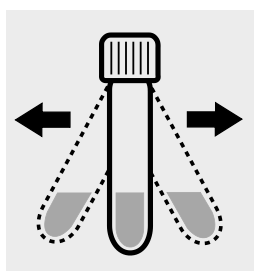
Pipette 0.20 ml of the sample into a reaction cell, close with the screw cap, and mix.



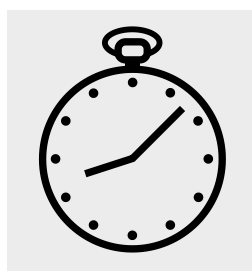
Add 5 drops of **PO₄-1K**, close with the screw cap, and mix.



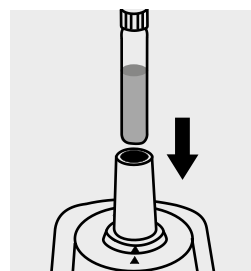
Add 1 dose of **PO₄-2K** using the blue dose-metering cap, close with the screw cap.



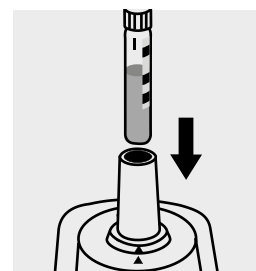
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly.

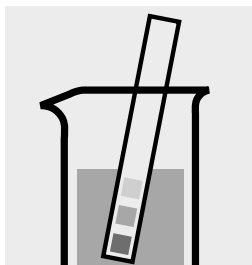
Phosphate

100673

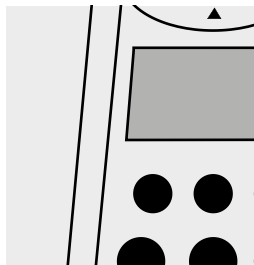
Determination of orthophosphate

Cell Test

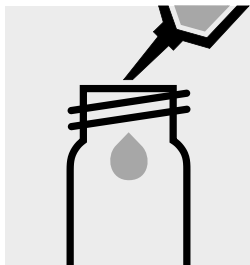
Measuring range: 3.0 – 100.0 mg/l PO ₄ -P	16-mm cell
9 – 307 mg/l PO ₄	16-mm cell
7 – 229 mg/l P ₂ O ₅	16-mm cell



Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



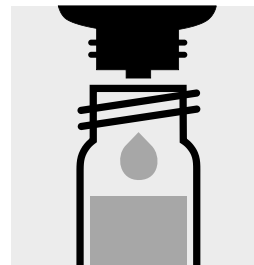
Select method **389**.



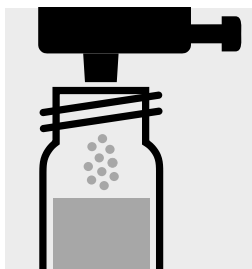
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



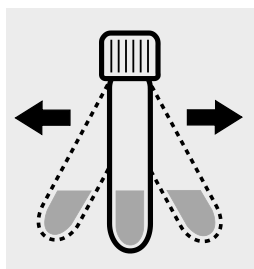
Pipette 0.20 ml of the sample into a reaction cell, close with the screw cap, and mix.



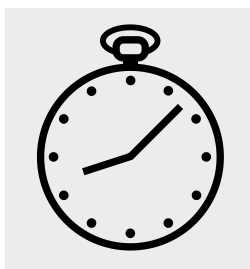
Add 5 drops of **P-2K**, close with the screw cap, and mix.



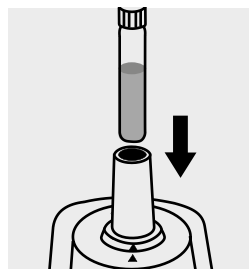
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



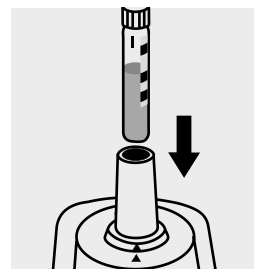
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press **Start** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly.

Phosphate

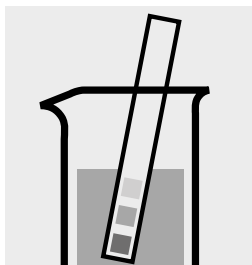
Determination of total phosphorus

= sum of orthophosphate, polyphosphate, and organophosphate

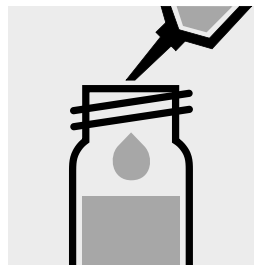
100673

Cell Test

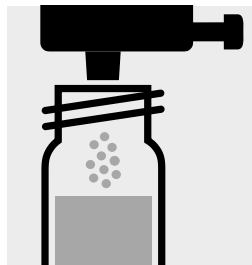
Measuring range: 3.0 – 100.0 mg/l P	16-mm cell
9 – 307 mg/l PO ₄	16-mm cell
7 – 229 mg/l P ₂ O ₅	16-mm cell



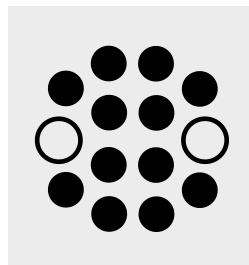
Check the pH of the sample, specified range: pH 0 – 10. If required, add dilute sulfuric acid drop by drop to adjust the pH.



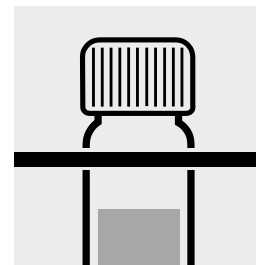
Pipette 0.20 ml of the sample into a reaction cell, close with the screw cap, and mix.



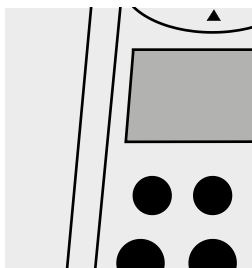
Add 1 dose of **P-1K** using the green dose-metering cap, close with the screw cap.



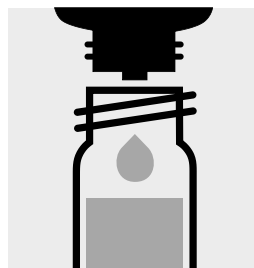
Heat the cell in the thermoreactor at 120 °C (100 °C) for 30 minutes.



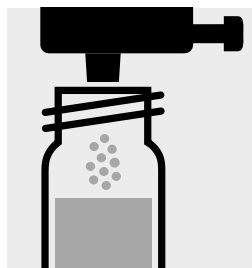
Remove the cell from the thermoreactor and place in a test-tube rack to cool to room temperature.



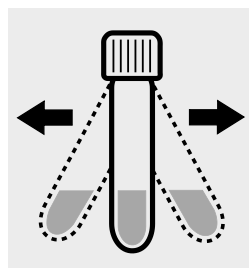
Select method (3)(8)(9).



Add 5 drops of **P-2K**, close with the screw cap, and mix.



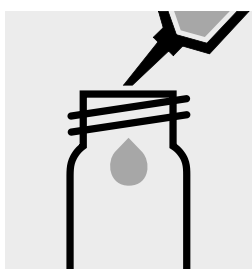
Add 1 dose of **P-3K** using the blue dose-metering cap, close with the screw cap.



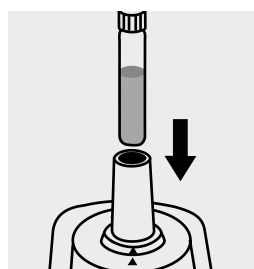
Shake the cell vigorously to dissolve the solid substance.



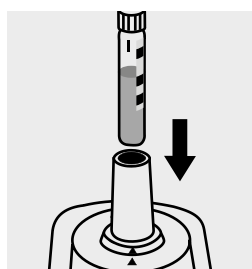
Reaction time: 5 minutes. Press (←) to start the countdown.



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

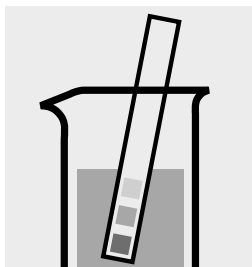
To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly as well as the Standard solutions for photometric applications, CRM, Cat.Nos. 125047, 125048, and 125049.

Phosphate

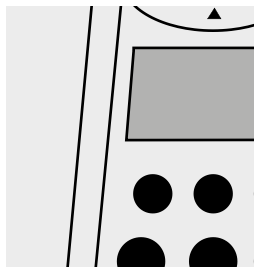
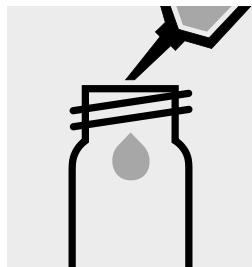
114848

Determination of orthophosphate

Test

Measuring range: 0.01 – 2.50 mg/l $\text{PO}_4\text{-P}$ 24-mm cell0.03 – 7.66 mg/l PO_4 24-mm cell0.02 – 5.73 mg/l P_2O_5 24-mm cell**Attention:** In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.

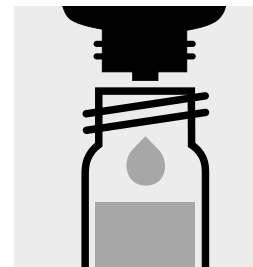
Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.

Select method **383**.

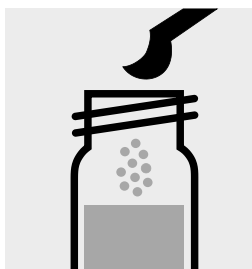
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



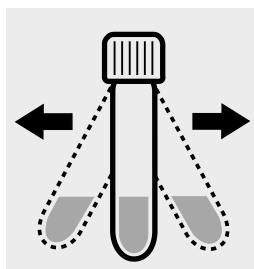
Pipette 10 ml of the sample into a 24-mm cell.



Add 10 drops of **PO₄-1**, close with the screw cap, and mix.



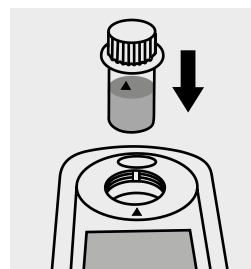
Add 2 level blue microspoons of **PO₄-2**, close with the screw cap.



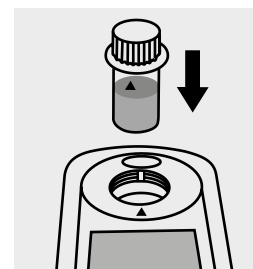
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes.
Press **Start** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate, and organophosphate** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676. Use 10 ml R-1 instead of the sample.

Ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO_4^{3-} , can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended. Use 10 ml sample + 0.1 ml R-2.

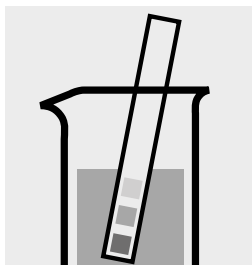
Phosphate

100798

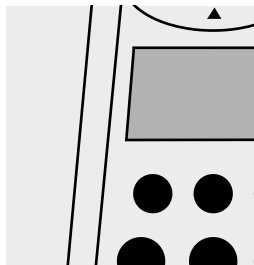
Determination of orthophosphate

Test

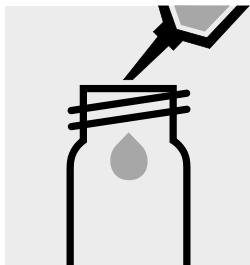
Measuring range: 1.0 – 60.0 mg/l PO ₄ -P	16-mm cell
3.1 – 184.0 mg/l PO ₄	16-mm cell
2.3 – 137.5 mg/l P ₂ O ₅	16-mm cell



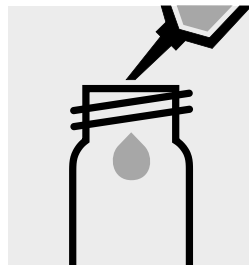
Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



Select method (3)(8)(4).



Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



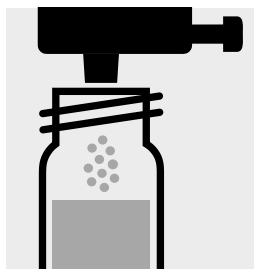
Pipette 8.0 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) into a 16-mm cell.



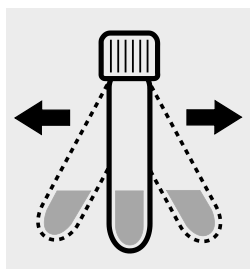
Add 0.50 ml of the sample with pipette, close with the screw cap, and mix.



Add 0.50 ml of **PO₄-1** with pipette, close with the screw cap, and mix.



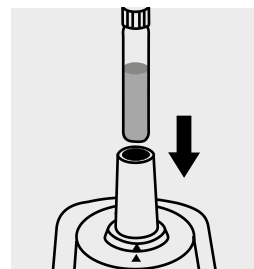
Add 1 dose of **PO₄-2** using the blue dose-metering cap, close with the screw cap.



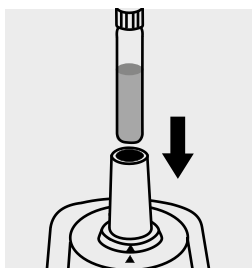
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press (↶) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Press (Test).

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly.

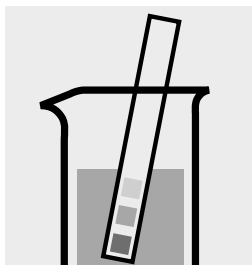
Phosphate

114842

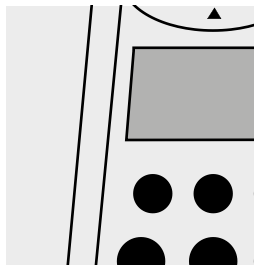
Determination of orthophosphate

Test

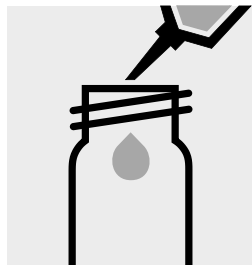
Measuring range: 0.5–30.0 mg/l PO ₄ -P	16-mm cell
1.5–92.0 mg/l PO ₄	16-mm cell
1.1–68.7 mg/l P ₂ O ₅	16-mm cell



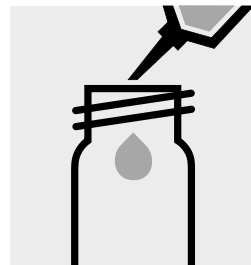
Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



Select method ③⑧⑤.



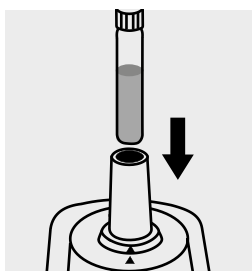
Pipette 5.0 ml of the sample into a 16-mm cell.



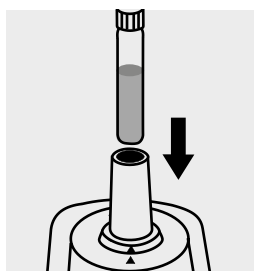
Pipette 5.0 ml of distilled water into a second 16-mm cell.
(Blank cell)



Add to each cell 1.2 ml of **PO₄-1** with pipette, close with the screw cap, and mix.



Insert the blank cell into the cell compartment.
Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly.

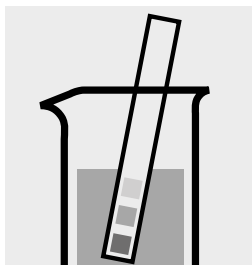
Phosphate

114546

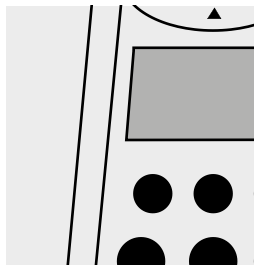
Determination of orthophosphate

Cell Test

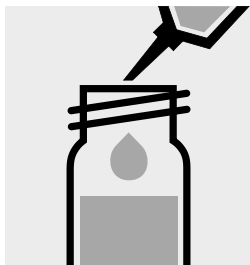
Measuring range: 0.5–25.0 mg/l PO ₄ -P	16-mm cell
1.5–76.7 mg/l PO ₄	16-mm cell
1.1–57.3 mg/l P ₂ O ₅	16-mm cell



Check the pH of the sample, specified range: pH 0 – 10.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



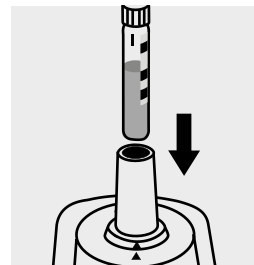
Select method ③⑧⑥.



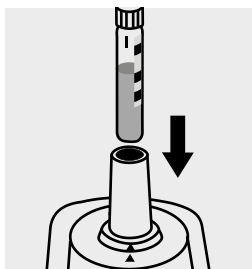
Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Important:

For the determination of **total phosphorus = sum of orthophosphate, polyphosphate and organophosphate** either Phosphate Cell Test, Cat. No. 114543, 114729, and 100673 or Phosphate Test, Cat. No. 114848 in conjunction with Crack Set 10/10C, Cat. No. 114687 resp. 114688 can be used.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use phosphate standard solution Certipur®, Cat.No. 119898, concentration 1000 mg/l PO₄³⁻, can be used after diluting accordingly.

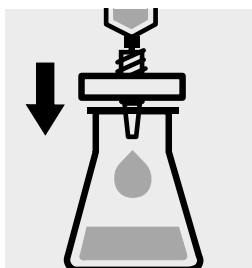
Potassium

114562

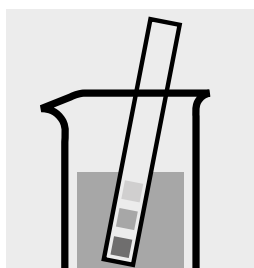
Cell Test

Measuring range: 5.0–50.0 mg/l K

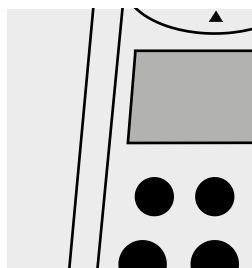
16-mm cell



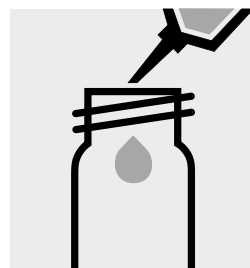
Filter turbid samples.



Check the pH of the sample, specified range: pH 3 – 12.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (4)(0)(0).



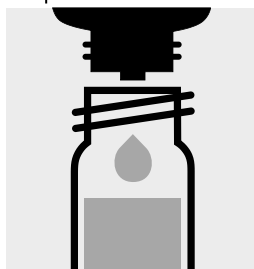
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



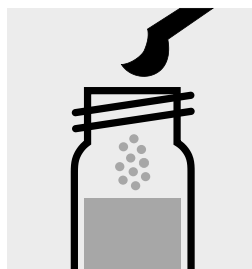
Pipette 2.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



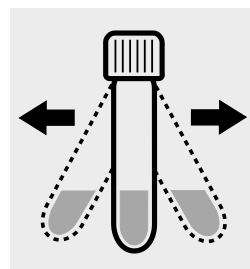
Check the pH, specified range: pH 10.0 – 11.5.



Add 6 drops of **K-1K**, close the cell with the screw cap, and mix.



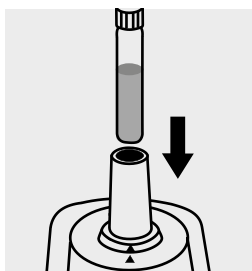
Add 1 level blue micro-spoon of **K-2K**, close the cell with the screw cap.



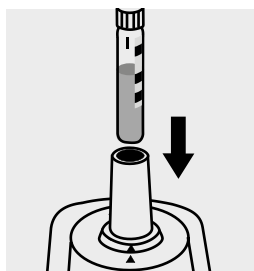
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press (↶) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample **without re-shaking the cell** into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use potassium standard solution Certipur®, Cat.No. 170230, concentration 1000 mg/l K, can be used after diluting accordingly.

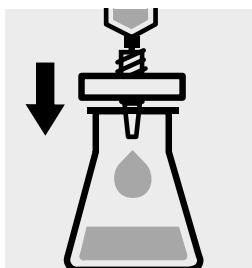
Potassium

100615

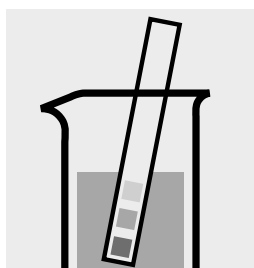
Cell Test

Measuring range: 30–300 mg/l K

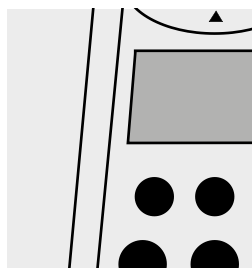
16-mm cell



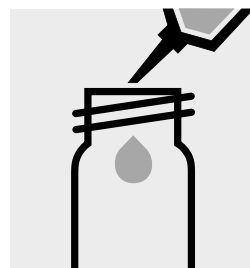
Filter turbid samples.



Check the pH of the sample, specified range: pH 3 – 12.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 401.



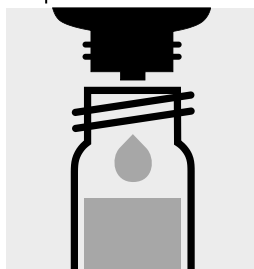
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



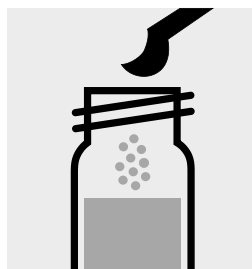
Pipette 0.50 ml of the sample into a reaction cell, close with the screw cap, and mix.



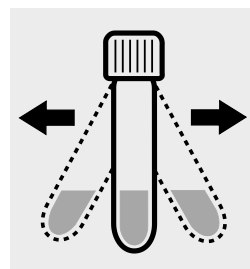
Check the pH, specified range: pH 10.0 – 11.5.



Add 6 drops of **K-1K**, close the cell with the screw cap, and mix.



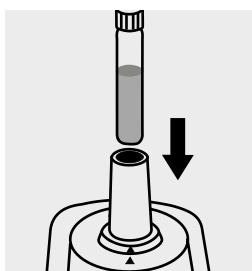
Add 1 level blue micro-spoon of **K-2K**, close the cell with the screw cap.



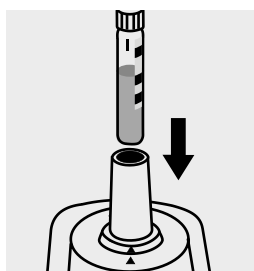
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **(Zero)**.



Insert the cell containing the sample **without re-shaking the cell** into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

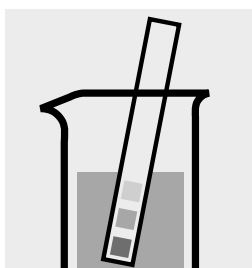
To check the measurement system (test reagents, measurement device, and handling) ready-to-use potassium standard solution Certipur®, Cat.No. 170230, concentration 1000 mg/l K, can be used after diluting accordingly.

