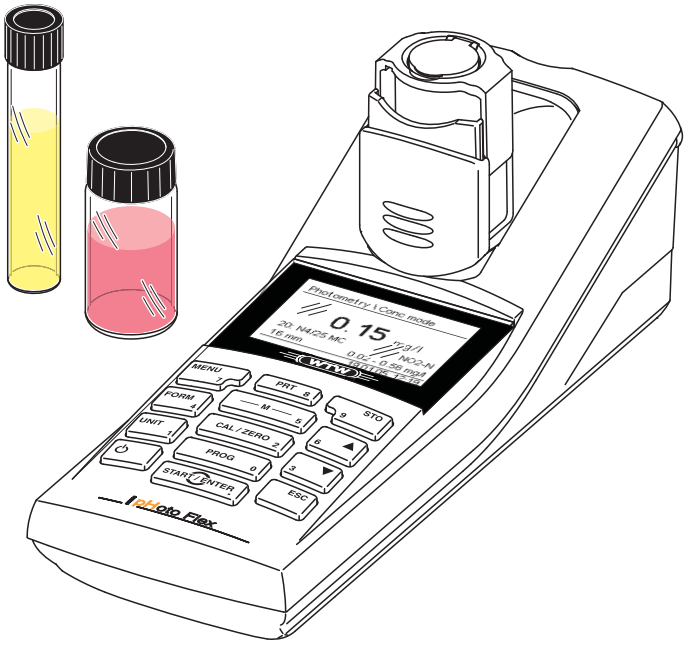
PHOTOMETRY
ANALYSIS MANUAL

ba75509e25 05/2022



pHotoFlex® series

PRACTICAL PART AND ANALYSIS SPECIFICATIONS, PROG. V 2.07 W

WTW
a xylem brand

Up-to-dateness of firmware

Part of the process of consequently improving our products is the continuos further development of instrument firmware. The current firmware for the pHotoFlex® series photometers can be found on the Internet. You can easily transfer it to your instrument with the aid of the AK 540/B cable provided and a Personal Computer.
More detailed information can be found in the appendix of this operating manual or on the Internet under http://www.WTW.com.

1 Practical part

1.1 For your safety

When developing test sets WTW carefully sees that the tests can be carried out as safely as possible. Some hazards by dangerous substances, however, cannot always be avoided.

Caution
Improper handling of certain reagents can cause damage to your health.
In any case follow the safety labels on the packing and the safety instructions of the package insert.
Protective measures specified there have to be followed exactly.

Qualification of the user

We assume that, due to their professional training and experience, the users are able to correctly understand the safety labels and safety instructions and to appropriately follow the protective measures specified there.

1.2 General information on test sets

Test sets contain special reagents that are added to the test sample according to a certain specification (analysis specification). These reagents react with the test sample. After the reaction the prepared product is inserted in the cell shaft of the photometer in a cell and the photometric measurement is carried out.

In addition to the reagents in the test set, further common laboratory auxiliary reagents can be required such as acids or lyes to adjust a certain pH value.

Categories

The test sets can be divided into two categories depending on the way they are carried out:

- Reaction cell tests
  They provide highest convenience. All the special reagents required are prepared in a measuring cell. Normally, a certain quantity of sample has just to be added (with some reaction cell tests, a dose of reagent as well).
- Reagent tests
  They contain all reagents required for measurement. Mostly, the sample and reagents can be prepared directly in the cell. An empty cell is required to carry out a reagent test (diameter, see analysis specification).

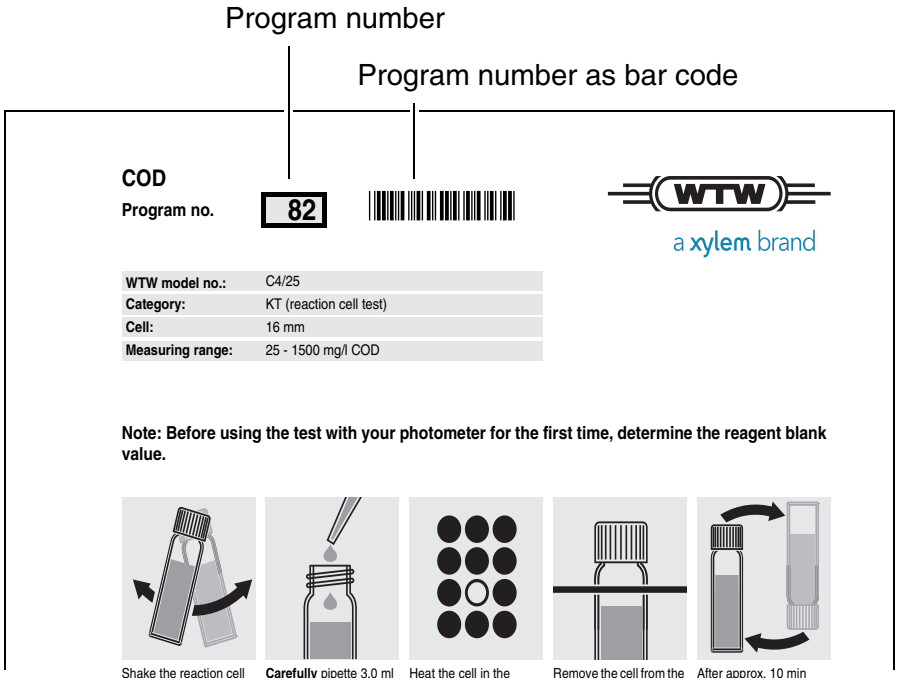
1.3 Carrying out photometric measurements

1.3.1 The analysis specifications

Following the present practical part are the analysis specifications for all photometric measurements that can be carried out with this photometer.

Program number

In order to measure, you have to enter on the photometer the program number quoted in the analysis specification. If you have connected a bar code reader, you can read in the program number from the analysis specification with it.



Further specifications

- WTW model number
- Category
- Cell to be used. Use suitable cells from the WTW product range only
- Measuring ranges and citation forms. After measurement you can switch between the stated citation forms.

Note

The measuring ranges specified in this Analysis Manual are valid especially for measurements with the pHotoFlex® series photometers and can be different from other data, e. g. on the package insert.

1.3.2 Reagent blank values

The evaluation of the photometric measurement always refers to the comparison value of a sample without the substance to be determined (reagent blank value). Thus the influence of the basic absorbance of the reagents on photometric measurement is compensated for.

In practice, measurement of the reagent blank value is carried out with the same amount of deionized water instead of sample.

Default reagent blank values

For most tests, the reagent blank value is a constant value. It was determined in the factory and stored in the photometer. You can, however, measure the reagent blank value yourself. The default reagent blank value is then overwritten. The default reagent blank values are restored when the photometer is reset to default settings.

Reagent blank values without factory default

For some tests, it does not make sense to store a default reagent blank value in the factory, e.g. if a change of certain test elements during the storing period cannot be excluded. In this case, a reagent blank value has to be determined before the first measurement with a new photometer. The photometer informs you if no valid reagent blank value is available. The measured reagent blank value remains stored in the meter until a new reagent blank value is determined. When the photo-meter is reset to default, all reagent blank values that were not stored in the factory are erased.

Note
You can increase accuracy if you determine the reagent blank value with a test of a newly started reagent package and use the reagent blank value for all tests of this package.

1.3.3 Standard adjustment (user calibration)

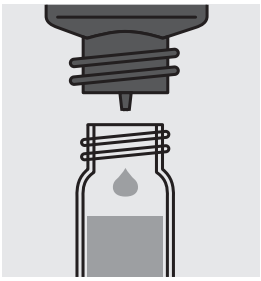
The pHotoFlex® pH and pHotoFlex® STD photometers provide the standard adjustment function. With this function you can adjust the factory-set calibration curve for some tests in order to optimize the accuracy if necessary. The standard adjustment especially compensates for lot specific deviations and age-related influences on the reagents.

For which tests the standard adjustment can be used is given in the LIST OF AVAILABLE PHOTOMETRIC TEST SETS on page 15.

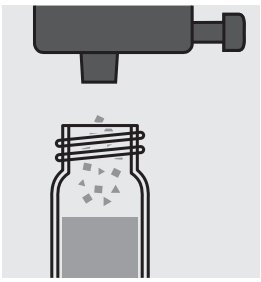
1.3.4 Dosing of sample and reagents

The exact dosing of the individual reagents is a precondition for the successful carrying out of a test. The test sets contain simple accessories for correct dosing.

Instructions on using dosing accessories provided with test sets



Dropping bottles (liquid dosing)
Hold the dropping bottle in an exactly vertical position with the dropping tip downward and let the reagent drip out slowly so the correct drop size forms.



Dosing tops/measurers (powder dosing)
Screw the dosing top on the reagent bottle instead of the screw cap. For dosing, hold the reagent bottle in a vertical position and for each specified dose press the lateral slide into the measurer up to the stop once. Subsequently, close the reagent bottle with the original screw cap so the contents cannot become moist.

Microspoon (powder dosing)
Microspoons are integrated in the screw cap of the reagent bottles. They are available in several colors for several dosing quantities.

Precise dosing of liquids

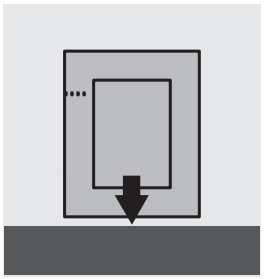
Exact dosing of the sample (and of certain reagents) is especially important. Use suitable laboratory pipettes for this. The two following pipettes from the WTW product range cover the whole range of required dosing volumes:

- Variable piston pipette 100-1000 µl (WTW model KHP/Var 1000)
- Variable piston pipette 0.5-5.0 ml (WTW model KHP/Var 5000)

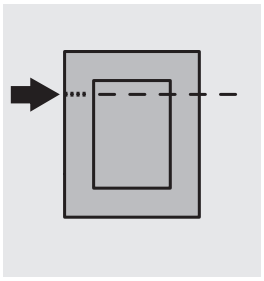
Read the operating manual of the pipette and make yourself really familiar with the correct dosing procedure. For volumes greater than 5.0 ml, pipette twice if necessary.

Use of powder packs

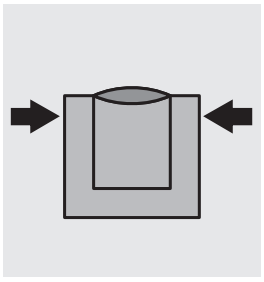
Some test sets contain reagents readily dosed as powder in small packs. Use the powder packs as follows:



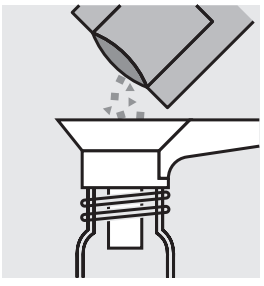
- Hold the powder pack in a vertical position as shown in the picture (perforation up) and hit it slightly against a solid base so the powder collects in the lower part.



- Cut open the pack (tear if necessary) along a horizontal line, starting at the perforation.



- Slightly press the pack from both sides so that a wide opening forms.



- Empty the pack completely. For narrow vessel openings use a suitable funnel top.

1.4 Working with the analysis timer

Many determination procedures include steps that need certain periods of time to expire. All these periods are stored in the photometer. If the analysis timer is switched on, a corresponding timer is activated for each time-critical step according to the proceeding described in the analysis specification. Only after all timers have expired can the photometric measurement be started.

1.5 Sample dilution

Diluting the sample can be required for the following reasons:

- The expected concentration of the substance to be determined is near or above the upper measuring range limit
- Other substances in the sample cause the measured values to be too high or too low due to matrix interferences

With the pHotoFlex® series you can measure diluted samples without having to multiply the measured value by the dilution factor afterwards. The measuring range is extended automatically. To do so, enter the dilution number in the photometer before measuring. Admissible are dilution numbers from 1+1 up to 1+99 (volume parts water + volume parts test sample) in whole number steps.

For diluting, use deionized water and common laboratory dosing equipment with sufficient dosing accuracy (volumetric flasks, pipettes etc.).

Note
Note that the dilution error can increase with an increasing dilution. Therefore, check whether a different test or method with a suitable measuring range can be used instead of diluting the sample.

1.6 Minimizing interfering effects

1.6.1 General information

The following factors can affect photometric determination and cause incorrect measurement results:

- Unsuitable pH value of the sample
- Turbidity
- Interferences due to certain water substances (e.g. complexing agents often disturb the determination of metals)
- Adverse temperature
- Improper, especially not representative, sampling
- Change of the sample due to too long storing period or unsuitable storing conditions until measurement

Many tests have package inserts included. Read these package inserts thoroughly. They inform you of special features to be noted during sampling, preparing the sample and carrying out the test and of possible interferences.

The following chapters provide a detailed description of important influencing factors and practical instructions on remedial actions.

1.6.2 Influence of the pH value

The pH value can affect the course of chemical reactions in a photometric determination. For some tests the pH value of a solution has to be in a certain range. With these tests, the analysis specification informs you of the necessity to check and if necessary adjust the pH value.

Adjusting the pH value

Observe the following points when adjusting the pH range:

- Measure the pH value with the aid of a pH meter or pH indicator
- Use the acids and lyes specified in the analysis specification
- Add the acid or lye drop by drop and measure the pH value after each drop added. Thus the volume of the sample does not increase (is not diluted) too much
- The volume increase by the drops is negligible if the resulting dilution is less than 2 %. With a greater dilution, the measurement result should be converted accordingly. Adding up to five drops per 10 ml of solution is uncritical as a rule of thumb.

1.6.3 Influence of turbidity

With samples that are visibly turbid, measured values can be oscillating or too high or too low during photometrical determination.

Compensating for turbidity

Depending on the type of sample or substance to be determined, the influence of turbidity can be compensated for in different ways:

- If you are positive that the substance to be determined is exclusively in the dissolved part, the sample can be filtrated before carrying out determination. For filtrating, simple common laboratory paper filters or membrane filters (recommended pore size 0.45 µm) can be used.
- If you assume that a considerable part of the substance to be determined is bound in the solid part of the sample, the substance has to be brought into an analysable form before carrying out the photometric determination. This is done in a chemical digestion procedure. Suitable digestion reagents can be found in the WTW catalog. With some procedures, the critical solid substance part is digested during the determination itself (e. g. COD measurement in aqueous samples with suspended matter with parts of organic compounds). Here it is important for an exact determination that the part of suspended matter be representative for the sample. For this the sample has to be homogenized, e.g. with a disperser.

1.6.4 Influence of complexing agents

Complexing agents can disturb the determination of metals by forming very stable compounds with them. In this form the metals cannot be analyzed. Here, a digestion has to be carried out prior to photometric determination. Suitable digestion reagents can be found in the WTW catalog.

1.7 Ordering information

Description	Model	Order no.
16 mm empty cell (25 pieces)	RK 14/25	250 621
Variable piston pipette 100-1000 µl	KHP/Var 1000	250 545
Variable piston pipette 0.5-5.0 ml	KHP/Var 5000	250 546

2 Analysis specifications

List of available photometric test sets

Name	Prog	Model	Order no.	Measuring range (main citation form)	Cell	Type(1)	Blank value	P.
Acid capacity up to pH 4.3	105	01758	252087	0.40 - 8.00 mmol/l OH	16 mm	KT	required	21
Alkalinity-M = M-value	351(5)	KsM-1	251424	5 - 200 mg/l $CaCO_3$	28 mm	RT	required	22
Alkalinity-P = P-value	352(5)	KsP-1	251425	5 - 300 mg/l $CaCO_3$	28 mm	RT	required	23
Aluminium	30	14825	250425	0.05 - 0.40 mg/l Al	28 mm	RT	required	24
Aluminium	323(5)	Al-1 TP	251400	0.002 - 0.250 mg/l Al	28 mm	RT	required	25
Ammonia (4)	74	14544	250329	(0.5 - 16.0 mg/l NH_4-N)	16 mm	KT	required	26
Ammonia (4)	71	14752/1 14752/2	250426 252081	(0.02 - 0.90 mg/l NH_4-N)	28 mm	RT		27
Ammonia (4)	72	14752/1 14752/2	250426 252081	(0.02 - 1.50 mg/l NH_4-N)	16 mm	RT		28
Ammonia (4)	341	NH4-1 TP	251408	(0.01 - 0.50 mg/l NH_4-N)	28 mm	RT	required	29
Ammonia (4)	339	NH4-2 TC (LR)	251997	(0.02 - 2.50 mg/l NH_4-N)	16 mm	KT	required	30
Ammonia (4)	340	NH4-3 TC (HR)	251998	(0.4 - 50.0 mg/l NH_4-N)	16 mm	KT	required	31
Ammonia (free)	333	NH3-1 TR	251419RP1	0.010 - 0.500 mg/l NH_3-N (f)	28 mm	RT		32
Ammonium	60	14544	250329	0.5 - 16.0 mg/l NH_4-N	16 mm	KT	required	33
Ammonium	48	14558	252000	0.20 - 8.00 mg/l NH_4-N	16 mm	KT	required	34
Ammonium	31	14752/1 14752/2	250426 252081	0.02 - 0.90 mg/l NH_4-N	28 mm	RT		35
Ammonium	32	14752/1 14752/2	250426 252081	0.02 - 1.50 mg/l NH_4-N	16 mm	RT		36
Ammonium	83	A6/25	252072	0.20 - 8.00 mg/l NH_4-N	16 mm	KT	required	37
Ammonium vario	324(5)	NH4-1 TP	251408	0.01 - 0.50 mg/l NH_4-N	28 mm	RT	required	38
Ammonium vario HR	313(5)	NH4-3 TC (HR)	251998	0.4 - 50.0 mg/l NH_4-N	16 mm	KT	required	39
Ammonium vario LR)	312(5)	NH4-2 TC (LR)	251997	0.02 - 2.50 mg/l NH_4-N	16 mm	KT	required	40
Arsenic	75	01747	252063	0.002 - 0.100 mg/l As	16 mm	RT		41
Bromine	526	Br2-1 CV	(6)	0.90 - 9.00 mg/l Br_2	13 mm	CV		(2)
Cadmium	103	01745	252051	0.010 - 0.500 mg/l Cd	28 mm	RT	required	42
Cadmium	4	14834	250314	0.025 - 1.000 mg/l Cd	16 mm	KT		43
Calcium	62	14815	250428	10 - 160 mg/l Ca	16 mm	RT	required	44
Calcium	63	14815	250428	5 - 80 mg/l Ca	28 mm	RT	required	45
Carbon dioxide (4)	106	01758	252087	(0.40 - 8.00 mmol/l OH)	16 mm	KT	required	46
Chloride	70	14730	250353	5 - 125 mg/l Cl	16 mm	KT	required	47

(1) KT = reaction cell test; RT = reagent test; CV = ampoule test
(2) Analysis specification, see package insert.
(3) No test set is required to determine coloration.
(4) This programm includes a pH measurement by means of the integrated pH function of the meter. Thus the programm cannot be used with the pHotoFlex® STD.
(5) Standard adjustment (user calibration) is possible.
Note: Standard adjustment is not possible with pHotoFlex® Turb meters with serial numbers < 12420000.

Name	Prog	Model	Order no.	Measuring range (main citation form)	Cell	Type[1]	Blank value	P.
Chloride	64	14897	250491	10 - 190 mg/l Cl	16 mm	RT	required	48
Chloride	104	14897	250491	2.5 - 30.0 mg/l Cl	16 mm	RT	required	49
Chlorine (free & total)	34	00597	250420	0.05 - 4.50 mg/l Cl_2	16 mm	KT		50
Chlorine (free & total)	109	00597	250420	0.025 - 2.500 mg/l Cl_2	28 mm	KT		51
Chlorine (free)	33	00595	250419	0.05 - 4.50 mg/l Cl_2	16 mm	KT		52
Chlorine (free)	108	00595	250419	0.025 - 2.500 mg/l Cl_2	28 mm	KT		53
Chlorine (free) vario	325	Cl2-1 TP	251401	0.02 - 2.00 mg/l Cl_2	28 mm	RT	required	54
Chlorine (free) vario	326	Cl2-2 TP	251402	0.5 - 5.0 mg/l Cl_2	28 mm	RT	required	55
Chlorine (total) vario	327	Cl2-3 TP	251414	0.02 - 2.00 mg/l Cl_2	28 mm	RT	required	56
Chlorine (total) vario	328	Cl2-4 TP	251415	0.5 - 5.0 mg/l Cl_2	28 mm	RT	required	57
Chlorine (with liquid reagents)	110	00086/00087/ 00088	252077/ 252078/ 252079	0.05 - 4.50 mg/l Cl_2	16 mm	KT		58
Chlorine (with liquid reagents)	111	00086/00087/ 00088	252077/ 252078/ 252079	0.025 - 2.500 mg/l Cl_2	28 mm	KT		59
Chlorine dioxide	38	00608	252017	0.02 - 5.00 mg/l ClO_2	28 mm	RT		60
Chlorine dioxide	39	00608	252017	0.02 - 7.50 mg/l ClO_2	16 mm	RT		61
Chrome	5	14552	250341	0.05 - 2.00 mg/l Cr	16 mm	KT		62
COD	114	01797	252093	5000 - 90000 mg/l COD	16 mm	KT	required	63
COD	49	14540	252001	10 - 150 mg/l COD	16 mm	KT	required	64
COD	50	14541	252002	25 - 1500 mg/l COD	16 mm	KT	required	65
COD	99	14555	250309	500 - 9500 mg/l COD	16 mm	KT	required	66
COD	97	14690	250304	50 - 500 mg/l COD	16 mm	KT	required	67
COD	98	14691	250351	300 - 3500 mg/l COD	16 mm	KT	required	68
COD	96	14895	250359	15 - 300 mg/l COD	16 mm	KT	required	69
COD	81	C3/25	252070	10 - 150 mg/l COD	16 mm	KT	required	70
COD	82	C4/25	252071	25 - 1500 mg/l COD	16 mm	KT	required	71
COD (Hg-free)	58	09772	250301	10 - 150 mg/l COD	16 mm	KT	required	72
COD (Hg-free)	59	09773	250306	100 - 1500 mg/l COD	16 mm	KT	required	73
COD HR	311[5]	COD3 TC (HR)	251992	200 - 15000 mg/l COD	16 mm	KT	required	74
COD HR (Hg-free)	350[5]	COD13 TC (HR-MF)	251986	0 - 15000 mg/l COD	16 mm	KT	required	75
COD LR	309[5]	COD1 TC (LR)	251990	3 - 150 mg/l COD	16 mm	KT	required	76
COD LR (Hg-free)	348[5]	COD11 TC (LR-MF)	251984	0 - 150 mg/l COD	16 mm	KT	required	77
COD MR	310[5]	COD2 TC (MR)	251991	20 - 1500 mg/l COD	16 mm	KT	required	78

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Name	Prog	Model	Order no.	Measuring range (main citation form)	Cell	Type[1]	Blank value	P.
COD MR (Hg-free)	349[5]	COD12 TC (MR-MF)	251985	0 - 1500 mg/l COD	16 mm	KT	required	79
Coloration at 435 nm (FB436)	43	FB436	[3]	0.1 - 50.0 m^{-1}	28 mm			80
Coloration at 517 nm (FB517)	44	FB517	[3]	0.1 - 50.0 m^{-1}	28 mm			81
Coloration at 610 nm (FB610)	45	FB610	[3]	0.1 - 50.0 m^{-1}	28 mm			82
Copper	13	14553	250408	0.05 - 7.50 mg/l Cu	16 mm	KT		83
Copper	41	14767	250441	0.04 - 3.50 mg/l Cu	28 mm	RT		84
Copper	42	14767	250441	0.10 - 6.00 mg/l Cu	16 mm	RT		85
Copper vario	302[5]	Cu-1 TP	251403	0.04 - 5.00 mg/l Cu	28 mm	RT	required	86
Cyanide (free cyanide)	6	14561	250344	0.01 - 0.30 mg/l CN	16 mm	KT		87
Cyanuric Acid	113	19253	252091	2 - 160 mg/l Cyan Acid	28 mm	RT		88
DEHA vario	335	DEHA-1 TP	251421	0.004 - 0.450 mg/l DEHA	28 mm	RT	required	89
Fluoride	115	00809	252094	0.10 - 1.80 mg/l F	16 mm	KT	required	90
Formaldehyde	92	14500	250406	0.10 - 7.00 mg/l HCHO	16 mm	KT	required	91
Gold	77	14821	250436	0.5 - 9.0 mg/l Au	16 mm	RT		92
Hydrazine vario	329[5]	N2H4-1 TP	251416	0.004 - 0.600 mg/l N_2H_4	28 mm	RT	required	93
Iron	9	14549	250349	0.05 - 3.00 mg/l Fe	16 mm	KT		94
Iron	10	14761	250435	0.05 - 1.50 mg/l Fe	28 mm	RT		95
Iron	11	14761	250435	0.10 - 3.00 mg/l Fe	16 mm	RT		96
Iron	107	14896	250361	1.0 - 50.0 mg/l Fe	16 mm	KT	required	97
Iron vario	301[5]	Fe-2 TP	251405	0.02 - 3.00 mg/l Fe	28 mm	RT	required	98
Iron vario TPTZ	300[5]	Fe-1 TP	251404	0.012 - 1.800 mg/l Fe	28 mm	RT	required	99
Lead	2	09717	252034	0.01 - 4.00 mg/l Pb	28 mm	RT	required	100
Lead	3	09717	252034	0.02 - 5.00 mg/l Pb	16 mm	RT	required	101
Magnesium	47	00815	252043	5.0 - 75.0 mg/l Mg	16 mm	KT	required	102
Manganese	14	00816	252035	0.10 - 5.00 mg/l Mn	16 mm	KT		103
Manganese	15	14770	250442	0.02 - 5.00 mg/l Mn	28 mm	RT		104
Manganese	16	14770	250442	0.04 - 9.00 mg/l Mn	16 mm	RT		105
Manganese vario	303[5]	Mn-1 TP	251406	0.2 - 20.0 mg/l Mn	28 mm	RT	required	106
Manganese vario	330[5]	Mn-2 TP	251417	0.007 - 0.700 mg/l Mn	28 mm	RT	required	107
Molybdate vario	304[5]	Mo-1 TP	251407	0.3 - 35.0 mg/l Mn	28 mm	RT	required	108
Molybdenum	80	00860	252040	0.02 - 1.00 mg/l Mo	16 mm	KT	required	109
Molybdenum	112	19252	252090	0.02 - 1.00 mg/l Mo	16 mm	KT		110
Molybdenum vario	331[5]	Mo-2 TP	251418	0.3 - 40.0 mg/l Mo	28 mm	RT	required	111
Monochloramine (MCA)	342	MCA TP	251419	0.04 - 4.50 mg/l Cl_2 (MCA)	16 mm	RT		112
Monochloramine (MCA)	343	MCA TP	251419	0.04 - 3.00 mg/l Cl_2 (MCA)	28 mm	RT		113

[1] KT = reaction cell test; RT = reagent test; CV = ampoule test
[2] Analysis specification, see package insert.
[3] No test set is required to determine coloration.
[4] This programm includes a pH measurement by means of the integrated pH function of the meter. Thus the programm cannot be used with the pHotoFlex® STD.
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Name	Prog	Model	Order no.	Measuring range (main citation form)	Cell	Type[1]	Blank value	P.
Nickel	93	14554	250409	0.10 - 6.00 mg/l Ni	16 mm	KT	required	114
Nickel	95	14785	250443	0.10 - 3.80 mg/l Ni	28 mm	RT	required	115
Nitrate	17	14542	250410	0.5 - 14.5 mg/l NO_3-N	16 mm	KT		116
Nitrate	61	14556	250411	0.10 - 2.70 mg/l NO_3-N	16 mm	KT	required	117
Nitrate	69	14942	250422	0.2 - 13.0 mg/l NO_3-N	16 mm	KT	required	118
Nitrate	314[5]	NO3-1 TC	251993	0.2 - 30.0 mg/l NO_3-N	16 mm	KT	required	119
Nitrite	55	14547	252004	0.020 - 0.550 mg/l NO_2-N	16 mm	KT		120
Nitrite	18	14776/1 14776/2	250445 250440	0.01 - 0.30 mg/l NO_2-N	28 mm	RT		121
Nitrite	19	14776/1 14776/2	250445 250440	0.02 - 0.50 mg/l NO_2-N	16 mm	RT		122
Nitrite	85	N5/25	252074	0.020 - 0.550 mg/l NO_2-N	16 mm	KT		123
Nitrite HR	317[5]	NO2-2 TC	251994	0.30 - 3.00 mg/l NO_2-N	16 mm	KT	required	124
Nitrite LR	318[5]	NO2-2 TC	251994	0.03 - 0.60 mg/l NO_2-N	16 mm	KT	required	125
Nitrite vario	305[5]	NO2-1 TP	251409	0.002 - 0.300 mg/l NO_2-N	28 mm	RT	required	126
Nitrite vario	334[5]	NO2-3 TP	251420	0.002 - 0.300 mg/l NO_2-N	28 mm	RT	required	127
Nitrogen (total)	35	14537	250358	0.50 - 15.00 mg/l N	16 mm	KT	required	128
Nitrogen, total HR	320[5]	Ntot2 TC (HR)	251996	10 - 150 mg/l N	16 mm	KT	required	129
Nitrogen, total LR	319[5]	Ntot1 TC (LR)	251995	0.5 - 25.0 mg/l N	16 mm	KT	required	130
Ozone	36	00607/1 00607/2	252016 252054	0.01 - 1.80 mg/l O_3	28 mm	RT		131
Ozone	37	00607/1 00607/2	252016 252054	0.01 - 3.50 mg/l O_3	16 mm	RT		132
Phenol	91	14551	250412	0.10 - 2.50 mg/l C_6H_5OH	16 mm	KT	required	133
Phosphate	21	14546	250413	0.5 - 25.0 mg/l PO_4-P	16 mm	KT	required	134
Phosphate	22	14848/1 14848/2	250446 252086	0.02 - 1.60 mg/l PO_4-P	28 mm	RT		135
Phosphate	23	14848/1 14848/2	250446 252086	0.05 - 3.00 mg/l PO_4-P	16 mm	RT		136
Phosphate vario (ortho)	306[5]	PO4-1 TP	251410	0.007 - 0.800 mg/l PO_4-P	28 mm	RT	required	137
Phosphate, acid hydrolyzable	336[5]	PO4-4 TC	251987	0.06 - 3.50 mg/l PO_4	16 mm	KT	required	138
Phosphate, ortho	315[5]	PO4-2 TC	251989	0.06 - 5.00 mg/l PO_4	16 mm	KT	required	139
Phosphate, total	316[5]	PO4-3 TC	251988	0.06 - 3.50 mg/l PO_4	16 mm	KT	required	140
Phosphate, total	336	PO4-4 TC	251987	0.06 - 3.50 mg/l PO_4	16 mm	KT	required	141
Phosphate: ortho-P	78	00616	252021	1.0 - 70.0 mg/l PO_4-P	16 mm	KT	required	142
Phosphate: ortho-P	79	00798	251404	1.0 - 50.0 mg/l PO_4-P	16 mm	RT	required	143

(1) KT = reaction cell test; RT = reagent test; CV = ampoule test
(2) Analysis specification, see package insert.
(3) No test set is required to determine coloration.
(4) This programm includes a pH measurement by means of the integrated pH function of the meter. Thus the programm cannot be used with the pHotoFlex® STD.
(5) Standard adjustment (user calibration) is possible.
Note: Standard adjustment is not possible with pHotoFlex® Turb meters with serial numbers < 12420000.

Name	Prog	Model	Order no.	Measuring range (main citation form)	Cell	Type[1]	Blank value	P.
Phosphate: ortho-P	86	P6/25	252075	0.05 - 3.00 mg/l PO_4-P	16 mm	KT		144
Phosphate: ortho-P	87	P7/25	252076	0.5 - 15.0 mg/l PO_4-P	16 mm	KT		145
Phosphate: Orthophosphate	51	14543	250324	0.05 - 3.00 mg/l PO_4-P	16 mm	KT		146
Phosphate: Orthophosphate	53	14729	250334	0.5 - 15.0 mg/l PO_4-P	16 mm	KT		147
Phosphate: Total P	86	P6/25	252075	0.05 - 3.00 mg/l PO_4-P	16 mm	KT		148
Phosphate: Total P	87	P7/25	252076	0.5 - 15.0 mg/l PO_4-P	16 mm	KT		149
Phosphate: Total phosphate	52	14543	250324	0.05 - 3.00 mg/l PO_4-P	16 mm	KT		150
Phosphate: Total phosphate	54	14729	250334	0.5 - 15.0 mg/l PO_4-P	16 mm	KT		151
Potassium	90	00615	252020	30 - 300 mg/l K	16 mm	KT	required	152
Potassium	56	14562	250407	5.00 - 50.00 mg/l K	16 mm	KT	required	153
Silica HR vario	307	Si-2 TP (HR)	251412	0.7 - 70.0 mg/l SiO_2	28 mm	RT	required	154
Silica HR vario	308[5]	Si-2 TP (HR)	251412	1 - 100 mg/l SiO_2	16 mm	RT	required	155
Silica HR vario	337[5]	Si-3 TP (HR)	251422	1 - 75 mg/l SiO_2	28 mm	RT	required	156
Silica LR vario	321[5]	Si-1 TP (LR)	251411	0.01 - 1.60 mg/l SiO_2	28 mm	RT	required	157
Silicon	67	00857	252046	0.5 - 50.0 mg/l Si	16 mm	RT		158
Silicon	65	14794	250438	0.10 - 5.00 mg/l Si	16 mm	RT		159
Silicon	66	14794	250438	0.05 - 2.50 mg/l Si	28 mm	RT		160
Silver	76	14831	250448	0.25 - 2.75 mg/l Ag	16 mm	RT	required	161
Sodium	57	00885	252044	10 - 300 mg/l Na	16 mm	KT		162
Sulfate	28	14548	250414	25 - 250 mg/l SO_4	16 mm	KT		164
Sulfate vario	322[5]	SO4-1 TP	251413	2 - 70 mg/l SO_4	28 mm	RT	required	165
Sulfate vario	338[5]	SO4-2 TP	251423	2 - 70 mg/l SO_4	28 mm	RT	required	166
Tensides (anionic)	100	14697	250333	0.05 - 2.00 mg/l MBAS	16 mm	KT	required	167
Tensides (nonionic)	101	01787	252061	0.10 - 7.50 mg/l TritonX-100	16 mm	KT	required	168
Water hardness, total hardness	46	00961	252039	5 - 215 mg/l GH/Ca	16 mm	KT	required	169
Zinc	68	00861	252049	0.025 - 1.000 mg/l Zn	16 mm	KT	required	170
Zinc	40	14566	250417	0.20 - 5.00 mg/l Zn	16 mm	KT	required	171

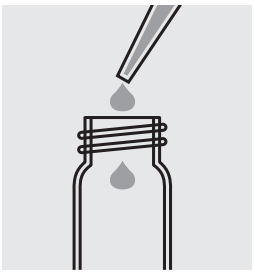
(1) KT = reaction cell test; RT = reagent test; CV = ampoule test
(2) Analysis specification, see package insert.
(3) No test set is required to determine coloration.
(4) This programm includes a pH measurement by means of the integrated pH function of the meter. Thus the programm cannot be used with the pHotoFlex® STD.
(5) Standard adjustment (user calibration) is possible.
Note: Standard adjustment is not possible with pHotoFlex® Turb meters with serial numbers < 12420000.

Acid capacity up to pH 4.3

Program no. **105**

WTW model no.:	01758
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.40 - 8.00 mmol/l OH
	20 - 400 mg/l $CaCO_3$

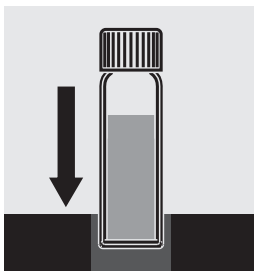
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 4.0 ml of **AC-1** into the cell.

Add 1.0 ml sample with a pipette, close the cell with the screw cap and mix.

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



Insert the cell in the photometer cell shaft and start measurement.

