Model

14500 Formaldehyde (HCHO)

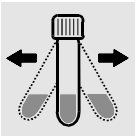
Order number	250 406
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of formaldehyde using chromotropic acid in sulphuric acid.
Application	Disinfectants and preservatives Process wastewater (e. g. from the synthetic material industry) After special sample pretreatment: cosmetic products, textile fabrics, chip boards.
Interferences	Turbidities Action: Filter sample. NO_2 > 1 mg/l
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform determination immediately.

Measuring range

	Measuring range	Sample volume	Cell
Formaldehyde	**0.1 - 10.0 mg/l HCHO**	2 ml	14 mm

Analysis: Procedure

Add 1 green microspoonful of **HCHO-1K** into a reaction cell, close with screw cap.



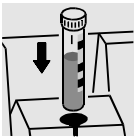
Shake cell vigorously to dissolve solids.

With a pipette add 2 ml of sample, close with screw cap and mix.

Reaction time: 5 minutes.

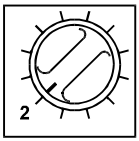
Measurement **(The color of the sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

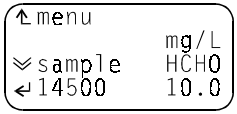


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



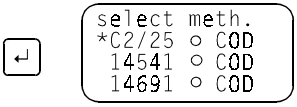
Select filter position 2.



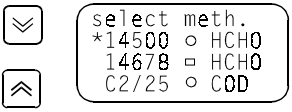
Check display: 14500 set?

If required: Set method 14500.

MPM 2010 / MPM 3000



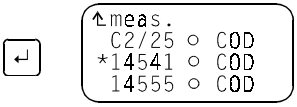
Enter selection of methods: Press key.



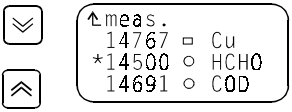
Scroll until 14500 is set.

Confirm: Press key.

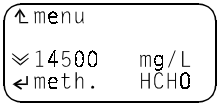
MultiLab P5



Enter selection of methods: Press key.



Scroll until 14500 is set.



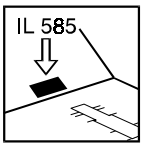
Confirm: Press key.

Measurement

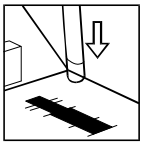
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 585 into filter compartment, lettering shows to user.



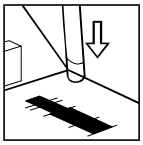
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 003.4**.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (With colored samples only)

Pipette 2 ml of sample into a reaction cell and mix.

Reaction time: 5 minutes.

Measurement (see instruction manual of the meter: “Correction of sample blank value“).

Model

14537 Total **Nitrogen (N)**

Order number	250 358
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Nitrogen compounds are converted to nitrate according to the Koroleff method and photometrically determined.
Application	For low-rate wastewater with max. 300 mg/l COD and 1000 mg/l chloride.
Interferences	COD > 300 mg/l Action: Sample predilution. Chloride > 1000 mg/l
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation by acidulating to pH 2 and cooling to 2 °C to 5 °C: 24 hours stable.

Measuring range

	Measuring range	Sample volume	Cell
Total Nitrogen	**0.5 - 15.0 mg/l N**	1.5 ml	14 mm

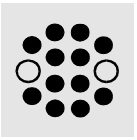
Analysis: Procedure

Sample preparation

Pipette 10 ml of sample into an empty reaction cell. (Empty cell RK14/25: WTW order no. 250621)

Add 1 blue microspoonful of **N-1K**.

Add 6 drops of **N-2K**, close with screw cap and mix.

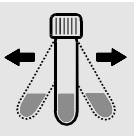


Heat cell in the thermoreactor for 1 hour at 120 °C (100 °C).

Remove cell from the thermoreactor, allow to cool to room temperature in the round cell rack.

Preparation of measurement

Add 1 blue microspoonful of **N-3K** into a reaction cell, close with screw cap.



Shake cell vigorously for 1 minute to dissolve solids.

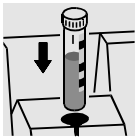
With a pipette add 1,5 ml of prepared sample, close tight with screw cap and mix. **Caution, cell gets very hot!**

Reaction time: 10 minutes.

Important: Sample solution and reagents must have a temperature of 20 to 25 °C; bring to the correct temperature if necessary.

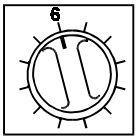
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

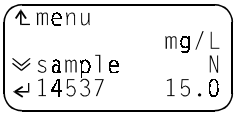


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



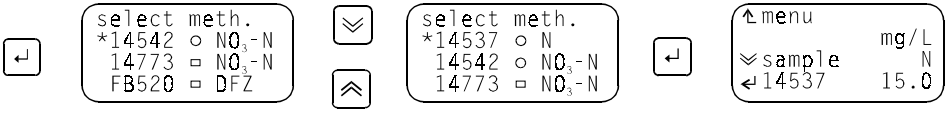
Select filter position 6.



Check display: 14537 set?

If required: set method 14537.