Residual Hardness

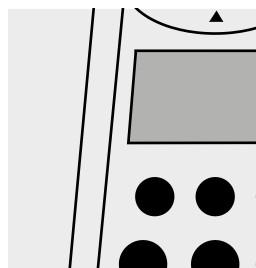
114683

Cell Test

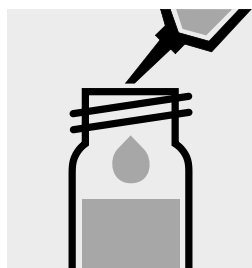
Measuring range: 0.50 – 5.00 mg/l Ca	16-mm cell	Measuring range: 0.07 – 0.70 °d	16-mm cell
0.70 – 7.00 mg/l CaO	16-mm cell	0.12 – 1.25 °f	16-mm cell
1.2 – 12.5 mg/l CaCO ₃	16-mm cell	0.09 – 0.87 °e	16-mm cell



Check the pH of the sample, specified range: pH 5 – 8.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method (4)(1)(0).



Pipette 4.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



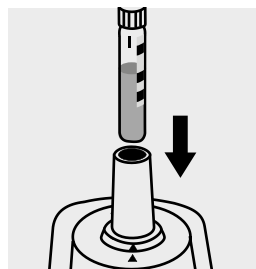
Pipette 4.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



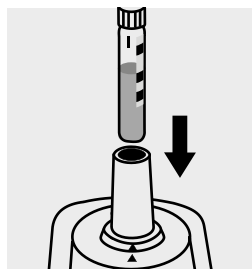
Add to each cell 0.20 ml of **RH-1K** with pipette, close with the screw cap, and mix.



Reaction time: 10 minutes, **measure immediately**. Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use calcium standard solution Certipur®, Cat.No. 119778, concentration 1000 mg/l Ca, can be used after diluting accordingly. (Pay attention to pH value!)

Silicate (Silicic Acid)

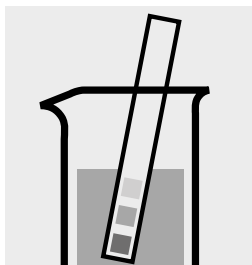
114794

Test

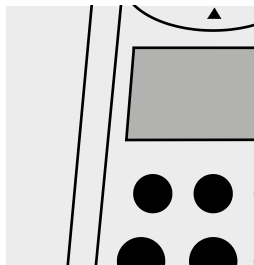
Measuring range: 0.11 – 8.56 mg/l SiO_2 24-mm cell

0.05 – 4.00 mg/l Si 24-mm cell

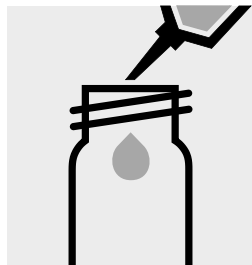
Attention: In contrast to the instructions given in the package insert the sample volume as well as the reagent volume must be doubled.



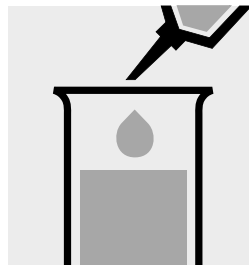
Check the pH of the sample, specified range: pH 2 – 10. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



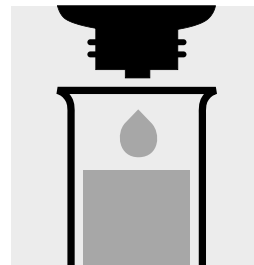
Select method 420.



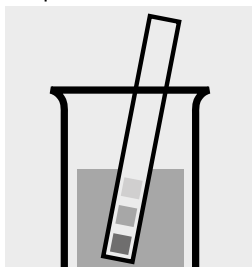
Fill approx. 10 ml of distilled water into a 24-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Pipette 10 ml of the sample into a test tube.



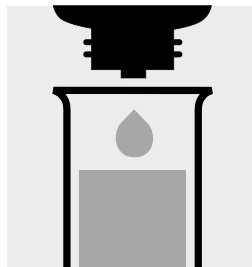
Add 6 drops of **Si-1** and mix.



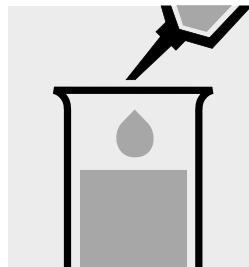
Check the pH, specified range: pH 1.2 – 1.6.



Reaction time: 3 minutes
Press **(Enter)** to start the countdown.



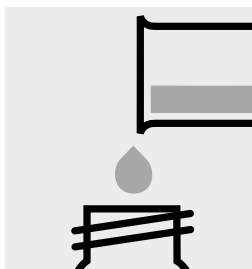
Add 6 drops of **Si-2** and mix.



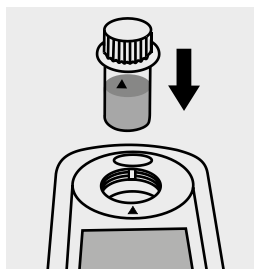
Add 1.0 ml of **Si-3** with pipette and mix.



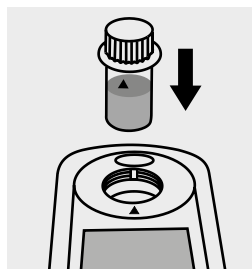
Reaction time: 10 minutes
Press **(←)** to start the countdown.



Transfer the solution into a 24-mm cell, close with the screw cap.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Zero)**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **(Test)**.

Quality assurance:

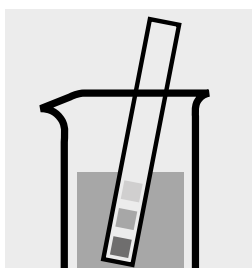
To check the measurement system (test reagents, measurement device, and handling) ready-to-use silicon standard solution Certipur®, Cat.No. 170236, concentration 1000 mg/l Si, can be used after diluting accordingly or the Standard solutions for photometric applications, CRM, Cat.Nos. 132243 and 132245 (Attention! Do **not** store standard solutions in glass vessels - see section "Standard solutions").

Silicate (Silicic Acid)

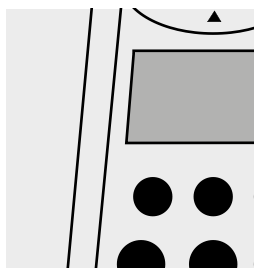
100857

Test

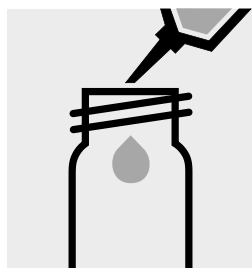
Measuring range: 11 – 1070 mg/l SiO_2	16-mm cell
5 – 500 mg/l Si	16-mm cell



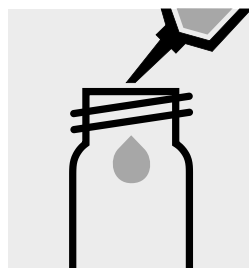
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method ④②①.



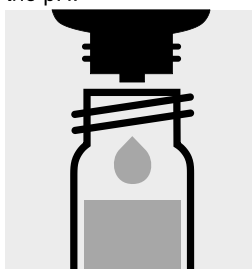
Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



Pipette 5.0 ml of distilled water (Water for analysis EMSURE®, Cat.No. 116754, is recommended) into a 16-mm cell.



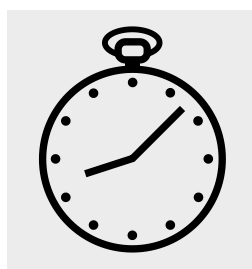
Add 0.50 ml of the sample with pipette, close with the screw cap, and mix.



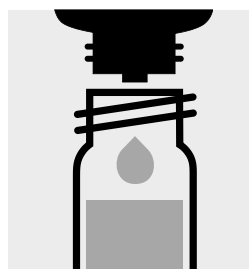
Add 4 drops of **Si-1**, close with the screw cap, and mix.



Add 2.0 ml of **Si-2** with pipette, close with the screw cap, and mix.



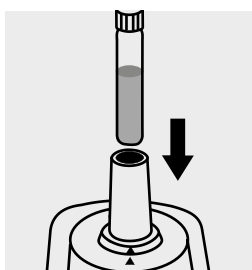
Reaction time: 2 minutes
Press to start the countdown.



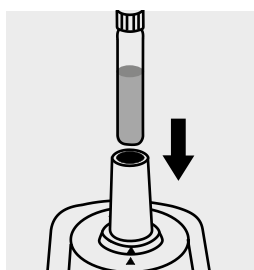
Add 4 drops of **Si-3**, close with the screw cap, and mix.



Reaction time: 2 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Quality assurance:

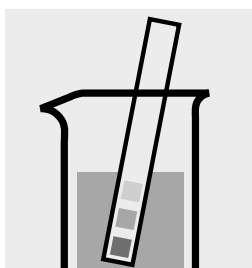
To check the measurement system (test reagents, measurement device, and handling) ready-to-use silicon standard solution Certipur®, Cat.No. 170236, concentration 1000 mg/l Si, can be used after diluting accordingly (Attention! Do **not** store standard solutions in glass vessels - see section "Standard solutions").

Silicate (Silicic Acid)

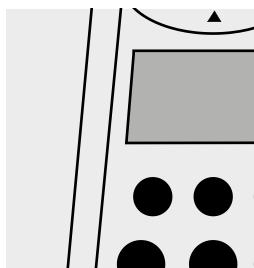
101813

Test

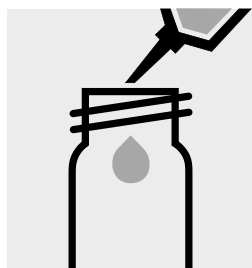
Measuring range: 0.004–0.500 mg/l SiO ₂	24-mm cell
0.002–0.234 mg/l Si	24-mm cell



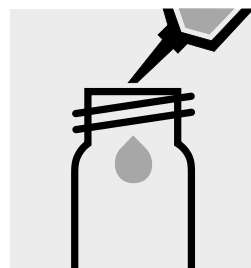
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (4)(2)(2).



Pipette 10 ml of the sample into a plastic vessel (**Flat-bottomed tubes, Cat.No. 117988**).



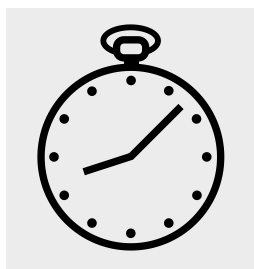
Pipette 10 ml of distilled water (Water Ultrapur, Cat.No. 101262, is recommended) into a second plastic vessel (**Flat-bottomed tubes, Cat.No. 117988**). (Blank)



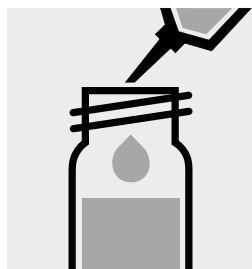
Add to each vessel 0.10 ml of **Si-1** with pipette, close with the screw cap, and mix.



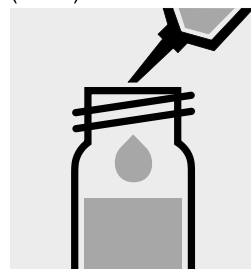
Check the pH, specified range: pH 1.2 – 1.6.



Reaction time: 5 minutes.
Press (↶) to start the countdown.



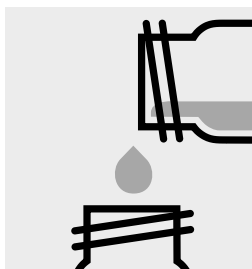
Add to each vessel 0.10 ml of **Si-2** with pipette, close with the screw cap, and mix.



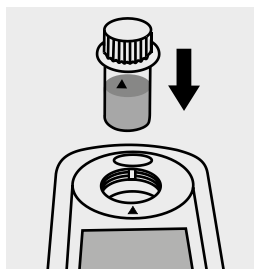
Add to each vessel 0.50 ml of **Si-3** with pipette, close with the screw cap, and mix.