Notes:

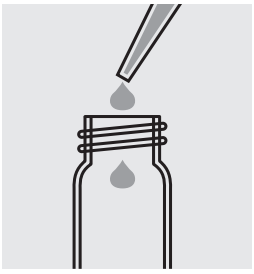
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Alkalinity-M = M-value

Program no. **351**

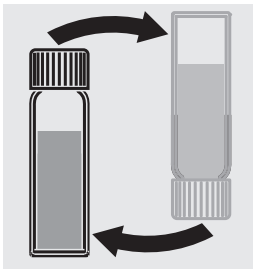
WTW model no.:	KsM-1
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	5 - 200 mg/l $CaCO_3$

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

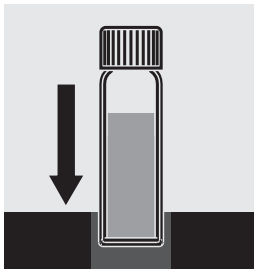


Pipette 10.0 ml of sample into the empty cell.

Add 1 tablet **ALKA-M-PHOTOMETER** directly from the foil; crush it with a clean stirring rod and close the cell with the screw cap.



Mix the contents by swirling the cell until the tablet has dissolved.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

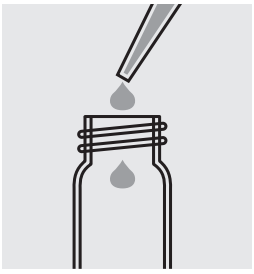
- We recommend that you determine a new reagent blank value (H2O dist instead of the sample) when starting a new package.
- The coloring that has developed is not long-term stable. Therefore, measure the sample speedily after the tablet has dissolved.
- The coloring is very intensive and can discolor the stirring rod and cells. If possible, clean the utensils immediately after measuring.

Alkalinity-P = P-value

Program no. **352**

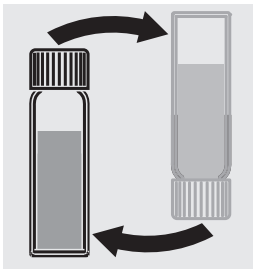
WTW model no.:	KsP-1
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	5 - 300 mg/l $CaCO_3$

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



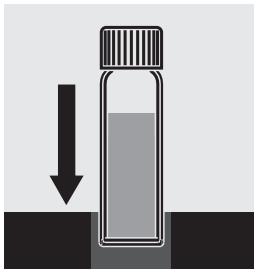
Pipette 10.0 ml of sample into the empty cell.

Add 1 tablet **ALKA-P-PHOTOMETER** directly from the foil; crush it with a clean stirring rod and close the cell with the screw cap.



Mix the contents by swirling the cell until the tablet has dissolved.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

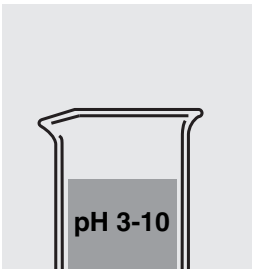
- We recommend that you determine a new reagent blank value (H2O dist instead of the sample) when starting a new package.
- The coloring that has developed is not long-term stable. Therefore, measure the sample speedily after the reaction time is over.
- The coloring is very intensive and can discolor the stirring rod and cells. If possible, clean the utensils immediately after measuring.

Aluminium

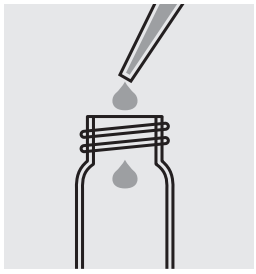
Program no. **30**

WTW model no.:	14825
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.05 - 0.40 mg/l Al
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 3-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



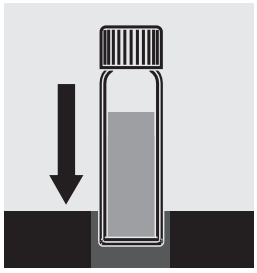
Pipette 10 ml sample into the empty cell.

Add 2 level blue microspoons of **Al-1** and dissolve solids.

Add 2.4 ml **Al-2** with a pipette and mix.

Add 0.50 ml **Al-3** with a pipette, close the cell with the screw cap and mix.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

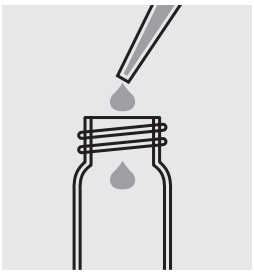
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Aluminium

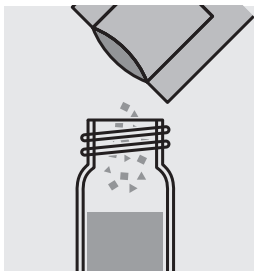
Program no. **323**

WTW model no.:	Al-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.002 - 0.250 mg/l Al

Note: Before using this test with your photometer for the first time, determine the reagent blank value (see notes below).



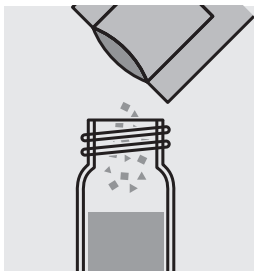
Pipette 20.0ml sample into the empty cell.



Add the contents of a **VARIO Aluminum ECR F20** powder pack and close the cell with the screw cap.

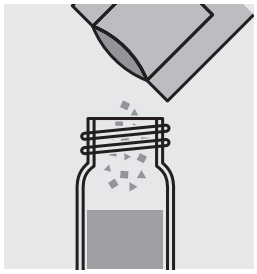
Dissolve the powder by shaking.

Allow to react for 30 seconds.



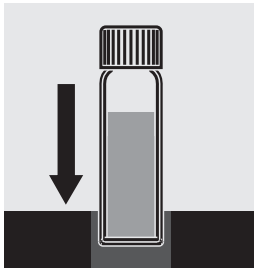
Add the contents of a **VARIO Hexamine F20** powder pack and close the cell with the screw cap.

Dissolve the powder by shaking.



<u>For reagent blank value only:</u>
Add 2 drops of **VARIO ECR-Masking RGT**, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- To avoid errors due to contamination, rinse the equipment with hydrochloric acid solution (approx. 20%), then deionized water beforehand.
- Adding the **VARIO ECR-Masking RGT** masking reagent is only required when determining the reagent blank value.
- The sample temperature has to be between 20 and 25 °C.
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

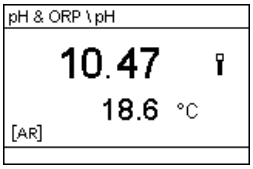
Ammonia

Program no. **74**

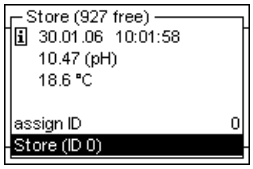
WTW model no.:	14544
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	Corresponding to 0.7 - 20.6 mg/l NH_4 or 0.5 - 16.0 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.09 - 3.00 mg/l NH_3 at pH 8.5 and 25 °C.
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value. To determine the reagent blank value it is <u>not</u> necessary to measure the pH and temperature.

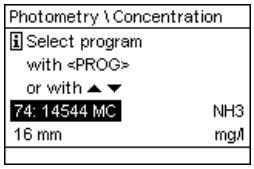
Step 1: pH and temperature measurement



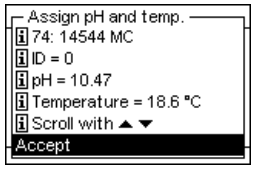
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



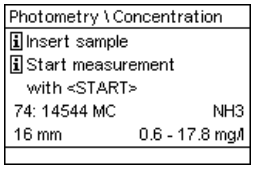
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 74.



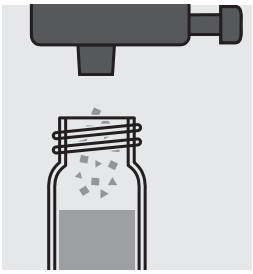
When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



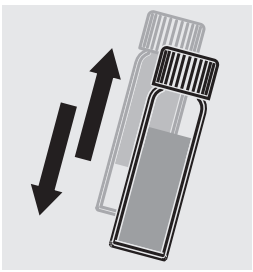
The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

Step 2: photometric measurement

Pipette 0.50 ml of sample into a reaction cell and mix.

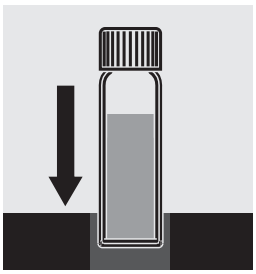


Add 1 dose of **NH_4-1K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

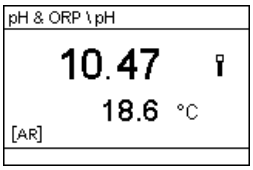
- The measuring range depends largely on the pH and temperature. On the basis of the pH and temperature measurement, it is individually calculated and displayed for each determination.
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test solution should be yellowish green or green. Very high ammonium concentrations in the sample cause turquoise solutions and too low measured values. Dilute the sample in this case.
- For further notes please refer to the package insert of the test.

Ammonia

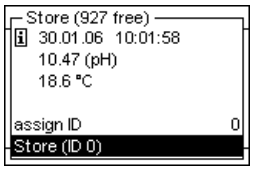
Program no. **71**

WTW model no.:	14752
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	Corresponding to 0.03 - 1.16 mg/l NH_4 or 0.02 - 0.90 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.005 - 0.168 mg/l NH_3 at pH 8.5 and 25 °C.
	Display in mmol/l possible

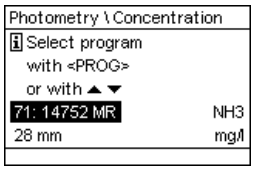
Step 1: pH and temperature measurement



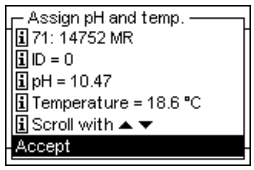
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



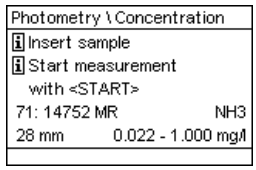
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 71.

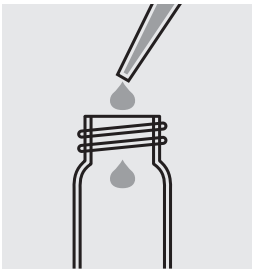


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



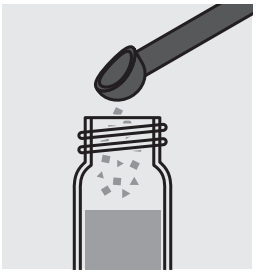
The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

Step 2: photometric measurement

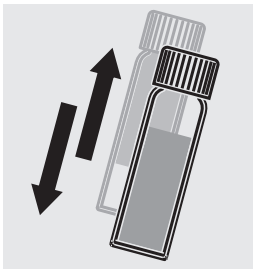


Pipette 10.0 ml of sample into the empty cell.

Add 1.20 ml of **NH_4-1** with a pipette and mix.

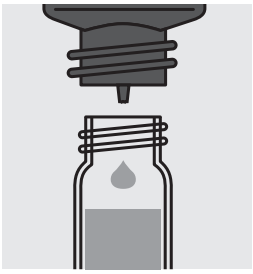


Add 2 level blue microspoons of **NH_4-2** and close the cell with the screw cap.



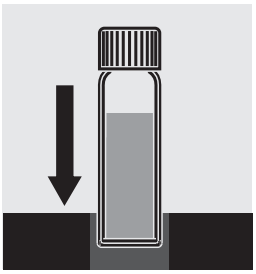
Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Add 8 drops of **NH_4-3**, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

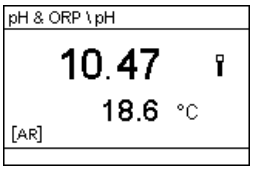
- The measuring range depends largely on the pH and temperature. On the basis of the pH and temperature measurement, it is individually calculated and displayed for each determination.
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started. To determine the reagent blank value it is not necessary to measure the pH and temperature.
- For further notes please refer to the package insert of the test.

Ammonia

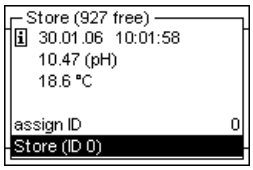
Program no. **72**

WTW model no.:	14752
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	Corresponding to 0.03 - 1.93 mg/l NH_4 or 0.02 - 1.50 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.005 - 0.270 mg/l NH_3 at pH 8.5 and 25 °C.
	Display in mmol/l possible

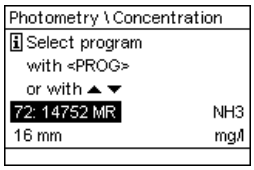
Step 1: pH and temperature measurement



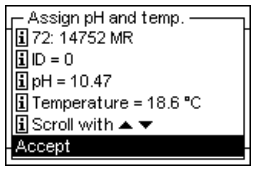
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



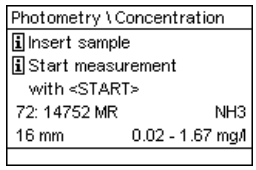
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 72.

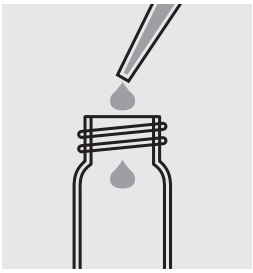


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

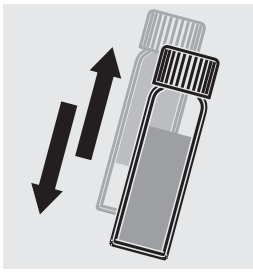
Step 2: photometric measurement



Pipette 5.0 ml of sample into the empty cell.

Add 0.60 ml of **NH_4-1** with a pipette and mix.

Add 1 level blue microspoon of **NH_4-2** and close the cell with the screw cap.

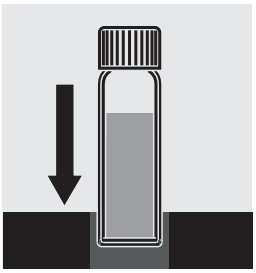


Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.

Add 4 drops of **NH_4-3**, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- The measuring range depends largely on the pH and temperature. On the basis of the pH and temperature measurement, it is individually calculated and displayed for each determination.
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started. To determine the reagent blank value it is not necessary to measure the pH and temperature.
- For further notes please refer to the package insert of the test.

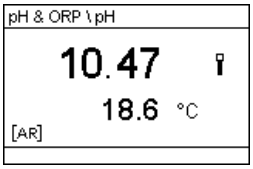
Ammonia

Program no. **341**

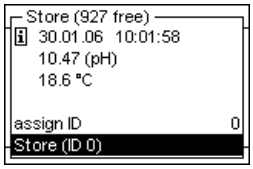
WTW model no.:	NH4-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	Corresponding to 0.01 - 0.64 mg/l NH_4 or 0.01 - 0.50 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.002 - 0.092 mg/l NH_3 at pH 8.5 and 25 °C.

Note: Before using the test with your photometer for the first time, determine the reagent blank value. To determine the reagent blank value it is <u>not</u> necessary to measure the pH and temperature.

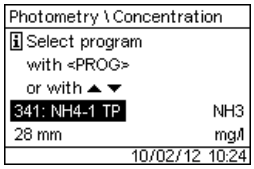
Step 1: pH and temperature measurement



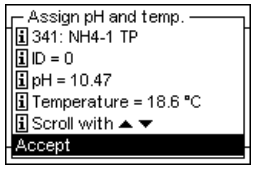
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



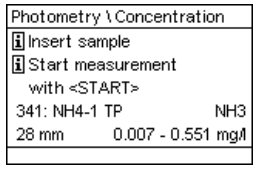
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 341.

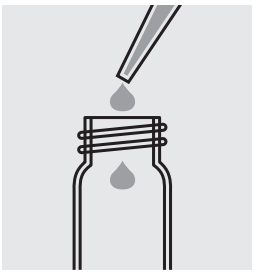


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.

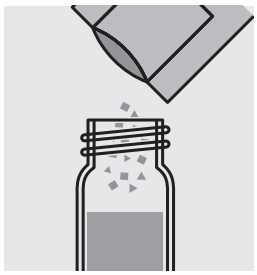


The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

Step 2: photometric measurement

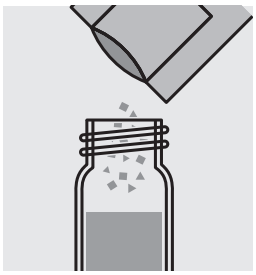


Pipette 10.0 ml of sample into the empty cell.

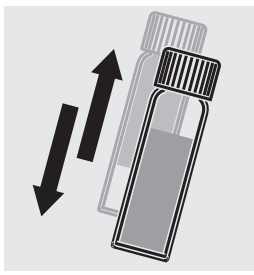


Add the contents of a **VARIO AMMONIA Salicylate F10** powder pack and close the cell with the screw cap.

Allow to react for 3 minutes (reaction time).

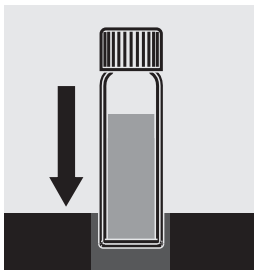


Add the contents of a **VARIO AMMONIA Cyanurate F10** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO AMMONIA Cyanurate F10 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.

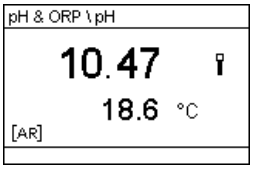
Ammonia

Program no. **339**

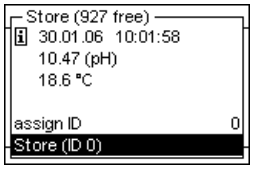
WTW model no.:	NH4-2 TC (LR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	Corresponding to 0.03 - 3.20 mg/l NH_4 or 0.02 - 2.50 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.005 - 0.447 mg/l NH_3 at pH 8.5 and 25 °C.

Note: Before using the test with your photometer for the first time, determine the reagent blank value. To determine the reagent blank value it is <u>not</u> necessary to measure the pH and temperature.

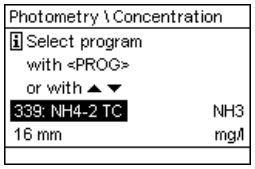
Step 1: pH and temperature measurement



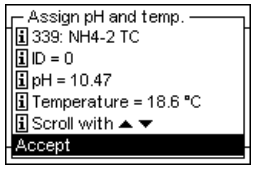
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



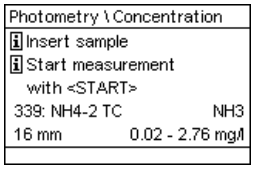
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 339.

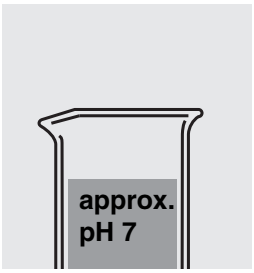


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



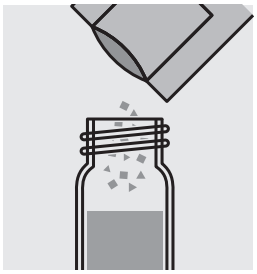
The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

Step 2: photometric measurement

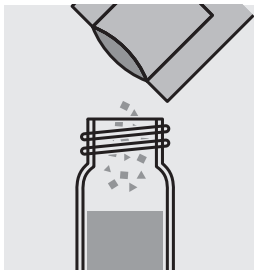


Check the pH value of the sample.
Desired value: approx. pH 7.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

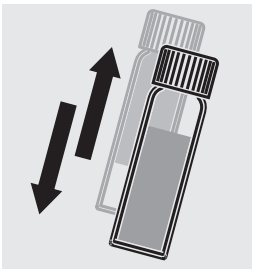
Pipette 2.0 ml of sample into a reaction cell.



Add the contents of a **VARIO AMMONIA Salicylate F5** powder pack.

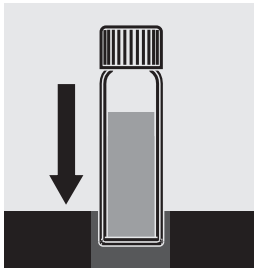


Add the contents of a **VARIO AMMONIA Cyanurate F5** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 20 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO AMMONIA Cyanurate F5 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.
- Iron disturbs the measurement and can be eliminated as follows: Determine the total iron concentration and prepare an iron standard solution with the determined concentration. Use this solution instead of distilled water to determine the reagent blank value for ammonium measurement.

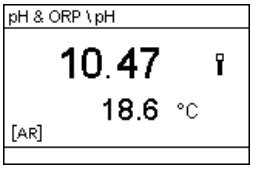
Ammonia

Program no. **340**

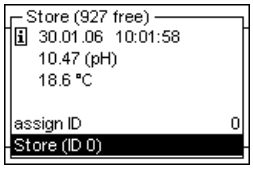
WTW model no.:	NH4-3 TC (HR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	Corresponding to 0.5 - 64.4 mg/l NH_4 or 0.4 - 50.0 mg/l NH_4-N
	Measuring ranges for NH_3 or NH_3-N depending on pH value and temperature,
	Example: 0.07 - 9.37 mg/l NH_3 at pH 8.5 and 25 °C.

Note: Before using the test with your photometer for the first time, determine the reagent blank value. To determine the reagent blank value it is <u>not</u> necessary to measure the pH and temperature.

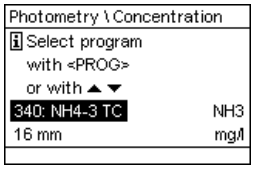
Step 1: pH and temperature measurement



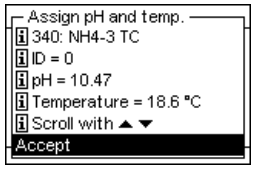
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



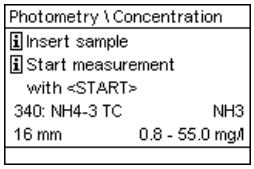
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 340.

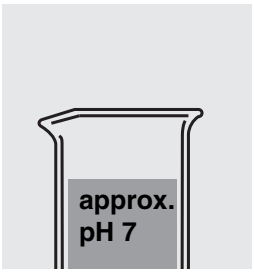


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



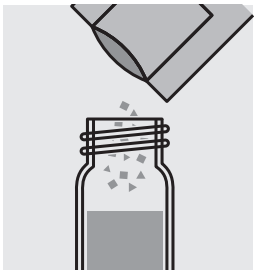
The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

Step 2: photometric measurement

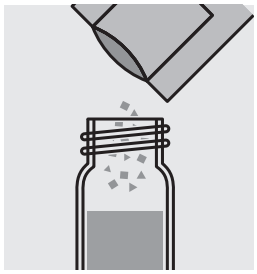


Check the pH value of the sample.
Desired value: approx. pH 7.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

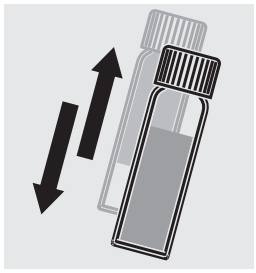
Pipette 0.1 ml of sample into a reaction cell.



Add the contents of a **VARIO AMMONIA Salicylate F5** powder pack.

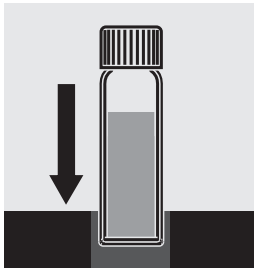


Add the contents of a **VARIO AMMONIA Cyanurate F5** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 20 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO AMMONIA Cyanurate F5 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.
- Iron disturbs the measurement and can be eliminated as follows: Determine the total iron concentration and prepare an iron standard solution with the determined concentration. Use this solution instead of distilled water to determine the reagent blank value for ammonium measurement.

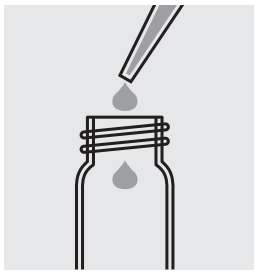
Ammonia (free)

Program no. **333**

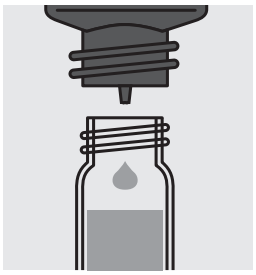
WTW model no.:	NH3-1 TR
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.010 - 0.500 mg/l NH_3-N (f)
	0.012 - 0.610 mg/l NH_3 (f)
	Display in mmol/l possible

CAL / ZERO 2

Perform a zero adjustment using a **28 mm** cell filled with **sample**.

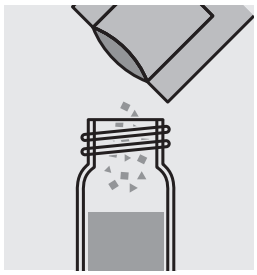


Pipette 10.0 ml sample into an empty **28 mm** cell.

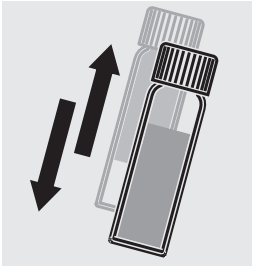


Add 1 drop of **Free Ammonia Reagent** solution, close the cell with the screw cap and mix.

Allow to react for 5 minutes (reaction time).

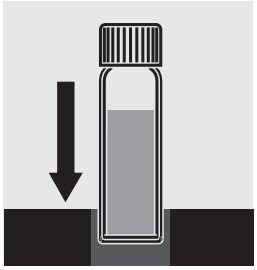


Add the contents of a **Monochlor F RGT** powder pack and close the cell with the screw cap.



Shake the cell vigorously for about 20 seconds to dissolve solids.

Allow to react for 5 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

CAL / ZERO 2

When switching to another program restore the zero adjustment by performing a new zero adjustment using a **28 mm** cell filled with **deionized water**.

Note: Failing to restore the zero adjustment will result in all future measurements being erroneous!

Notes:

- Collect samples in clean glass bottles and analyze as soon as possible.
- The 5 minutes reaction times refer to a sample temperature of 18-20 °C (64-68 °F).
  For other sample temperatures adjust the reaction time according to the follwing table:

Sample temperature		Reaction time (minutes)
°C	°F	
5	41	10
10	50	8
16	61	6

Sample temperature		Reaction time (minutes)
°C	°F	
20	68	5
23	73	2.5
25	77	2

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

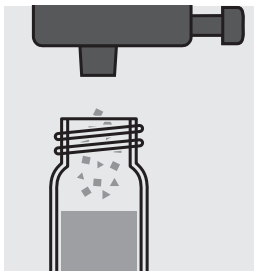
Ammonium

Program no. **60**

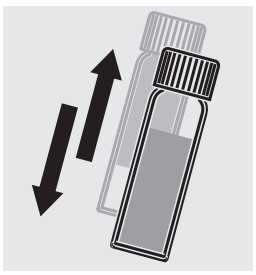
WTW model no.:	14544
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 16.0 mg/l NH_4-N
	0.7 - 20.6 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 0.50 ml of sample into a reaction cell and mix.

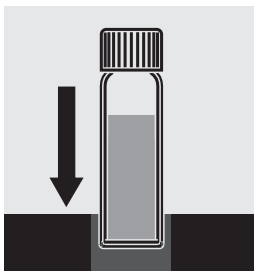


Add 1 dose of **NH_4-1K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test solution should be yellowish green or green. Very high ammonium concentrations in the sample cause turquoise solutions and too low measured values. Dilute the sample in this case.
- For further notes please refer to the package insert of the test.

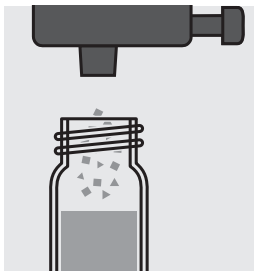
Ammonium

Program no. **48**

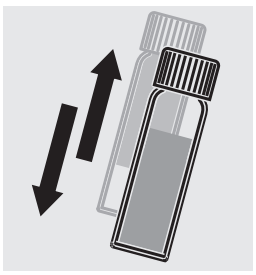
WTW model no.:	14558
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.20 - 8.00 mg/l NH_4-N
	0.26 - 10.30 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 1.0 ml of sample into a reaction cell and mix.

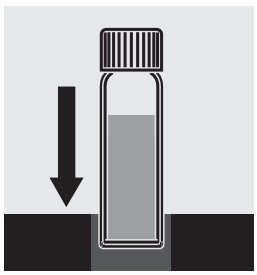


Add 1 dose of **NH_4-1K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

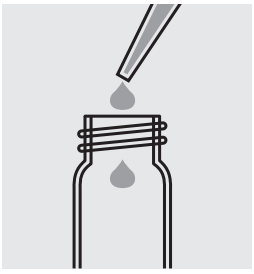
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Ammonium

Program no. **31**

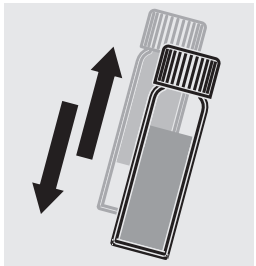
WTW model no.:	14752
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 0.90 mg/l NH_4-N
	0.03 - 1.16 mg/l NH_4
	Display in mmol/l possible



Pipette 10.0 ml of sample into the empty cell.

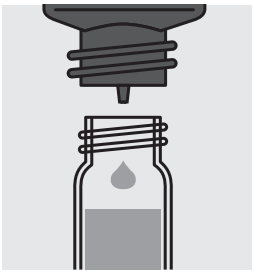
Add 1.20 ml of **NH_4-1** with a pipette and mix.

Add 2 level blue microspoons of **NH_4-2** and close the cell with the screw cap.



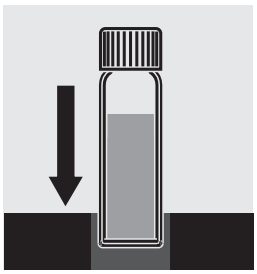
Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Add 8 drops of **NH_4-3**, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

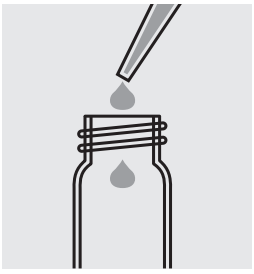
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Ammonium

Program no. **32**

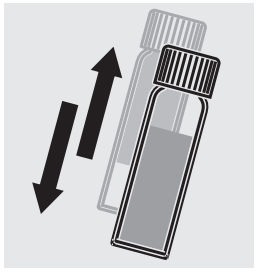
WTW model no.:	14752
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.02 - 1.50 mg/l NH_4-N
	0.03 - 1.93 mg/l NH_4
	Display in mmol/l possible



Pipette 5.0 ml of sample into the empty cell.

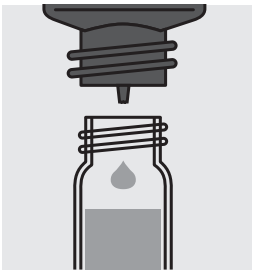
Add 0.60 ml of **NH_4-1** with a pipette and mix.

Add 1 level blue microspoon of **NH_4-2** and close the cell with the screw cap.



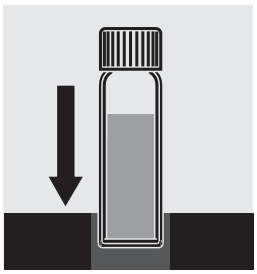
Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Add 4 drops of **NH_4-3**, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

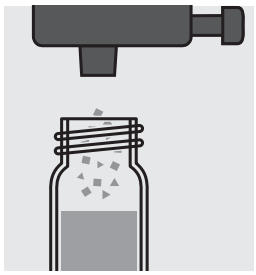
Ammonium

Program no. **83**

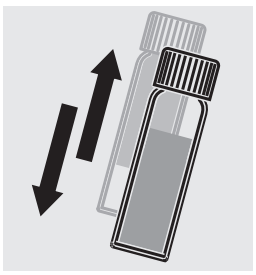
WTW model no.:	A6/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.20 - 8.00 mg/l NH_4-N
	0.26 - 10.30 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 1.0 ml of sample into a reaction cell and mix.

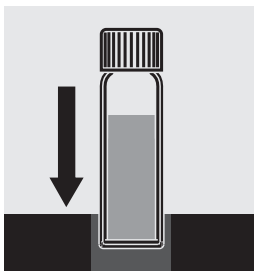


Add 1 dose of **NH_4-1K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

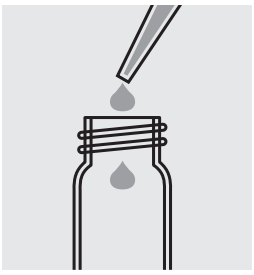
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Ammonium vario

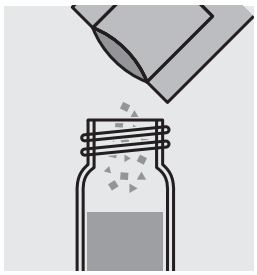
Program no. **324**

WTW model no.:	NH4-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.01 - 0.50 mg/l NH_4-N
	0.01 - 0.64 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

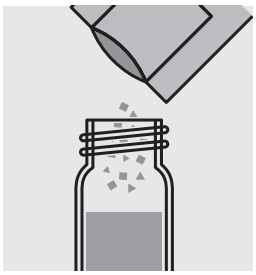


Pipette 10.0 ml of sample into the empty cell.

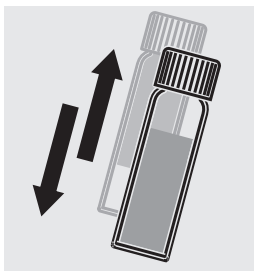


Add the contents of a **VARIO Ammonia Salicylate F10** powder pack and close the cell with the screw cap.

Allow to react for 3 minutes (reaction time).

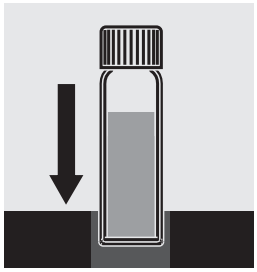


Add the contents of a **VARIO Ammonia Cyanurate F10** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

Notes:

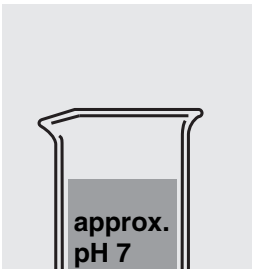
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO Ammonia Cyanurate F10 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.

Ammonium vario HR

Program no. **313**

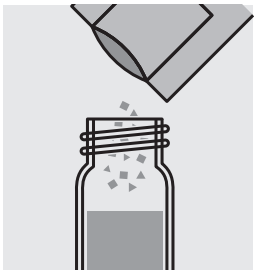
WTW model no.:	NH4-3 TC (HR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.4 - 50.0 mg/l NH_4-N
	0.5 - 64.4 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

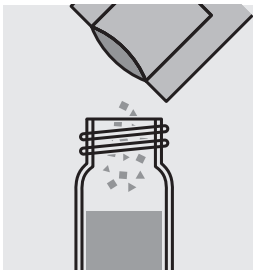


Check the pH value of the sample.
Desired value: approx. pH 7.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

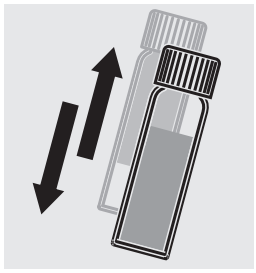
Pipette 0.1 ml of sample into a reaction cell.



Add the contents of a **VARIO Ammonia Salicylate F5** powder pack.

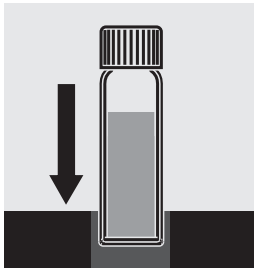


Add the contents of a **VARIO Ammonia Cyanurate F5** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 20 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

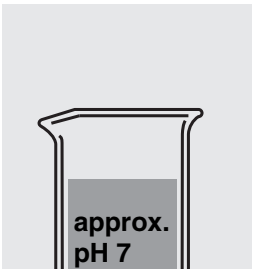
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO Ammonia Cyanurate F5 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.
- Iron disturbs the measurement and can be eliminated as follows: Determine the total iron concentration and prepare an iron standard solution with the determined concentration. Use this solution instead of distilled water to determine the reagent blank value for ammonium measurement.