MPM 2010 / MPM 3000

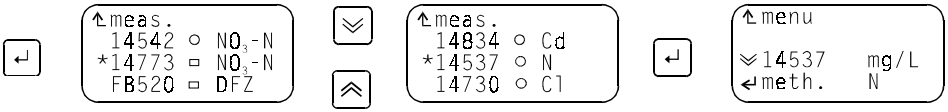


Enter selection of methods: Press key.

Scroll until 14537 is set.

Confirm: Press key.

MultiLab P5

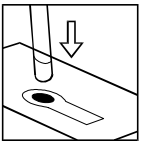


Enter selection of methods: Press key.

Scroll until 14537 is set.

Confirm: Press key.

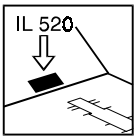
Measurement



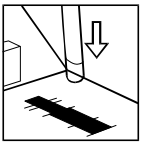
No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500



Insert filter IL 520 into filter compartment, lettering shows to user.



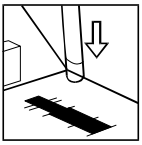
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 0008**.



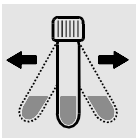
Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 1,5 ml of prepared sample into a reaction cell.



Mix.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Model

14542 Nitrate (NO_3)

Nitraten Nitrogen (NO_3-N)

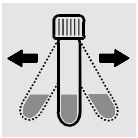
Order number	250 410
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of Nitrate with nitro spectral in concentrated sulfuric acid.
Application	Drinking water Wastewater Surface water
Interferences	Nitrite > 2 mg/l Action: 10 ml sample + approx. 0.5 g amido-sulphuric acid, wait for 10 minutes.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation by cooling to 4 °C: 24 hours stable. by acidulating to pH 2: 2 weeks stable.

Measuring range

	Measuring range	Sample volume	Cell
Nitrate Nitrogen	**0.5 - 18.0 mg/l NO_3-N**	1.5 ml	14 mm
Nitrate	**2.0 - 80.0 mg/l NO_3**	1.5 ml	14 mm

Analysis: Procedure

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



Shake cell vigorously for 1 minute to dissolve solids!

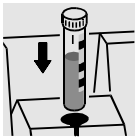
With a pipette add 1,5 ml of sample, close tight with screw cap and mix. **Caution, the cell gets very hot!**

Reaction time: 10 minutes.

Important: Sample solution and reagents must have a temperature of 20 to 25 °C. Bring to the required temperature if necessary.

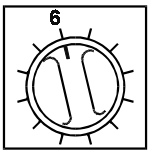
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

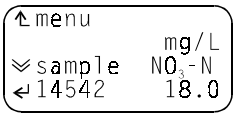


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



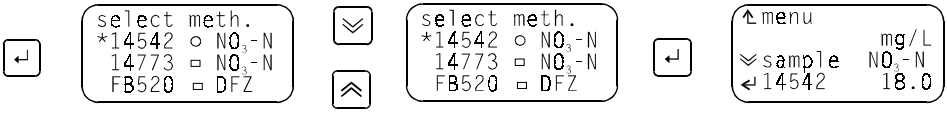
Select filter position 6.



Check display: 14542 set?

If required set method 14542.

MPM 2010 / MPM 3000

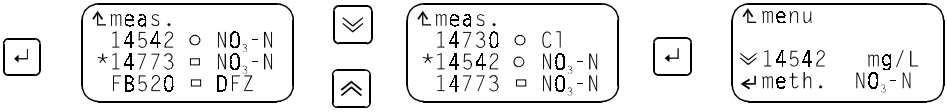


Enter selection of methods:
Press key.

Scroll until 14542 is set.

Confirm:
Press key.

MultiLab P5

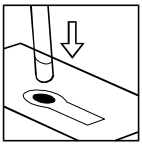


Enter selection of methods:
Press key.

Scroll until 14542 is set.

Confirm:
Press key.

Measurement



Insert cell.
Read measured value.

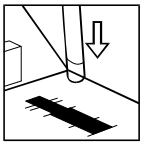
No zero adjustment required.

Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NO_3-N	0.5 - 18.0 mg/l	1.5 ml	14 mm	007.4
NO_3	2.0 - 80.0 mg/l	1.5 ml	14 mm	032.8

MPM 1000
MPM 1500

Insert filter IL 520 into filter compartment; lettering shows to user.



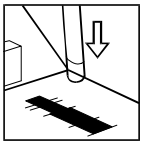
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



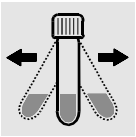
Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 1.5 ml of sample into a reaction cell.



Mix.

Reaction time: 10 minutes.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Model

14543 Total **Phosphate**

Total **Phosphorus (P)**

Order number	250 324
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination as molybdenum blue after acidic hydrolysis and oxidation at 100°C, better 120°C.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 3 to 10 using sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation not required.

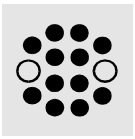
Measuring range

	Measuring range	Sample volume	Cell
Total Phosphate Phosphorus	**0.05 - 5.00 mg/l PO_4-P**	5 ml	14 mm
Total Phosphorus	**0.05 - 5.00 mg/l P_{total}**	5 ml	14 mm
Total Phosphate	**0.2 - 15.0 mg/l PO_4**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample solution into a reaction cell and mix.