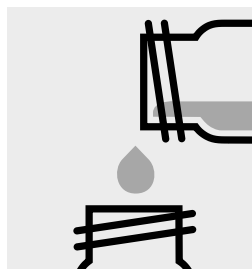
Reaction time: 5 minutes.
Press (↶) to start the countdown.



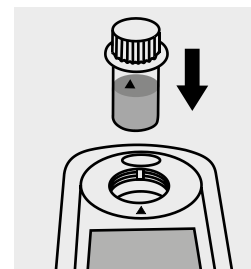
Transfer the blank into a 24-mm cell, close with the screw cap and measure **immediately**.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Transfer the measurement sample into a 24-mm cell, close with the screw cap and measure **immediately**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

No glass equipment may be used in the course of the determination (e.g. pipettes etc.)!

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use silicon standard solution Certipur®, Cat.No. 170236, concentration 1000 mg/l Si, can be used after diluting accordingly or the Standard solution for photometric applications, CRM, Cat.No. 132244 (Attention! Do **not** store standard solutions in glass vessels - see section "Standard solutions").

Sodium

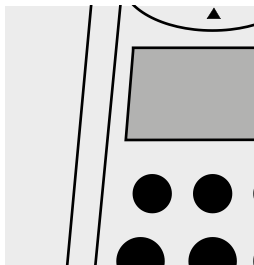
in nutrient solutions

100885

Cell Test

Measuring range: 10–300 mg/l Na

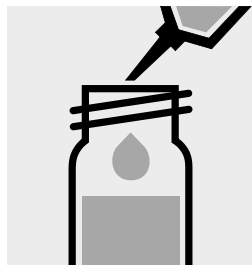
16-mm cell



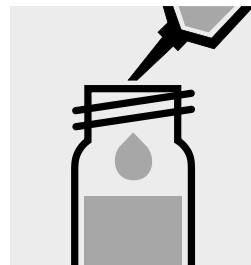
Select method (4)(3)(0).



Pipette 0.50 ml each of **Na-1K** into two reaction cells, close with the screw cap, and mix.



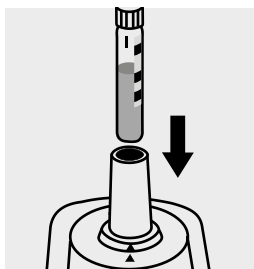
Add to one cell 0.50 ml of the sample with pipette, close with the screw cap, and mix.



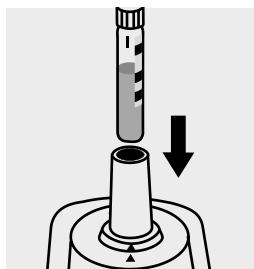
Add to the second cell 0.50 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Reaction time: 1 minute
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use chloride standard solution Certipur®, Cat.No. 119897, concentration 1000 mg/l Cl⁻ (corresponds to 649 mg/l Na), can be used after diluting accordingly (see section “Standard solutions”).

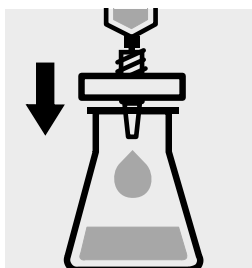
Sulfate

102532

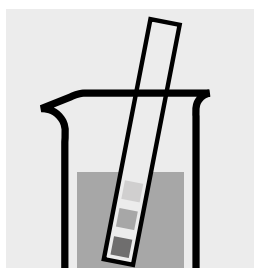
Cell Test

Measuring range: 2.0–50.0 mg/l SO_4

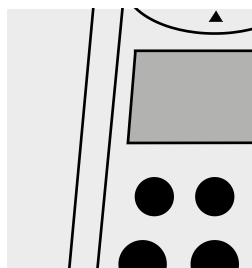
16-mm cell



Filter turbid samples.



Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



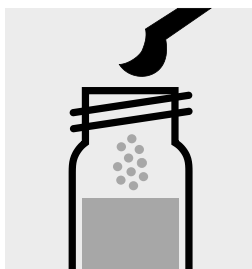
Select method 4 4 4.



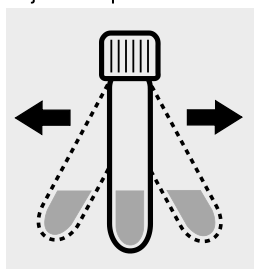
Pipette 10 ml of the sample into a reaction cell, close with the screw cap, and mix.



Pipette 10 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



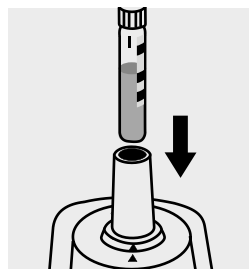
Add to each cell 1 level green microspoon of $\text{SO}_4\text{-1K}$, close the cell with the screw cap.



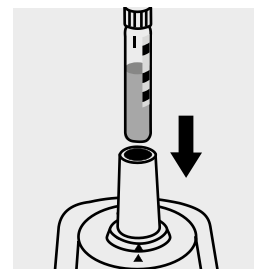
Shake both cells vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**.
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO_4^{2-} , can be used after diluting accordingly.

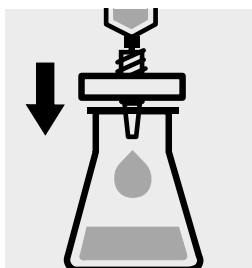
Sulfate

114548

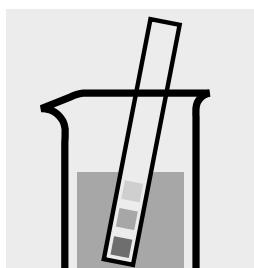
Cell Test

Measuring range: 5 – 250 mg/l SO₄

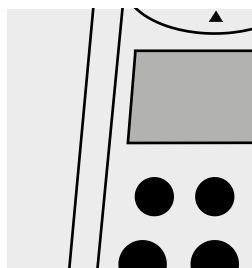
16-mm cell



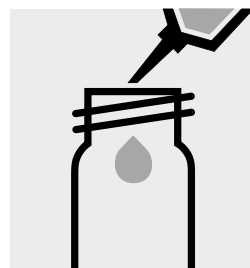
Filter turbid samples.



Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



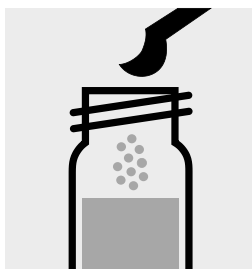
Select method (4)(4)(0).



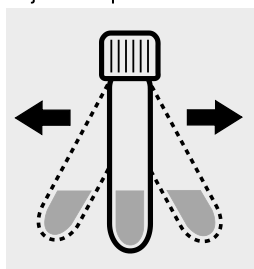
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 5.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



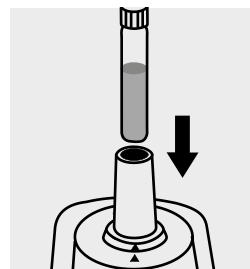
Add 1 level green micro-spoon of **SO₄-1K**, close the cell with the screw cap.



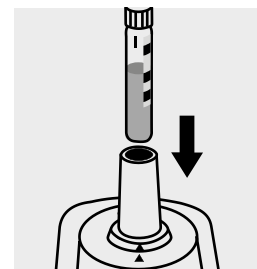
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**.
Press (←) to start the countdown.



Insert the blank cell into the cell compartment.
Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solutions for photometric applications, CRM, Cat.NoS. 125050 and 125051.

Ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO₄²⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

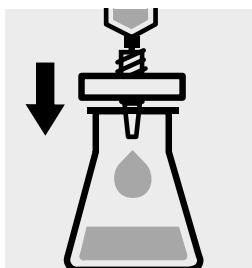
Sulfate

100617

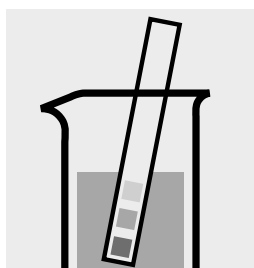
Cell Test

Measuring range: 50–500 mg/l SO₄

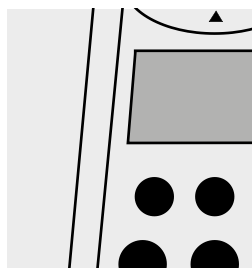
16-mm cell



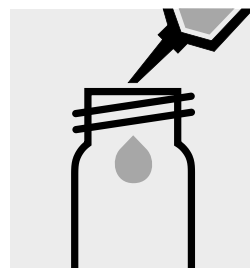
Filter turbid samples.



Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



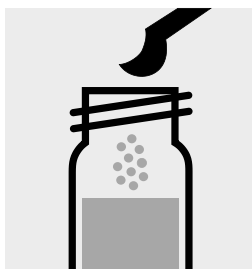
Select method 441.



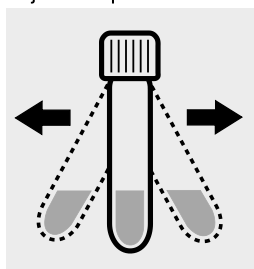
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 2.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



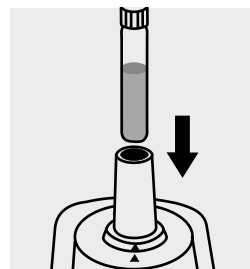
Add 1 level green micro-spoon of **SO₄-1K** and close the cell with the screw cap.



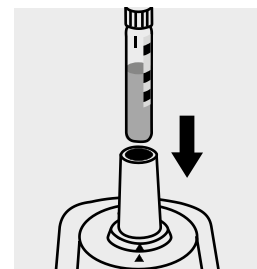
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**.
Press to start the countdown.



Insert the blank cell into the cell compartment.
Press .



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press .

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125051 and 125052.

Ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO₄²⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

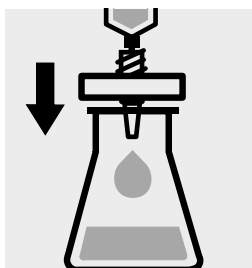
Sulfate

114564

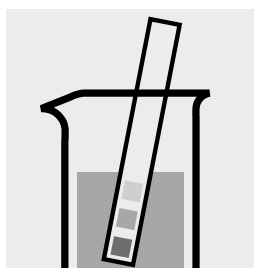
Cell Test

Measuring range: 100–1000 mg/l SO₄

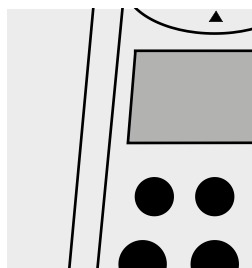
16-mm cell



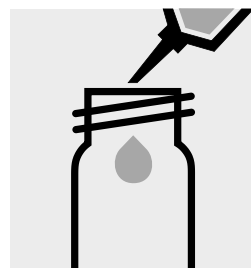
Filter turbid samples.



Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



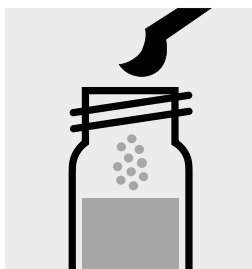
Select method (4)(4)(2).



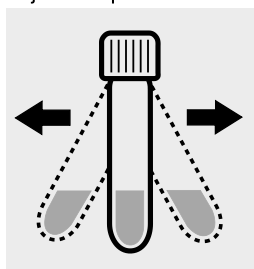
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



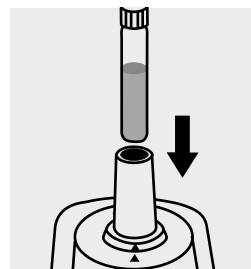
Add 1 level green micro-spoon of **SO₄-1K**, close the cell with the screw cap.