Ammonium vario LR

Program no. **312**

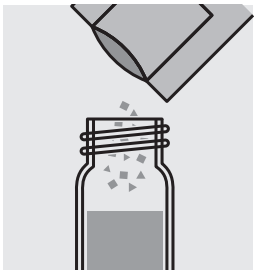
WTW model no.:	NH4-2 TC (LR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.02 - 2.50 mg/l NH_4-N
	0.03 - 3.20 mg/l NH_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

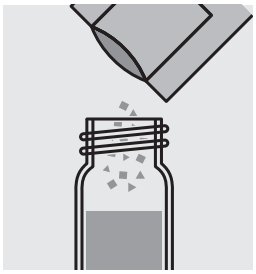


Check the pH value of the sample.
Desired value: approx. pH 7.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

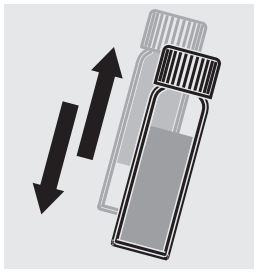
Pipette 2.0 ml of sample into a reaction cell.



Add the contents of a **VARIO Ammonia Salicylate F5** powder pack.

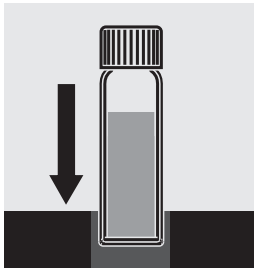


Add the contents of a **VARIO Ammonia Cyanurate F5** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 20 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

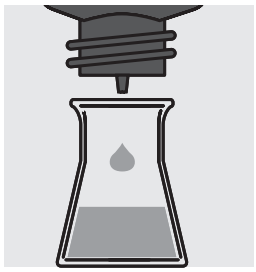
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If NH_4-N is present in the sample, the solution becomes green after VARIO Ammonia Cyanurate F5 was added.
- If chlorine is present, sodium thiosulfate has to be added to the sample immediately after sampling. Add 1 drop of a 0.1 mol/l sodium thiosulfate solution per 0.3 mg/l chlorine to 1 liter sample.
- Iron disturbs the measurement and can be eliminated as follows: Determine the total iron concentration and prepare an iron standard solution with the determined concentration. Use this solution instead of distilled water to determine the reagent blank value for ammonium measurement.

Arsenic

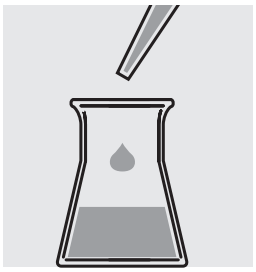
Program no. 75

WTW model no.:	01747
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.002 - 0.100 mg/l As
	Display in mmol/l possible

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

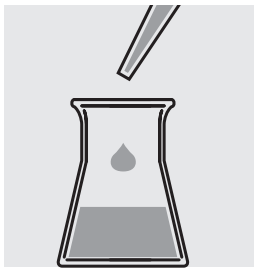


Add 5 drops of **As-1** and mix.

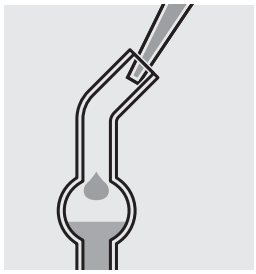


Add 20 ml sulfuric acid (95-97 % for analysis) and mix.

Add one level red measuring spoon of **As-3** and dissolve solids.



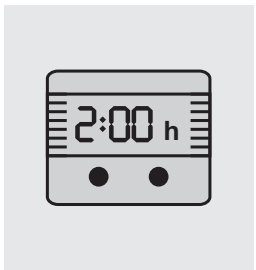
Add 1.0 ml **As-4** with a pipette and mix.



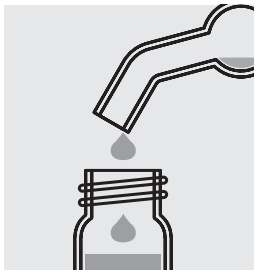
Pipette 5.0 ml **As-5** into the AS absorption tube (WTW article no. 252 066).

Using a pipette, add 1.0 ml **As-6** to the solution in the Erlenmeyer flask and mix.

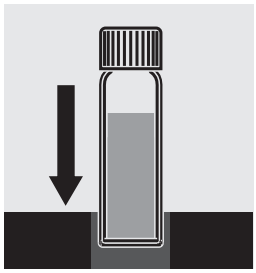
Add two level red measuring spoons of granulated zinc and **immediately** attach the filled absorption tube on the Erlenmeyer flask.



Allow to react for 2 hours. Sway the solution occasionally or stir slowly with a magnetic stirrer.



Fill the solution from the absorption tube into an empty cell.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

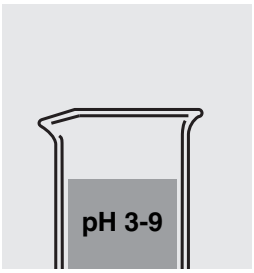
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Cadmium

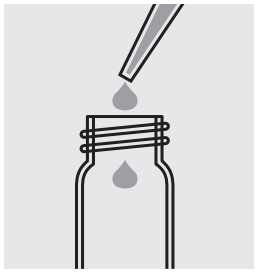
Program no. **103**

WTW model no.:	01745
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.010 - 0.500 mg/l Cd
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Required range: pH 3-9.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

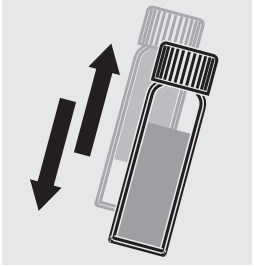


Pipette 1.0 ml of **Cd-1** into the empty cell.

Add 10.0 ml of sample with a pipette and mix.

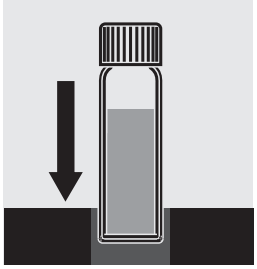
Add 0.20 ml **Cd-2** with a pipette and mix.

Add 1 level green microspoon of **Cd-3** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

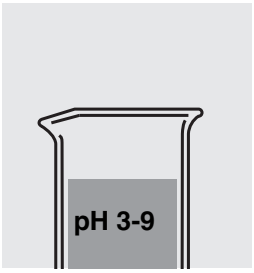
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Cadmium

Program no. 4

WTW model no.:	14834
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.025 - 1.000 mg/l Cd
	Display in mmol/l possible

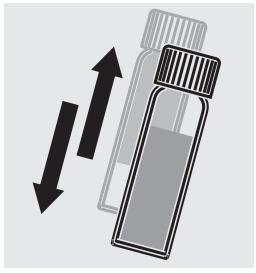


Check the pH value of the sample.
Desired range: pH 3-9.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 5.0 ml of sample into a reaction cell and mix.

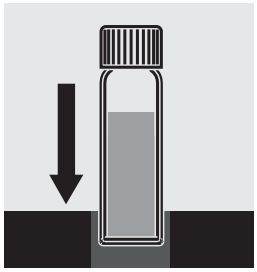
Add 0.20 ml **Cd-1K** with a pipette and mix.

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



Shake the cell vigorously to dissolve solids.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

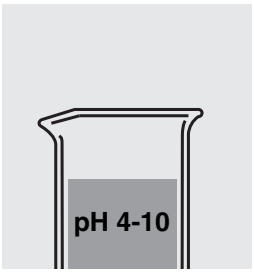
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Calcium

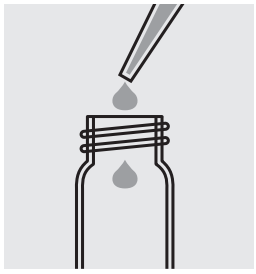
Program no. **62**

WTW model no.:	14815
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	10 - 160 mg/l Ca
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



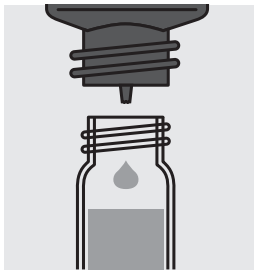
Check the pH value of the sample.
Desired range: pH 4-10.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.



Pipette 0.10 ml of sample into the empty cell.

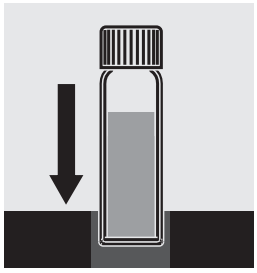
Add 5.0 ml **Ca-1** with a pipette and mix.

Add 4 drops of **Ca-2** and mix.



Add 4 drops of **Ca-3** and mix.

Allow to react for **exactly** 8 minutes.
The reaction time has to be kept exactly!



Insert the cell in the photometer cell shaft and start measurement.

Notes:

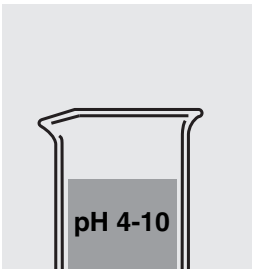
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Calcium

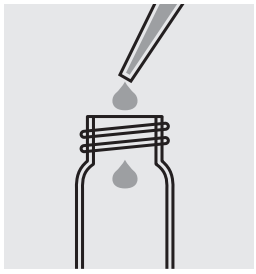
Program no. **63**

WTW model no.:	14815
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	5 - 80 mg/l Ca
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



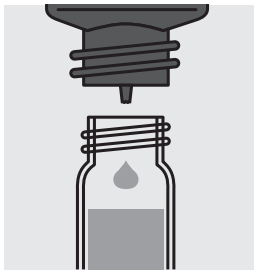
Check the pH value of the sample.
Desired range: pH 4-10.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.



Pipette 0.20 ml of sample into the empty cell.

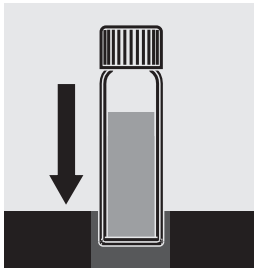
Add 10.0 ml **Ca-1** with a pipette and mix.

Add 8 drops of **Ca-2** and mix.



Add 8 drops of **Ca-3** and mix.

Allow to react for **exactly** 8 minutes.
The reaction time has to be kept exactly!



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

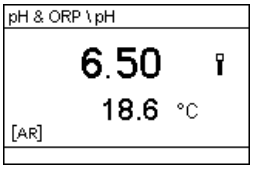
Carbon dioxide

Program no. **106**

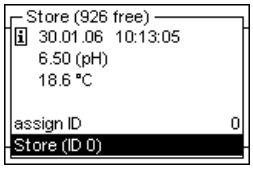
WTW model no.:	01758
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	Corresponding to 0.40 - 8.00 mmol/l OH
	Measuring range for CO_2 depending on pH value and temperature,
	Example: 14 - 275 mg/l CO_2 at pH 6.5 and 18.6 °C
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value. To determine the reagent blank value it is <u>not</u> necessary to measure the pH and temperature.

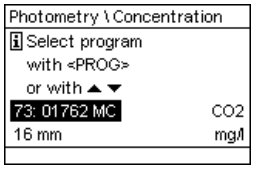
Step 1: pH and temperature measurement



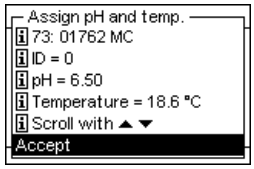
Measuring mode, *pH & ORP*:
Measure pH value and temperature immediately after sampling.



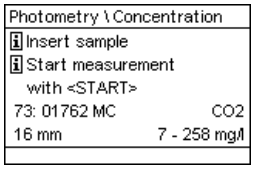
Store measured values with **<STO>**. If necessary, assign an ID for easier retrieving.



Switch to the *Photometry* measuring mode and select program no. 106.

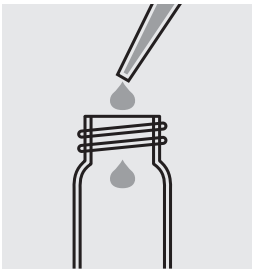


When the prompt *Assign pH und temp.* appears, select and accept the stored values from the pH and temperature measurement.



The meter is ready for the photometric measurement (step 2).
The measuring range is shown on the display.

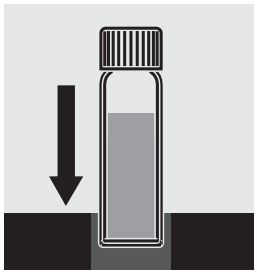
Step 2: photometric measurement



Pipette 4.0 ml of **AC-1** into the cell.

Add 1.0 ml sample with a pipette, close the cell with the screw cap and mix.

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



Insert the cell in the photometer cell shaft and start measurement.

Notes:

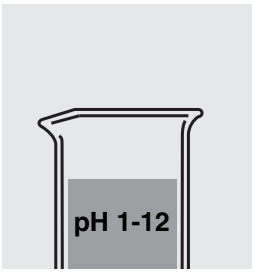
- The measuring range depends largely on the pH and temperature. On the basis of the pH and temperature measurement, it is individually calculated and displayed for each determination.
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Chloride

Program no. **70**

WTW model no.:	14730
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	5 - 125 mg/l Cl
	Display in mmol/l possible

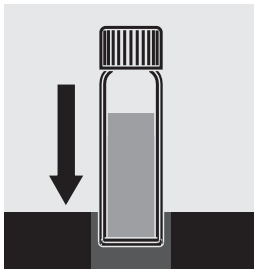
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 1-12.
Correct with diluted ammonia solution or nitric acid as necessary.

Using a pipette, add 0.50 ml of **Cl-1K** into a reaction cell, close the cell with the screw cap and mix.

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



Insert the cell in the photometer cell shaft and start measurement.

Notes:

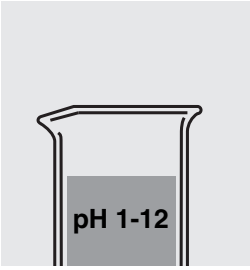
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Chloride

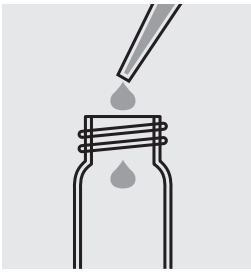
Program no. **64**

WTW model no.:	14897
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	10 - 190 mg/l Cl
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 1-12.
Correct with diluted ammonia solution or nitric acid as necessary.

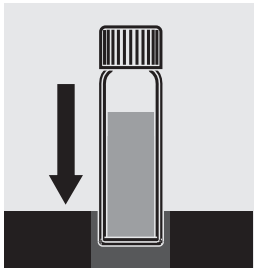


Pipette 1.0 ml of sample into the empty cell.

Add 2.5 ml **Cl-1** with a pipette and mix.

Add 0.50 ml **Cl-2** with a pipette and mix.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

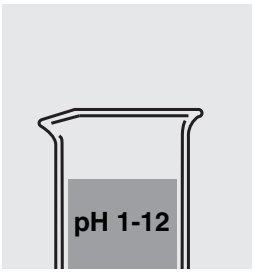
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Chloride

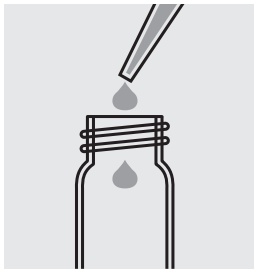
Program no. **104**

WTW model no.:	14897
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	2.5 - 30.0 mg/l Cl
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Required range:
pH 1-12.
Correct with diluted ammonia solution or nitric acid as necessary.

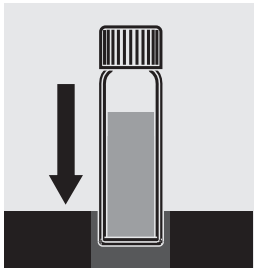


Pipette 5.0 ml of sample into the empty cell.

Add 2.5 ml **CI-1** with a pipette and mix.

Add 0.50 ml **CI-2** with a pipette and mix.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

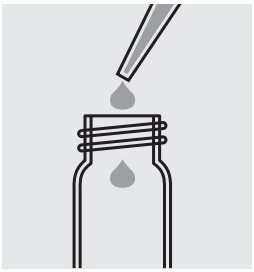
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Chlorine (free & total)

Program no. **34**

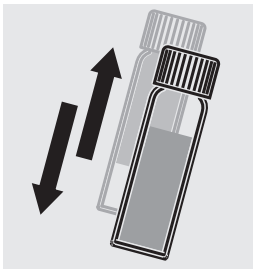
WTW model no.:	00597
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 4.50 mg/l Cl_2
	Display in mmol/l possible

Determination of total chlorine:

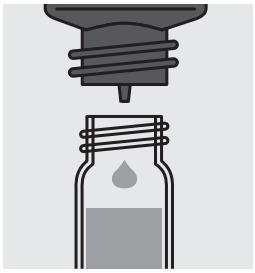


Pipette 5.0 ml of sample into a reaction cell.

Add 1 level blue microspoon of **Cl_2-1** and close the cell with the screw cap.

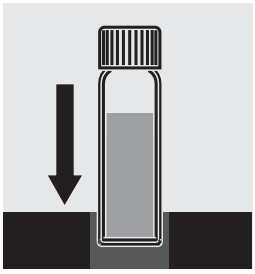


Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.



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

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Determination of free chlorine:

Similar preparation to above but without adding **Cl_2-2**.

Notes:

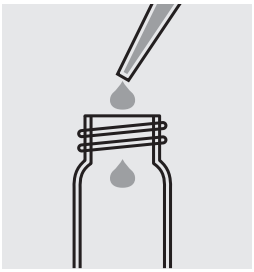
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- For further notes please refer to the package insert of the test.

Chlorine (free & total)

Program no. **109**

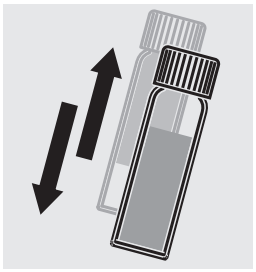
WTW model no.:	00597
Category:	KT (reaction cell test)
Cell:	28 mm
Measuring range:	0.025 - 2.500 mg/l Cl_2
	Display in mmol/l possible

Determination of total chlorine:

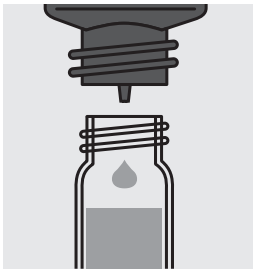


Pipette 10.0 ml of sample into a reaction cell.

Add 2 level blue microspoons of **Cl_2-1** and close the cell with the screw cap.

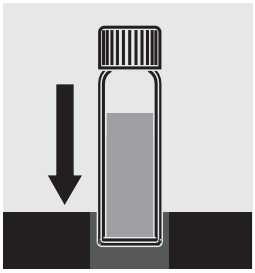


Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.



Add 4 drops of **Cl_2-2**, close the cell with the screw cap and mix.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Determination of free chlorine:

Similar preparation to above but without adding **Cl_2-2**.

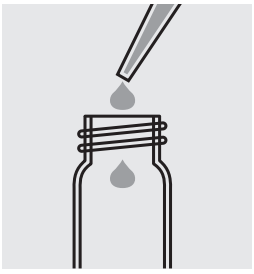
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
- For further notes please refer to the package insert of the test.

Chlorine (free)

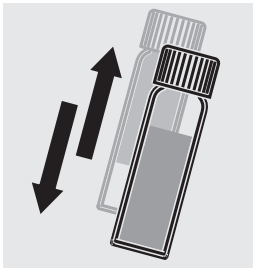
Program no. **33**

WTW model no.:	00595
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 4.50 mg/l Cl_2
	Display in mmol/l possible



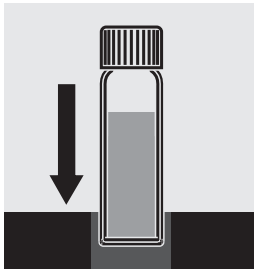
Pipette 5.0 ml of sample into a reaction cell.

Add 1 level blue microspoon of **Cl_2-1** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

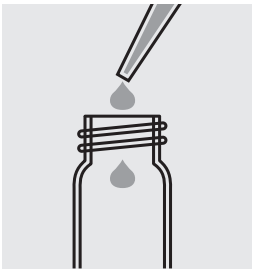
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- For further notes please refer to the package insert of the test.

Chlorine (free)

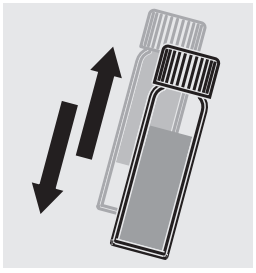
Program no. **108**

WTW model no.:	00595
Category:	KT (reaction cell test)
Cell:	28 mm
Measuring range:	0.025 - 2.500 mg/l Cl_2
	Display in mmol/l possible



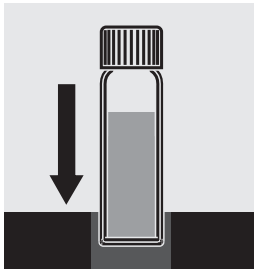
Pipette 10.0 ml of sample into a reaction cell.

Add 2 level blue microspoons of **Cl_2-1** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

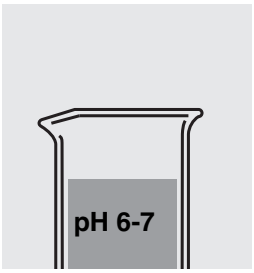
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- For further notes please refer to the package insert of the test.

Chlorine (free) vario

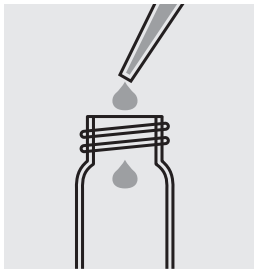
Program no. **325**

WTW model no.:	Cl2-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 2.00 mg/l Cl_2
	Display in mmol/l possible

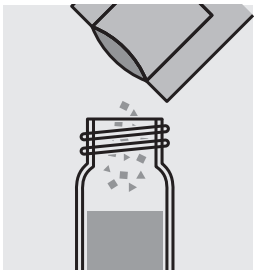
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



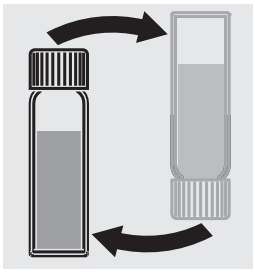
Check the pH value of the sample.
Desired range: pH 6-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



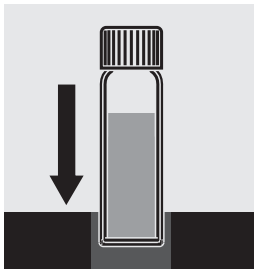
Pipette 10.0 ml of sample into the empty cell.



Add the contents of a **Chlorine Free-DPD F10** powder pack and close the cell with the screw cap.



Mix the contents by swaying (for 20 seconds).



Insert the cell in the photometer cell shaft within one minute and start measurement.

Notes:

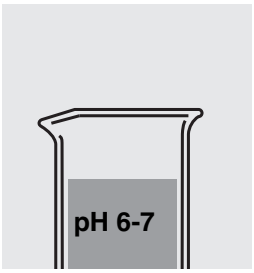
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be pink. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.

Chlorine (free) vario

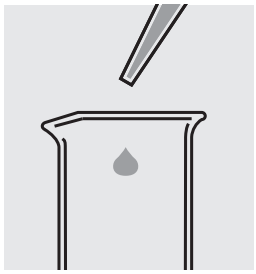
Program no. **326**

WTW model no.:	Cl2-2 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.5 - 5.0 mg/l Cl_2
	Display in mmol/l possible

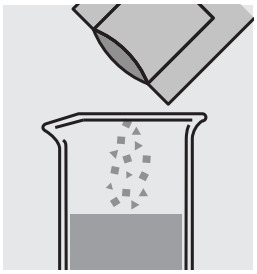
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



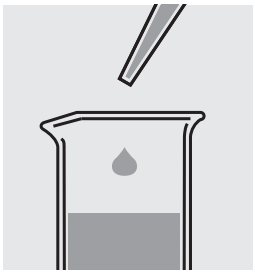
Check the pH value of the sample.
Desired range: pH 6-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



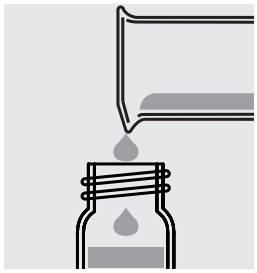
Pipette 10.0 ml of sample into an empty beaker.



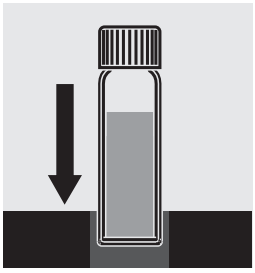
Add the contents of a **VARIO Chlorine Free-DPD F25** powder pack and dissolve them by stirring.



Add 15.0 ml deionized water with a pipette and mix.



Fill an empty cell with the prepared sample and close it with the screw cap.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

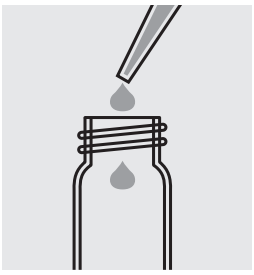
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be pink. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.

Chlorine (total) vario

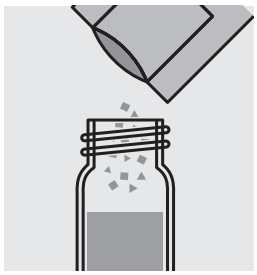
Program no. **327**

WTW model no.:	Cl2-3 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 2.00 mg/l Cl_2
	Display in mmol/l possible

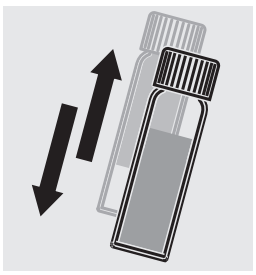
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

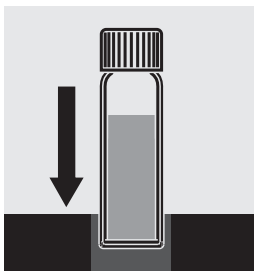


Add the contents of one **Chlorine Total- DPD F10** powder pack and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

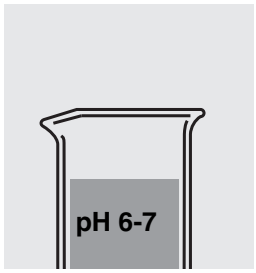
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be pink. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.

Chlorine (total) vario

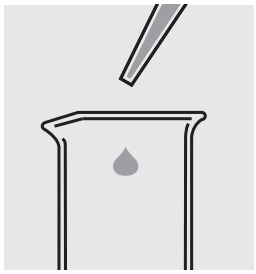
Program no. **328**

WTW model no.:	Cl2-4 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.5 - 5.0 mg/l Cl_2
	Display in mmol/l possible

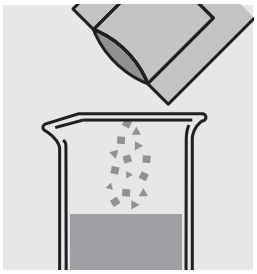
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



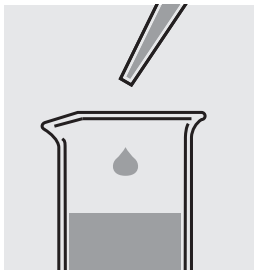
Check the pH value of the sample.
Required range: pH 6-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



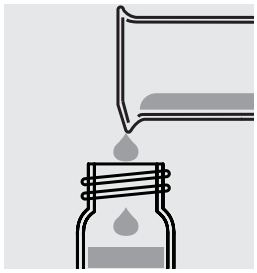
Pipette 10.0 ml of sample into an empty beaker.



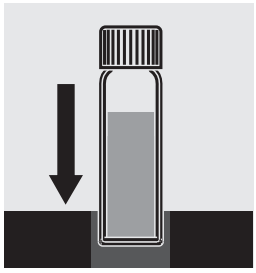
Add the contents of a **VARIO Chlorine Total-DPD F25 ml** powder pack and dissolve them by stirring.



Add 15.0 ml deionized water with a pipette and mix.



Fill an empty cell with the prepared sample and close it with the screw cap.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

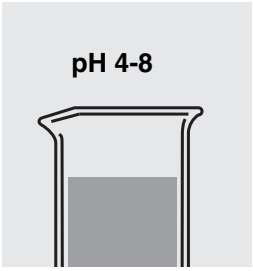
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be pink. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- Each time after determining total chlorine, rinse the cell with sulfuric acid 25 % and then several times with distilled water.

Chlorine (with liquid reagents)

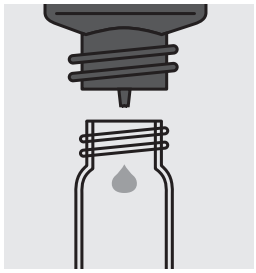
Program no. **110**

WTW model no.:	00086/00087/00088
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 4.50 mg/l Cl_2
	Display in mmol/l possible

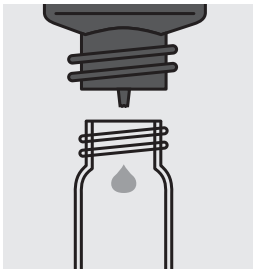
Determination of free chlorine:



Check the pH value. Required range: pH 4-8. Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



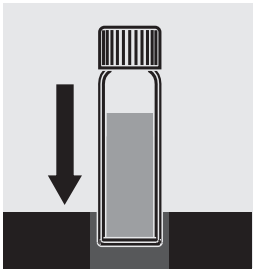
Place 6 drops of **Cl_2-1** into the empty cell.



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

With a pipette add 10 sample, close the cell with the screw cap and mix.

Allow to react for exactly 1 minute. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Determination of total chlorine:

Same preparation as described above. Add 2 drops of **Cl_2-3**, close with the screw cap, and mix after the end of the reaction time.

Notes:

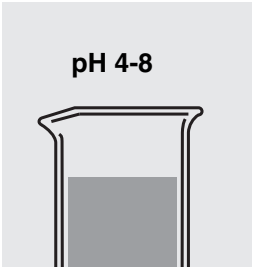
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
- For further notes please refer to the package insert of the test.

Chlorine (with liquid reagents)

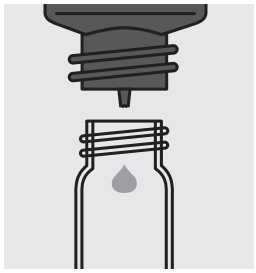
Program no. 111

WTW model no.:	00086/00087/00088
Category:	KT (reaction cell test)
Cell:	28 mm
Measuring range:	0.025 - 2.500 mg/l Cl_2
	Display in mmol/l possible

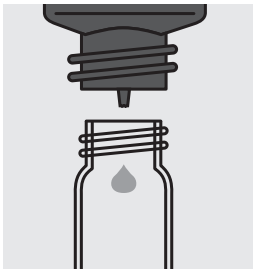
Determination of free chlorine:



Check the pH value. Required range: pH 4-8. Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



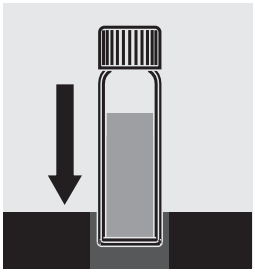
Place 6 drops of **Cl_2-1** into the empty cell.



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

With a pipette add 10 sample, close the cell with the screw cap and mix.

Allow to react for exactly 1 minute. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Determination of total chlorine:

Same preparation as described above. Add 2 drops of **Cl_2-3**, close with the screw cap, and mix after the end of the reaction time.

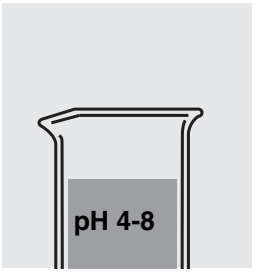
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be red. Very high chlorine concentrations in the sample cause yellow solutions and too low measured values. Dilute the sample in this case.
- After each determination of total chlorine rinse the cell with sulfuric acid 25 % and subsequently several times with distilled water.
- For further notes please refer to the package insert of the test.

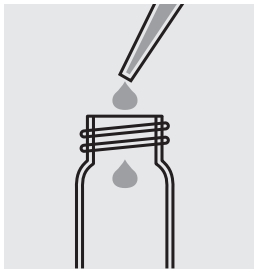
Chlorine dioxide

Program no. **38**

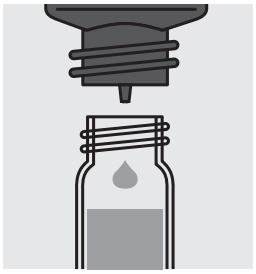
WTW model no.:	00608
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 5.00 mg/l ClO_2
	Display in mmol/l possible



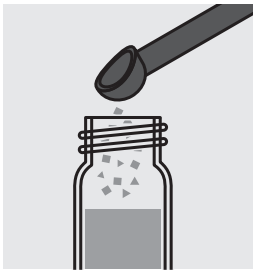
Check the pH value of the sample.
Desired range: pH 4-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



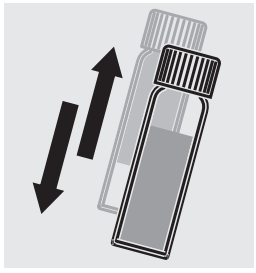
Pipette 10.0 ml sample into the empty cell.



Add 2 drops of **ClO_2-1** and mix.

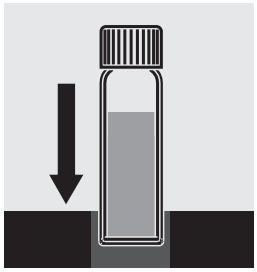


Add one level blue microspoon of **ClO_2-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

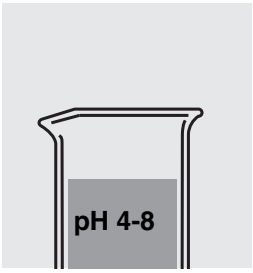
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

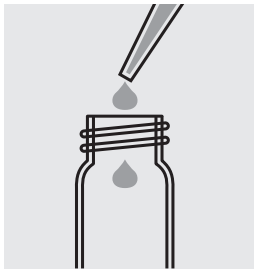
Chlorine dioxide

Program no. **39**

WTW model no.:	00608
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.02 - 7.50 mg/l ClO_2
	Display in mmol/l possible

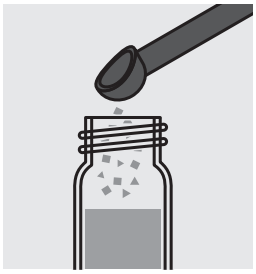


Check the pH value of the sample.
Desired range: pH 4-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

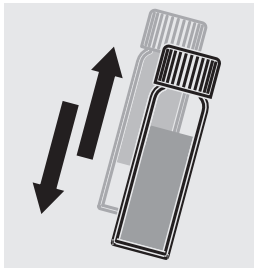


Pipette 10.0 ml sample into the empty cell.

Add 2 drops of **ClO_2-1** and mix.

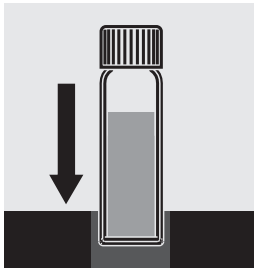


Add one level blue microspoon of **ClO_2-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

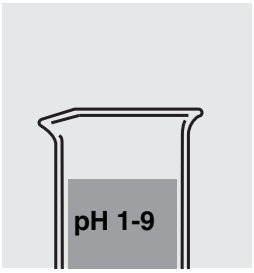
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

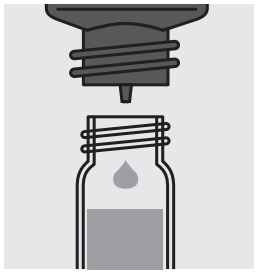
Chrome

Program no. 5

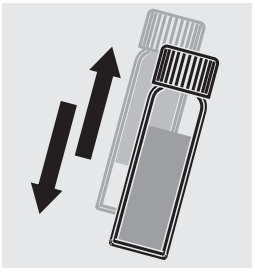
WTW model no.:	14552
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 2.00 mg/l Cr
	Display in mmol/l possible



Check the pH value of the sample.
Desired range: pH 1-9.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



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

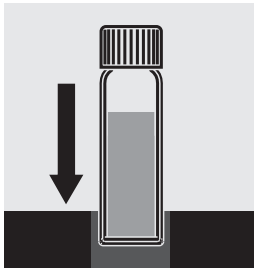


Shake the cell vigorously to dissolve solids.

Allow to react for 1 minute.

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

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

COD

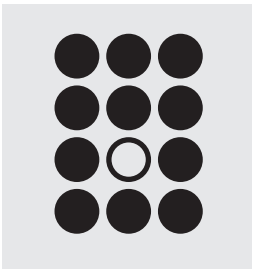
Program no. **114**

WTW model no.:	01797
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	5000 - 90000 mg/l COD

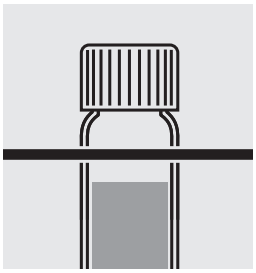
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that the sediment is suspended.