Add 1 dose of **P-1K** with the green measurer, close with screw cap.

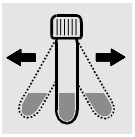


Heat cell in the thermoreaktor for 30 minutes at 120 °C (100 °C).

Remove cell from the thermoreactor, allow to cool to room temperature in the cell rack.

Add 5 drops of **P-2K,** mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.

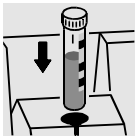


Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

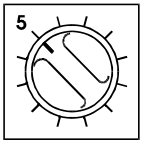
Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

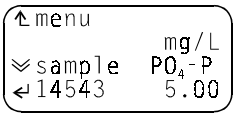


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



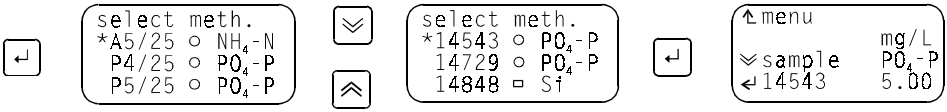
Select filter position 5.



Check display: 14543 set?

If required: Set method 14543.

MPM 2010 / MPM 3000

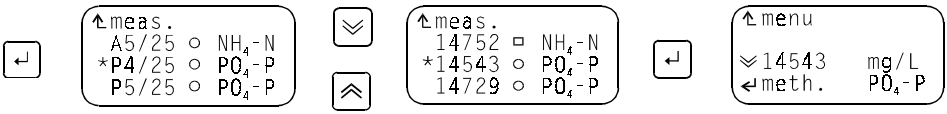


Enter selection of methods:
Press key.

Scroll until 14543 is set.

Confirm:
Press key.

MultiLab P5

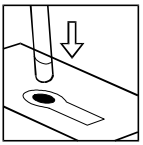


Enter selection of methods:
Press key.

Scroll until 14543 is set.

Confirm:
Press key.

Measurement



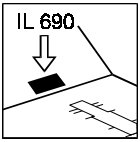
No zero adjustment required.

Insert cell.
Read measured value.

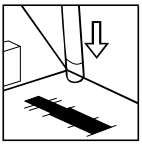
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.05 - 4.00 mg/l	5 ml	14 mm	01.64
P_{total}	0.05 - 4.00 mg/l	5 ml	14 mm	01.64
PO_4	0.2 - 12.3 mg/l	5 ml	14 mm	005.0

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



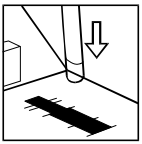
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table



Test sample: Insert cell with test sample.

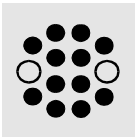
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 5 ml of sample into a reaction cell, mix.

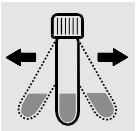
Add 1 dose of **P-1K** with the green measurer, close with screw cap.



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

Remove cell from the thermoreactor, allow to cool to room temperature in the cell rack.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.



Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

Measure: (see operating manual of the meter: „Sample blank value correction“).

Model

14543 Ortho **Phosphate (PO_4)**

Ortho **Phosphate Phosphorus (PO_4-P)**

Order number	250 324
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination as molybdenum blue.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 3 to 10 using sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation not required.

Measuring range

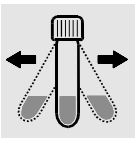
	Measuring range	Sample volume	Cell
Ortho Phosphate Phosphorus	**0.05 - 5.00 mg/l PO_4-P**	5 ml	14 mm
Ortho Phosphate	**0.2 - 15.0 mg/l PO_4**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample solution into a reaction cell and mix.

Add 5 drops of **P-2K,** close with screw cap and mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.

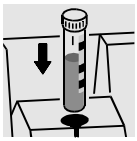


Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

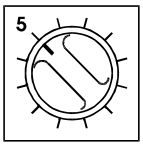
Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

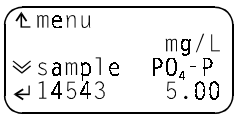


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



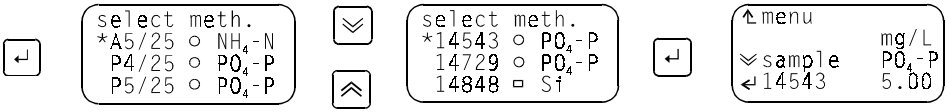
Select filter position 5.



Check display: 14543 set?

If required: Set method 14543.

MPM 2010 / MPM 3000

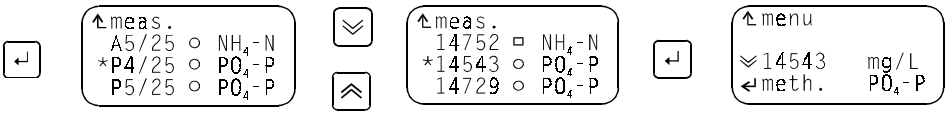


Enter selection of methods:
Press key.

Scroll until 14543 is set.

Confirm:
Press key.