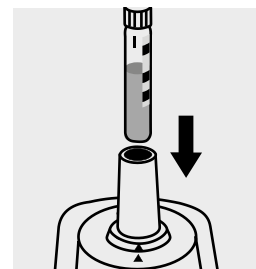
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**.
Press (←) to start the countdown.



Insert the blank cell into the cell compartment.
Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 20, Cat.No. 114675, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125051, 125052 and 125053.

Ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO₄²⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 20) is highly recommended.

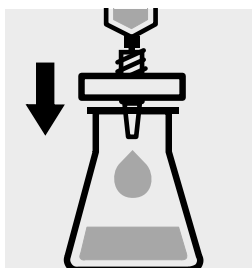
Sulfate

101812

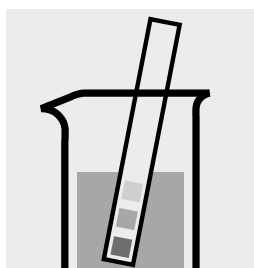
Test

Measuring range: 1.0–25.0 mg/l SO₄

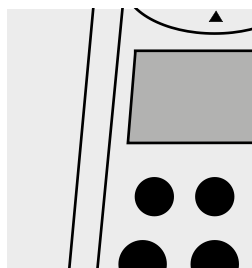
24-mm cell



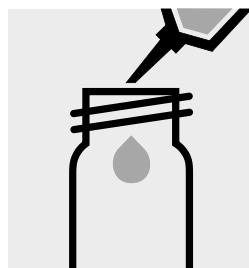
Filter turbid samples.



Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method ④④③.



Pipette 0.50 ml each of **SO₄-1** into two 24-mm cells.



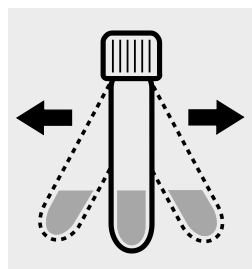
Add to one cell 10 ml of the sample with pipette, close with the screw cap, and mix.



Add to the second cell 10 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



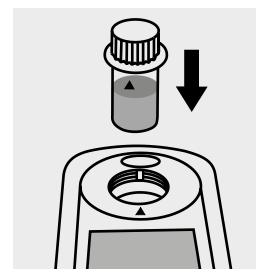
Add to each cell 1 level green microspoon of **SO₄-2**, close the cell with the screw cap.



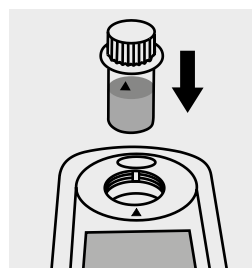
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**. Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO₄²⁻, can be used after diluting accordingly.

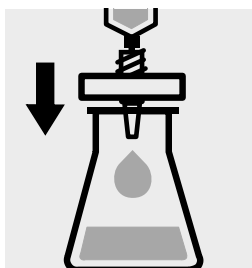
Sulfate

102537

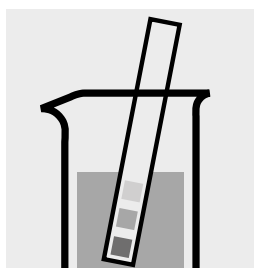
Test

Measuring range: 10–300 mg/l SO₄

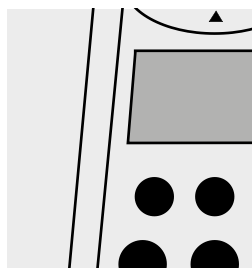
16-mm cell



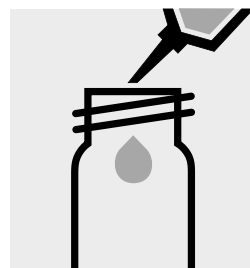
Filter turbid samples.



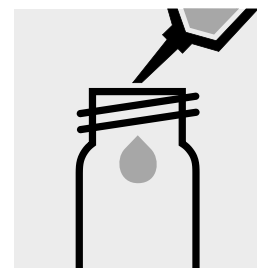
Check the pH of the sample, specified range: pH 2 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method (4)(4)(5).



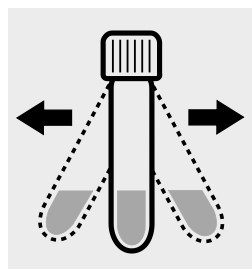
Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)

Pipette 0.50 ml of SO₄-1 into a 16-mm cell.

Add 5.0 ml of the sample with pipette, close with the screw cap, and mix.



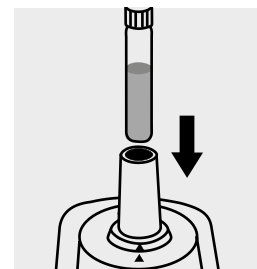
Add 1 level blue micro-spoon of SO₄-2 and close the cell with the screw cap.



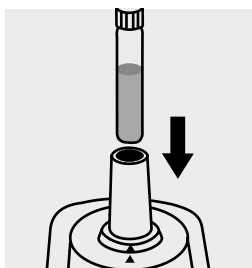
Shake the cell vigorously to dissolve the solid substance.



Reaction time: 2 minutes, **measure immediately**.
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Press (Zero).



Insert the cell containing the sample into the cell compartment. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 10, Cat.No. 114676, or the Standard solutions for photometric applications, CRM, Cat.Nos. 125050 and 125051.

Ready-to-use sulfate standard solution Certipur®, Cat.No. 119813, concentration 1000 mg/l SO₄²⁻, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 10) is highly recommended.

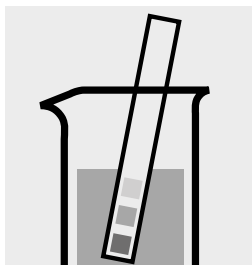
Sulfide

114779

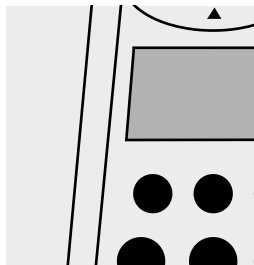
Test

Measuring range: 0.10 – 1.50 mg/l S

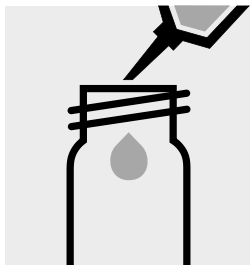
16-mm cell



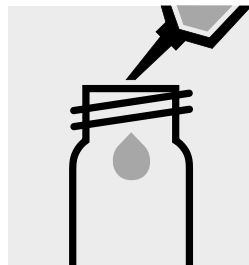
Check the pH of the sample, specified range: pH 2 – 10. If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



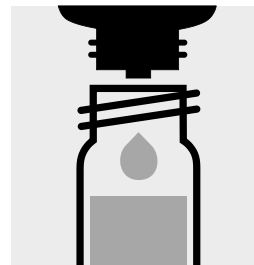
Select method **450**.



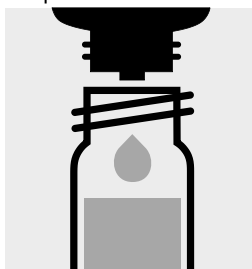
Fill approx. 10 ml of distilled water into a 16-mm cell (**do not add any reagents!**), close with the screw cap. (Blank cell)



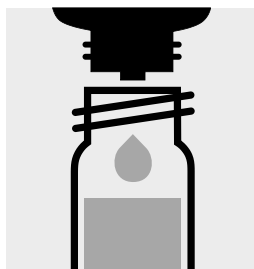
Pipette 5.0 ml of the sample into a 16-mm cell.



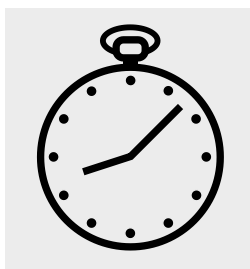
Add 1 drop of **S-1**, close with the screw cap, and mix.



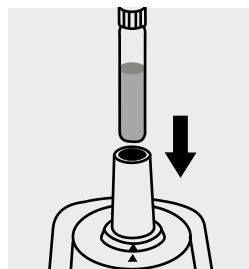
Add 5 drops of **S-2**, close with the screw cap, and mix.



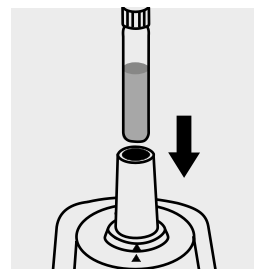
Add 5 drops of **S-3**, close with the screw cap, and mix.



Reaction time: 1 minute
Press **Start** to start the countdown.



Insert the blank cell into the cell compartment. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Press **Test**.

Quality assurance:

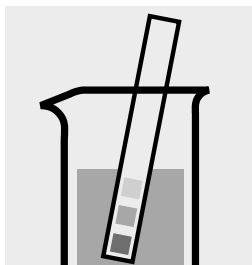
To check the measurement system (test reagents, measurement device, and handling) a sulfide standard solution must be prepared from sodium sulfide GR (see section "Standard solutions").

Sulfite

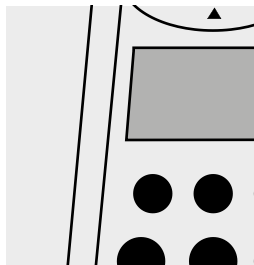
114394

Cell Test

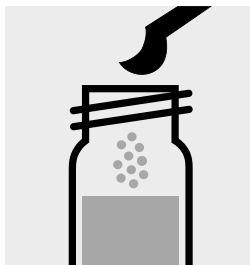
Measuring range: 1.0 – 20.0 mg/l SO ₃	16-mm cell
0.8 – 16.0 mg/l SO ₂	16-mm cell



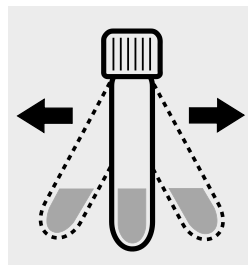
Check the pH of the sample, specified range: pH 4 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 460.



Add 1 level grey micro-spoon each of **SO₃-1K** into two reaction cells, close with the screw cap.



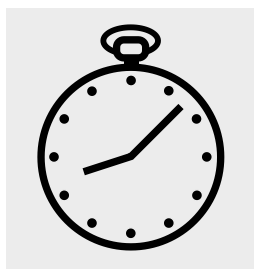
Shake both cells vigorously to dissolve the solid substance.



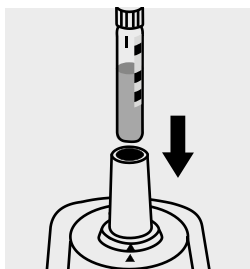
Add to one cell 3.0 ml of the sample with pipette, close with the screw cap, and mix.



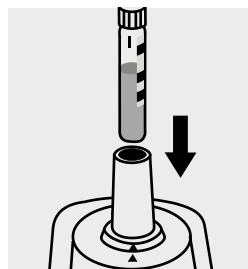
Add to the second cell 3.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Reaction time: 2 minutes.
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

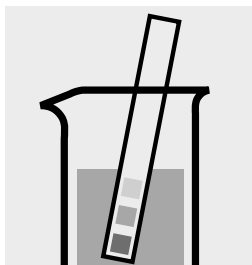
To check the measurement system (test reagents, measurement device, and handling) a sulfite standard solution must be prepared from sodium sulfite GR, Cat.No. 106657 (see section “Standard solutions”).