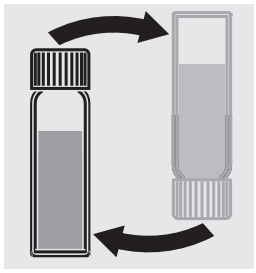
Carefully pipette 0.10 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



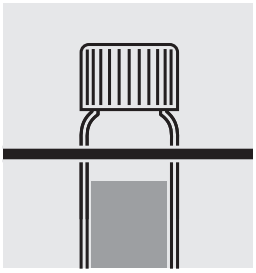
Heat the cell in the thermoreactor for two hours at 148 °C.



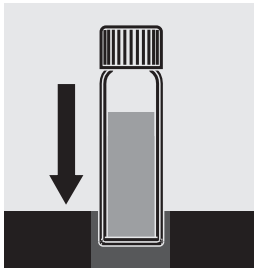
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 50000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

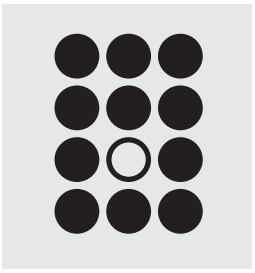
Program no. **49**

WTW model no.:	14540
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	10 - 150 mg/l COD

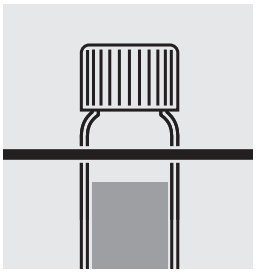
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

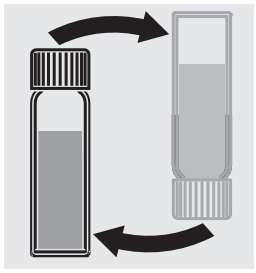
Carefully pipette 3.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



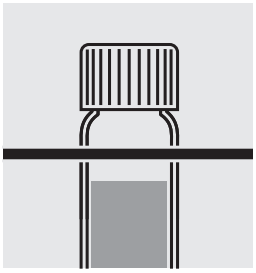
Heat the cell in the thermoreactor for two hours at 148 °C.



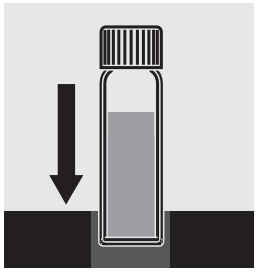
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

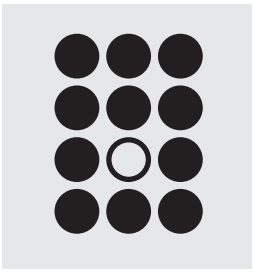
Program no. **50**

WTW model no.:	14541
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	25 - 1500 mg/l COD

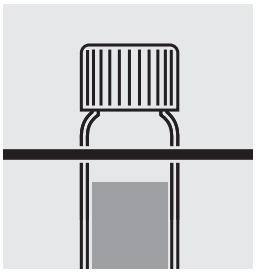
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

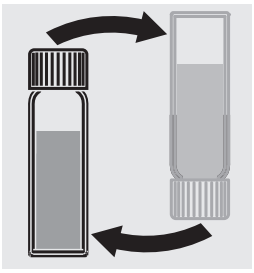
Carefully pipette 3.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



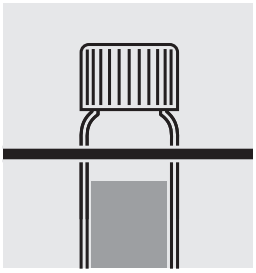
Heat the cell in the thermoreactor for two hours at 148 °C.



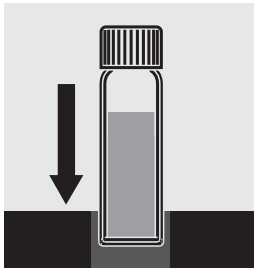
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

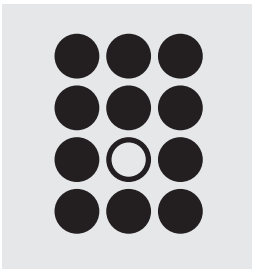
Program no. **99**

WTW model no.:	14555
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	500 - 9500 mg/l COD

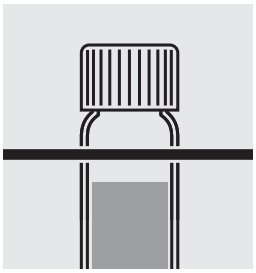
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that the sediment is suspended.

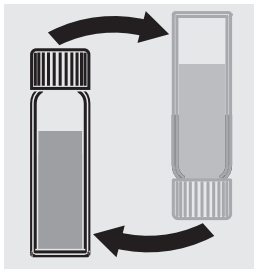
Carefully pipette 1.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



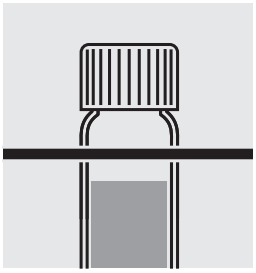
Heat the cell in the thermoreactor for two hours at 148 °C.



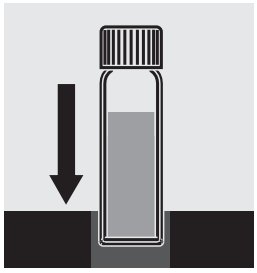
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 5000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

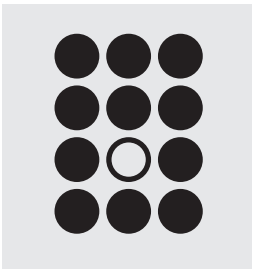
Program no. **97**

WTW model no.:	14690
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	50 - 500 mg/l COD

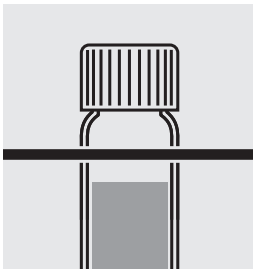
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that the sediment is suspended.

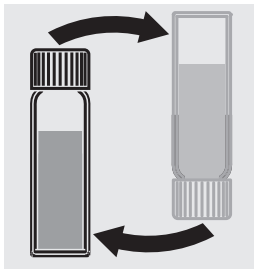
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



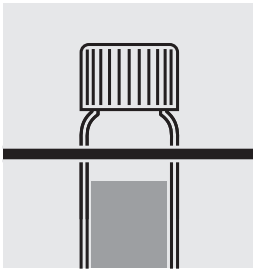
Heat the cell in the thermoreactor for two hours at 148 °C.



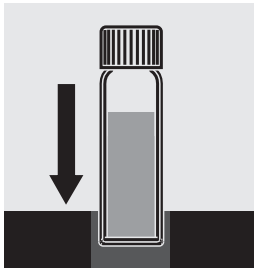
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2500 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

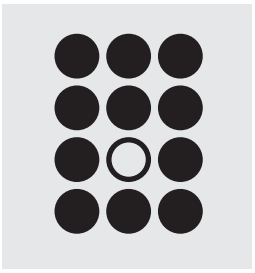
Program no. **98**

WTW model no.:	14691
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	300 - 3500 mg/l COD

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

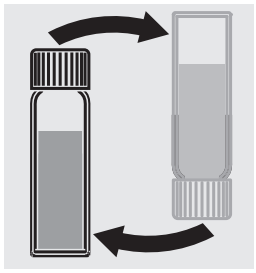
Shake the reaction cell so that the sediment is suspended.

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

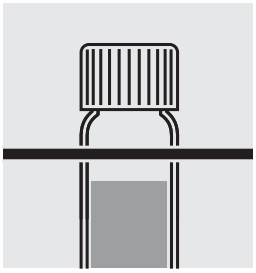


Heat the cell in the thermoreactor for two hours at 148 °C.

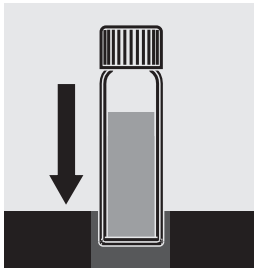
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2500 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

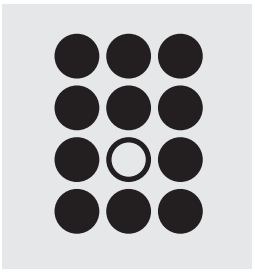
Program no. **96**

WTW model no.:	14895
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	15 - 300 mg/l COD

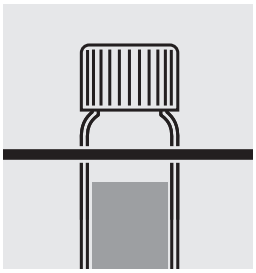
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that the sediment is suspended.

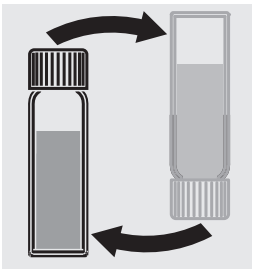
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



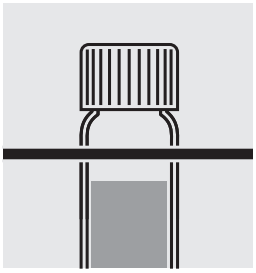
Heat the cell in the thermoreactor for two hours at 148 °C.



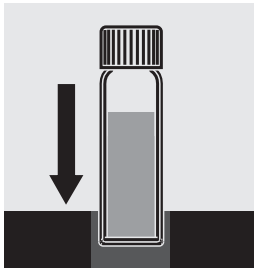
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

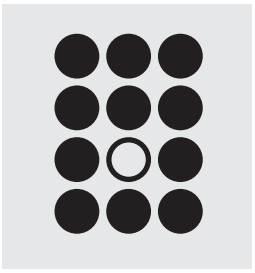
Program no. **81**

WTW model no.:	C3/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	10 - 150 mg/l COD

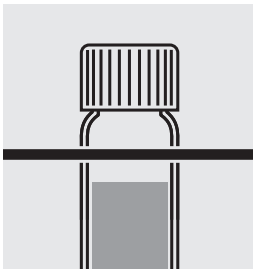
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

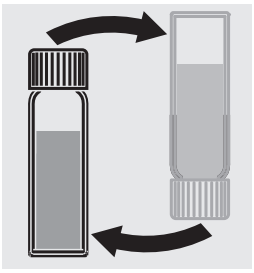
Carefully pipette 3.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



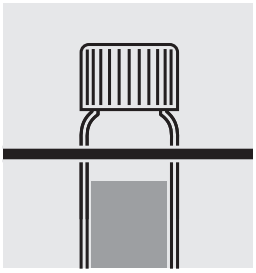
Heat the cell in the thermoreactor for two hours at 148 °C.



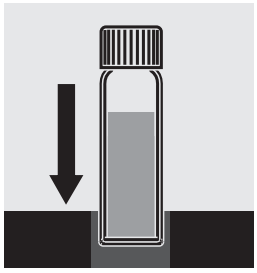
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 30 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD

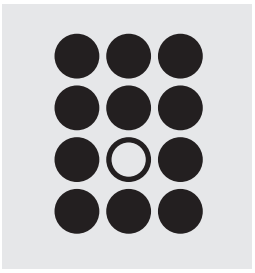
Program no. **82**

WTW model no.:	C4/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	25 - 1500 mg/l COD

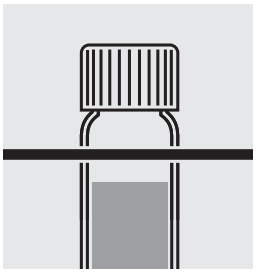
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

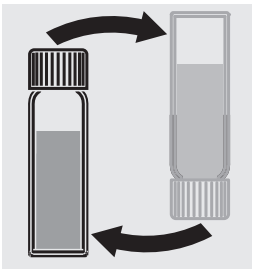
Carefully pipette 3.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



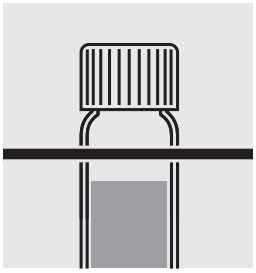
Heat the cell in the thermoreactor for two hours at 148 °C.



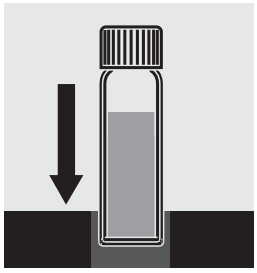
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 2000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 30 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

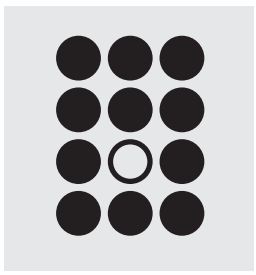
COD (Hg-free)

Program no. **58**

WTW model no.:	09772
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	10 - 150 mg/l COD

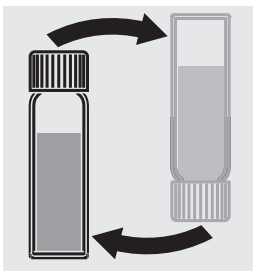
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

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



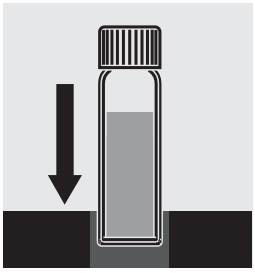
Heat the cell in the thermoreactor for two hours at 148 °C.

Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.

Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The presence of chloride causes the measured value to be too high. Refer to the package insert for details.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

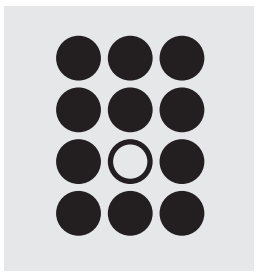
COD (Hg-free)

Program no. **59**

WTW model no.:	09773
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	100 - 1500 mg/l COD

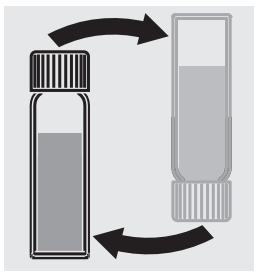
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

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



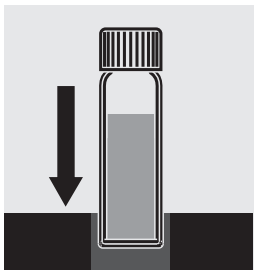
Heat the cell in the thermoreactor for two hours at 148 °C.

Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.

Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The presence of chloride causes the measured value to be too high. Refer to the package insert for details.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.
- For further notes please refer to the package insert of the test.

COD HR

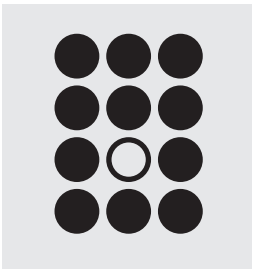
Program no. **311**

WTW model no.:	COD3 TC (HR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	200 - 15000 mg/l COD

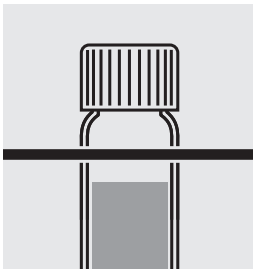
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

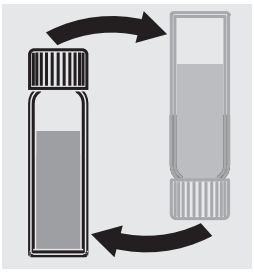
Carefully pipette 0.2 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



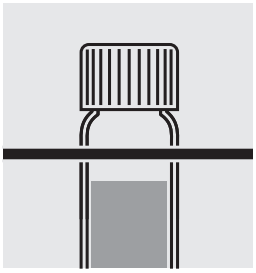
Heat the cell in the thermoreactor for two hours at 148 °C.



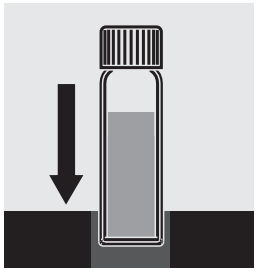
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 10,000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

COD HR (Hg-free)

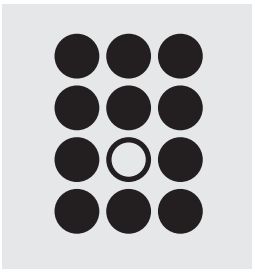
Program no. **350**

WTW model no.:	COD13 TC (HR-MF)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0 - 15000 mg/l COD

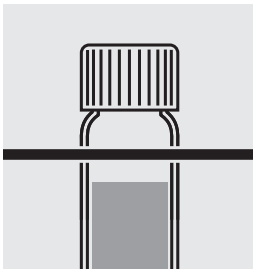
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

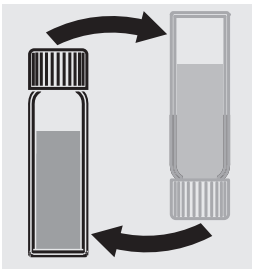
Carefully pipette 0.2 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



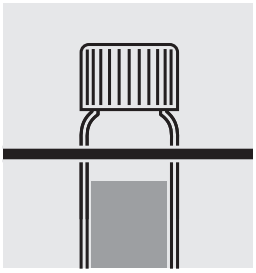
Heat the cell in the thermoreactor for two hours at 150 °C.



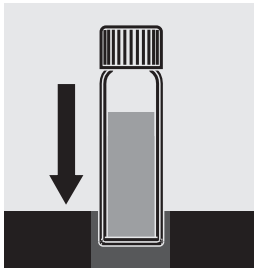
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

COD LR

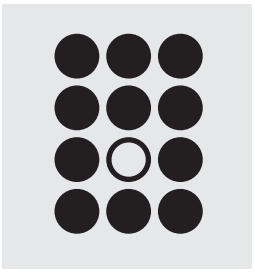
Program no. **309**

WTW model no.:	COD1 TC (LR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	3 - 150 mg/l COD

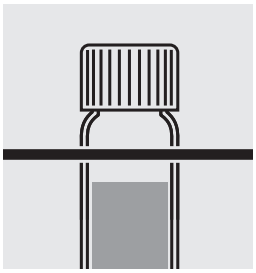
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

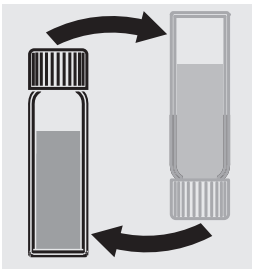
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



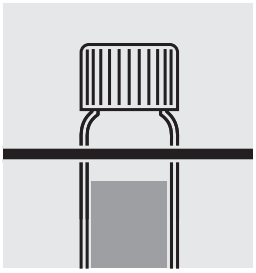
Heat the cell in the thermoreactor for two hours at 148 °C.



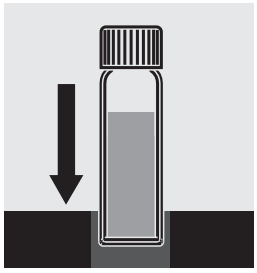
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 1000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

COD LR (Hg-free)

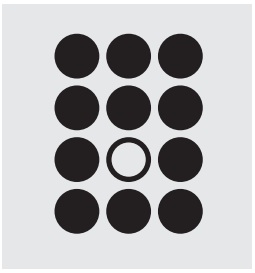
Program no. **348**

WTW model no.:	COD11 TC (LR-MF)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0 - 150 mg/l COD

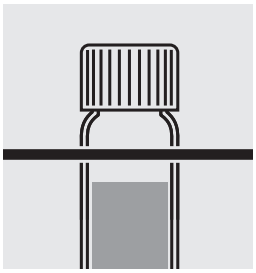
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

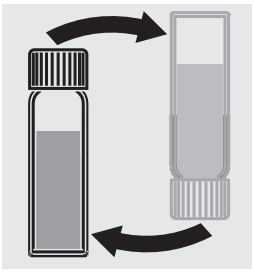
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



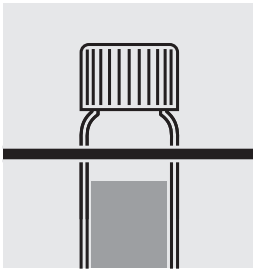
Heat the cell in the thermoreactor for two hours at 150 °C.



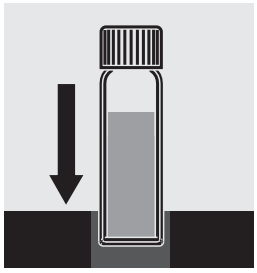
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

COD MR

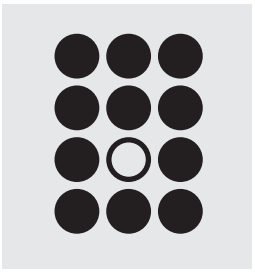
Program no. **310**

WTW model no.:	COD2 TC (MR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	20 - 1500 mg/l COD

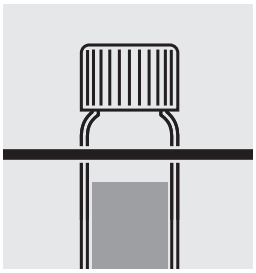
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

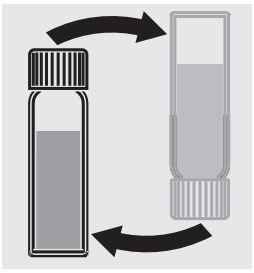
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



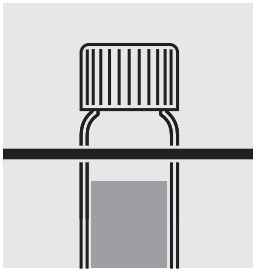
Heat the cell in the thermoreactor for two hours at 148 °C.



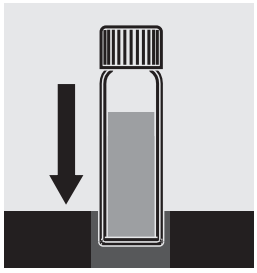
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The chloride content of the sample must not exceed 1000 mg/l.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

COD MR (Hg-free)

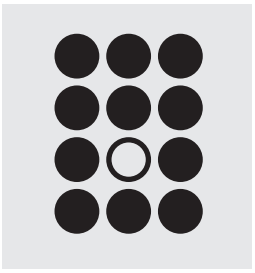
Program no. **349**

WTW model no.:	COD12 TC (MR-MF)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0 - 1500 mg/l COD

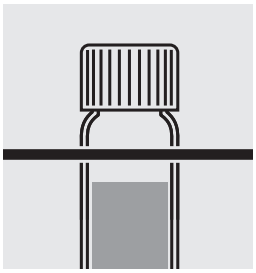
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Shake the reaction cell so that sediment is suspended.

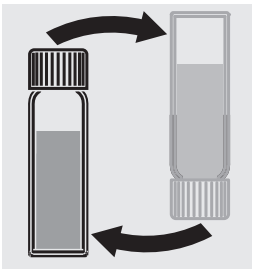
Carefully pipette 2.0 ml of sample into the cell, close with screw cap and mix vigorously.
Caution, cell becomes very hot!



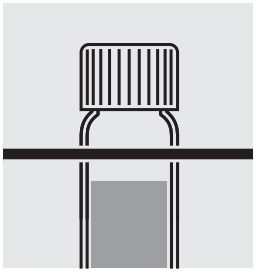
Heat the cell in the thermoreactor for two hours at 150 °C.



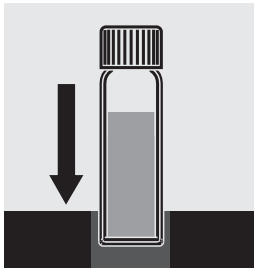
Remove the cell from the thermoreactor and let it cool down in a cell rack.



After approx. 10 min cooling time sway the cell.



Place the cell in the cell rack again and let it cool down **to room temperature**.



Carefully insert the cell in the photometer cell shaft and start measurement.

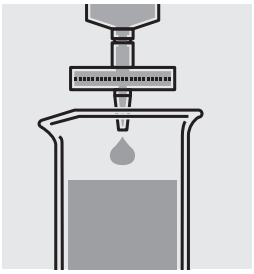
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Homogenize samples containing suspended matter with a disperser.
- Before being inserted in the thermoreactor and for photometric measurements the outside of the cell must be free of any contamination (e.g. fingerprints or drops of water). Wipe the cell with a dry cloth as necessary.
- Let the cell cool down long enough (at least 45 min) before inserting it in the photometer cell shaft. The cells remain stable for a long time after reaction and can also be left overnight and then measured.
- After cooling do not rock the cell until the measurement takes place in order not to suspend the solids that formed during the reaction. Suspended matter disturbs the photometric measurement.

Coloration at 435 nm (FB436)

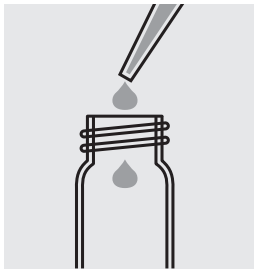
Program no. **43**

WTW model no.:	FB436
Category:	Reagent free test
Cell:	28 mm
Measuring range:	0.1 - 50.0 m^{-1}

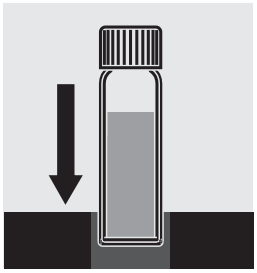


Filter the sample as necessary.

Note:
Filtered samples develop the real coloration, unfiltered samples the apparent coloration.



Pipette 10.0 ml of sample into the empty cell.

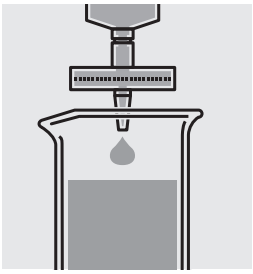


Insert the cell in the photometer cell shaft and start measurement.

Coloration at 517 nm (FB517)

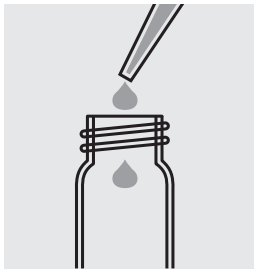
Program no. 44

WTW model no.:	FB517
Category:	Reagent free test
Cell:	28 mm
Measuring range:	0.1 - 50.0 m^{-1}

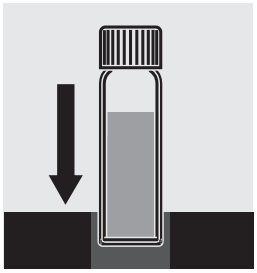


Filter the sample as necessary.

Note:
Filtered samples develop the real coloration, unfiltered samples the apparent coloration.



Pipette 10.0 ml of sample into the empty cell.

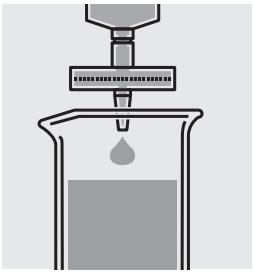


Insert the cell in the photometer cell shaft and start measurement.

Coloration at 610 nm (FB610)

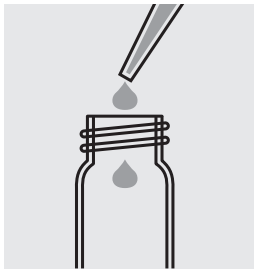
Program no. 45

WTW model no.:	FB610
Category:	Reagent free test
Cell:	28 mm
Measuring range:	0.1 - 50.0 m^{-1}

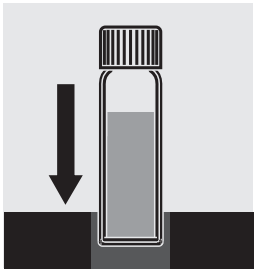


Filter the sample as necessary.

Note:
Filtered samples develop the real coloration, unfiltered samples the apparent coloration.



Pipette 10.0 ml of sample into the empty cell.

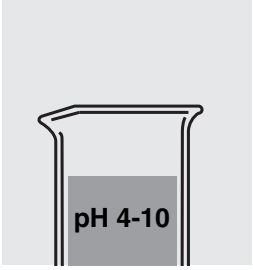


Insert the cell in the photometer cell shaft and start measurement.

Copper

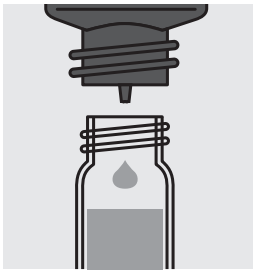
Program no. **13**

WTW model no.:	14553
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 7.50 mg/l Cu
	Display in mmol/l possible



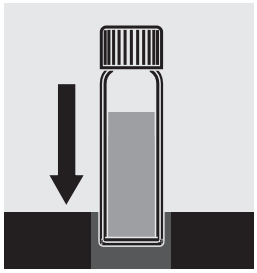
Check the pH value of the sample.
Desired range: pH 4-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 5.0 ml of sample into a reaction cell and mix.



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

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

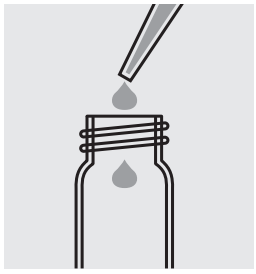
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Copper

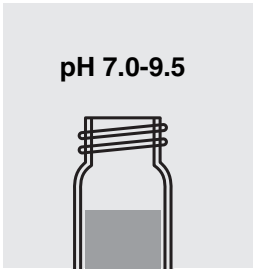
Program no. **41**

WTW model no.:	14767
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.04 - 3.50 mg/l Cu
	Display in mmol/l possible

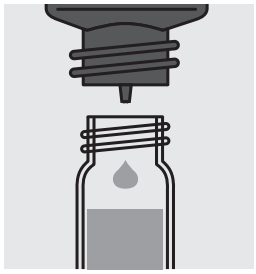


Pipette 10.0 ml of sample into the empty cell.

Add 2 green measurers of **Cu-1** and dissolve solids.

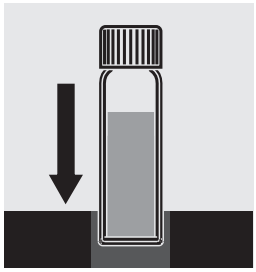


Check the pH value. Desired range: pH 7.0-9.5.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



Add 10 drops of **Cu-2**, close cell with screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

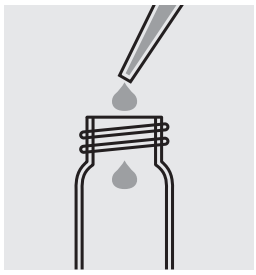
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be blue. Very high copper concentrations in the sample cause turquoise solutions and too low measured values. Dilute the sample in this case.

Copper

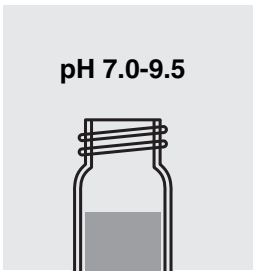
Program no. **42**

WTW model no.:	14767
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.10 - 6.00 mg/l Cu
	Display in mmol/l possible

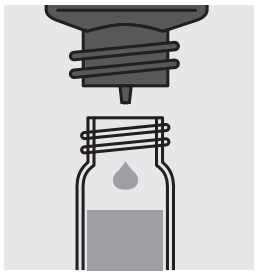


Pipette 5.0 ml of sample into the empty cell.

Add 1 green measurer of **Cu-1** and dissolve solids.

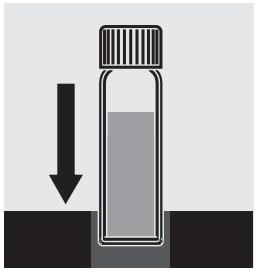


Check the pH value. Desired range: pH 7.0-9.5.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



Add 5 drops of **Cu-2**, close cell with screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

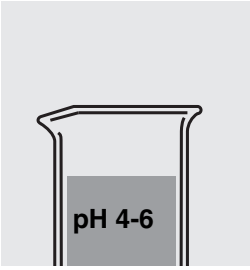
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The test sample should be blue. Very high copper concentrations in the sample cause turquoise solutions and too low measured values. Dilute the sample in this case.

Copper vario

Program no. **302**

WTW model no.:	Cu-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.04 - 5.00 mg/l Cu
	Display in mmol/l possible

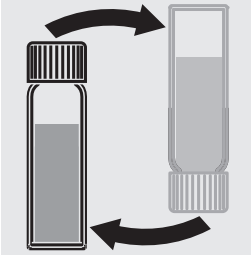
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 4-6.
Correct with diluted sodium hydroxide solution or caustic potash solution as necessary.

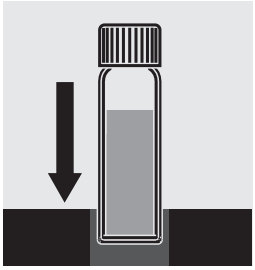
Pipette 10.0 ml of sample into the empty cell.

Add the contents of a **VARIO Cu1 F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).
Undissolved powder has no adverse effect on measurement.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

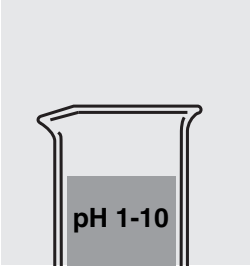
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Cyanide (free cyanide)

Program no. 6

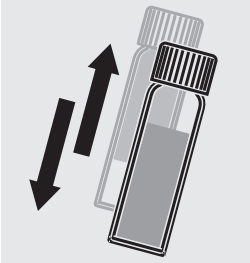
WTW model no.:	14561
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.01 - 0.30 mg/l CN
	Display in mmol/l possible



Check the pH value of the sample.
Desired range: pH 1-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

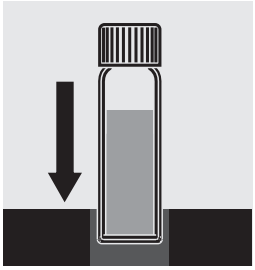
Pipette 5.0 ml of sample into a reaction cell and dissolve solids.

Add 1 level blue microspoon of **CN-3K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids. A small amount of solids may remain undissolved.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

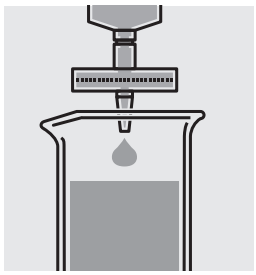
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Cyanuric Acid

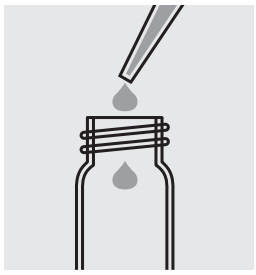
Program no. **113**

WTW model no.:	19253
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	2 - 160 mg/l Cyan Acid
	Display in mmol/l and ppm possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



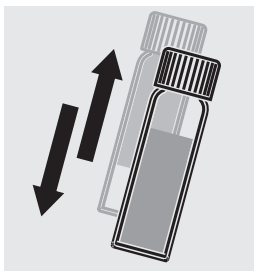
Filter turbid sample solutions.



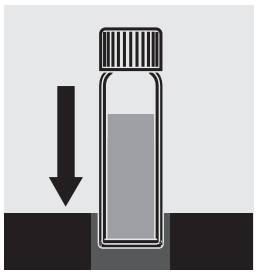
Pipette 5.0 ml of sample into the empty cell.

Add 5.0 ml deionized water with a pipette, close the cell with the screw cap and mix.

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



Swirl the cell **until the reagent is completely dissolved and no particles are visible.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

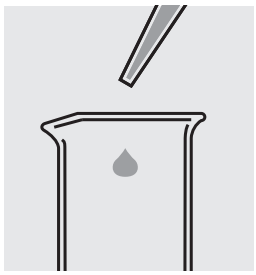
- **The reagent tablet must be completely dissolved.** Undissolved particles produce false-high measurement results.
- The turbidity of the measurement solution remains stable for 10 min.
- For further notes please refer to the package insert of the test.

DEHA vario

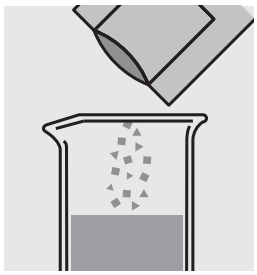
Program no. **335**

WTW model no.:	DEHA-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.004 - 0.450 mg/l DEHA
	Display in mmol/l possible

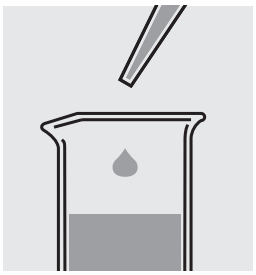
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



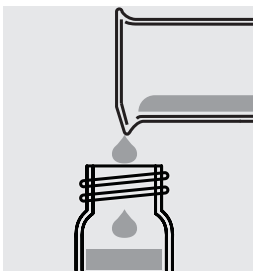
Pipette 25.0 ml of sample into an empty beaker.