MultiLab P5

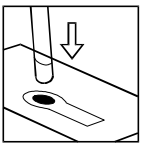


Enter selection of methods:
Press key.

Scroll until 14543 is set.

Confirm:
Press key.

Measurement



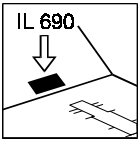
No zero adjustment required.

Insert cell.
Read measured value.

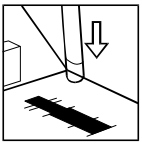
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.05 - 4.00 mg/l	5 ml	14 mm	01.64
PO_4	0.2 - 12.3 mg/l	5 ml	14 mm	005.0

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



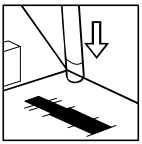
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

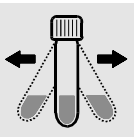
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution **(In case of colored or turbid samples only)**

Pipette 5 ml of sample into a reaction cell, mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.



Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

Measure:
(see operating manual of the meter: „Sample blank value correction“).

Model

14544 Ammonium (NH_4)

Ammonium Nitrogen (NH_4-N)

Order number	250 329		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of Ammonium Nitrogen with sodium dichlorisocyanurate and phenolderivate (Indophenol method).		
Applicability	Drinking water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Buffered sample solutions	Action:	Adjust to pH 4 to 13 with caustic soda lye.
	Turbid samples	Action:	Filter samples.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5°C to 25°C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Preservation by cooling down to 4°C: 6 hours stable.		

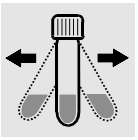
Measuring range

	Measuring range	Sample volume	Cell
Ammonium Nitrogen	**0.5 - 16.0 mg/l NH_4-N**	0.5 ml	14 mm
Ammonium	**0.6 - 21.0 mg/l NH_4**	0.5 ml	14 mm

Analysis: Procedure

Pipette 0.5 ml of sample solution into a reaction cell and mix.

With the blue measurer add 1 dose of **NH_4-1K**, close with screw cap.



Shake cell well to dissolve solids.

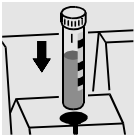
Reaction time 15 minutes.

Notes:

- Replace the black screw cap of the NH_4-1K reagent bottle with the blue measurer. Place the reagent bottle **vertically** on the opening of the cell. When dosing the reagent, always press the slide into the measurer **up to the stop**.
- **Immediately after taking out the reagent, close the bottle with the black screw cap again.**
- Keep the NH_4-1K reagent dry.

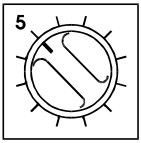
Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral



Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5

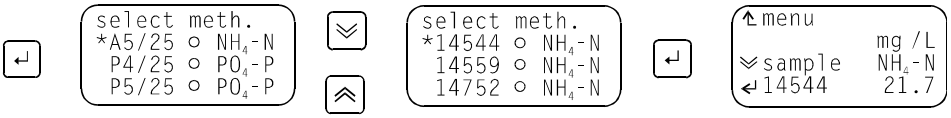


Select filter position 5.

Check display: 14544 set?

If required: Set method 14544.

MPM 2010 / MPM 3000

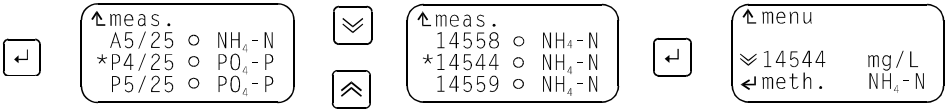


Enter selection of methods: Press key.

Scroll until 14544 is set.

Confirm: Press key.

MultiLab P5

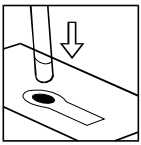


Enter selection of methods: Press key.

Scroll until 14544 is set.

Confirm: Press key.

Measurement



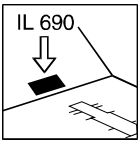
No zero adjustment required.

Insert cell.
Read measured value.

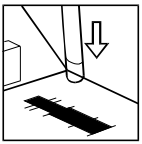
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NH_4-N	0.8 - 21.7 mg/l	0.5 ml	14 mm	008.5
NH_4	1.0 - 27.9 mg/l	0.5 ml	14 mm	011.0

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment; lettering shows to user.



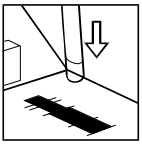
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored samples only)

Pipette 0.5 ml of sample solution into a reaction cell and mix.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Note: After determination of the sample blank value use the solution as measuring solution.
Continue in paragraph "Analysis: Procedure" with adding 1 dose of NH_4-1K reagent.

Model

14546 Ortho **Phosphate (PO_4)**

Ortho **Phosphate Phosphorus (PO_4-P)**

Order number	250 413		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of the yellow phosphoric acid molybdate vanadate complex.		
Application	Industrial water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 6 to 8 using diluted caustic soda lye or sulphuric acid.
	Yellow self-coloration of the sample solution	Action:	Add activated carbon, stir intensively, filter.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Preservation not possible, perform determination as soon as possible.		