Sulfite

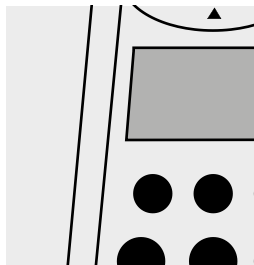
101746

Test

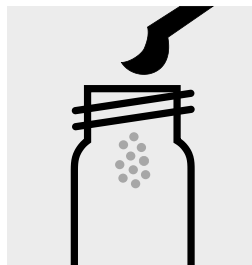
Measuring range: 1.0 – 60.0 mg/l SO_3	16-mm cell
0.8 – 48.0 mg/l SO_2	16-mm cell



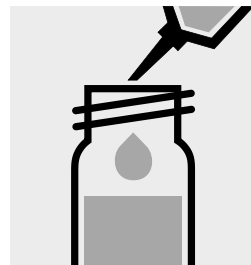
Check the pH of the sample, specified range: pH 4 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



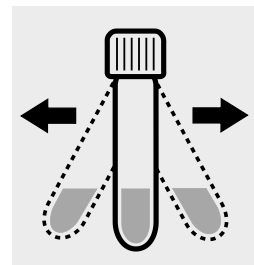
Select method ④⑥①.



Place 1 level grey microspoon each of $\text{SO}_3\text{-1}$ into two dry 16-mm cells.



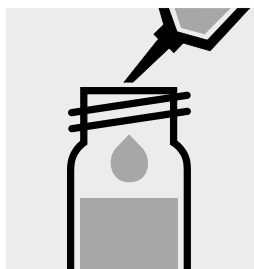
Add to each cell 3.0 ml of $\text{SO}_3\text{-2}$ with pipette, close with the screw cap.



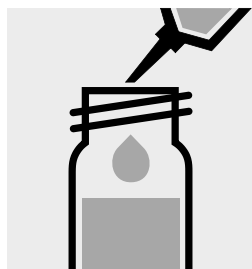
Shake both cells vigorously to dissolve the solid substance.



Add to each cell 5.0 ml of distilled water with pipette, close with the screw cap, and mix.



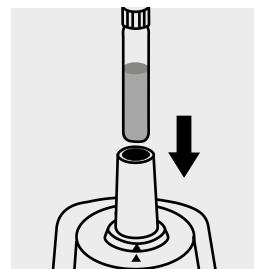
Add to one cell 2.0 ml of the sample with pipette, close with the screw cap, and mix.



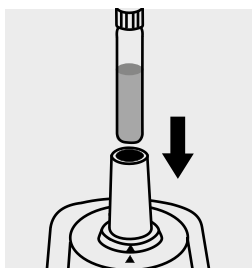
Add to the second cell 2.0 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Reaction time: 2 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Press .



Insert the cell containing the sample into the cell compartment. Press .

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a sulfite standard solution must be prepared from sodium sulfite GR, Cat.No. 106657 (see section “Standard solutions”).

Surfactants (anionic)

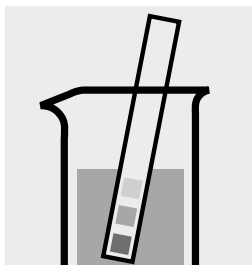
114697

Cell Test

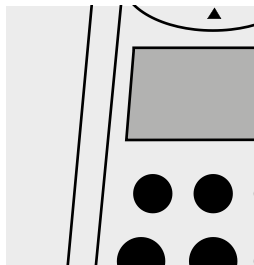
Measuring range: 0.05 – 2.00 mg/l MBAS*

16-mm cell

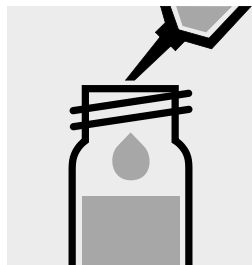
* Methylene-blue-active substances



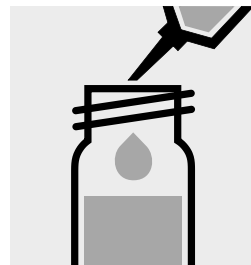
Check the pH of the sample, specified range: pH 5 – 10.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



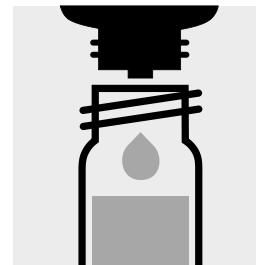
Select method (4)(7)(0).



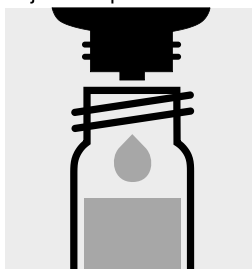
Pipette 5.0 ml of the sample into a reaction cell, **do not mix!**



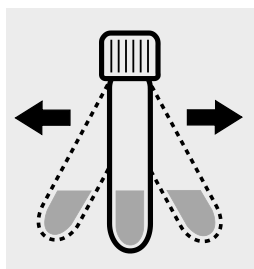
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, **do not mix!** (Blank cell)



Add to each cell 3 drops of T-1K, **do not mix!**



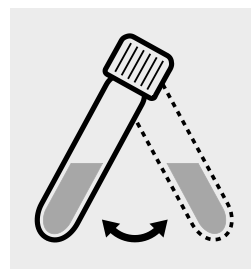
Add to each cell 2 drops of T-2K, close with the screw cap.



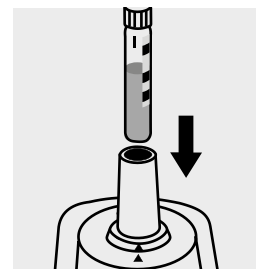
Shake both cells vigorously for 30 seconds.



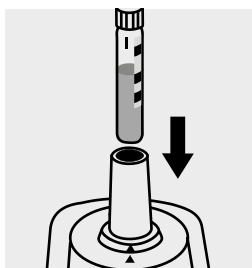
Reaction time: 10 minutes
Press (Start) to start the countdown.



Swirl both cells before the measurement.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a surfactants standard solution must be prepared from dodecane-1-sulfonic acid sodium salt GR, Cat.No. 112146 (see section “Standard solutions”).

Surfactants (anionic)

102552

Cell Test

Measuring range: 0.10 – 2.00 mg/l SDAS* 16-mm cell

*sodium 1-dodecanesulfonate

0.06 – 2.56 mg/l SDBS*

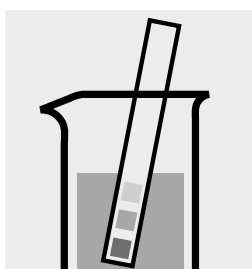
*sodium dodecylbenzenesulfonate

0.05 – 2.12 mg/l SDS*

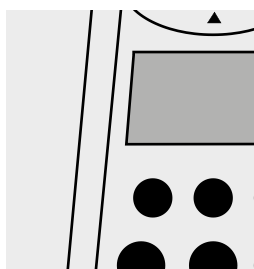
*sodium dodecyl sulfate

0.08 – 3.26 mg/l SDOSSA*

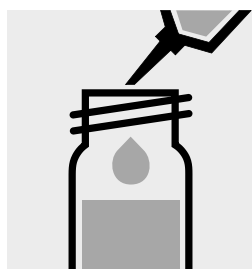
*sodium dioctyl sulfosuccinate



Check the pH of the sample, specified range: pH 5 – 10. If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method (4)(7)(3).



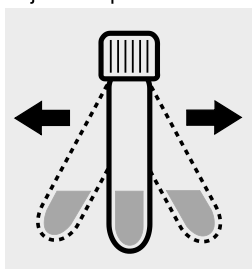
Pipette 5.0 ml of the sample into a reaction cell, **do not mix!**



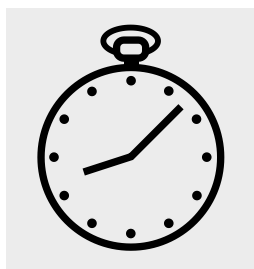
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, **do not mix!** (Blank cell)



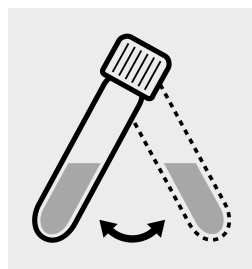
Add to each cell 2 drops of **T-1K**, close with the screw cap.



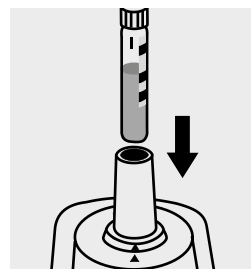
Shake both cells **vigorously for 30 seconds**.



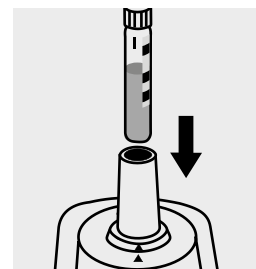
Reaction time: 10 minutes
Press (←) to start the countdown.



Swirl both cells before the measurement.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

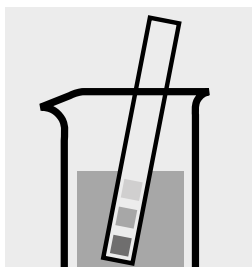
To check the measurement system (test reagents, measurement device, and handling) a surfactants standard solution must be prepared from dodecane-1-sulfonic acid sodium salt GR, Cat.No. 112146 (see section “Standard solutions”).

Surfactants (cationic)

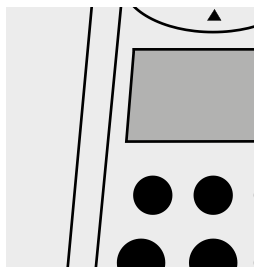
101764

Cell Test

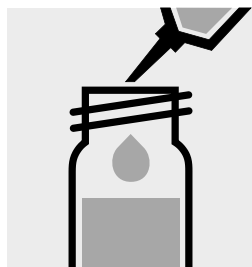
Measuring range: 0.05–1.50 mg/l surfactants (cationic) 16-mm cell
(calculated as N-cetyl-N,N,N-trimethylammonium bromide)



Check the pH of the sample, specified range: pH 3 – 8.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method 471.



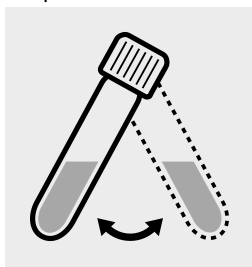
Pipette 5.0 ml of the sample into a reaction cell, **do not mix!**



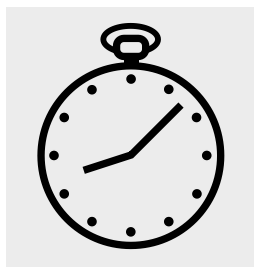
Pipette 5.0 ml of distilled water into a second reaction cell, close with the screw cap, **do not mix!** (Blank cell)



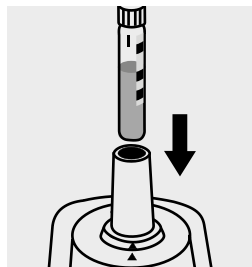
Add to each cell 0.50 ml of **T-1K** with pipette, close with the screw cap.



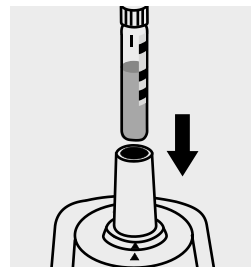
Swirl both cells for 30 seconds.



Reaction time: 5 minutes
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a surfactants standard solution must be prepared from Cetyltrimethylammonium Bromide, Cat.No. 219374 (see section “Standard solutions”).