Add the contents of a **VARIO Oxyscav 1 RGT** powder packet and dissolve it by stirring.

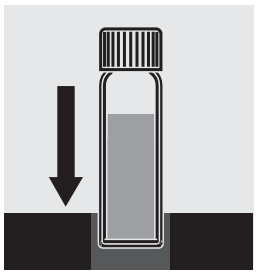


Add 0.5 ml VARIO **DEHA 2 RGT** with a pipette and mix.



Fill an empty cell with the prepared sample, close it with the screw cap **and put it in a dark place**.

Allow the sample to react for ten minutes **in a dark place**. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

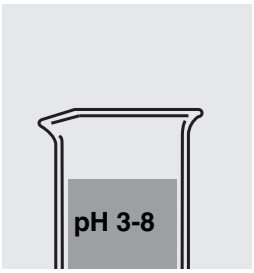
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean all laboratory glassware with hydrochloric acid (approx. 20 %), then thoroughly rinse with deionized water.
- Avoid excessive movements and exposure to sun light during sampling. Store the samples hermetically sealed.
- The temperature of the samples must be 25±3 °C.

Fluoride

Program no. **115**

WTW model no.:	00809
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 1.80 mg/l F
	Display in mmol/l possible

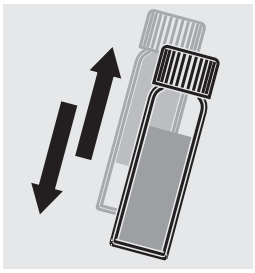
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 3-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

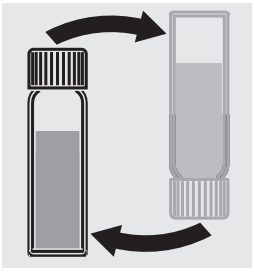
Pipette 5.0 ml of sample into a reaction cell and mix.

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

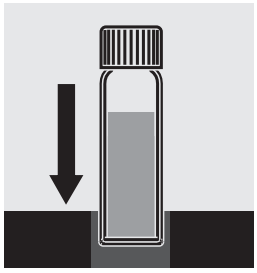


Shake the cell vigorously to dissolve solids.

Allow to react for 15 minutes.



Sway the reaction cell once again.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

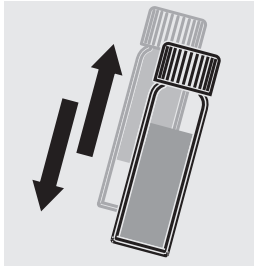
Formaldehyde

Program no. **92**

WTW model no.:	14500
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 7.00 mg/l HCHO
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

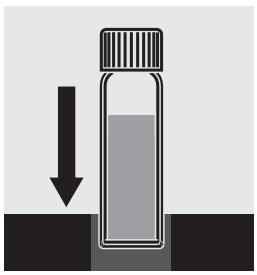
Add 1 level green microspoon of **HCHO-1K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

With a pipette, carefully add 2.0 ml sample, close the cell with the screw cap and mix.
Caution, cell becomes very hot!

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

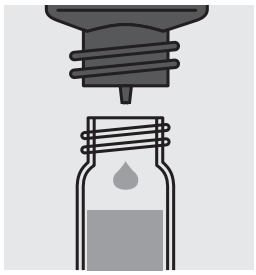
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Gold

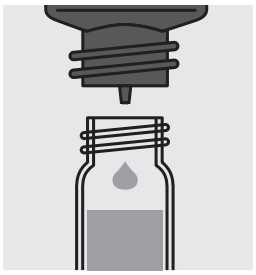
Program no. 77

WTW model no.:	14821
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.5 - 9.0 mg/l Au
	Display in mmol/l possible

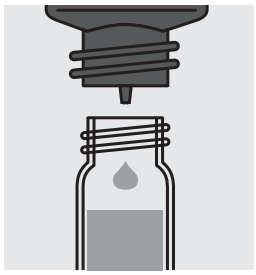
Pipette 2.0 ml of the sample into a test tube with screw cap.



Add 2 drops of **Au-1A** and mix.

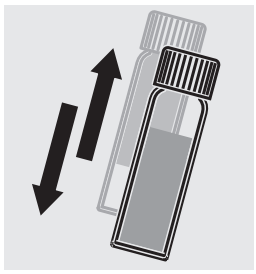


Add 4 drops of **Au-2A** and mix.

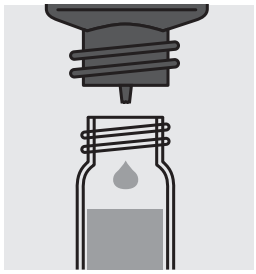


Add 6 drops of **Au-3A** and mix.

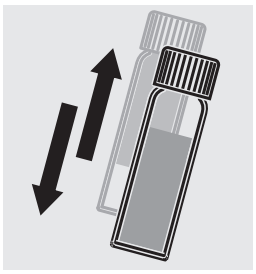
Using a pipette, add 6.0 ml **Au-4A** and close the tube.



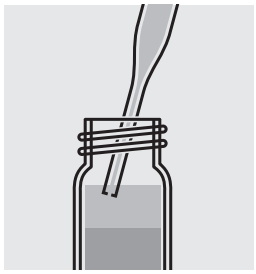
Shake the tube vigorously for one minute.



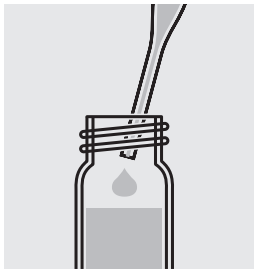
Add 6 drops of **Au-5A** and close the tube.



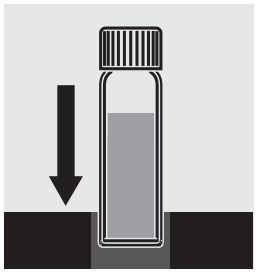
Shake the tube vigorously for one minute.



Aspirate the clear upper phase using a Pasteur pipette.



Fill the clean solution into an empty pipette.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

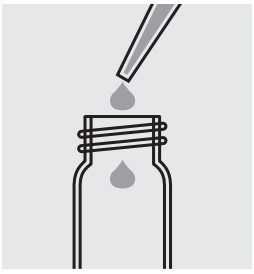
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Hydrazine vario

Program no. **329**

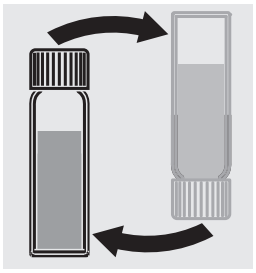
WTW model no.:	N2H4-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.004 - 0.600 mg/l N_2H_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



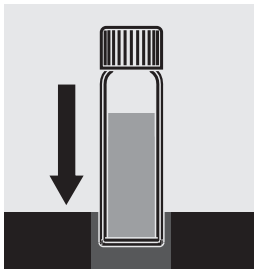
Pipette 10.0 ml of sample into the empty cell.

With a pipette add 0.5 ml **VARIO Hydra2 Reagent Solution** and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for 12 minutes.



Insert the cell in the photometer cell shaft and start measurement.

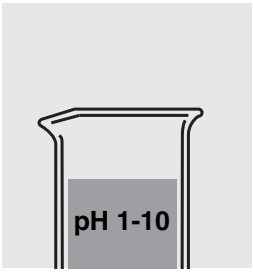
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If any hydrazine is present, the solution develops a yellow color after the reagent is added.
- The temperature of the samples must be 21±4 °C.
- Avoid moving the sample or too long exposure to air.

Iron

Program no. **9**

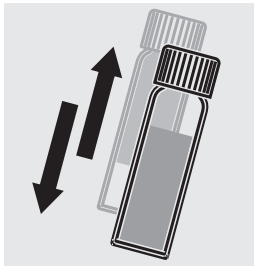
WTW model no.:	14549
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l Fe
	Display in mmol/l possible



Check the pH value of the sample.
Desired range: pH 1-10.
Correct with diluted hydrochloric acid as necessary.

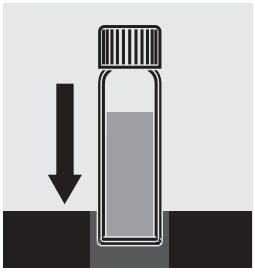
Pipette 5.0 ml of sample into a reaction cell and mix.

Add 1 level blue microspoon of **Fe-1K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

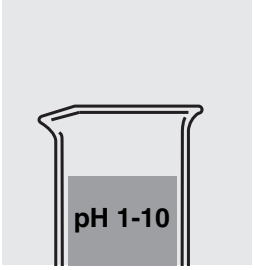
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

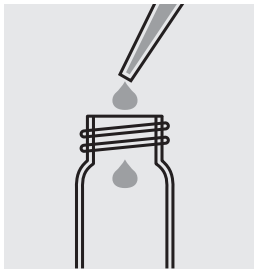
Iron

Program no. **10**

WTW model no.:	14761
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.05 - 1.50 mg/l Fe
	Display in mmol/l possible



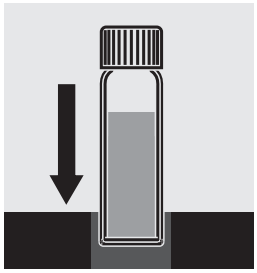
Check the pH value of the sample.
Desired range: pH 1-10.
Correct with diluted hydrochloric acid as necessary.



Pipette 10 ml sample into the empty cell.

Add 6 drops of **Fe-1**, close the cell with the screw cap and mix.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

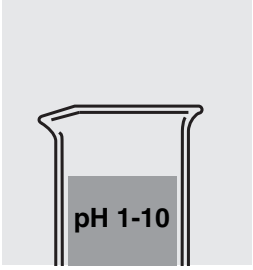
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

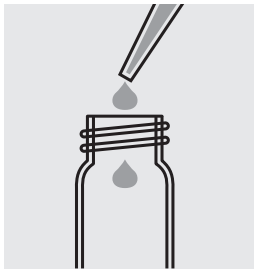
Iron

Program no. **11**

WTW model no.:	14761
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.10 - 3.00 mg/l Fe
	Display in mmol/l possible



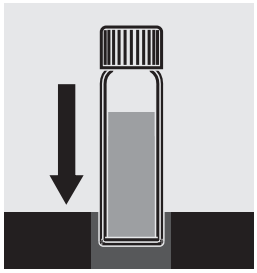
Check the pH value of the sample.
Desired range: pH 1-10.
Correct with diluted hydrochloric acid as necessary.



Pipette 5.0 ml of sample into the empty cell.

Add 3 drops of **Fe-1**, close the cell with the screw cap and mix.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

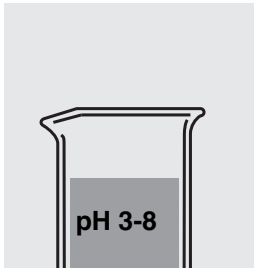
Iron

Program no. **107**

WTW model no.:	14896
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	1.0 - 50.0 mg/l Fe
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

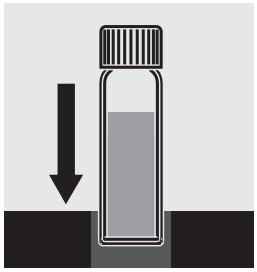
Determination of iron(II):



Check the pH value of the sample.
Desired range: pH 3-8.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

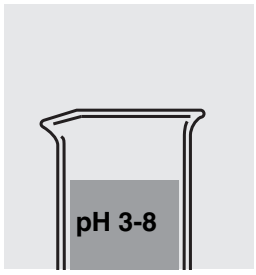
Add 1.0 ml sample with a pipette, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



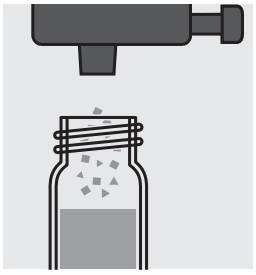
Insert the cell in the photometer cell shaft and start measurement.

Determination of the sum of iron(II) + iron(III):

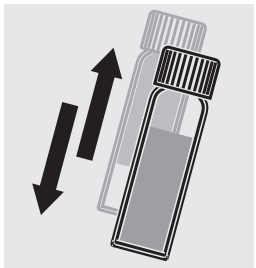


Check the pH value of the sample.
Desired range: pH 3-8.
Correct with diluted sodium hydroxide solution or hydrofluoric acid as necessary.

Add 1.0 ml sample with a pipette, close the cell with the screw cap and mix.

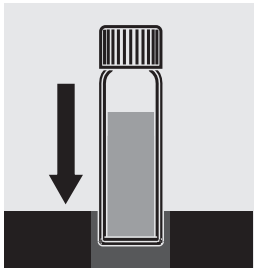


Add 1 dose of **Fe-1K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

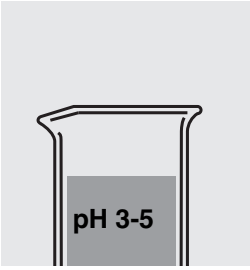
Note:
For the determination of **total iron** a pretreatment with Crack Set 10C, Cat.No. 252033, or Crack Set 10, Cat.No. 250496 and thermoreactor is necessary.

Iron vario

Program no. **301**

WTW model no.:	Fe-2 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 3.00 mg/l Fe
	Display in mmol/l possible

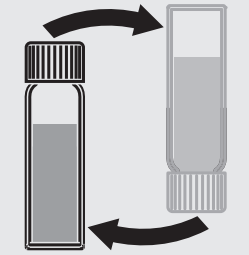
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 3-5.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

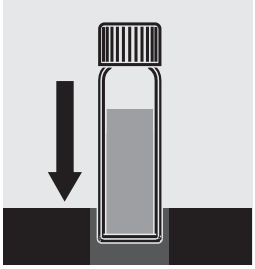
Pipette 10.0 ml of sample into the empty cell.

Add the contents of a **VARIO Ferro F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).
Undissolved powder has no adverse effect on measurement.

Allow to react for 3 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

Notes:

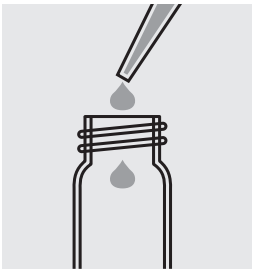
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This method covers all forms of dissolved iron and most forms of undissolved iron.
- In the case of samples with visible rust the reaction time should be extended to at least 5 minutes.

Iron vario TPTZ

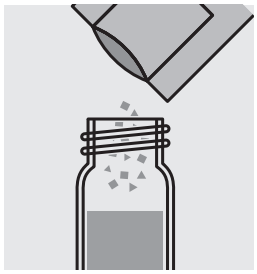
Program no. 300

WTW model no.:	Fe-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.012 - 1.800 mg/l Fe
	Display in mmol/l possible

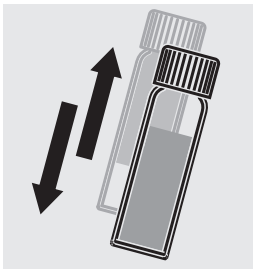
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

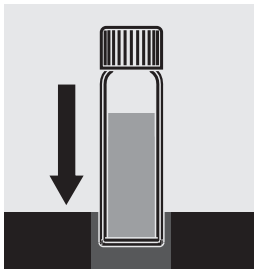


Add the contents of a **VARIO Iron TPTZ F10** powder pack and close the cell with the screw cap.



To dissolve solids, shake the cell vigorously for approx. 30 seconds.

Allow to react for 3 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

Notes:

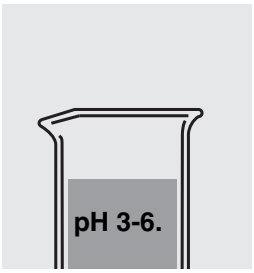
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Lead

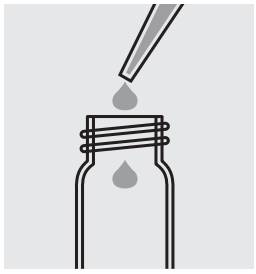
Program no. **2**

WTW model no.:	09717
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.01 - 4.00 mg/l Pb
	Display in mmol/l possible

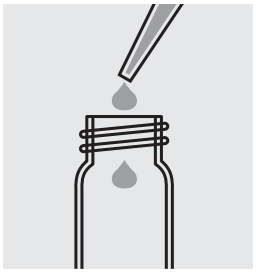
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 3-6.
Correct with diluted nitric acid or ammonia solution as necessary.

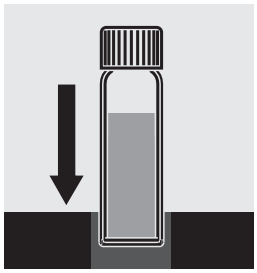


Pipette 0.50 ml of **Pb-1** into the empty cell.



Add 0.50 ml **Pb-2** with a pipette and mix.

Add 8.0 ml sample with a pipette, close the cell with the screw cap and mix.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

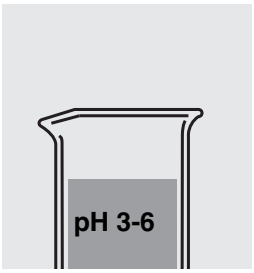
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Lead

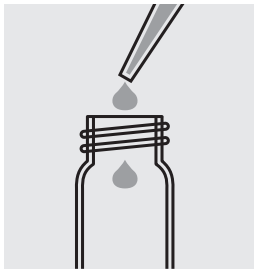
Program no. **3**

WTW model no.:	09717
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.02 - 5.00 mg/l Pb
	Display in mmol/l possible

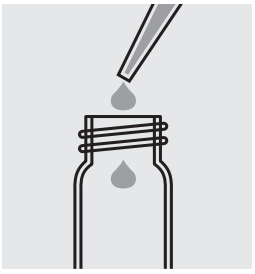
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Desired range: pH 3-6.
Correct with diluted nitric acid or ammonia solution as necessary.

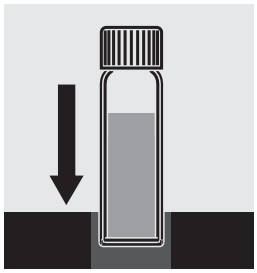


Pipette 0.50 ml of **Pb-1** into the empty cell.



Add 0.50 ml **Pb-2** with a pipette and mix.

Add 8.0 ml sample with a pipette, close the cell with the screw cap and mix.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

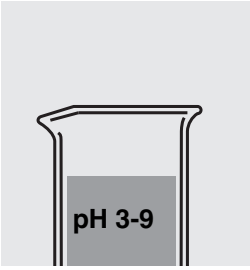
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Magnesium

Program no. **47**

WTW model no.:	00815
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	5.0 - 75.0 mg/l Mg
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



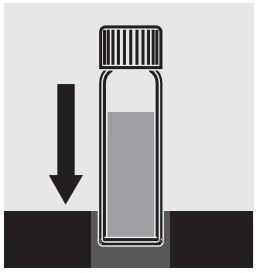
Check the pH value of the sample.
Desired range: pH 3-9.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

Pipette 1.0 ml of sample into a reaction cell and mix.

Add 1.0 ml **Mg-1K** with a pipette, close the cell with the screw cap and mix.

Allow to react for 3 exactly minutes.

Add 3 drops of **Mg-2K**, close cell with screw cap and mix.



Insert the cell in the photometer cell shaft and start measurement.

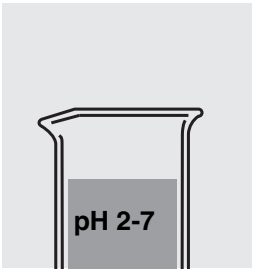
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Manganese

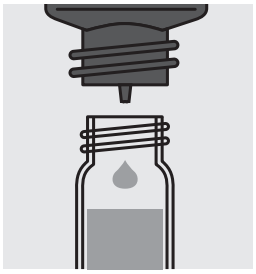
Program no. **14**

WTW model no.:	00816
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 5.00 mg/l Mn
	Display in mmol/l possible



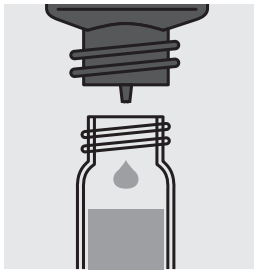
Check the pH value of the sample.
Desired range: pH 2-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 7.0 ml of sample into a reaction cell and mix.



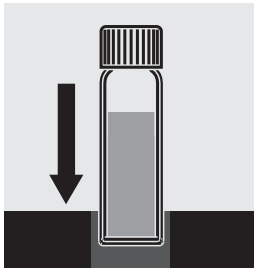
Add 2 drops of **Mn-1K** and mix.

Allow to react for 2 minutes.



Add 3 drops of **Mn-2K**, close cell with screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

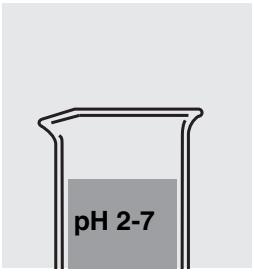
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Manganese

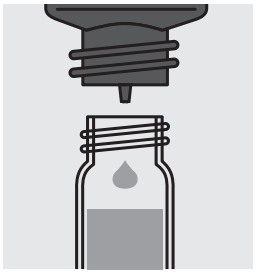
Program no. **15**

WTW model no.:	14770
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 5.00 mg/l Mn
	Display in mmol/l possible

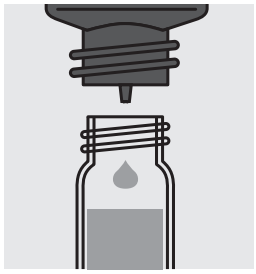


Check the pH value of the sample.
Desired range: pH 2-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 10.0 ml of sample into the empty cell.

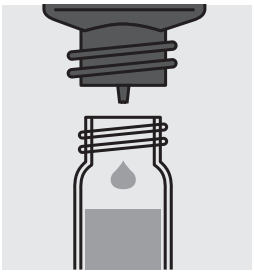


Add 8 drops of **Mn-1** and mix.



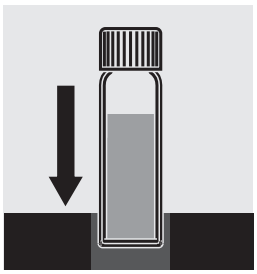
Add 4 drops of **Mn-2** and mix.

Allow to react for 2 minutes.



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

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

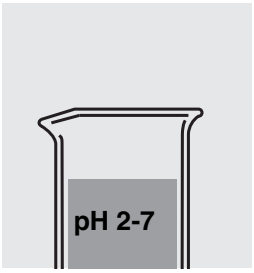
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Manganese

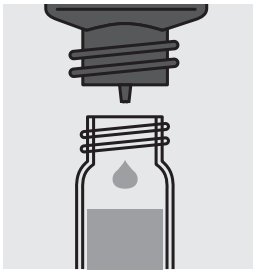
Program no. **16**

WTW model no.:	14770
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.04 - 9.00 mg/l Mn
	Display in mmol/l possible

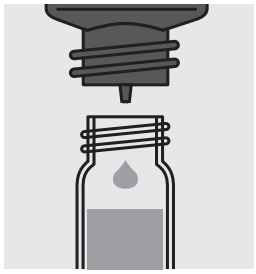


Check the pH value of the sample.
Desired range: pH 2-7.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 10.0 ml of sample into the empty cell.

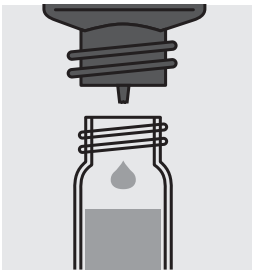


Add 8 drops of **Mn-1** and mix.



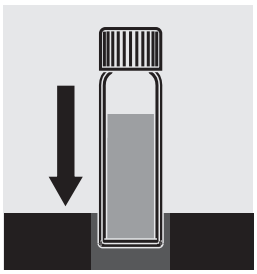
Add 4 drops of **Mn-2** and mix.

Allow to react for 2 minutes.



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

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

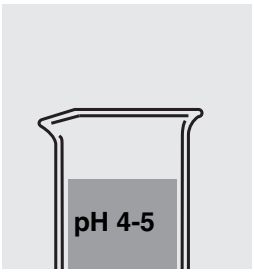
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Manganese vario

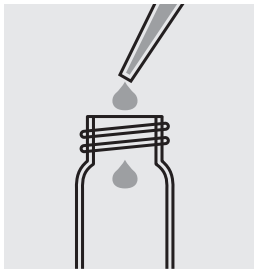
Program no. **303**

WTW model no.:	Mn-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.2 - 20.0 mg/l Mn
	Display in mmol/l possible

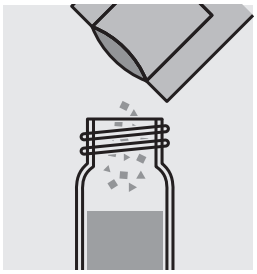
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



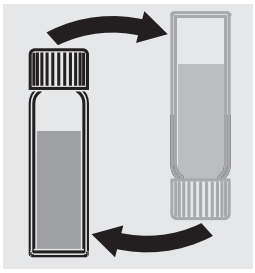
Check the pH value of the sample.
Desired range: pH 4-5.
Correct with diluted nitric acid or sodium hydroxide solution as necessary.



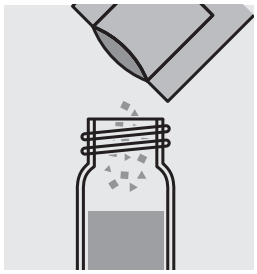
Pipette 10.0 ml of sample into the empty cell.



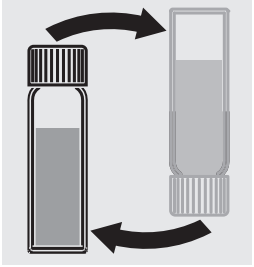
Add the contents of a **VARIO Manganese Citrate Buffer** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).

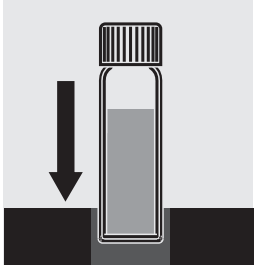


Add the contents of a **VARIO Sodium Periodate** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

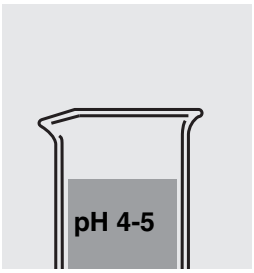
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Manganese vario

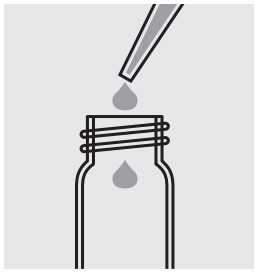
Program no. **330**

WTW model no.:	Mn-2 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.007 - 0.700 mg/l Mn
	Display in mmol/l possible

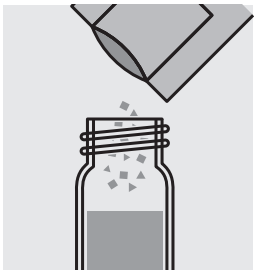
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



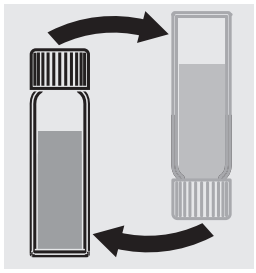
Check the pH value of the sample.
Required range: pH 4-5.
Correct with diluted nitric acid or sodium hydroxide solution as necessary.



Pipette 10.0 ml of sample into the empty cell.

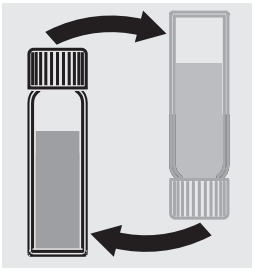


Add the contents of a **VARIO Ascorbic Acid** powder packet and close the cell with the screw cap.



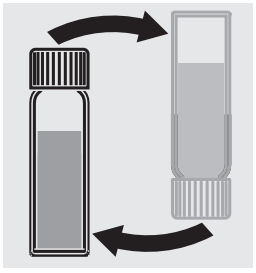
Mix the contents by carefully swaying the cell.

Add 15 drops of **VARIO Alkaline-Cyanide Reagent Solution** and close the cell with the screw cap.



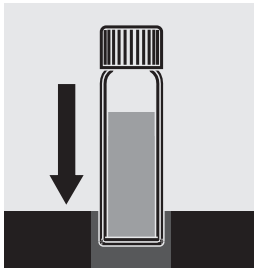
Mix the contents by carefully swaying the cell.

Add 21 drops of **VARIO PAN Indicator Solution 0.1 %** and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

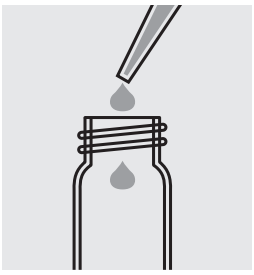
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean all laboratory glassware with nitric acid, then thoroughly rinse with deionized water.

Molybdate vario

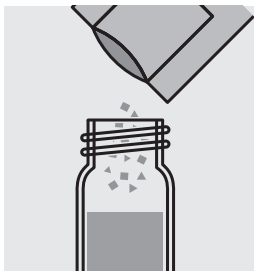
Program no. **304**

WTW model no.:	Mo-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.3 - 35.0 mg/l Mn
	Display in mmol/l possible

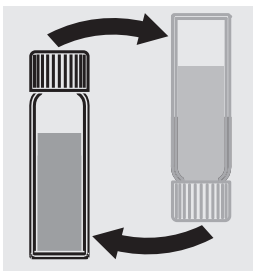
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



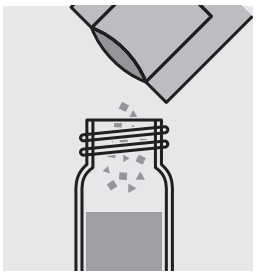
Pipette 10.0 ml of sample into the empty cell.



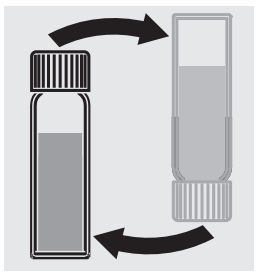
Add the contents of a **VARIO Molybdenum HR1 F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).

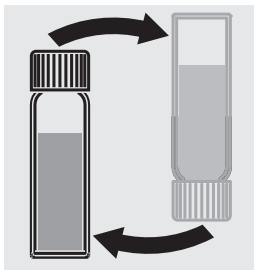


Add the contents of a **VARIO Molybdenum HR2 F10** powder pack and close the cell with the screw cap.



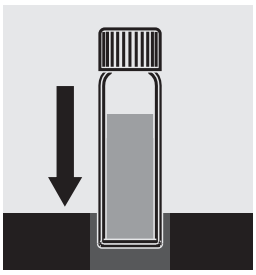
Mix the contents by carefully swaying the cell (10 x).

Add the contents of a **VARIO Molybdenum HR3 F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).
Undissolved powder has no adverse effect on measurement.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

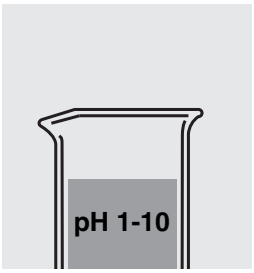
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Molybdenum

Program no. **80**

WTW model no.:	00860
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.02 - 1.00 mg/l Mo
	Display in mmol/l possible

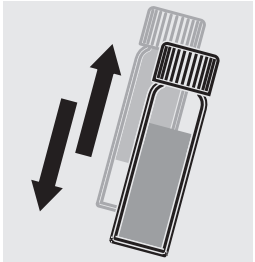
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Required range: pH 1-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

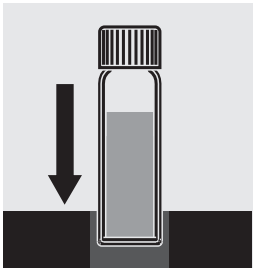
Add 2 drops of **Mo-1K** into a reaction cell, close the cell with the screw cap and mix.

Add 10.0 ml sample with a pipette and close the cell.



Shake the cell vigorously to dissolve solids.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

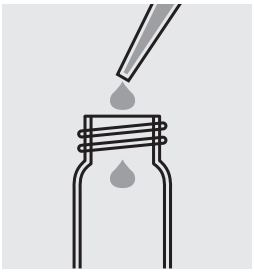
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

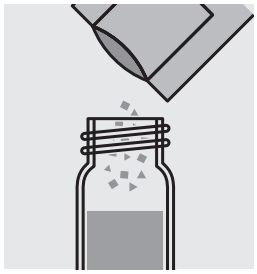
Molybdenum

Program no. **112**

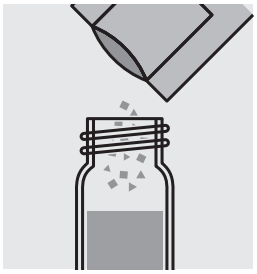
WTW model no.:	19252
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.5 - 45.0 mg/l Mo
	0.8 - 75.0 mg/l MoO_4
	Display in mmol/l possible



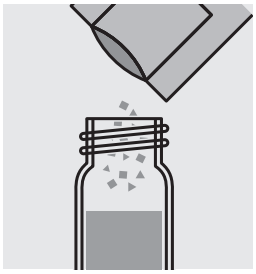
Pipette 10.0 ml of sample into the empty cell.



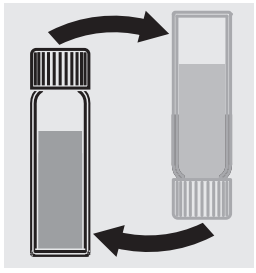
Add 1 powder pack of **Molybdenum HR1**, close the cell with the screw cap and dissolve solids.



Add 1 powder pack of **Molybdenum HR2**, close the cell with the screw cap and dissolve solids.

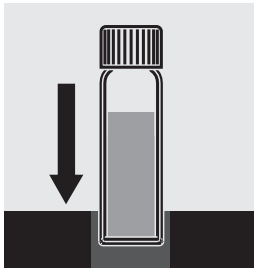


Add 1 powder pack of **Molybdenum HR3** and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for exactly 5 minutes. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

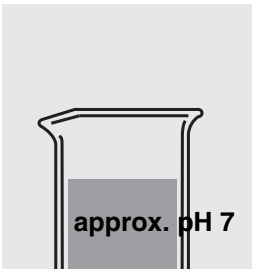
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Molybdenum vario

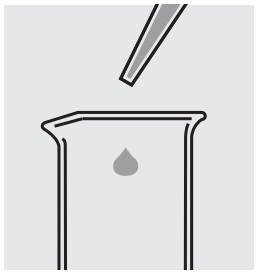
Program no. **331**

WTW model no.:	Mo-2 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.3 - 40.0 mg/l Mo
	Display in mmol/l possible

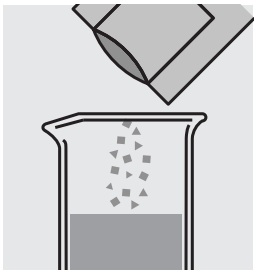
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



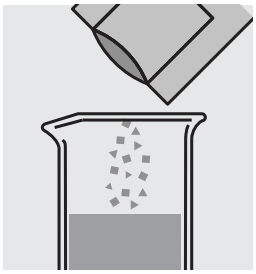
Check the pH value of the sample.
Nominal value: approx. pH 7.
Correct with diluted sodium hydroxide solution or nitric acid as necessary.



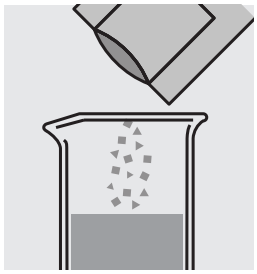
Pipette 25.0 ml of sample into an empty beaker.



Add the contents of a **VARIO Molybdenum HR 1 F25 ml** powder pack and dissolve them by stirring.

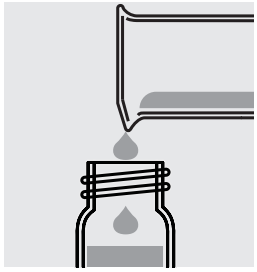


Add the contents of a **VARIO Molybdenum HR 2 F25 ml** powder pack and dissolve them by stirring.