Measuring range

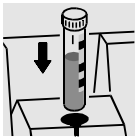
	Measuring range	Sample volume	Cell
Ortho Phosphate Phosphorus	**0.5 - 25.0 mg/l PO_4-P**	5 ml	14 mm
Ortho Phosphate	**1.5 - 75.0 mg/l PO_4**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample into a reaction cell, close with screw cap and mix.

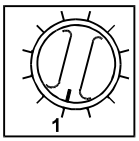
Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

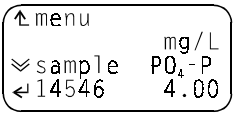


Insert cell in the cell shaft.
Read measured value.

MPM 2010

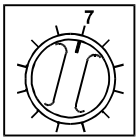


Select filter position 1.

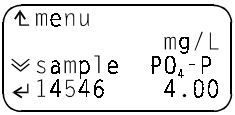


Check display: 14546 set?

MPM 3000
MultiLab P5



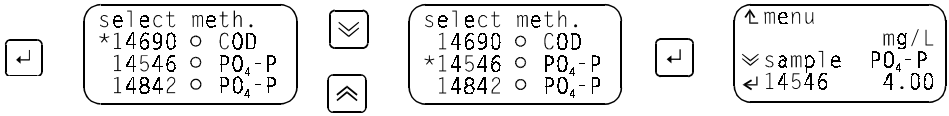
Select filter position 7.



Check display: 14546 set?

If necessary: Set method 14546.

MPM 2010

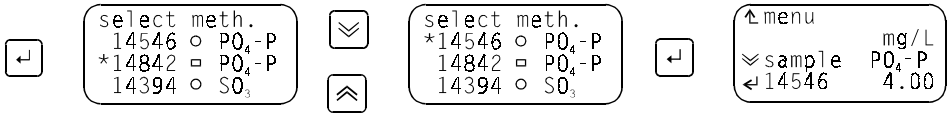


Enter selection of methods:
Press key.

Scroll until 14546 is set.

Confirm:
Press key.

MPM 3000

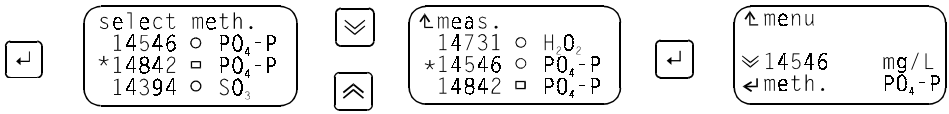


Enter selection of methods:
Press key.

Scroll until 14546 is set.

Confirm:
Press key.

MultiLab P5

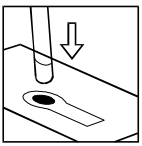


Enter selection of methods:
Press key.

Scroll until 14546 is set.

Confirm:
Press key.

Measurement



No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

These photometers do not support the measurement.

Sample blank solution **(In case of colored or turbid samples only)**

Pipette 5 ml of sample
into an empty reaction cell
(RK 14/25, WTW
order no. 250 621).

Measure
(see operating manual of the meter:
“Sample blank value correction“).

Model

14548 Sulphate (SO_4)

Order number	250 414	
Safety instructions	Observe danger marks on the individual parts of the kit!	
Method	Turbidity measurement as barium sulphate.	
Application	Ground water Wastewater Seawater	
Interferences	Turbidities	Action: Filter sample using a membrane filter.
	Wrong pH value of the sample	Action: pH value should be in the range 2 to 10. If necessary, adjust pH value by adding diluted caustic soda lye or hydrochloric acid drop by drop.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).	
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).	
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.	
Sample material	Preservation not required.	

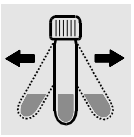
Measuring range

	Measuring range	Sample volume	Cell
Sulphate	**5 - 250 mg/l SO_4**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample into a reaction cell and mix.

With the green measurer add 1 dose of **SO_4-1K**, close with screw cap.

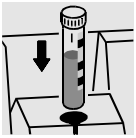


Shake cell vigorously to dissolve solids.

Reaction time: 2 minutes, **then measure immediately**.

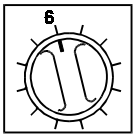
Measurement **(The color of the test sample remains stable for at least 10 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

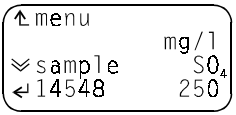


Insert cell in the cell shaft. Read measured value.

MPM 2010
MPM 3000
MultiLab P5



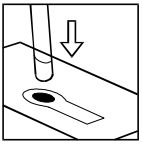
Select filter position 6.



Check display: 14548 set?

If required: Set method 14548 (see operating manual of the photometer).

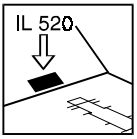
Measurement



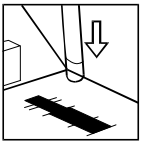
Insert cell. Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 520 into
filter compartment;
lettering shows to
user.



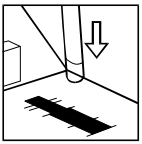
Insert cell with
blank sample
(see sample
blank solution).

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 01.00.



Test sample:
Insert cell with
test sample.

M

Press key:
Absorbance value is
displayed. The
correspond-ing
concentration value
is given in the table below.