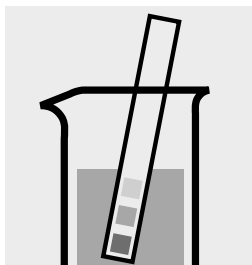
Surfactants (nonionic)

101787

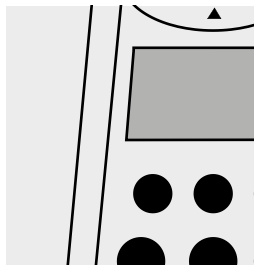
Cell Test

Measuring range: 0.10 – 7.50 mg/l surfactants (nonionic)
(calculated as Triton® X-100)

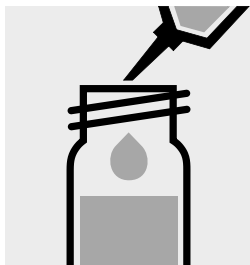
16-mm cell



Check the pH of the sample, specified range: pH 3 – 9.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



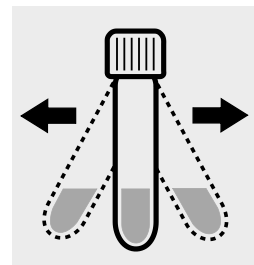
Select method (4)(7)(2).



Pipette 4.0 ml of the sample into a reaction cell, close with the screw cap.



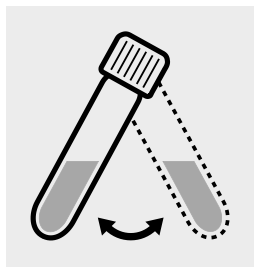
Pipette 4.0 ml of distilled water into a second reaction cell, close with the screw cap. (Blank cell)



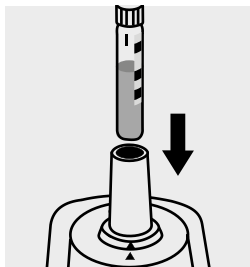
Shake both cells **vigorously for 1 minute**.



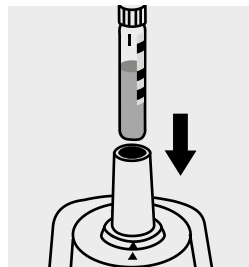
Reaction time:
2 minutes
Press (←) to start the countdown.



Swirl both cells before the measurement.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Quality assurance:

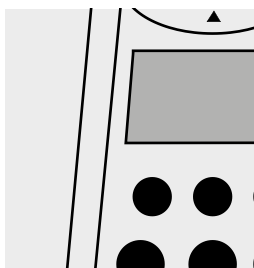
To check the measurement system (test reagents, measurement device, and handling) a surfactants standard solution must be prepared from Triton® X-100, Cat.No. 112298 (see section "Standard solutions").

The Standard solutions for photometric applications, CRM, Cat.Nos. 133022 and 133023 can also be used.

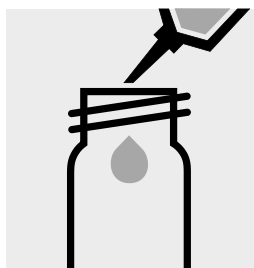
Suspended Solids

Measuring range: 50 – 750 mg/l of suspended solid

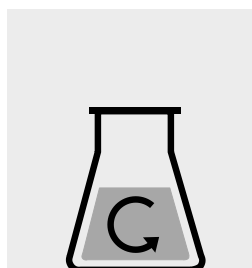
24-mm cell



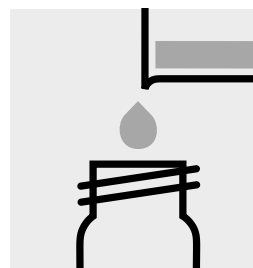
Select method 480.



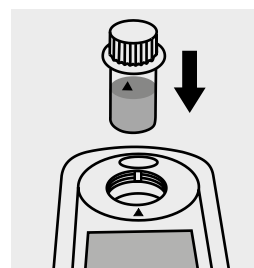
Fill approx. 10 ml of distilled water into a 24-mm cell, close with the screw cap. (Blank cell)



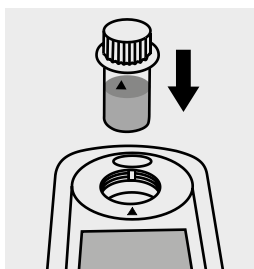
Homogenize 500 ml of sample for 2 minutes in a mixer running at high speed.



Transfer the solution into a 24-mm cell, close with the screw cap.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

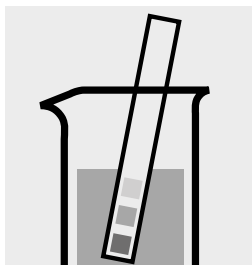
Tin

114622

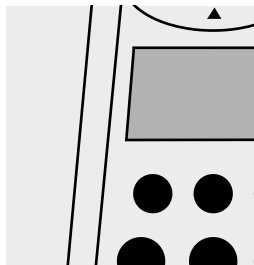
Cell Test

Measuring range: 0.10–2.50 mg/l Sn

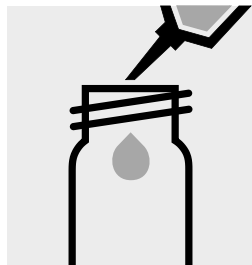
16-mm cell



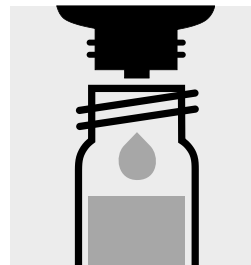
Check the pH of the sample, specified range: pH <3.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



Select method (4)(9)(0).



Fill approx. 10 ml of distilled water into an empty 16-mm cell (**do not add any reagents!**), close with the screw cap.
(Blank cell)



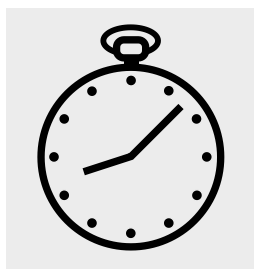
Add 6 drops of **Sn-1K** into a reaction cell, close with the screw cap, and mix.



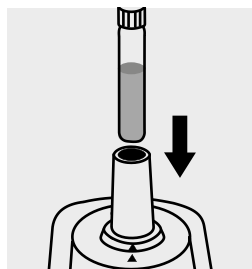
Add 5.0 ml of the sample with pipette, close with the screw cap, and mix.



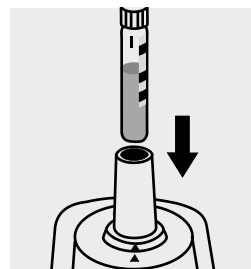
Check the pH, specified range: pH 1.5 – 3.5.
If required, add dilute sulfuric acid drop by drop to adjust the pH.



Reaction time: 15 minutes
Press (←) to start the countdown.



Insert the blank cell into the cell compartment.
Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer.
Press (Test).

Quality assurance:

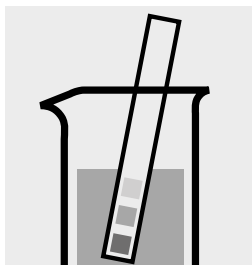
To check the measurement system (test reagents, measurement device, and handling) a tin standard solution must be prepared from ready-to-use tin standard solution Certipur®, Cat.No. 170242, concentration 1000 mg/l Sn (see section “Standard solutions”).

Total Hardness

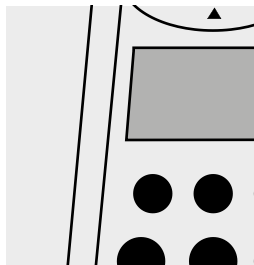
100961

Cell Test

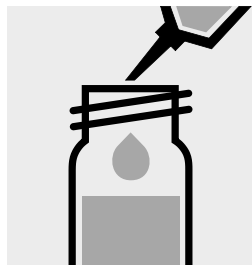
Measuring range: 5 – 215 mg/l Ca	16-mm cell	Measuring range: 0.7 – 30.1 °d	16-mm cell
7 – 301 mg/l CaO	16-mm cell	1.2 – 53.7 °f	16-mm cell
12 – 537 mg/l CaCO ₃	16-mm cell	0.9 – 37.6 °e	16-mm cell



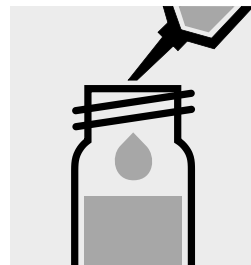
Check the pH of the sample, specified range: pH 3 – 9.
If required, add dilute sodium hydroxide solution or hydrochloric acid drop by drop to adjust the pH.



Select method **510**.



Pipette 1.0 ml of the sample into a reaction cell, close with the screw cap, and mix.



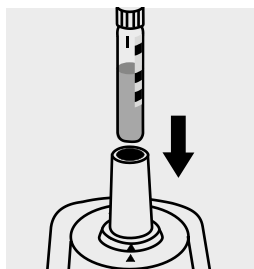
Pipette 1.0 ml of distilled water into a second reaction cell, close with the screw cap, and mix. (Blank cell)



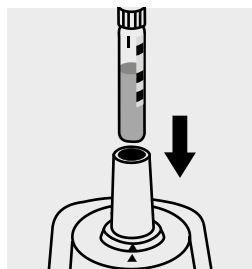
Add to each cell 1.0 ml of **H-1K** with pipette, close with the screw cap, and mix.



Reaction time: 3 minutes
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

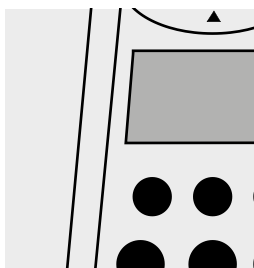
To check the measurement system (test reagents, measurement device, and handling) a freshly prepared standard solution can be used (see section “Standard solutions”).

Turbidity

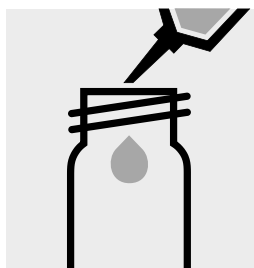
analogous to **EN ISO 7027**

Measuring range: 1 – 100 FAU

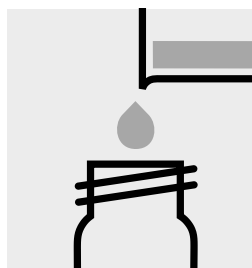
24-mm cell



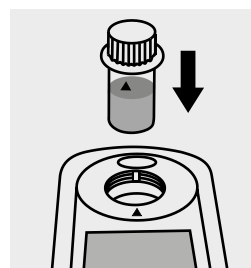
Select method **5****2****0**.



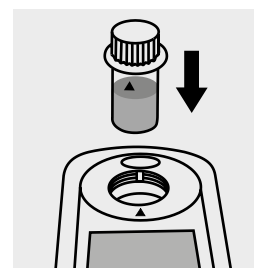
Fill approx. 10 ml of distilled water into a 24-mm cell, close with the screw cap. (Blank cell)



Transfer the sample into a 24-mm cell, close with the screw cap.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



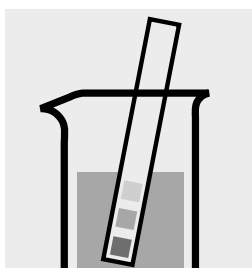
Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Volatile Organic Acids

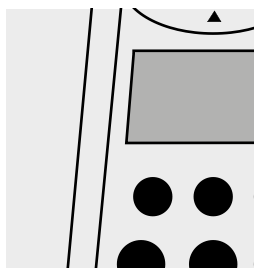
101749

Cell Test

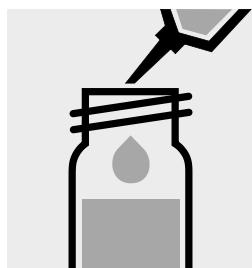
Measuring range: 50 – 3000 mg/l volatile organic acid	(calculated as acetic acid)	16-mm cell
71 – 4401 mg/l volatile organic acid	(calculated as butyric acid)	16-mm cell



Check the pH of the sample, specified range: pH 2 – 12.



Select method 531.



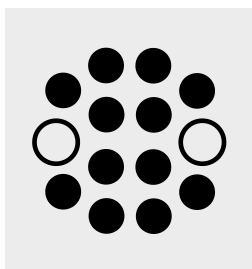
Pipette 0.50 ml each of **OA-1K** into two reaction cells.