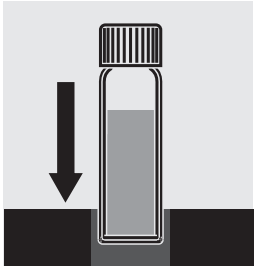


Add the contents of a **VARIO Molybdenum HR 3 F25 ml** powder pack and dissolve them by stirring.

Allow to react for 5 minutes.



Fill an empty cell with the prepared sample and close it with the screw cap.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If any molybdenum is present, the solution develops a yellow color after all reagents have been added.

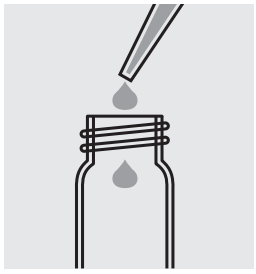
Monochloramine (MCA)

Program no. **342**

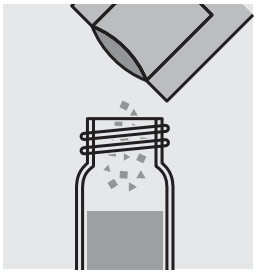
WTW model no.:	MCA TP
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.04 - 4.50 mg/l Cl_2 (MCA)
	0.03 - 3.26 mg/l NH_2Cl
	Display in mmol/l possible

CAL / ZERO 2

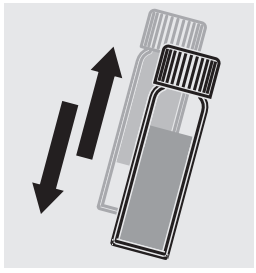
Perform a zero adjustment using a **16 mm** cell filled with **sample**.



Pipette 10.0 ml sample into an empty **28 mm** cell.

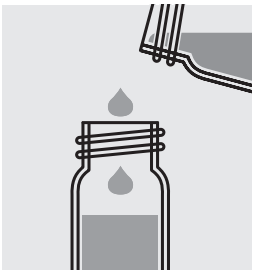


Add the contents of a **Monochlor F RGT** powder pack and close the cell with the screw cap.

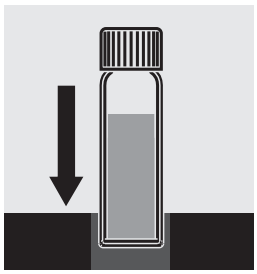


Shake the cell vigorously for about 20 seconds to dissolve solids.

Allow to react for 5 minutes (reaction time).



Transfer the prepared sample to an empty **16 mm** cell and close it with the screw cap.



Insert the **16 mm** cell in the photometer cell shaft and start measurement.

CAL / ZERO 2

When switching to another program restore the zero adjustment by performing a new zero adjustment using a **16 mm** cell filled with **deionized water**.

Note: Failing to restore the zero adjustment will result in all future measurements being erroneous!

Notes:

- Collect samples in clean glass bottles and analyze as soon as possible.
- The 5 minutes reaction times refer to a sample temperature of 18-20 °C (64-68 °F).
  For other sample temperatures adjust the reaction time according to the follwing table:

Sample temperature		Reaction time (minutes)
°C	°F	
5	41	10
10	50	8
16	61	6

Sample temperature		Reaction time (minutes)
°C	°F	
20	68	5
23	73	2.5
25	77	2

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

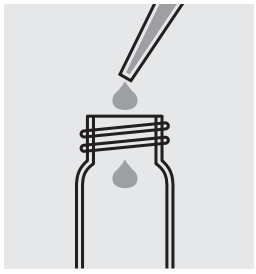
Monochloramine (MCA)

Program no. **343**

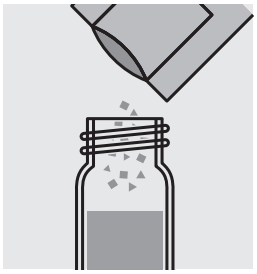
WTW model no.:	MCA TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.04 - 3.00 mg/l Cl_2 (MCA)
	0.03 - 2.17 mg/l NH_2Cl
	Display in mmol/l possible

CAL / ZERO 2

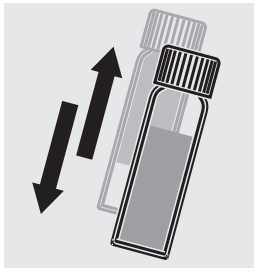
Perform a zero adjustment using a **28 mm** cell filled with **sample**.



Pipette 10.0 ml sample into an empty **28 mm** cell.

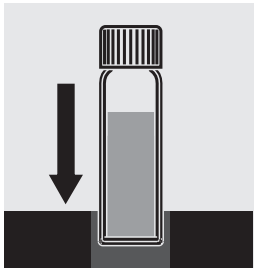


Add the contents of a **Monochlor F RGT** powder pack and close the cell with the screw cap.



Shake the cell vigorously for about 20 seconds to dissolve solids.

Allow to react for 5 minutes (reaction time).



Insert the cell in the photometer cell shaft and start measurement.

CAL / ZERO 2

When switching to another program restore the zero adjustment by performing a new zero adjustment using a **28 mm** cell filled with **deionized water**.

Note: Failing to restore the zero adjustment will result in all future measurements being erroneous!

Notes:

- Collect samples in clean glass bottles and analyze as soon as possible.
- The 5 minutes reaction times refer to a sample temperature of 18-20 °C (64-68 °F).
  For other sample temperatures adjust the reaction time according to the follwing table:

Sample temperature		Reaction time (minutes)
°C	°F	
5	41	10
10	50	8
16	61	6

Sample temperature		Reaction time (minutes)
°C	°F	
20	68	5
23	73	2.5
25	77	2

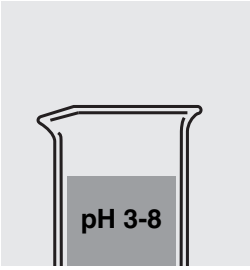
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Nickel

Program no. **93**

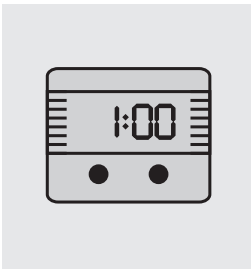
WTW model no.:	14554
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 6.00 mg/l Ni
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



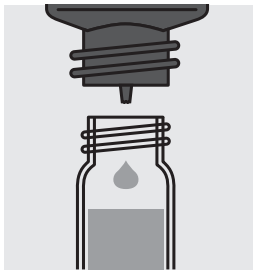
Check the pH value of the sample.
Required range: pH 3-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

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



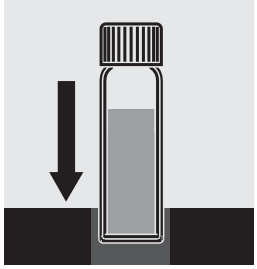
Allow to react for 1 minute.

Add 2 drops of **Ni-1K**, close the cell with the screw cap and mix.



Add 2 drops of **Ni-2K**, close the cell with the screw cap and mix.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

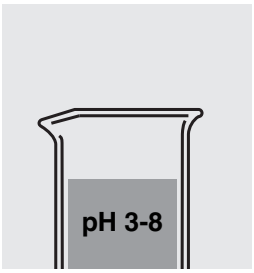
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nickel

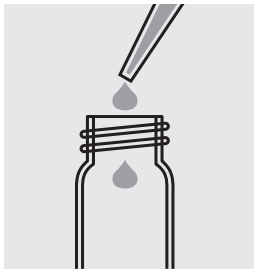
Program no. **95**

WTW model no.:	14785
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.10 - 3.80 mg/l Ni
	Display in mmol/l possible

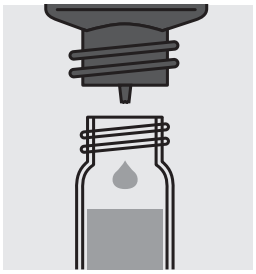
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Required range: pH 3-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

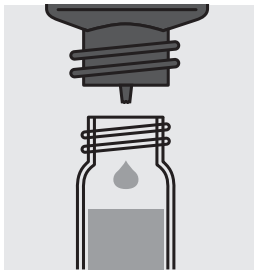


Pipette 10.0 ml of sample into the empty cell.

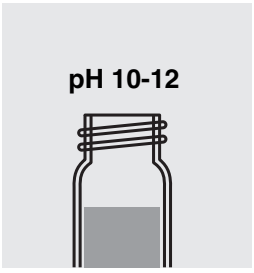


Add 2 drops of **Ni-1** and mix. If the solution discolors, go on adding **Ni-1** drop by drop until a slight brown coloring is maintained.

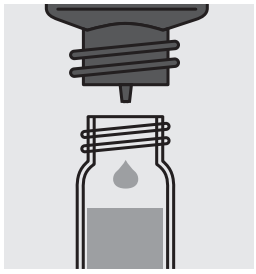
Allow to react for 1 minute.



Add 4 drops of **Ni-2** and mix.

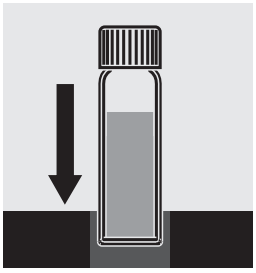


Check the pH value.
Required range:
pH 10-12.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



Add 4 drops of **Ni-3** and mix.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

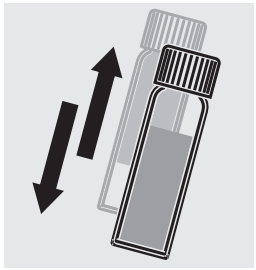
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrate

Program no. **17**

WTW model no.:	14542
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 14.5 mg/l NO_3-N
	2.2 - 64.2 mg/l NO_3
	Display in mmol/l possible

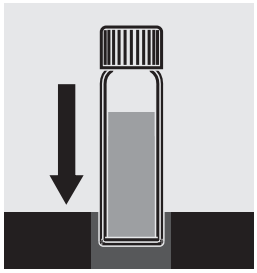
Add 1 level blue microspoon of **NO_3-1K** into a reaction cell and close the cell with the screw cap.



To dissolve solids, shake the cell **vigorously for 1 minute**.

Carefully add 1.5 ml of sample with a pipette, close the cell with the screw cap and mix. **Caution, cell becomes very hot!**

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrate

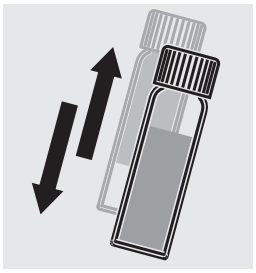
Program no. **61**

WTW model no.:	14556
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 2.70 mg/l NO_3-N
	0.44 - 11.95 mg/l NO_3
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

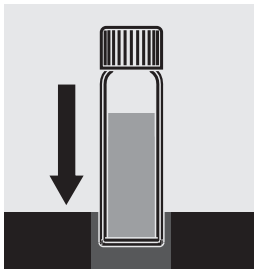
Pipette 2.0 ml of sample into a reaction cell. **Do not mix the contents!**

Add 1 level blue microspoon of **NO_3-1K**. **Immediately** close the cell tightly. **Caution, the contents will foam very much! Use protective goggles and gloves.**



To dissolve solids, shake the cell **vigorously for 5 seconds**.

Allow to react for 30 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

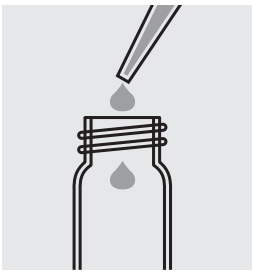
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrate

Program no. **69**

WTW model no.:	14942
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.2 - 13.0 mg/l NO_3-N
	0.9 - 57.5 mg/l NO_3
	Display in mmol/l possible

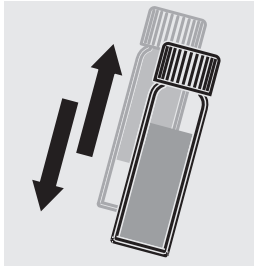
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 5.0 ml of **NO_3-1** into the empty cell.

Add 1.0 ml sample with a pipette.
Caution, cell becomes very hot!

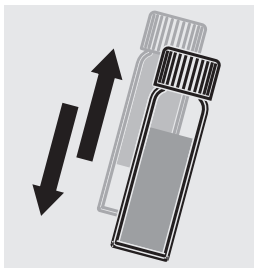
Immediately add 1.5 ml **NO_3-2** with a pipette and close the cell with the screw cap.



Shake the cell vigorously.

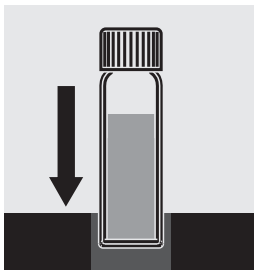
Allow to react for 15 minutes.

Add two level gray microspoons of **NO_3-3** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 60 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

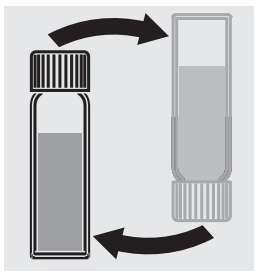
Nitrate

Program no. **314**

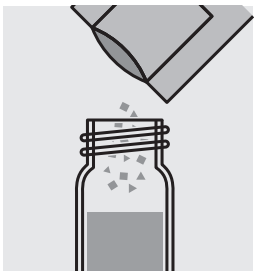
WTW model no.:	NO3-1 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.2 - 30.0 mg/l NO_3-N
	1.0 - 133.0 mg/l NO_3
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

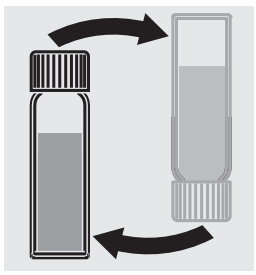
Pipette 1.0 ml of sample into a reaction cell and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x).

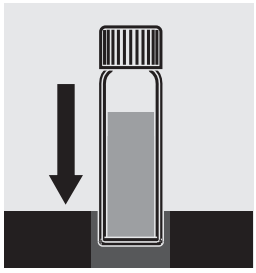


Add the contents of a **Nitrate Chromotropic** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x). A small amount of solids may remain undissolved.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

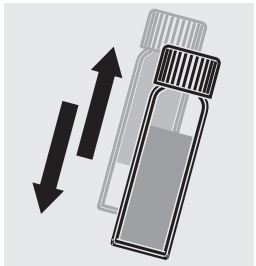
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Nitrite

Program no. 55

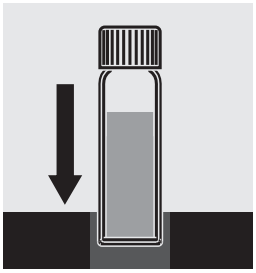
WTW model no.:	14547
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.020 - 0.550 mg/l NO_2-N
	0.070 - 1.810 mg/l NO_2
	Display in mmol/l possible

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



Shake the cell vigorously to dissolve solids.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

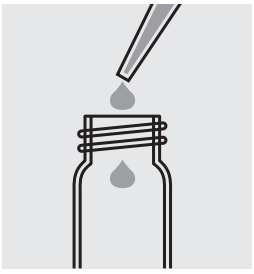
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrite

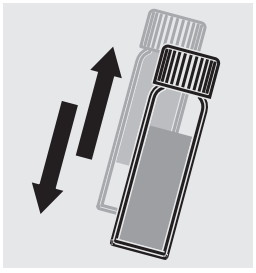
Program no. **18**

WTW model no.:	14776
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.01 - 0.30 mg/l NO_2-N
	0.03 - 0.99 mg/l NO_2
	Display in mmol/l possible

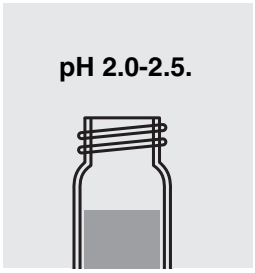


Pipette 10.0 ml of sample into the empty cell.

Add 2 level blue microspoons of **NO_2-1** and close the cell with the screw cap.

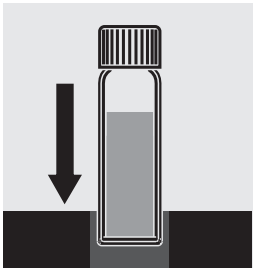


Shake the cell vigorously to dissolve solids.



Check the pH value. Desired range: pH 2.0-2.5.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

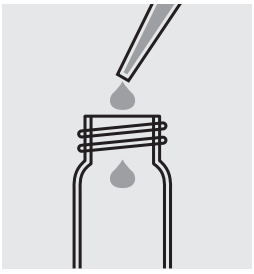
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrite

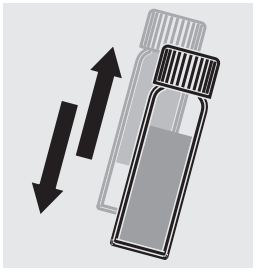
Program no. **19**

WTW model no.:	14776
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.02 - 0.50 mg/l NO_2-N
	0.06 - 1.64 mg/l NO_2
	Display in mmol/l possible

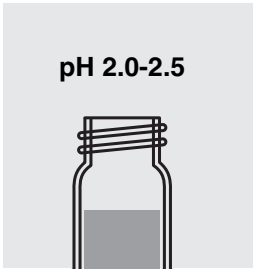


Pipette 10.0 ml of sample into the empty cell.

Add 2 level blue microspoons of **NO_2-1** and close the cell with the screw cap.

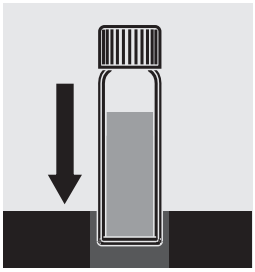


Shake the cell vigorously to dissolve solids.



Check the pH value. Desired range: pH 2.0-2.5.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

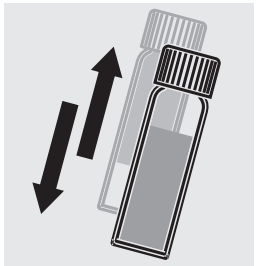
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Nitrite

Program no. 85

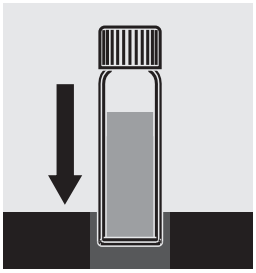
WTW model no.:	N5/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.020 - 0.550 mg/l NO_2-N
	0.070 - 1.810 mg/l NO_2
	Display in mmol/l possible

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



Shake the cell vigorously to dissolve solids.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

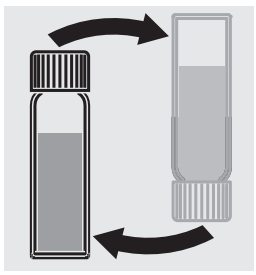
Nitrite HR

Program no. **317**

WTW model no.:	NO2-2 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.30 - 3.00 mg/l NO_2-N
	0.99 - 9.85 mg/l NO_2
	Display in mmol/l possible

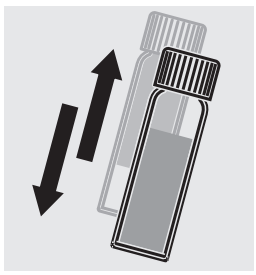
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 0.5 ml of sample into a reaction cell.



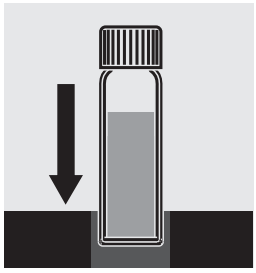
Mix the contents by carefully swaying the cell.

Add 1 level black measuring spoon no. 8 of **Nitrit-101** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Store the closed reagents at a temperature of +4 to +8 °C.

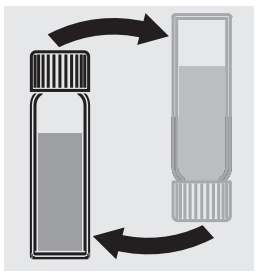
Nitrite LR

Program no. **318**

WTW model no.:	NO2-2 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.03 - 0.60 mg/l NO_2-N
	0.10 - 1.97 mg/l NO_2
	Display in mmol/l possible

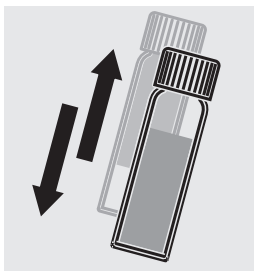
Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 2.0 ml of sample into a reaction cell.



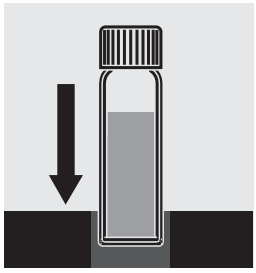
Mix the contents by carefully swaying the cell.

Add 1 level black measuring spoon no. 8 of **Nitrit-101** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

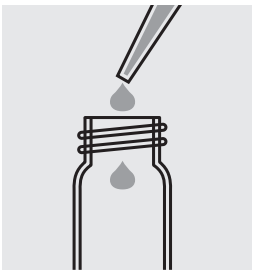
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Store the closed reagents at a temperature of +4 to +8 °C.

Nitrite vario

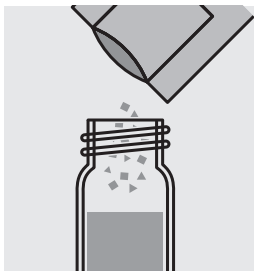
Program no. **305**

WTW model no.:	NO2-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.002 - 0.300 mg/l NO_2-N
	0.007 - 0.985 mg/l NO_2
	Display in mmol/l possible

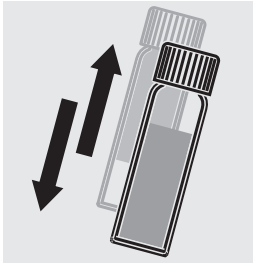
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

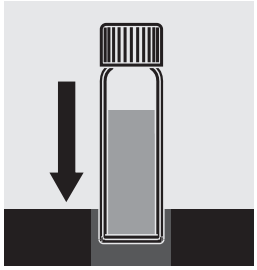


Add the contents of a **VARIO Nitri 3 F10** powder pack and close the cell with the screw cap.



Shake the cell. Undissolved powder has no adverse effect on measurement.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

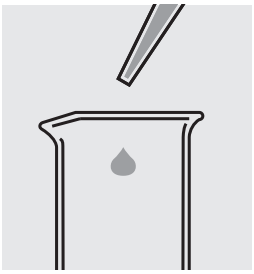
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Nitrite vario

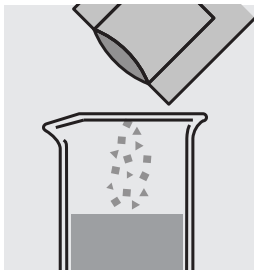
Program no. **334**

WTW model no.:	NO2-3 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.002 - 0.300 mg/l NO_2-N
	0.007 - 0.985 mg/l NO_2
	Display in mmol/l possible

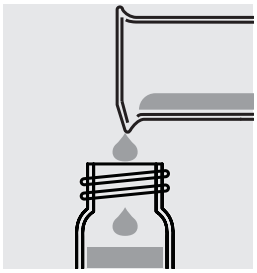
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 25.0 ml of sample into an empty beaker.

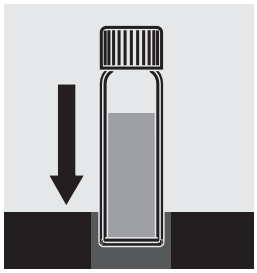


Add the contents of a **VARIO Nitri 3 F25 ml** powder pack and dissolve them by stirring.



Fill an empty cell with the prepared sample and close it with the screw cap.

Allow to react for 20 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

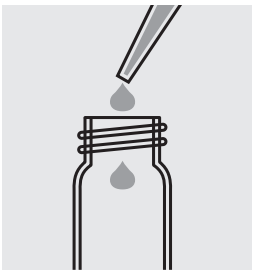
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Nitrogen (total)

Program no. **35**

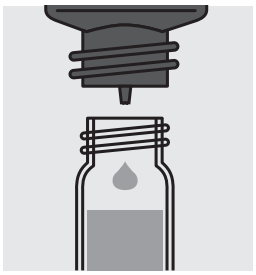
WTW model no.:	14537
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.50 - 15.00 mg/l N

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

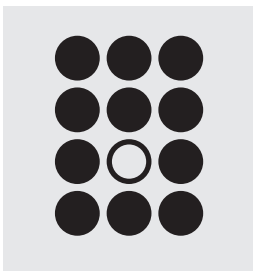


Pipette 10.0 ml of sample into an empty cell.

Add 1 level blue microspoon of **N-1K**.

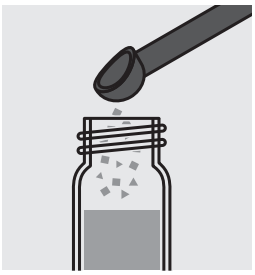


Add 6 drops of **N-2K**, close cell with screw cap and mix.

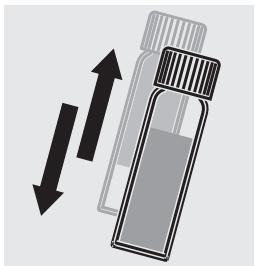


Heat the cell in the thermoreactor for one hour at 120 °C.

Place the cell in the cell rack again and let it cool down to room temperature (=**prepared sample**).



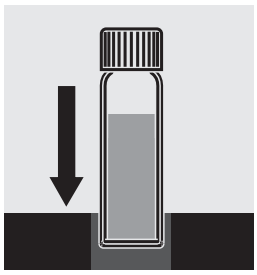
Add 1 level blue microspoon of **N-3K** into a reaction cell and close the cell with the screw cap.



To dissolve solids, shake the cell **vigorously for 1 minute**.

With a pipette add 1.5 ml of prepared sample very slowly, close with screw cap and mix vigorously. **Caution, cell becomes very hot!**

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

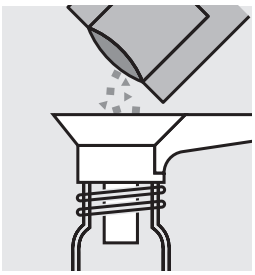
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Sample solution and reagents must have a temperature of 20-25 °C. Temper as necessary.
- For further notes please refer to the package insert of the test.

Nitrogen, total HR

Program no. **320**

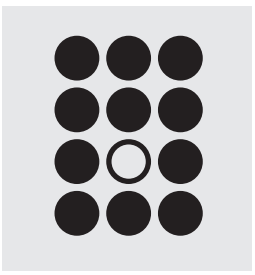
WTW model no.:	Ntot2 TC (HR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	10 - 150 mg/l N

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



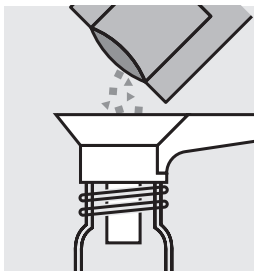
Add the contents of a **VARIO Total N Persulfate RGT** powder pack into a **Total Nitrogen Hydroxide HR Tube** digestion cell.

With a pipette add 0.5 ml of sample, close the cell with the screw cap and mix vigorously for at least 30 s. A small amount of solids may remain undissolved.



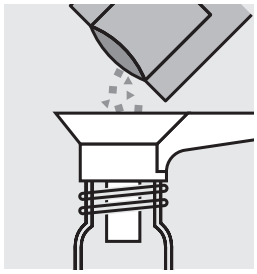
Heat the cell in the thermoreactor at 120 °C for 30 minutes.

Remove the cell from the thermoreactor and let it cool down in a cell rack.



Add the contents of a **VARIO Total Nitrogen Reagent A** powder pack, close the cell with the screw cap and mix for at least 15 s.

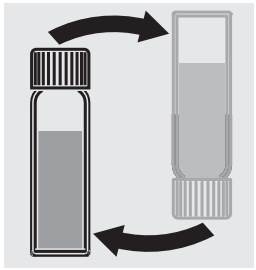
Allow to react for 3 minutes.



Add the contents of a **VARIO Total Nitrogen Reagent B** powder pack, close the cell with the screw cap and mix for at least 15 s.

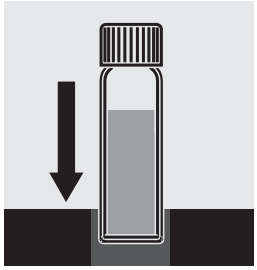
Allow to react for 2 minutes.

Pipette 2.0 ml of prepared sample into a **Total Nitrogen Acid HR Tube (Reagent C)** reaction cell and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x / for approx. 30 s altogether).
Caution, the cell becomes warm!

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

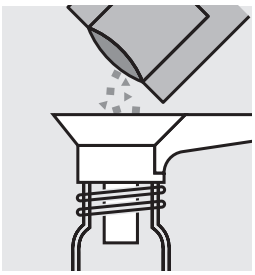
Note:
Always clean the powder funnel prior to adding a reagent!

Nitrogen, total LR

Program no. **319**

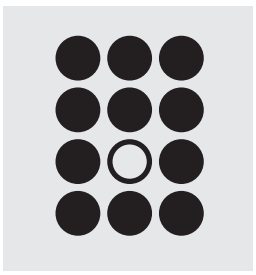
WTW model no.:	Ntot1 TC (LR)
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 25.0 mg/l N

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



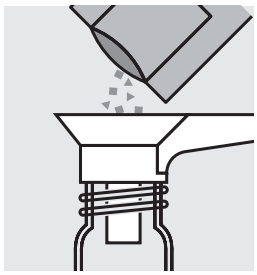
Add the contents of a **VARIO Total N Persulfate RGT** powder pack into a **Total Nitrogen Hydroxide LR Tube** digestion cell.

With a pipette add 2.0 ml of sample, close the cell with the screw cap and mix vigorously for at least 30 s. A small amount of solids may remain undissolved.



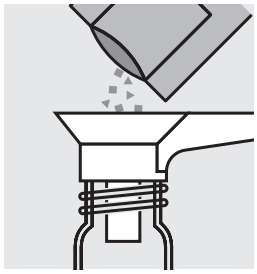
Heat the cell in the thermoreactor at 120 °C for 30 minutes.

Remove the cell from the thermoreactor and let it cool down in a cell rack.



Add the contents of a **VARIO Total Nitrogen Reagent A** powder pack, close the cell with the screw cap and mix for at least 15 s.

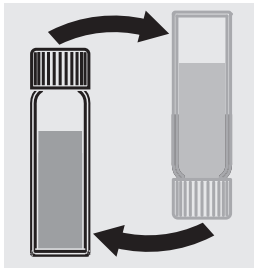
Allow to react for 3 minutes.



Add the contents of a **VARIO Total Nitrogen Reagent B** powder pack, close the cell with the screw cap and mix for at least 15 s.

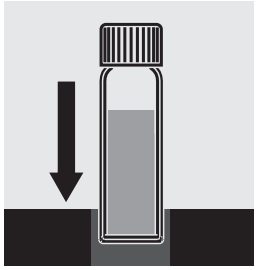
Allow to react for 2 minutes.

Pipette 2.0 ml of prepared sample into a **Total Nitrogen Acid LR Tube (Reagent C)** reaction cell and close the cell with the screw cap.



Mix the contents by carefully swaying the cell (10 x / for approx. 30 s altogether).
Caution, the cell becomes warm!

Allow to react for 5 minutes.



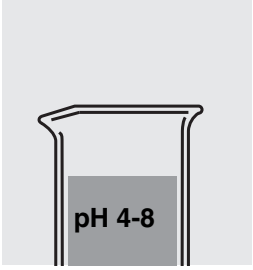
Insert the cell in the photometer cell shaft and start measurement.

Note:
Always clean the powder funnel prior to adding a reagent!

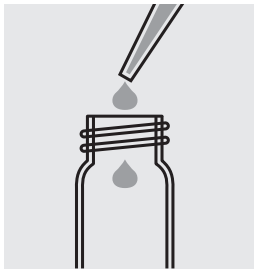
Ozone

Program no. **36**

WTW model no.:	00607
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.01 - 1.80 mg/l O_3
	Display in mmol/l possible

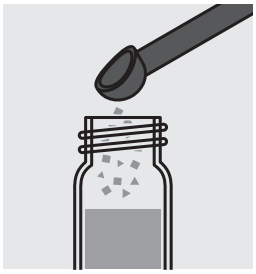


Check the pH value of the sample.
Desired range: pH 4-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

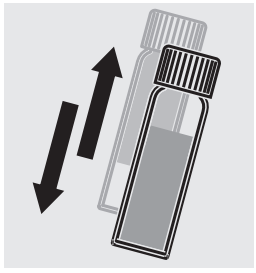


Pipette 10.0 ml sample into the empty cell.

Add 2 drops of **O_3-1** and mix.

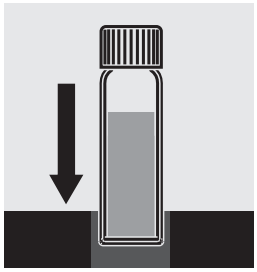


Add one level blue microspoon of **O_3-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

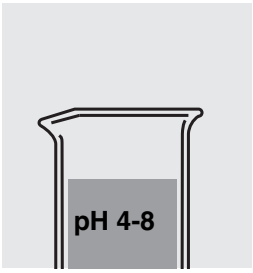
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

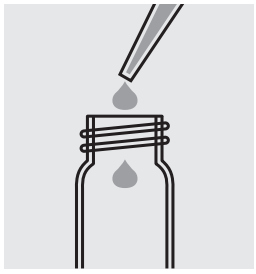
Ozone

Program no. **37**

WTW model no.:	00607
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.01 - 3.50 mg/l O_3
	Display in mmol/l possible

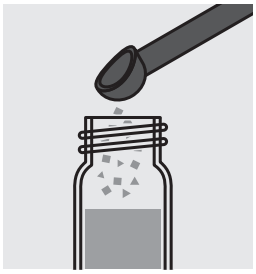


Check the pH value of the sample.
Desired range: pH 4-8.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

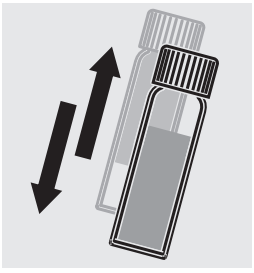


Pipette 10.0 ml sample into the empty cell.

Add 2 drops of **O_3-1** and mix.

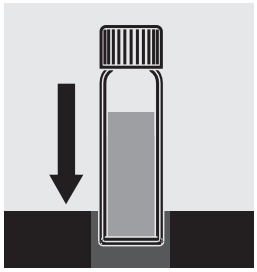


Add one level blue microspoon of **O_3-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

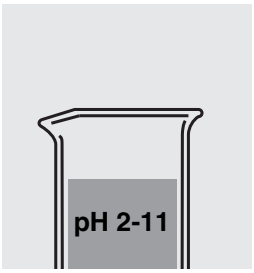
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Phenol

Program no. **91**

WTW model no.:	14551
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 2.50 mg/l C_6H_5OH
	Display in mmol/l possible

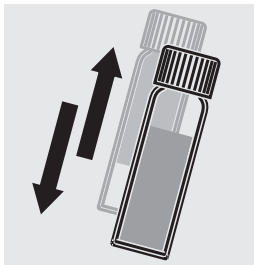
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Check the pH value of the sample.
Required range: pH 2-11.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

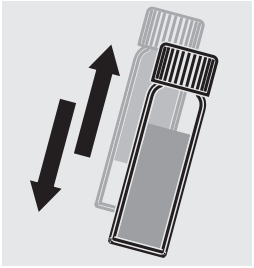
Pipette 10 ml of sample into a reaction cell, close the cell with the screw cap and mix.

Add 1 level gray microspoon of **Ph-1K** and close the cell with the screw cap.



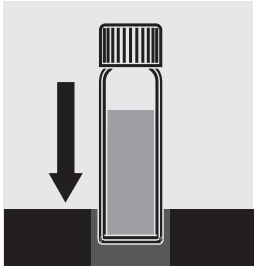
Shake the cell vigorously to dissolve solids.

Add 1 level green microspoon of **Ph-2K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

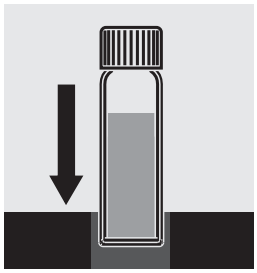
Phosphate

Program no. **21**

WTW model no.:	14546
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 25.0 mg/l PO_4-P
	1.5 - 76.7 mg/l PO_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

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



Insert the cell in the photometer cell shaft and start measurement.