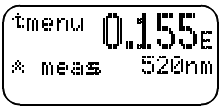
Sample blank value = Blank sample **(Only required with colored samples.**

Exception:

at MPM 1500/1000 required for zero adjustment)

The sample blank value correction has to be made manually,
also for MPM 2010/3000!

Pipette 5 ml of sample into
an empty round cell
(white screw cap).

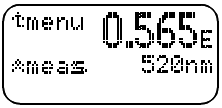


(Example)

Measure the **absorbance** of the **sample blank value**
(see operating manual of the meter).

Prepare **sample**.

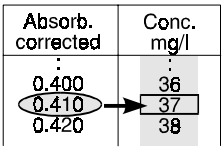
(see section
„Analysis: Procedure“).



(Example)

Measure the **absorbance** of the **sample**
(see operating manual of the meter).

Absorbance ***Sample***	–	Absorbance ***Sample blank value***	=	Absorbance ***corrected***	Result: *corrected absorbance* of the sample.
08.565	–	08.155	=	**0.410**	(Example)



- Look for the value of the *corrected absorbance* (e. g. 0.410) in the table below (if necessary, interpolate intermediate values linearly).
- The corresponding concentration value, e. g. 37 mg/l, is the **sample concentration corrected** by the sample blank value.

Table for **MPM 2010/3000:** ***Sample blank value correction***
MPM 1500/1000: ***Reading the sulphate concentration***

(valid for 14 mm standard cell and sample volume 5 ml)

Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc mg/l**
0.220	**20**	0.550	**50**	0.880	**82**	1.210	**122**	1.540	**175**
0.230	**21**	0.560	**51**	0.890	**83**	1.220	**123**	1.550	**177**
0.240	**22**	0.570	**52**	0.900	**84**	1.230	**124**	1.560	**179**
0.250	**23**	0.580	**52**	0.910	**85**	1.240	**126**	1.570	**181**
0.260	**24**	0.590	**53**	0.920	**86**	1.250	**127**	1.580	**183**
0.270	**24**	0.600	**54**	0.930	**87**	1.260	**129**	1.590	**185**
0.280	**25**	0.610	**55**	0.940	**89**	1.270	**130**	1.600	**187**
0.290	**26**	0.620	**56**	0.950	**90**	1.280	**131**	1.610	**189**
0.300	**27**	0.630	**57**	0.960	**91**	1.290	**133**	1.620	**191**
0.310	**28**	0.640	**58**	0.970	**92**	1.300	**134**	1.630	**193**
0.320	**29**	0.650	**59**	0.980	**93**	1.310	**136**	1.640	**195**
0.330	**30**	0.660	**60**	0.990	**94**	1.320	**137**	1.650	**197**
0.340	**32**	0.670	**61**	1.000	**95**	1.330	**139**	1.660	**200**
0.350	**32**	0.680	**62**	1.010	**96**	1.340	**140**	1.670	**202**
0.360	**32**	0.690	**63**	1.020	**98**	1.350	**142**	1.680	**204**
0.370	**33**	0.700	**64**	1.030	**99**	1.360	**144**	1.690	**206**
0.380	**34**	0.710	**65**	1.040	**100**	1.370	**145**	1.700	**209**
0.390	**35**	0.720	**66**	1.050	**101**	1.380	**147**	1.710	**211**
0.400	**36**	0.730	**67**	1.060	**102**	1.390	**148**	1.720	**213**
0.410	**37**	0.740	**68**	1.070	**104**	1.400	**150**	1.730	**216**
0.420	**38**	0.750	**69**	1.080	**105**	1.410	**152**	1.740	**218**
0.430	**39**	0.760	**70**	1.090	**106**	1.420	**153**	1.750	**220**
0.440	**40**	0.770	**71**	1.100	**107**	1.430	**155**	1.760	**223**
0.450	**41**	0.780	**72**	1.110	**109**	1.440	**157**	1.770	**225**
0.460	**41**	0.790	**73**	1.120	**110**	1.450	**159**	1.780	**228**
0.470	**42**	0.800	**74**	1.130	**111**	1.460	**160**	1.790	**230**
0.480	**43**	0.810	**75**	1.140	**112**	1.470	**162**	1.800	**233**
0.490	**44**	0.820	**76**	1.150	**114**	1.480	**164**	1.810	**235**
0.500	**45**	0.830	**77**	1.160	**115**	1.490	**166**	1.820	**238**
0.510	**46**	0.840	**78**	1.170	**116**	1.500	**167**	1.830	**241**
0.520	**47**	0.850	**79**	1.180	**118**	1.510	**169**		
0.530	**48**	0.860	**80**	1.190	**119**	1.520	**171**		
0.540	**49**	0.870	**81**	1.200	**120**	1.530	**173**		

Model

14549 Iron (Fe)

Order number	250 349
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of iron with ferrospectral after reduction to Fe(II) with ascorbic acid.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions — Action: Adjust to pH 1 to 10 with diluted hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform determination immediately after sampling.

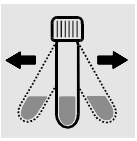
Measuring range

	Measuring range	Sample volume	Cell
Iron	**0.05 - 4.00 mg/l Fe**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample into a reaction cell and mix.