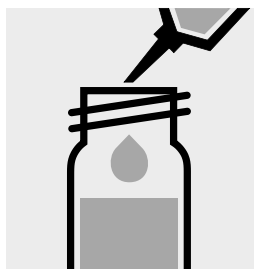
Add to one cell 0.50 ml of the sample with pipette, close with the screw cap, and mix.



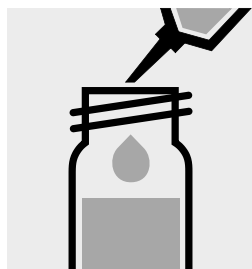
Add to the second cell 0.50 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



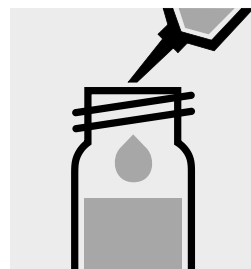
Heat both cells in the thermoreactor at 100 °C for 15 minutes. Then cool to room temperature under running water.



Add to each cell 1.0 ml of **OA-2K** with pipette.



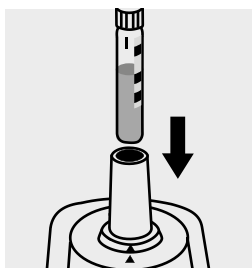
Add to each cell 1.0 ml of **OA-3K** with pipette, close with the screw cap, and mix.



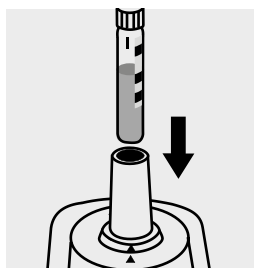
Add to each cell 1.0 ml of **OA-4K** with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

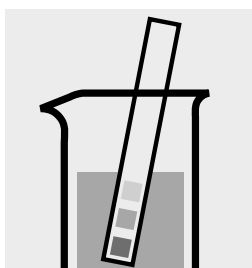
To check the measurement system (test reagents, measurement device, and handling) a standard solution must be prepared from sodium acetate anhydrous, Cat.No. 106268 (see section "Standard solutions").

Volatile Organic Acids

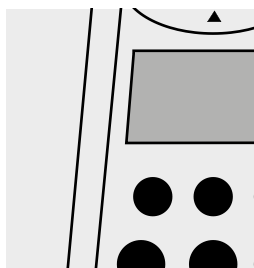
101809

Test

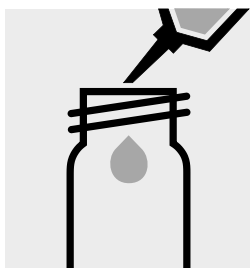
Measuring range: 50 – 3000 mg/l volatile organic acid	(calculated as acetic acid)	16-mm cell
71 – 4401 mg/l volatile organic acid	(calculated as butyric acid)	16-mm cell



Check the pH of the sample, specified range: pH 2 – 12.



Select method **531**.



Pipette 0.75 ml each of **OA-1** into two round cells.



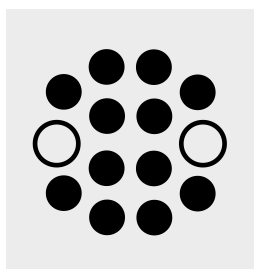
Add to each cell 0.50 ml of **OA-2** with pipette.



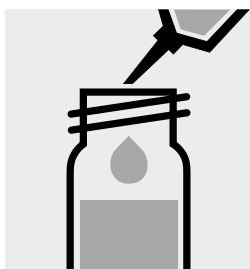
Add to one cell 0.50 ml of the sample with pipette, close with the screw cap, and mix.



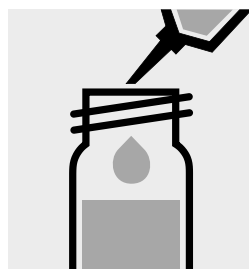
Add to the second cell 0.50 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



Heat both cells in the thermoreactor at 100 °C for 15 minutes. Then cool to room temperature under running water.



Add to each cell 1.0 ml of **OA-3** with pipette.



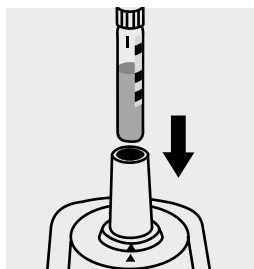
Add to each cell 1.0 ml of **OA-4** with pipette, close with the screw cap, and mix.



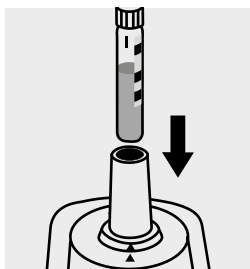
Add to each cell 1.0 ml of **OA-5** with pipette, close with the screw cap, and mix.



Reaction time: 1 minute
Press **←** to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) a standard solution must be prepared from sodium acetate anhydrous, Cat.No. 106268 (see section "Standard solutions").

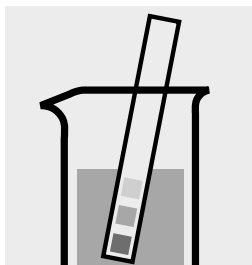
Zinc

100861

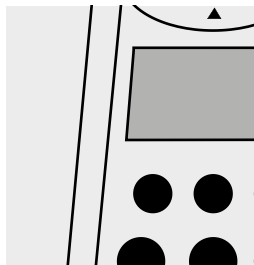
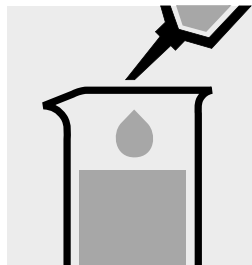
Cell Test

Measuring range: 25 – 1000 µg/l Zn

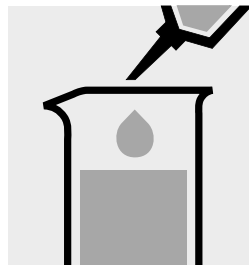
16-mm cell



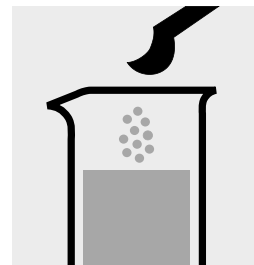
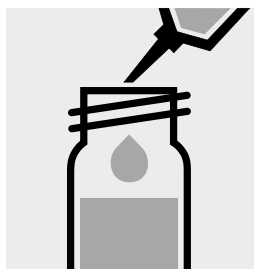
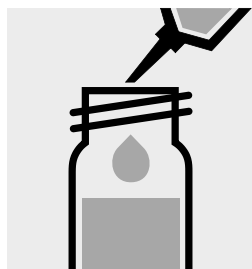
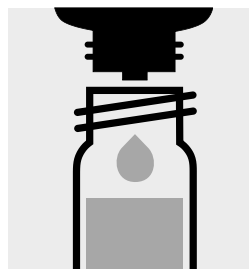
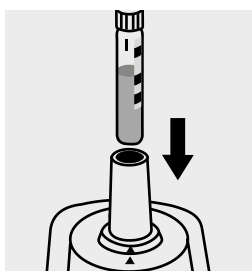
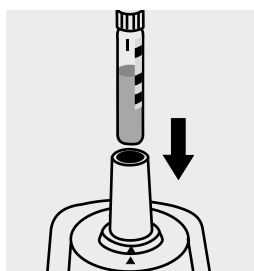
Check the pH of the sample, specified range: pH 1 – 7.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.

Select method **540**.

Pipette 10 ml of the sample into a glass vessel.



Pipette 10 ml of distilled water into a second glass vessel.

Add to each glass vessel 1 level green microspoon of **Zn-1K** and dissolve the solid substance: **pretreated sample / blank**.Pipette 0.50 ml each of **Zn-2K** into two reaction cells, close with the screw cap, and mix.Add to one cell 2.0 ml of **pretreated sample** with pipette, close the cell with the screw cap, and mix.Add to the second cell 2.0 ml of **pretreated blank** with pipette, close the cell with the screw cap, and mix. (Blank cell)Add to each cells 5 drops of **Zn-3K**, close the cell with the screw cap, and mix.Reaction time: 15 minutes
Press **Start/Stop** to start the countdown.Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press **Zero**.Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press **Test**.**Important:**

For the determination of **total zinc** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 100, Cat.No. 118701.

Ready-to-use zinc standard solution Certipur®, Cat.No. 119806, concentration 1000 mg/l Zn, can also be used after diluting accordingly.

The measurement results are expressed in µg/l.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 100) is highly recommended.

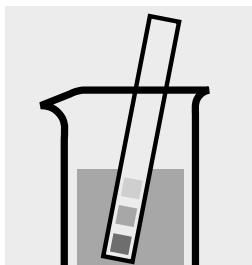
Zinc

114566

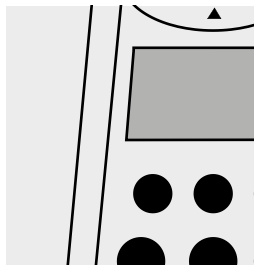
Cell Test

Measuring range: 0.20 – 5.00 mg/l Zn

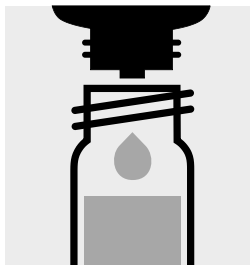
16-mm cell



Check the pH of the sample, specified range: pH 3 – 10.
If required, add dilute sodium hydroxide solution or sulfuric acid drop by drop to adjust the pH.



Select method (5)(4)(1).



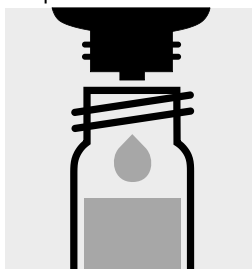
Add 5 drops each of **Zn-1K** into two reaction cells, close with the screw cap, and mix.



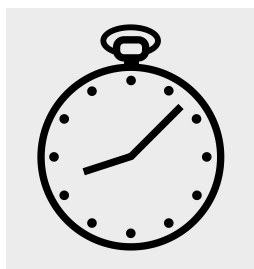
Add to one cell 0.50 ml of the sample with pipette, close with the screw cap, and mix.



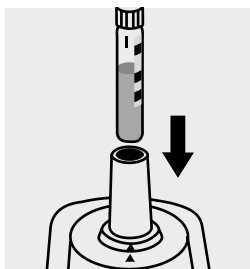
Add to the second cell 0.50 ml of distilled water with pipette, close with the screw cap, and mix. (Blank cell)



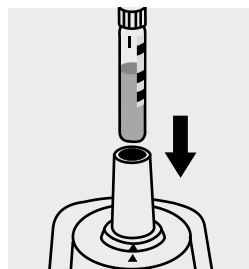
Add to each cell 5 drops of **Zn-2K**, close with the screw cap, and mix.



Reaction time: 15 minutes
Press (←) to start the countdown.



Insert the blank cell into the cell compartment. Align the mark on the cell with that on the photometer. Press (Zero).



Insert the cell containing the sample into the cell compartment. Align the mark on the cell with that on the photometer. Press (Test).

Important:

For the determination of **total zinc** a pretreatment with Crack Set 10C, Cat.No. 114688, or Crack Set 10, Cat.No. 114687, and thermoreactor is necessary.

Quality assurance:

To check the measurement system (test reagents, measurement device, and handling) we recommended to use Spectroquant® CombiCheck 40, Cat.No. 114692.

Ready-to-use zinc standard solution Certipur®, Cat.No. 119806, concentration 1000 mg/l Zn, can also be used after diluting accordingly.

To check for sample-dependent effects the use of addition solutions (e.g. in CombiCheck 40) is highly recommended.