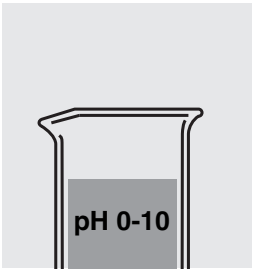
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This test covers orthophosphate only.
- For further notes please refer to the package insert of the test.

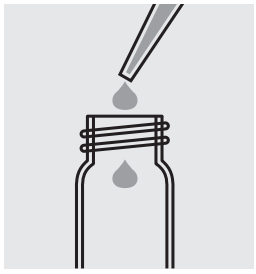
Phosphate

Program no. **22**

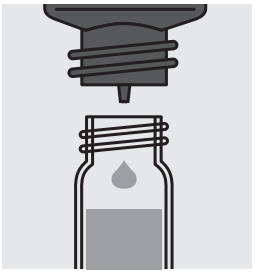
WTW model no.:	14848
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.02 - 1.60 mg/l PO_4-P
	0.06 - 4.91 mg/l PO_4
	Display in mmol/l possible



Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted hydrochloric acid as necessary.

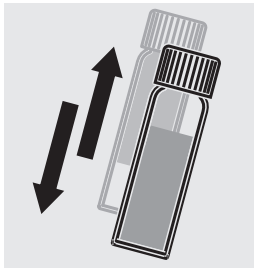


Pipette 10.0 ml of sample into the empty cell.



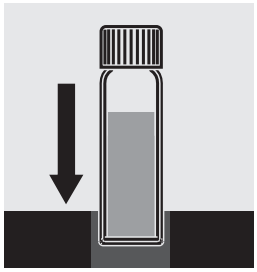
Add 10 drops of **PO_4-1** and mix.

Add 2 level blue microspoons of **PO_4-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

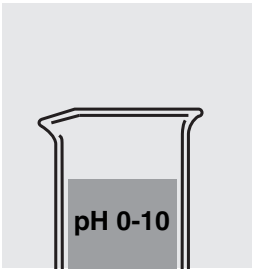
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This test determines orthophosphate only.
- For further notes please refer to the package insert of the test.

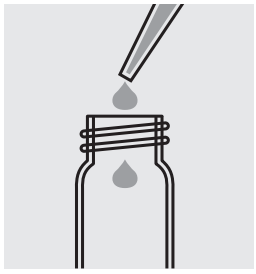
Phosphate

Program no. **23**

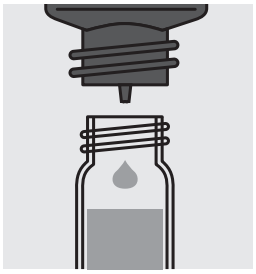
WTW model no.:	14848
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l PO_4-P
	0.15 - 9.20 mg/l PO_4
	Display in mmol/l possible



Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted hydrochloric acid as necessary.

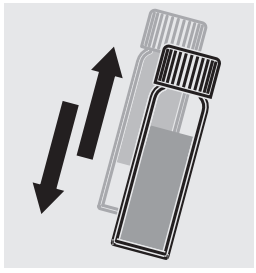


Pipette 5.0 ml of sample into the empty cell.



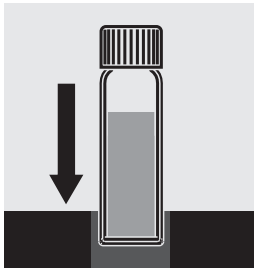
Add 5 drops of **PO_4-1** and mix.

Add 1 level blue microspoon of **PO_4-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

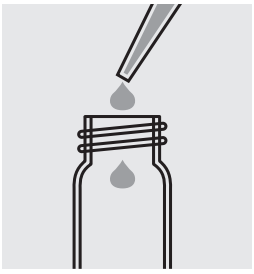
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This test determines orthophosphate only.
- For further notes please refer to the package insert of the test.

Phosphate vario (ortho)

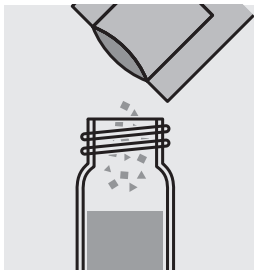
Program no. **306**

WTW model no.:	PO4-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.007 - 0.800 mg/l PO_4-P
	0.02 - 2.45 mg/l PO_4
	Display in mmol/l possible

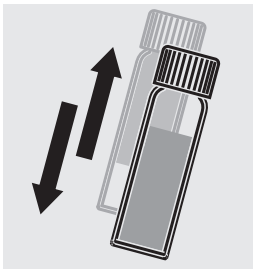
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

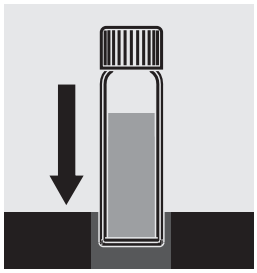


Add the contents of a **VARIO Phos3 F10** powder pack and close the cell with the screw cap.



Shake the cell for 10 to 15 seconds. Undissolved powder has no adverse effect on measurement.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

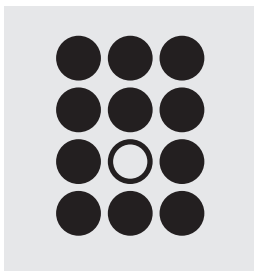
Phosphate, acid hydrolyzable

Program no. **336**

WTW model no.:	PO4-4 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.06 - 3.50 mg/l PO_4
	0.020 - 1.141 mg/l PO_4-P
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

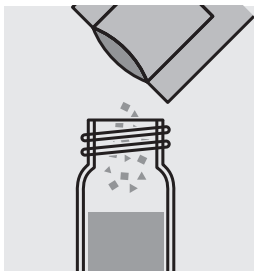
Pipette 5 ml of sample into a reaction cell and close the cell with the screw cap.



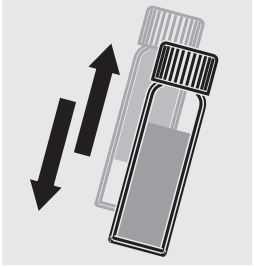
Heat the cell in the thermoreactor for 30 minutes at 120 °C.

Remove the cell from the thermoreactor and let it cool down in a cell rack.

With a pipette add 2.0 ml **Sodium hydroxide 1.00 N**, close the cell with the screw cap and mix.

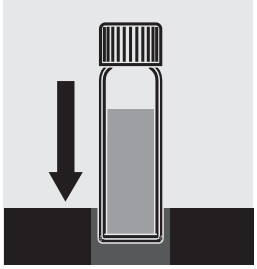


Add the contents of a **Phosphate RGT F10 ml** powder packet and close the cell with the screw cap.



Shake the cell for 10-15 s. A small amount of solid matter remains undissolved.

Allow to react for 2 minutes.



Within 8 minutes after the last reagent was added:
Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean all laboratory glassware with hydrochloric acid (approx. 20 %), then thoroughly rinse with deionized water. Do not used any detergents that contain phosphate!

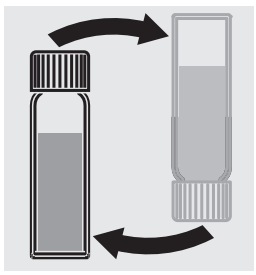
Phosphate, ortho

Program no. **315**

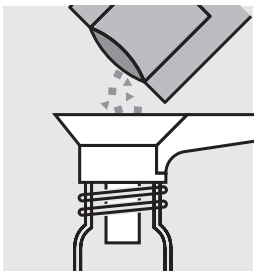
WTW model no.:	PO4-2 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.06 - 5.00 mg/l PO_4
	0.02 - 1.63 mg/l PO_4-P
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

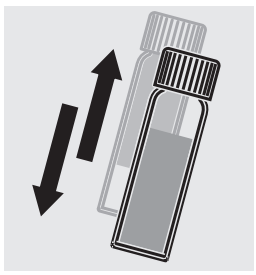
Pipette 5.0 ml of sample into a reaction cell and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

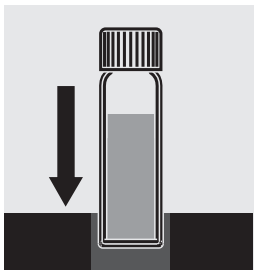


Add the contents of a **VARIO Phosphate RGT F10** powder pack and close the cell with the screw cap.



To dissolve solids, shake the cell for approx. 10 to 15 seconds. A small amount of solids may remain undissolved.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

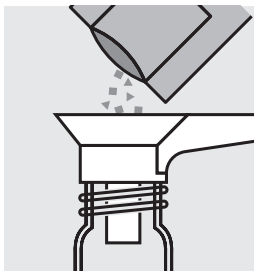
Phosphate, total

Program no. **316**

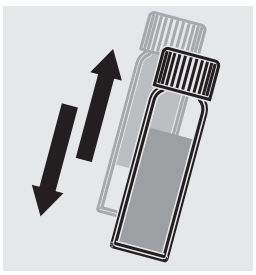
WTW model no.:	PO4-3 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.06 - 3.50 mg/l PO_4
	0.020 - 1.141 mg/l PO_4-P
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

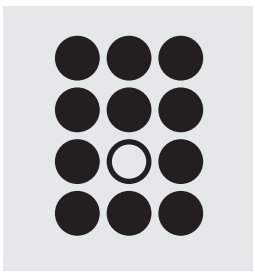
Pipette 5.0 ml of sample into a reaction cell.



Add the contents of a **VARIO Potassium Persulfate F10** powder pack and close the cell with the screw cap.



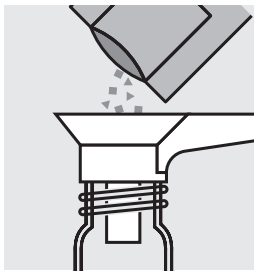
Shake the cell vigorously to dissolve solids.



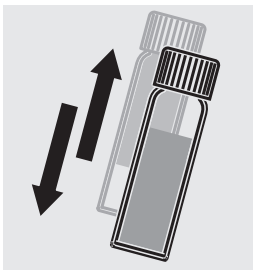
Heat the cell in the thermoreactor for 30 minutes at 120 °C.

Remove the cell from the thermoreactor and let it cool down in a cell rack.

With a pipette add 2.0 ml of 1.54 N sodium hydroxide solution, close the cell with the screw cap and mix the contents by carefully swaying the cell.

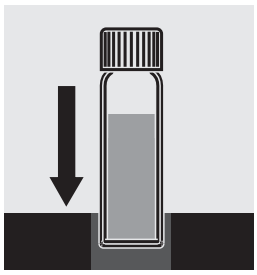


Add the contents of a **VARIO Phosphate RGT F10** powder pack and close the cell with the screw cap.



To dissolve solids, shake the cell for approx. 10 to 15 seconds. A small amount of solids may remain undissolved.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

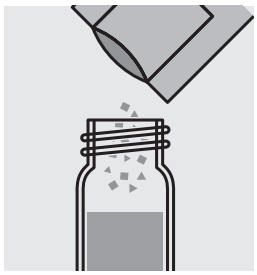
Phosphate, total

Program no. **336**

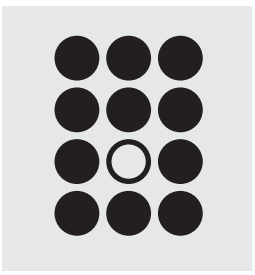
WTW model no.:	PO4-4 TC
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.06 - 3.50 mg/l PO_4
	0.020 - 1.141 mg/l PO_4-P
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

Pipette 5 ml of sample into a reaction cell and close the cell with the screw cap.



Add the contents of a **Potassium Persulfate F10 ml** powder packet and close the cell with the screw cap.

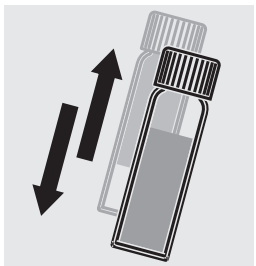


Heat the cell in the thermoreactor for 30 minutes at 120 °C.

Remove the cell from the thermoreactor and let it cool down in a cell rack.

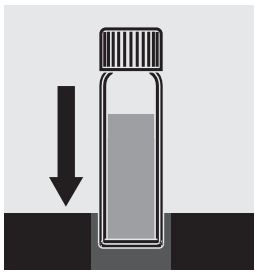
With a pipette add 2.0 ml **Sodium hydroxide 1.54N**, close the cell with the screw cap and mix.

Add the contents of a **Phosphate RGT F10 ml** powder packet and close the cell with the screw cap.



Shake the cell for 10-15 s. A small amount of solid matter remains undissolved.

Allow to react for 2 minutes.



Within 8 minutes after the last reagent was added:
Insert the cell in the photometer cell shaft and start measurement.

Notes:

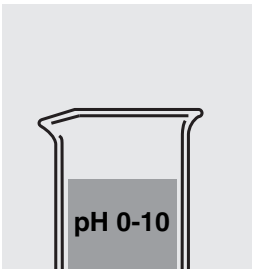
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean all laboratory glassware with hydrochloric acid (approx. 20 %), then thoroughly rinse with deionized water. Do not used any detergents that contain phosphate!

Phosphate: ortho-P

Program no. **78**

WTW model no.:	00616
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	1.0 - 70.0 mg/l PO_4-P
	3.1 - 214.6 mg/l PO_4
	Display in mmol/l possible

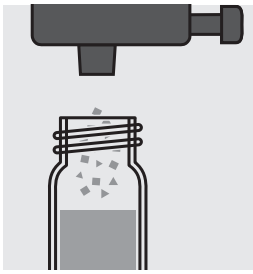
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



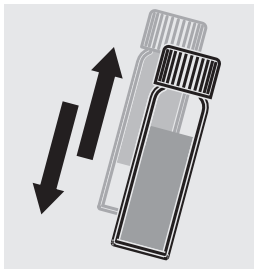
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 0.20 ml of sample into a reaction cell and mix.

Add 5 drops of **PO_4-1K**, close the cell with the screw cap and mix.

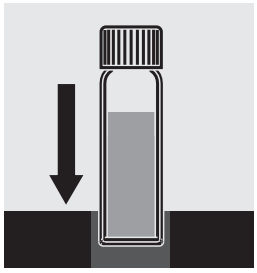


Add 1 dose of **PO_4-2K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

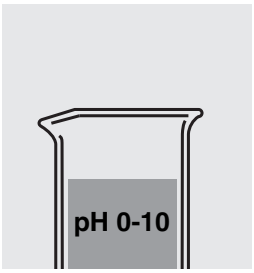
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This test covers orthophosphate only.
- For further notes please refer to the package insert of the test.

Phosphate: ortho-P

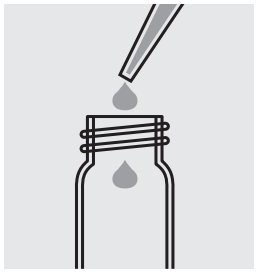
Program no. **79**

WTW model no.:	00798
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	1.0 - 50.0 mg/l PO_4-P
	3.1 - 153.3 mg/l PO_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



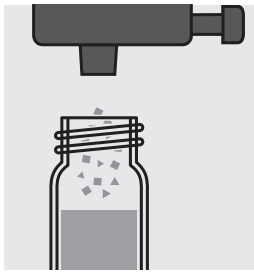
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



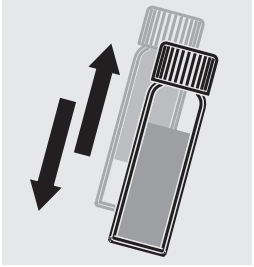
Pipette 8.0 ml of deionized water into the empty cell.

Add 0.50 ml of sample with a pipette and mix.

Add 0.50 ml **PO4-1** with a pipette and mix.

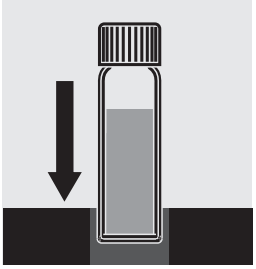


Add 1 dose of **PO_4-2K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

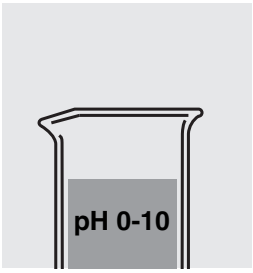
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- This test covers orthophosphate only.
- For further notes please refer to the package insert of the test.

Phosphate: ortho-P

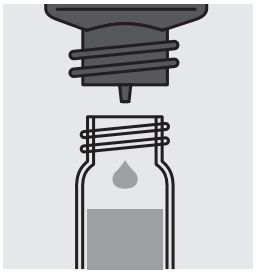
Program no. **86**

WTW model no.:	P6/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l PO_4-P
	0.15 - 9.20 mg/l PO_4
	Display in mmol/l possible

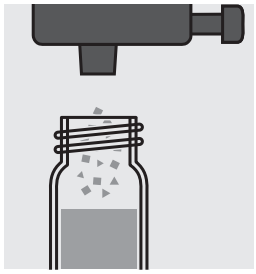


Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

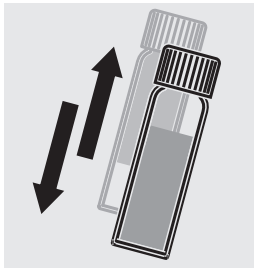
Pipette 5.0 ml of sample into a reaction cell and mix.



Add 5 drops of **P-2K**, close cell with screw cap and mix.

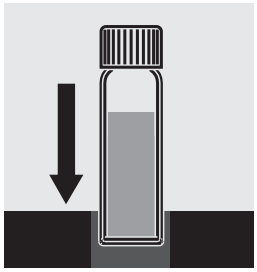


Add one dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

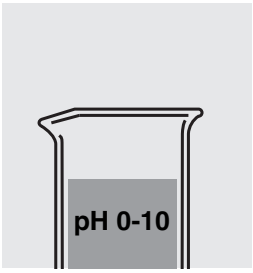
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- In the case high levels of chloride it is recommended to swap the order of the reagents P-2K and P-3K.
- For further notes please refer to the package insert of the test.

Phosphate: ortho-P

Program no. **87**

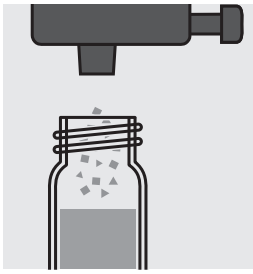
WTW model no.:	P7/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 15.0 mg/l PO_4-P
	1.5 - 46.0 mg/l PO_4
	Display in mmol/l possible



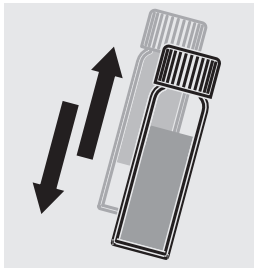
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 1.0 ml of sample into a reaction cell and mix.

Add 5 drops of **P-2K**, close cell with screw cap and mix.

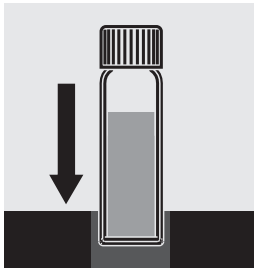


Add one dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

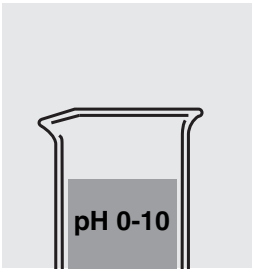
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- In the case high levels of chloride it is recommended to swap the order of the reagents P-2K and P-3K.
- For further notes please refer to the package insert of the test.

Phosphate: Orthophosphate

Program no. **51**

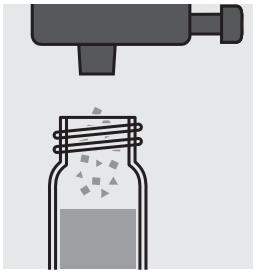
WTW model no.:	14543
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l PO_4-P
	0.15 - 9.20 mg/l PO_4
	Display in mmol/l possible



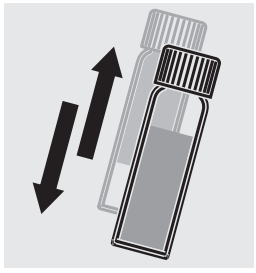
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 5.0 ml of sample into a reaction cell and mix.

Add 5 drops of **P-2K**, close the cell with the screw cap and mix.

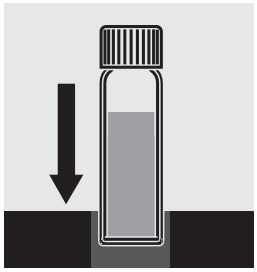


Add 1 dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

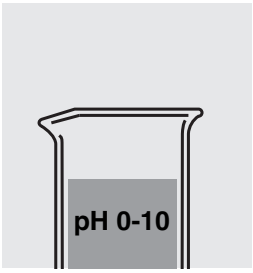
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Phosphate: Orthophosphate

Program no. **53**

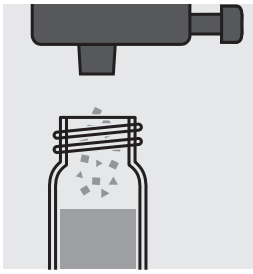
WTW model no.:	14729
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 15.0 mg/l PO_4-P
	1.5 - 46.0 mg/l PO_4
	Display in mmol/l possible



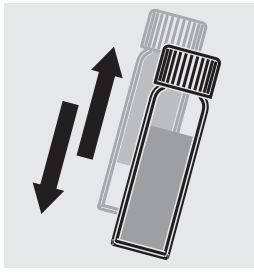
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

Pipette 1.0 ml of sample into a reaction cell and mix.

Add 5 drops of **P-2K**, close the cell with the screw cap and mix.

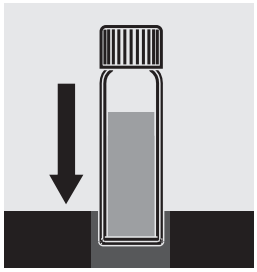


Add 1 dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

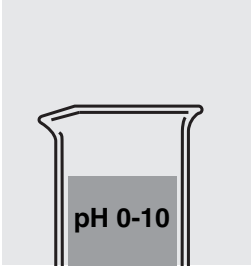
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

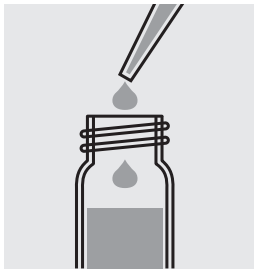
Phosphate: Total P

Program no. **86**

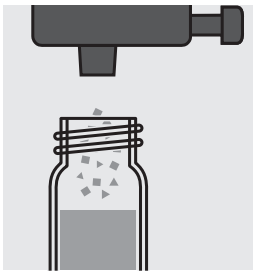
WTW model no.:	P6/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l PO_4-P
	0.15 - 9.20 mg/l PO_4
	Display in mmol/l possible



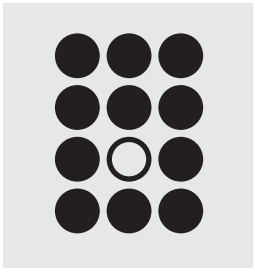
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



Pipette 5.0 ml of sample into a reaction cell and mix.

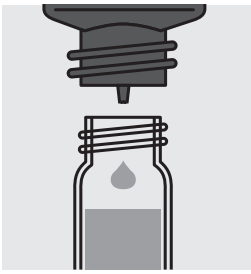


Add one dose of **P-1K** with the green measurer and close the cell with the screw cap.

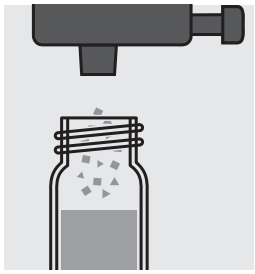


Heat the reaction cell in the thermoreactor at 120 °C for 30 minutes.

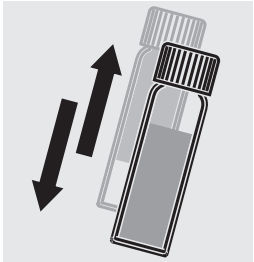
Remove the reaction cell from the thermoreactor and let it cool down to room temperature in a cell rack.



Add 5 drops of **P-2K**, close cell with screw cap and mix.

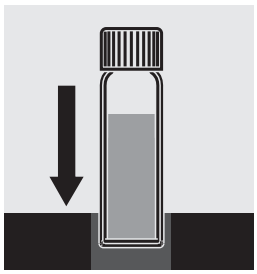


Add one dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

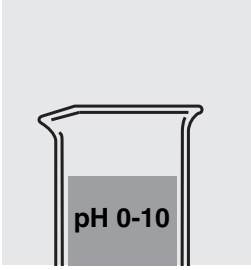
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- In the case high levels of chloride it is recommended to swap the order of the reagents P-2K and P-3K.
- For further notes please refer to the package insert of the test.

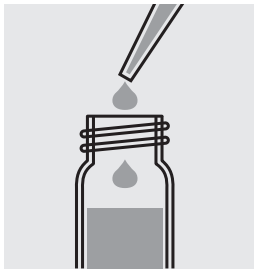
Phosphate: Total P

Program no. **87**

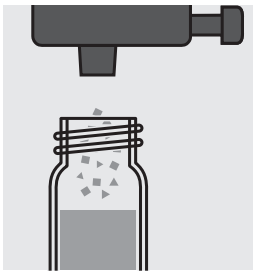
WTW model no.:	P7/25
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 15.0 mg/l PO_4-P
	1.5 - 46.0 mg/l PO_4
	Display in mmol/l possible



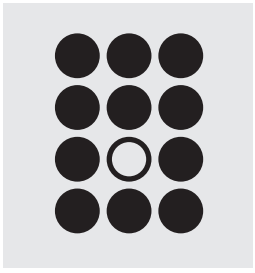
Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



Pipette 1.0 ml of sample into a reaction cell and mix.

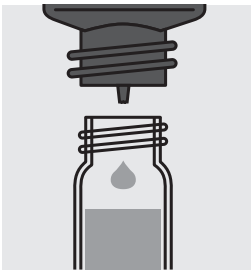


Add one dose of **P-1K** with the green measurer and close the cell with the screw cap.

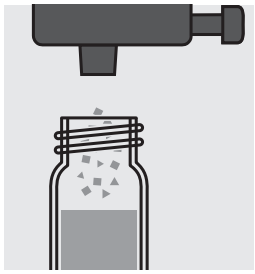


Heat the reaction cell in the thermoreactor at 120 °C for 30 minutes.

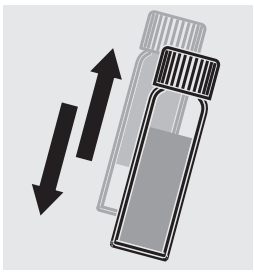
Remove the reaction cell from the thermoreactor and let it cool down to room temperature in a cell rack.



Add 5 drops of **P-2K**, close cell with screw cap and mix.

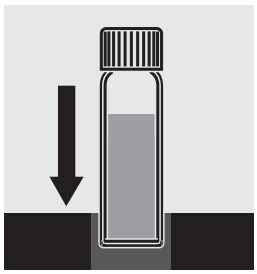


Add one dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

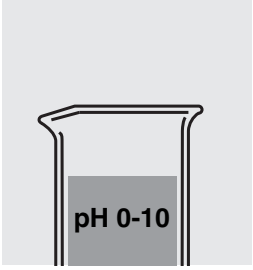
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- In the case high levels of chloride it is recommended to swap the order of the reagents P-2K and P-3K.
- For further notes please refer to the package insert of the test.

Phosphate: Total phosphate

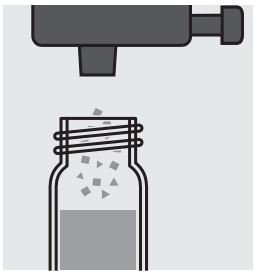
Program no. **52**

WTW model no.:	14543
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 3.00 mg/l PO_4-P
	0.15 - 9.20 mg/l PO_4
	Display in mmol/l possible

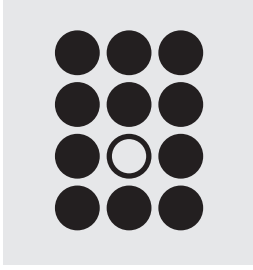


Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

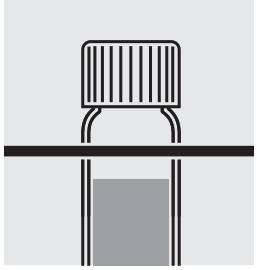
Pipette 5.0 ml of sample into a reaction cell and mix.



Add 1 dose of **P-1K** with the green measurer and close the cell with the screw cap.

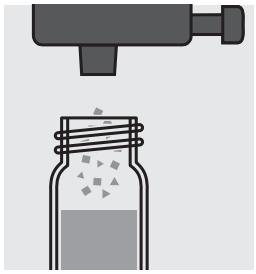


Heat the reaction cell in the thermoreactor at 120 °C for 30 minutes.

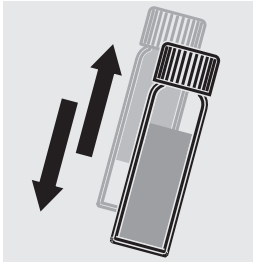


Remove the reaction cell from the thermoreactor and let it cool down to room temperature in a cell rack.

Add 5 drops of **P-2K**, close the cell with the screw cap and mix.

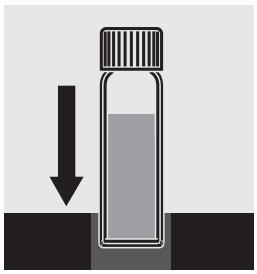


Add 1 dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

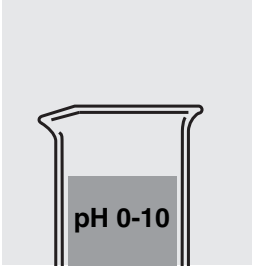
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Phosphate: Total phosphate

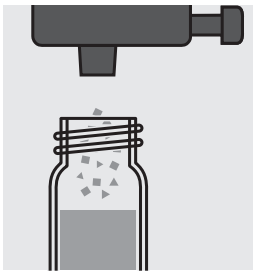
Program no. **54**

WTW model no.:	14729
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.5 - 15.0 mg/l PO_4-P
	1.5 - 46.0 mg/l PO_4
	Display in mmol/l possible

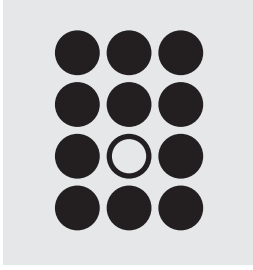


Check the pH value of the sample.
Desired range: pH 0-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

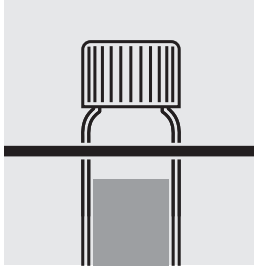
Pipette 1.0 ml of sample into a reaction cell and mix.



Add 1 dose of **P-1K** with the green measurer and close the cell with the screw cap.

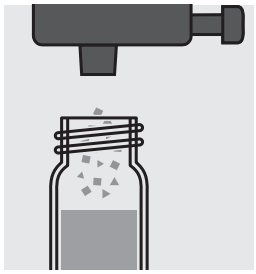


Heat the reaction cell in the thermoreactor at 120 °C for 30 minutes.

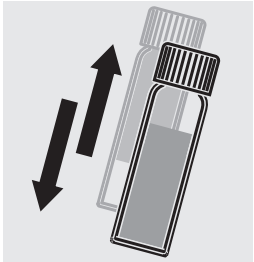


Remove the reaction cell from the thermoreactor and let it cool down to room temperature in a cell rack.

Add 5 drops of **P-2K**, close the cell with the screw cap and mix.

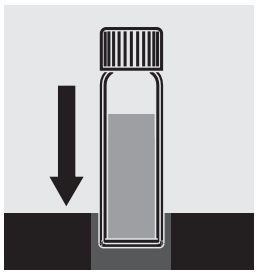


Add 1 dose of **P-3K** with the blue measurer and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

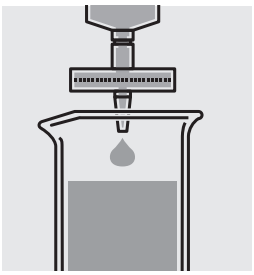
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Potassium

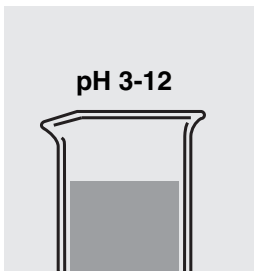
Program no. **90**

WTW model no.:	00615
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	30 - 300 mg/l K
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

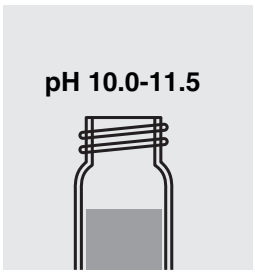


Filter turbid sample solutions.

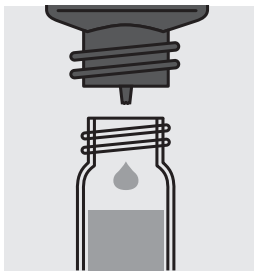


Check the pH value of the sample.
Desired range: pH 3-12.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

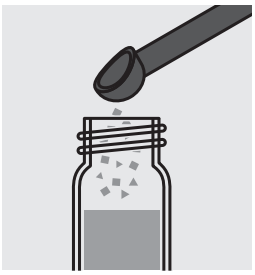
Pipette 0.50 ml of sample into a reaction cell, close the cell with the screw cap and mix.



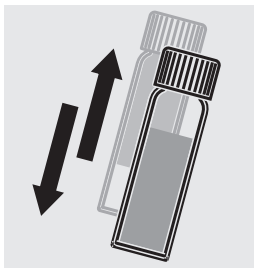
Check the pH value of the sample.
Desired range:
pH 10.0-11,5.



Add 6 drops of **K-1K**, close cell with screw cap and mix.

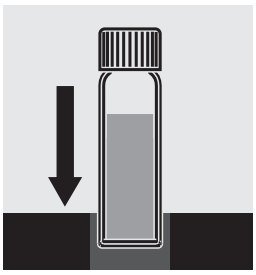


Add 1 level blue microspoon of **K-2K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for exactly 5 minutes. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

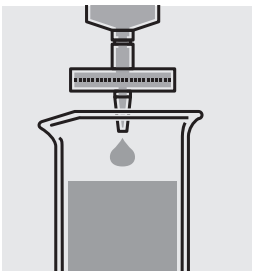
- The turbidity of the measurement solution remains stable for only a short time (the measurement value increases by 5 to 7 % per minute).
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Potassium

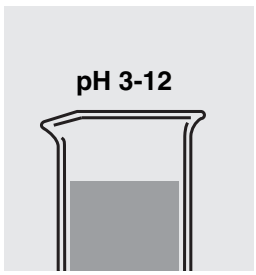
Program no. **56**

WTW model no.:	14562
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	5.00 - 50.00 mg/l K
	Display in mmol/l possible

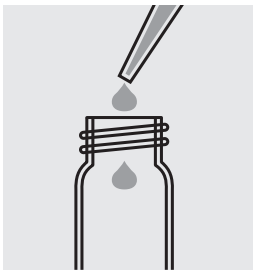
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



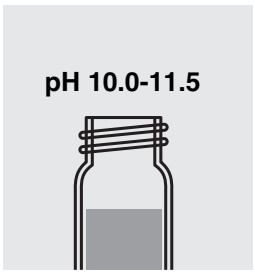
Filter turbid sample solutions.



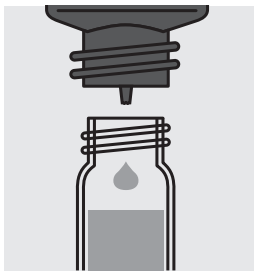
Check the pH value of the sample.
Desired range: pH 3-12.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



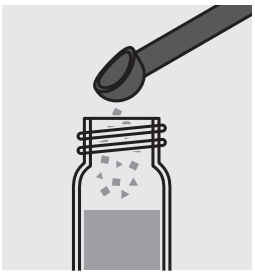
Pipette 2.0 ml of sample into a reaction cell, close the cell with the screw cap and mix.



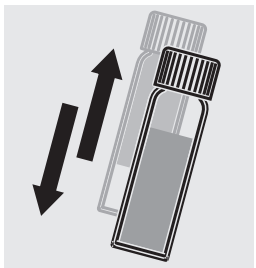
Check the pH value of the sample.
Desired range:
pH 10.0-11.5.