Add 1 blue micro-spoonful of **Fe-1K**, close with screw cap.

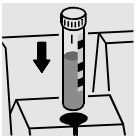


Shake cell vigorously to dissolve solids.

Reaction time: 2 minutes.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

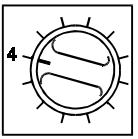
PhotoLab S6
PhotoLab S12
PhotoLab Spektral



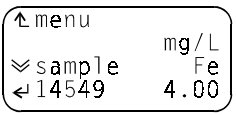
Insert cell in the cell shaft.
Read measured value.

Important: The result can also be given as the sum of iron (Σ Fe) (see instruction manual of the photometer).

MPM 2010
MPM 3000
MultiLab P5



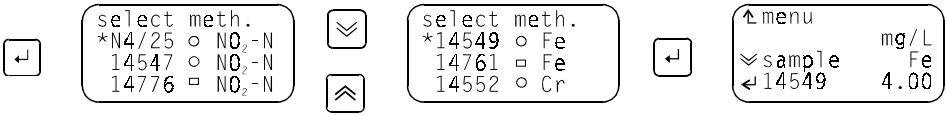
Select filter position 4.



Check display: 14549 set?

If required: set method 14549.

MPM 2010 / MPM 3000

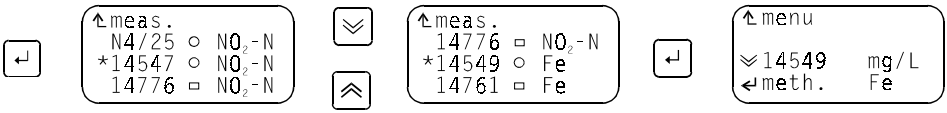


Enter selection of methods:
Press key.

Scroll until 14549 is set.

Confirm:
Press key.

MultiLab P5

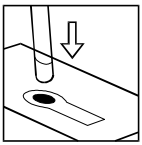


Enter selection of methods:
Press key.

Scroll until 14549 is set.

Confirm:
Press key.

Measurement



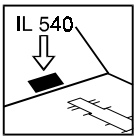
No zero adjustment required.

Insert cell.
Read measured value.

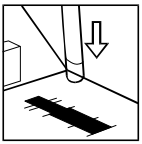
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
Fe	0.10 - 4.00 mg/l	5 ml	14 mm	01.85
Fe_2O_3	0.14 - 5.72 mg/l	5 ml	14 mm	02.64

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment; lettering shows to user.



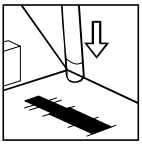
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: **Enter factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution **(in case of colored or turbid samples only)**

Pipette 5 ml of sample into a reaction cell and mix.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Note: After the determination of the sample blank value, use the solution as test solution. Continue with paragraph "Analysis: Procedure" with the addition of 1 blue microspoonful of the **Fe-1K** reagent.

Model

14551 Phenol (C_6H_5OH)

Order number	250 412		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of phenol with thiazole derivative. The test measures phenol and most phenol derivatives.		
Application	Surface water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 2 to 11 with diluted caustic soda lye or sulphuric acid.
	Turbidities	Action:	Filter samples.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination of samples 4 hours after sampling at the latest.		

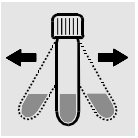
Measuring range

	Measuring range	Sample volume	Cell
Phenol	**0.10 - 2.50 mg/l Phen**	10 ml	14 mm
Only with PhotoLab S12 and PhotoLab Spektral: Phenol	**0.025 - 1.000 mg/l Phen**	10 ml	50 mm

Analysis: Procedure

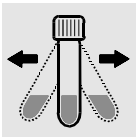
Pipette 10 ml of sample into a reaction cell and mix.

Add 1 grey micro-spoonful of **Ph-1K**, close with screw cap



Shake cell vigorously to dissolve solids.

Add 1 green micro-spoonful of **Ph-2K,** close with screw cap.

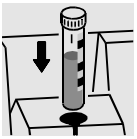


Shake cell vigorously to dissolve solids.

Reaction time: 1 minute.

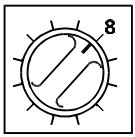
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

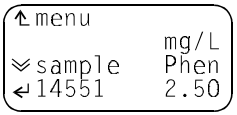


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



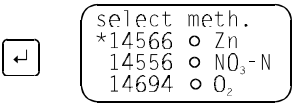
Select
filter position 8.



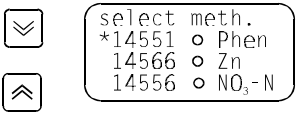
Check display:
14551 set?

If required: set method 14551.

MPM 3000



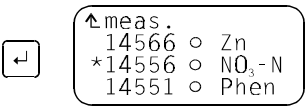
Enter selection of methods:
Press key.



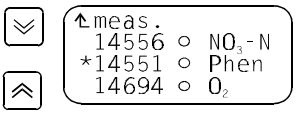
Scroll until 14551 is set.

Confirm:
Press key.