Add 6 drops of **K-1K**, close the cell with the screw cap and mix.

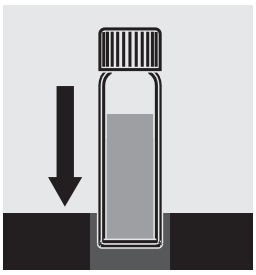


Add 1 level blue microspoon of **K-2K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for exactly 5 minutes. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

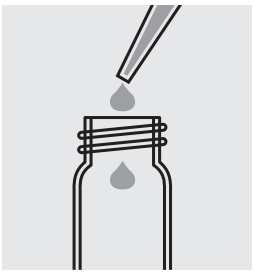
- The turbidity of the measurement solution remains stable for only a short time (the measurement value increases by 5 to 7 % per minute).
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Silica HR vario

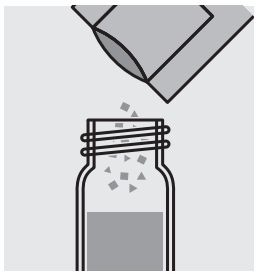
Program no. **307**

WTW model no.:	Si-2 TP (HR)
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.7 - 70.0 mg/l SiO_2
	0.3 - 32.7 mg/l Si
	Display in mmol/l possible

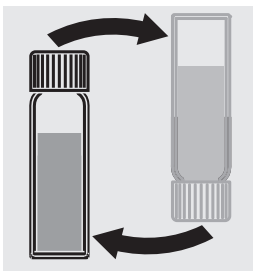
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



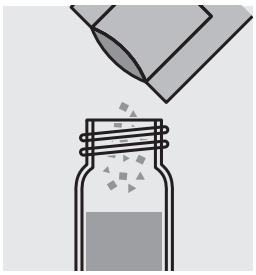
Pipette 10.0 ml of sample into the empty cell.



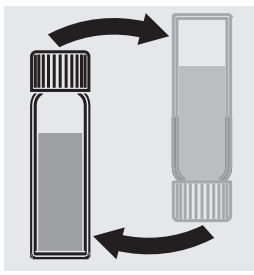
Add the contents of a **VARIO Silica HR Molybdate F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

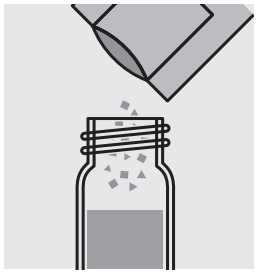


Add the contents of a **VARIO Silica HR Acid RGT F10** powder pack and close the cell with the screw cap.

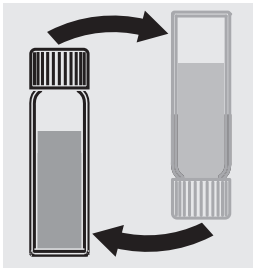


Mix the contents by carefully swaying the cell.

Allow to react for 10 minutes.

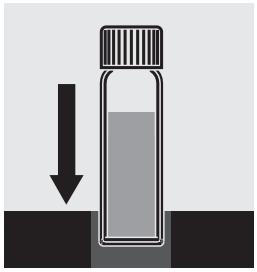


Add the contents of a **VARIO Silica Citric Acid F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

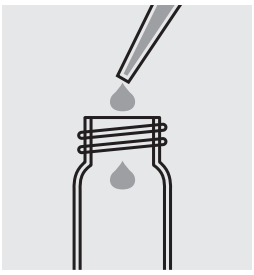
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The sample temperature has to be between 15 and 25 °C.

Silica HR vario

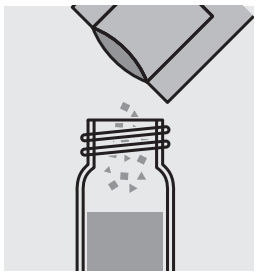
Program no. **308**

WTW model no.:	Si-2 TP (HR)
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	1 - 100 mg/l SiO_2
	0.5 - 46.7 mg/l Si
	Display in mmol/l possible

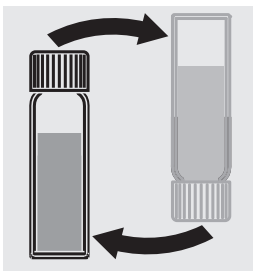
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



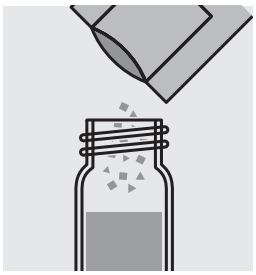
Pipette 10.0 ml of sample into the empty cell.



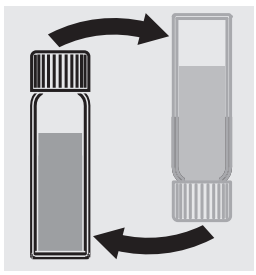
Add the contents of a **VARIO Silica HR Molybdate F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

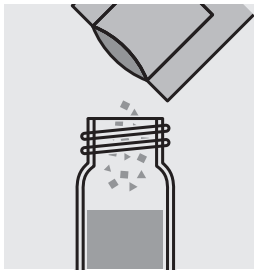


Add the contents of a **VARIO Silica HR Acid RGT F10** powder pack and close the cell with the screw cap.

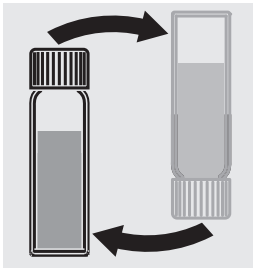


Mix the contents by carefully swaying the cell.

Allow to react for 10 minutes.

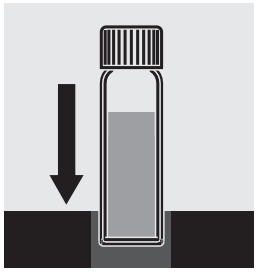


Add the contents of a **VARIO Silica Citric Acid F10** powder pack and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

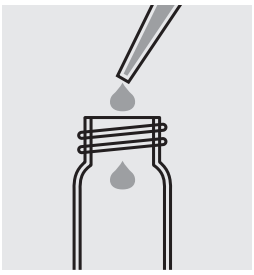
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The sample temperature has to be between 15 and 25 °C.

Silica HR vario

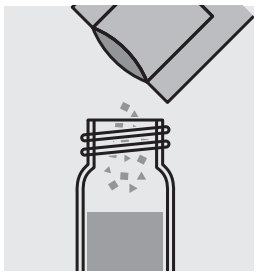
Program no. **337**

WTW model no.:	Si-3 TP (HR)
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	1 - 75 mg/l SiO_2
	0.5 - 35.1 mg/l Si
	Display in mmol/l possible

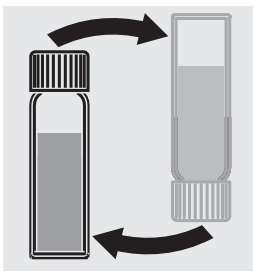
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



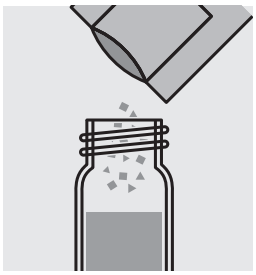
Pipette 25.0 ml of sample into the empty cell.



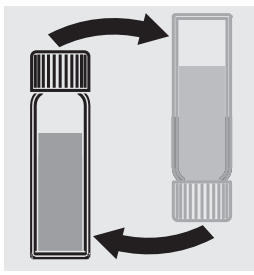
Add the contents of a **VARIO Silica HR Molybdate F25** powder packet and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

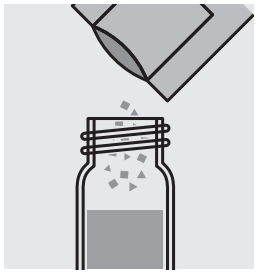


Add the contents of a **VARIO Silica HR Acid RGT F25** powder packet and close the cell with the screw cap.

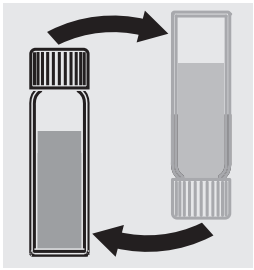


Mix the contents by carefully swaying the cell.

Allow to react for 10 minutes.

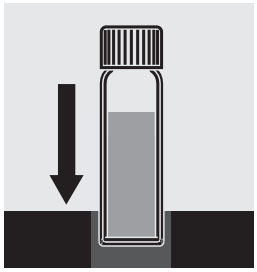


Add the contents of a **VARIO Silica HR Citric Acid F25** powder packet and close the cell with the screw cap.



Mix the contents by carefully swaying the cell.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

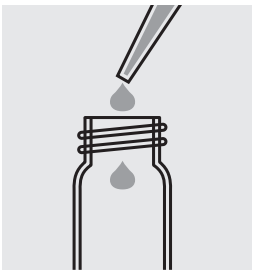
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The temperature of the samples must be in the range 15 ... 25 °C.

Silica LR vario

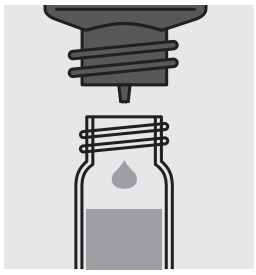
Program no. 321

WTW model no.:	Si-1 TP (LR)
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.01 - 1.60 mg/l SiO_2
	0.005 - 0.748 mg/l Si
	Display in mmol/l possible

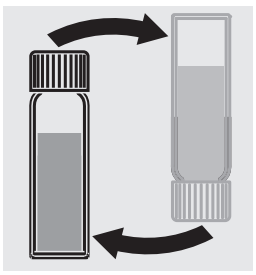
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

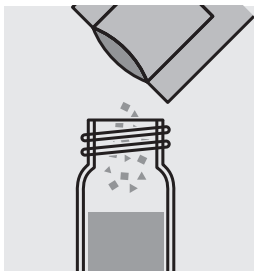


Add 15 drops of **VARIO Molybdate 3 Reagent Solution** and close the cell with the screw cap.

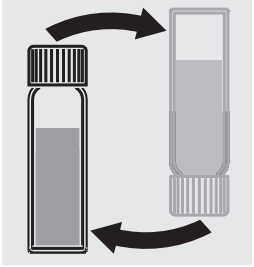


Mix the contents by carefully swaying the cell.

Allow to react for 4 minutes (temperature dependence, see note).

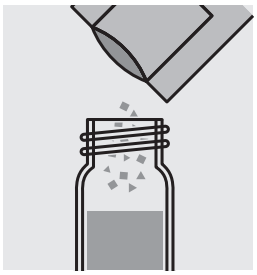


Add the contents of a **VARIO Silica Citric Acid F10** powder pack and close the cell with the screw cap.



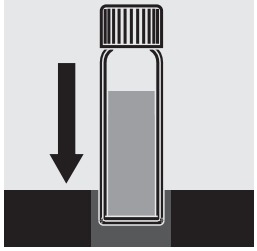
Mix the contents by carefully swaying the cell.

Allow to react for 1 minute (temperature dependence, see note).



Add the contents of a **VARIO Silica LR Amino Acid F F10** powder pack, close the cell with the screw cap and mix.

Allow to react for 2 minutes. If SiO_2 is present in the sample, the solution becomes blue.



Insert the cell in the photometer cell shaft and start measurement.

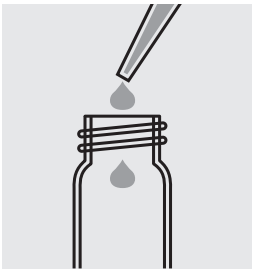
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- The above mentioned reaction times are valid at room temperature (20 °C). At 10 °C the reaction time has to be doubled, at 30 °C it has to be halved.

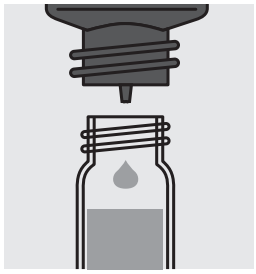
Silicon

Program no. **67**

WTW model no.:	00857
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.5 - 50.0 mg/l Si
	1.1 - 106.9 mg/l SiO_2
	Display in mmol/l possible



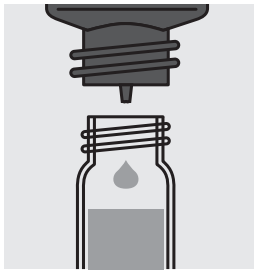
Pipette 4.0 ml of sample into the empty cell.



Add 4 drops of **Si-1** and mix.

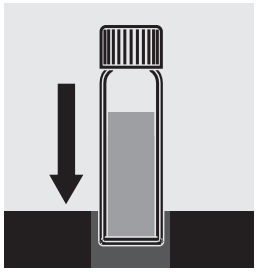
Add 2.0 ml **Si-2** with a pipette and mix.

Allow to react for 2 minutes.



Add 4 drops of **Si-3** and mix.

Allow to react for 2 minutes.



Insert the cell in the photometer cell shaft and start measurement.

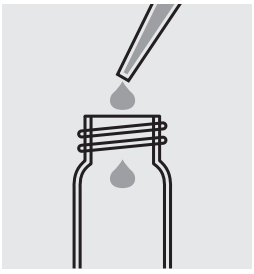
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean the cells and all glass vessels that sometimes come into contact with the blue complex as follows: Fill the vessels with sodium hydroxide solution (approx. 0.4 %) and let it act for max. 1 hour.
- For further notes please refer to the package insert of the test.

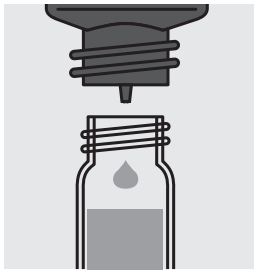
Silicon

Program no. **65**

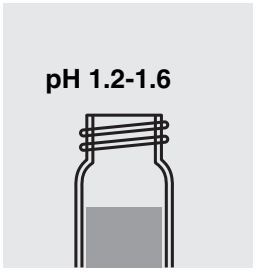
WTW model no.:	14794
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.10 - 5.00 mg/l Si
	0.21 - 10.70 mg/l SiO_2
	Display in mmol/l possible



Pipette 5.0 ml of sample into the empty cell.

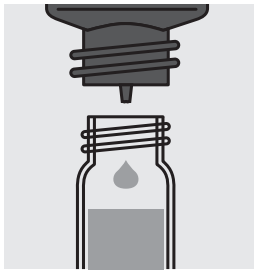


Add 3 drops of **Si-1** and mix.



Check the pH value of the sample.
Desired range:
pH 1.2-1.6.
If necessary, adjust by adding more drops of **Si-1**.

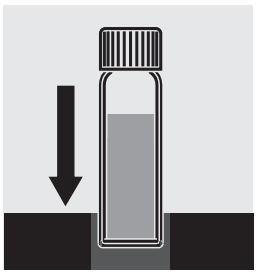
Allow to react for 3 minutes.



Add 3 drops of **Si-2** and mix.

Add 0.50 ml **Si-3** with a pipette, close the cell with the screw cap and mix.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

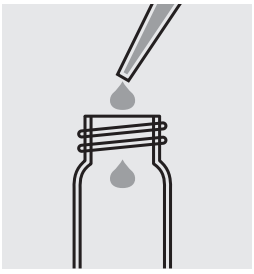
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean the cells and all glass vessels that sometimes come into contact with the blue complex as follows: Fill the vessels with sodium hydroxide solution (approx. 0.4 %) and let it act for max. 1 hour.
- For further notes please refer to the package insert of the test.

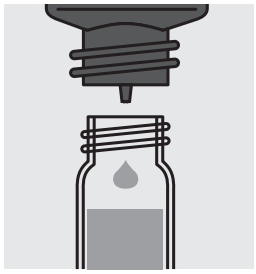
Silicon

Program no. **66**

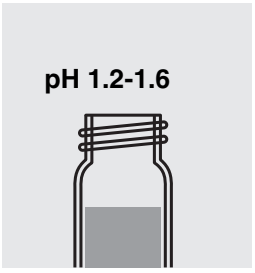
WTW model no.:	14794
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	0.05 - 2.50 mg/l Si
	0.11 - 5.35 mg/l SiO_2
	Display in mmol/l possible



Pipette 10.0 ml of sample into the empty cell.

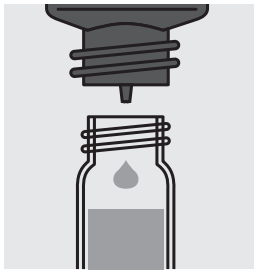


Add 6 drops of **Si-1** and mix.



Check the pH value of the sample.
Desired range:
pH 1.2-1.6.
If necessary, adjust by adding more drops of **Si-1**.

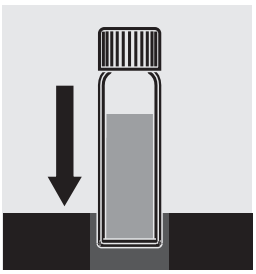
Allow to react for 3 minutes.



Add 6 drops of **Si-2** and mix.

Add 1.00 ml **Si-3** with a pipette, close the cell with the screw cap and mix.

Allow to react for 10 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

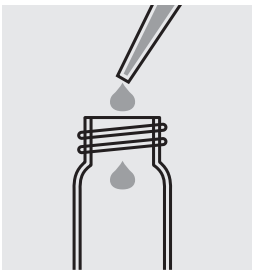
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- Clean the cells and all glass vessels that sometimes come into contact with the blue complex as follows: Fill the vessels with sodium hydroxide solution (approx. 0.4 %) and let it act for max. 1 hour.
- For further notes please refer to the package insert of the test.

Silver

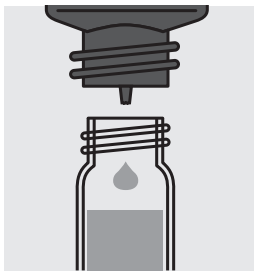
Program no. **76**

WTW model no.:	14831
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	0.25 - 2.75 mg/l Ag
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

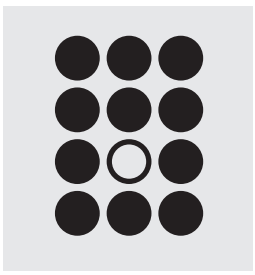


Pipette 10.0 ml of sample into the empty cell.



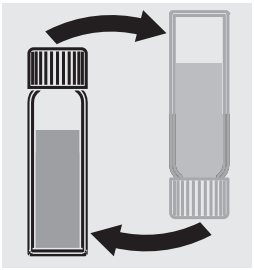
Add 2 drops of **Ag-1**.

Add one level green microspoon of **Ag-2** and close the cell with the screw cap.

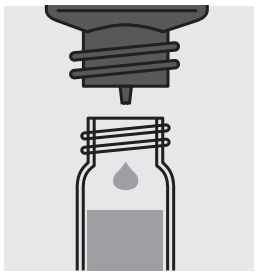


Heat the cell in the thermoreactor at 120 °C (100 °C) for 60 minutes.

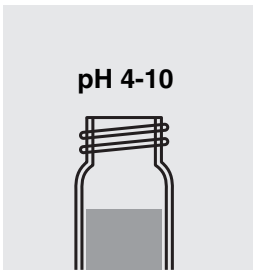
Remove the cell from the thermoreactor and let it cool down in a cell rack.



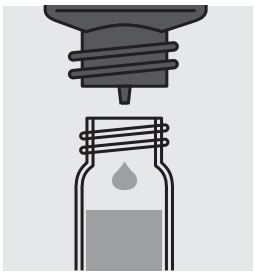
Sway the cell before opening it.



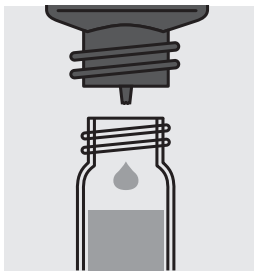
Add 3 drops of **Ag-3**, close the cell with the screw cap and mix.



Check the pH value of the solotion.
Required range: pH 4-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.



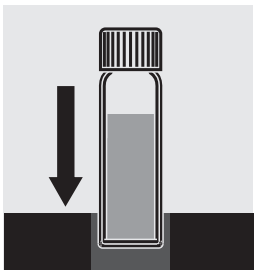
Add 1 drop of **Ag-4**, close the cell with the screw cap and mix.



Add 5 drops of **Ag-5**, close the cell with the screw cap and mix.

Add 1.0 ml **Ag-6** with a pipette, close the cell with the screw cap and mix.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Sodium

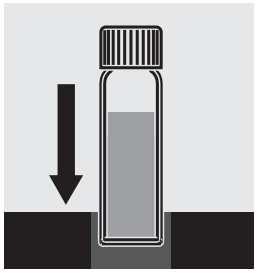
Program no. **57**

WTW model no.:	00885
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	10 - 300 mg/l Na
	Display in mmol/l possible

Pipette 0.50 ml **Na-1K** into a reaction cell and mix.

Add 0.50 ml of sample, close cell with screw cap and mix.

Allow to react for 1 minute.



Insert the cell in the photometer cell shaft and start measurement.

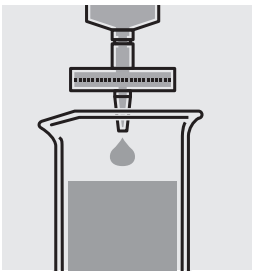
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

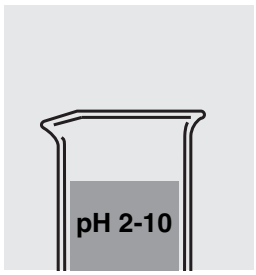
Sulfate

Program no. **116**

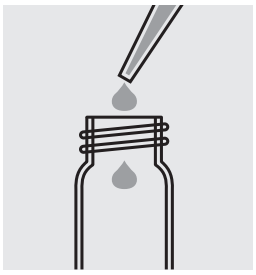
WTW model no.:	02537
Category:	RT (reagent test)
Cell:	16 mm
Measuring range:	5 - 300 mg/l SO_4
	Display in mmol/l possible



Filter turbid sample solutions.



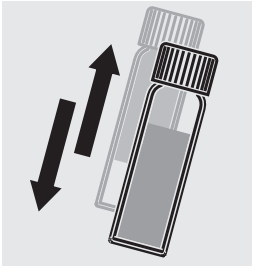
Check the pH value of the sample.
Desired range: pH 2-10.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.



Pipette 0.50 ml of **SO_4-1** into the empty cell.

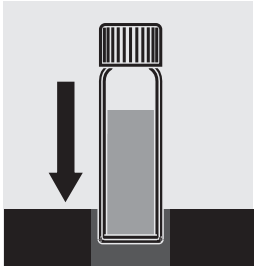
Add 5.0 ml sample with a pipette and mix.

Add 1 level blue microspoon of **SO_4-2** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 2 minutes. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

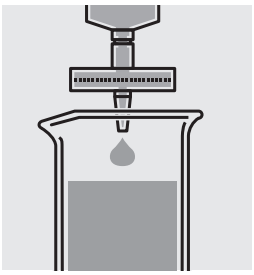
Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

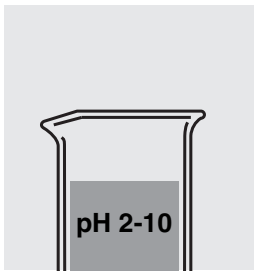
Sulfate

Program no. **28**

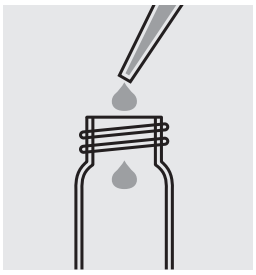
WTW model no.:	14548
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	25 - 250 mg/l SO_4
	Display in mmol/l possible



Filter turbid sample solutions.

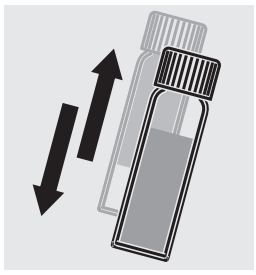


Check the pH value of the sample.
Desired range: pH 2-10.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.



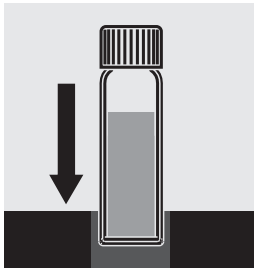
Pipette 5.0 ml of sample into a reaction cell and mix.

Add 1 level green microspoon of **SO_4-1K** and close the cell with the screw cap.



Shake the cell vigorously to dissolve solids.

Allow to react for 2 minutes. **Then measure immediately.**



Insert the cell in the photometer cell shaft and start measurement.

Notes:

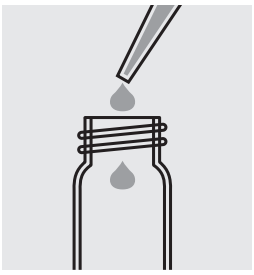
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Sulfate vario

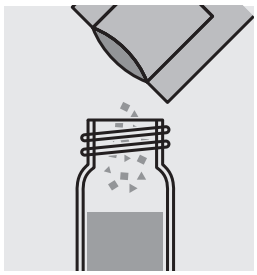
Program no. **322**

WTW model no.:	SO4-1 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	2 - 70 mg/l SO_4
	Display in mmol/l possible

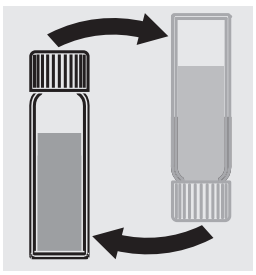
Note: Before using the test with your photometer for the first time, determine the reagent blank value.



Pipette 10.0 ml of sample into the empty cell.

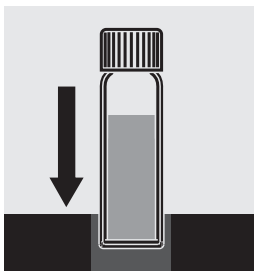


Add the contents of a **VARIO Sulfa 4 F10** powder pack and close the cell with the screw cap.



Mix the contents by swaying. If sulfate is present in the sample, a white turbidity occurs.

Allow to react for 5 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

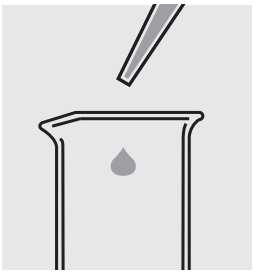
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Sulfate vario

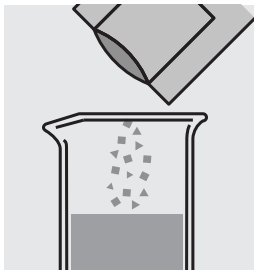
Program no. **338**

WTW model no.:	SO4-2 TP
Category:	RT (reagent test)
Cell:	28 mm
Measuring range:	2 - 70 mg/l SO_4
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

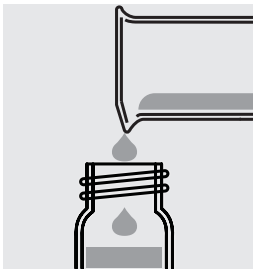


Pipette 25.0 ml of sample into an empty beaker.

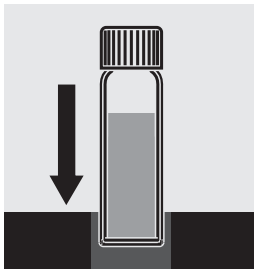


Add the contents of a **SO4-1 TP VARIO Sulfa 4 F25 ml** powder pack and dissolve them by stirring.

Allow to react for 5 minutes.



Fill an empty cell with the prepared sample and close it with the screw cap.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

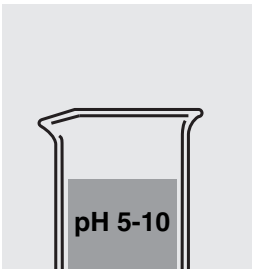
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- If any sulfate is present, a white turbidity develops.
- Powder sedimented at the bottom does not affect the measurement result.

Tensides (anionic)

Program no. **100**

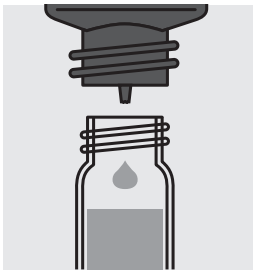
WTW model no.:	14697
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.05 - 2.00 mg/l MBAS
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

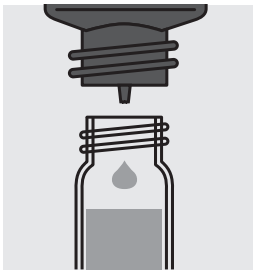


Check the pH value of the sample.
Required range:
pH 5-10.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

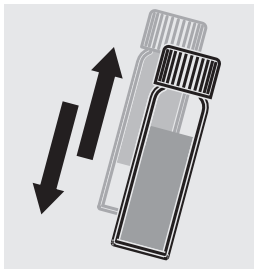
Pipette 5.0 ml of sample into a reaction cell.
Do not mix the contents!



Add 3 drops of **T-1K**.
Do not mix the contents!

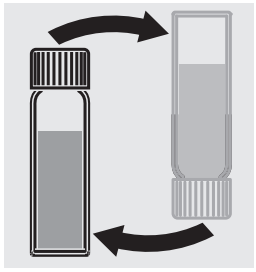


Add 2 drops of **T-2K**, close the cell with the screw cap and mix.

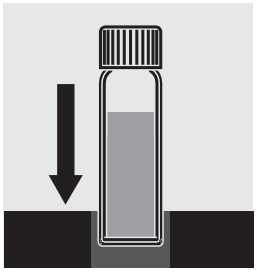


Shake the cell vigorously for 30 seconds.

Allow to react for 10 minutes.



Sway the cell before measuring.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

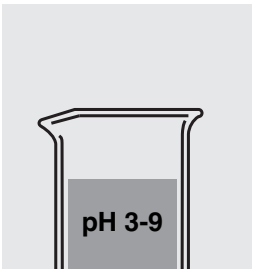
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Tensides (nonionic)

Program no. **101**

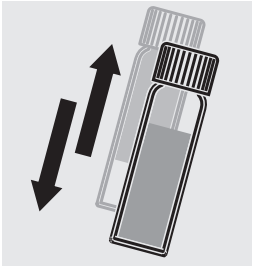
WTW model no.:	01787
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.10 - 7.50 mg/l TritonX-100

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



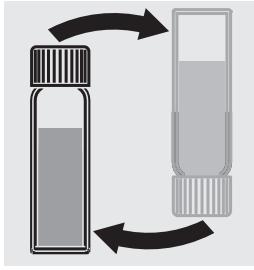
Check the pH value of the sample.
Required range: pH 3-9.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

Pipette 4.0 ml of sample into a reaction cell and close the cell with the screw cap.

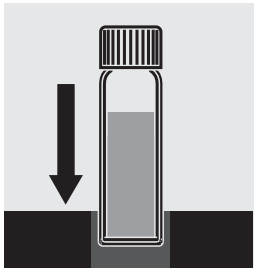


Shake the cell vigorously for 60 seconds.

Allow to react for 2 minutes.



Sway the cell before measuring.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

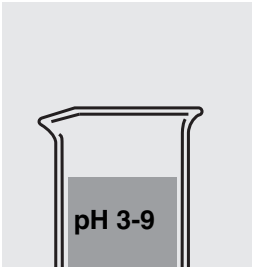
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Water hardness, total hardness

Program no. **46**

WTW model no.:	00961
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	5 - 215 mg/l GH/Ca
	0.7 - 30.1 °d
	0.9 - 37.6 °e
	1.2 - 53.7 °f
	7 - 301 mg/l CaO
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

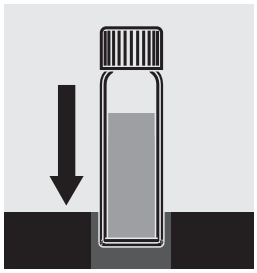


Check the pH value of the sample.
Desired range: pH 3-9.
Correct with diluted sodium hydroxide solution or hydrochloric acid as necessary.

Pipette 1.0 ml of sample into a reaction cell and mix.

Add 1.0 ml **H-1K** with a pipette, close the cell with the screw cap and mix.

Allow to react for 3 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

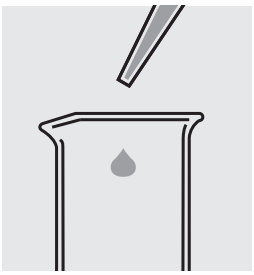
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For further notes please refer to the package insert of the test.

Zinc

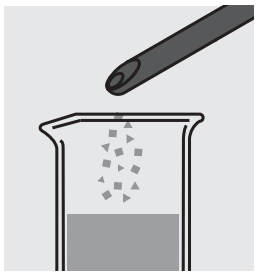
Program no. **68**

WTW model no.:	00861
Category:	KT (Reaction cell test)
Cell:	16 mm
Measuring range:	0.025 - 1.000 mg/l Zn
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.



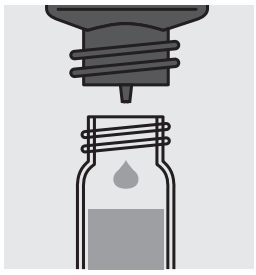
Pipette 10.0 ml of sample into an empty beaker.



Add one level gray microspoon of **Zn-1K** and dissolve the solids (=**prepared sample**).

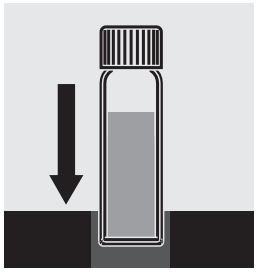
Using a pipette, add 0.50 ml of **Zn-2K** into a reaction cell and close the cell with the screw cap.

Carefully add 2.0 ml of the **prepared sample** with a pipette, close the cell with the screw cap and mix.



Add 5 drops of **Zn-3K**, close cell with screw cap and mix.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

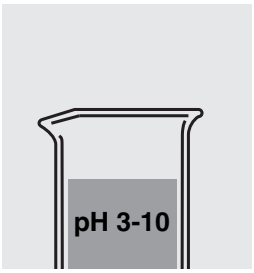
- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.

Zinc

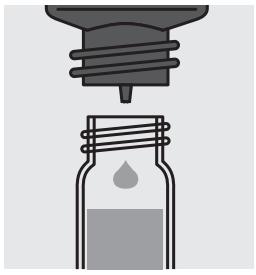
Program no. **40**

WTW model no.:	14566
Category:	KT (reaction cell test)
Cell:	16 mm
Measuring range:	0.20 - 5.00 mg/l Zn
	Display in mmol/l possible

Note: Before using the test with your photometer for the first time, determine the reagent blank value.

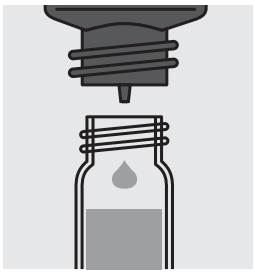


Check the pH value of the sample.
Desired range: pH 3-10.
Correct with diluted sodium hydroxide solution or sulfuric acid as necessary.

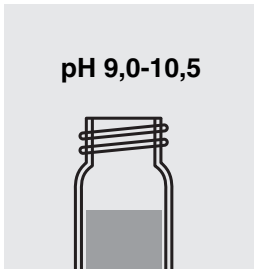


Add 5 drops of **Zn-1K** into a reaction cell.
Hold the bottle upright while adding the reagent.
Close the cell with the screw cap and mix.

Add 0.50 ml of sample with a pipette, close the cell with the screw cap and mix.

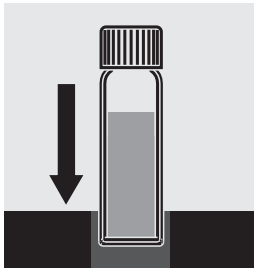


Add 5 drops of **Zn-2K**.
Hold the bottle upright while adding the reagent
Close cell with screw cap and mix.



Check the pH value of the test sample (e.g. with a pH indicator rod).
Desired range: pH 9.0-10.5
If the pH value is too high, correct with reagent **Zn-1K**.

Allow to react for 15 minutes.



Insert the cell in the photometer cell shaft and start measurement.

Notes:

- We recommend to determine a new reagent blank value (deionized water instead of sample) for each test package started.
- For correct measurements, the pH value of the test sample must be in the required range.
  The required range of the pH value is achieved by dripping in the correct number and size of drops.
  A pH value that is too high leads to incorrectly low measured values.
- For further notes please refer to the package insert of the test.

Xylem |ˈzīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

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