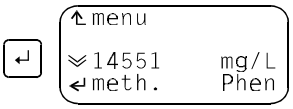
MultiLab P5



Enter selection of methods:
Press key.

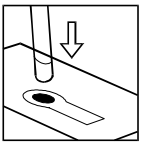


Scroll until 14551 is set.



Confirm:
Press key.

Measurement



Insert cell.
Read measured value.

No zero adjustment required.

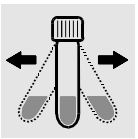
MPM 1000
MPM 1500

These photometers do not support the measurement!

Sample blank solution (In case of colored of turbid samples only)

Pipette 10 ml of sample into a reaction cell and mix.

Add 1 green micro-spoonful of **Ph-2K**, close with screw cap.



Shake cell vigorously to dissolve solids.

Reaction time: 1 minute.

Measurement (see instruction manual of the meter: “Sample blank value correction“).

Model

14552 Total Chromium (Cr)

Order number	250 341		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Acidic oxidation of chromium(III) to chromium(VI) and subsequent determination with diphenylcarbarzide.		
Application	Drinking water Wastewater Seawater		
Interferences	Strongly alkaline sample solutions	Action:	Adjust to pH 1 to 9 with diluted sulfuric acid.
	Turbidities	Action:	Filter sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately.		

Measuring range

	Measuring range	Sample volume	Cell
Total Chromium	**0.05 - 2.00 mg/l Cr**	5 ml	14 mm

Analysis: Procedure

Sample preparation

Pipette 10 ml of sample into an empty round cell (RK 14/25, WTW order no. 250621).

Add 1 drop of **Cr-1K** and mix.

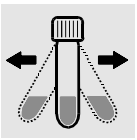
With the green measurer add 1 dose of **Cr-2K**, close tight with screw cap.

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

Preparation of measurement

Remove cell from the thermoreactor, allow to cool to room temperature in a cell rack.

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



Shake cell vigorously to dissolve solids and wait for 1 minute.

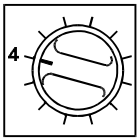
With a pipette add 5 ml of prepared sample, close with screw cap and mix.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

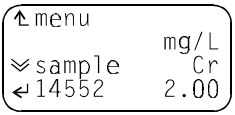
PhotoLab S6
PhotoLab S12
PhotoLab Spektral

Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



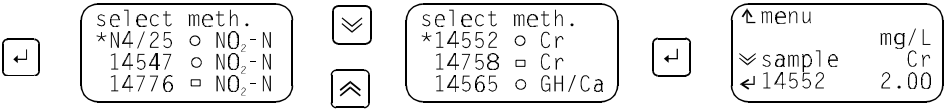
Select
filter position 4.



Check display:
14552 set?

If required: Set method 14552.

MPM 2010 / MPM 3000

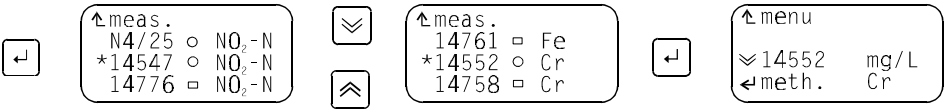


Enter selection of methods:
Press key.

Scroll until 14552 is set.

Confirm:
Press key.

MultiLab P5

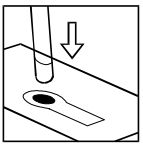


Enter selection of methods:
Press key.

Scroll until 14552 is set.

Confirm:
Press key.

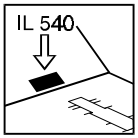
Measurement



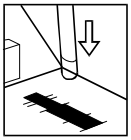
No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment; lettering shows to user.



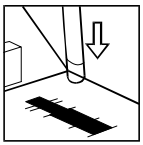
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 00.95.

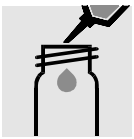


Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Sample blank solution (in case of colored samples only)



Pipette 5 ml of prepared sample into an empty round cell (RK 14/25, WTW order no. 250621).

Add 6 drops of **Cr-3K,** close with screw cap and mix.
Leave for 1 minute.

Measurement:
(see instruction manual of the meter:
“Correction of sample blank value“).

Model

14552 Chromium (VI)

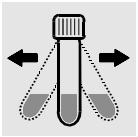
Order number	250 341		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of chromium with diphenylcarbazide.		
Application	Drinking water Wastewater Seawater		
Interferences	Strongly alkaline sample solutions	Action:	Adjust to pH 1 to 9 with diluted sulfuric acid.
	Turbidities	Action:	Filter sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately.		

Measuring range

	Measuring range	Sample volume	Cell
Chromium (VI)	**0.05 - 2.00 mg/l Cr**	5 ml	14 mm

Analysis: Procedure

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

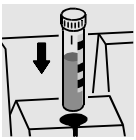


Shake cell vigorously to dissolve solids and let stand for 1 minute.

With a pipette add 5 ml of prepared sample, close with screw cap and mix.

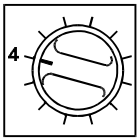
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

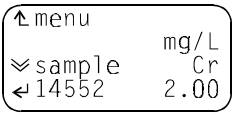


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



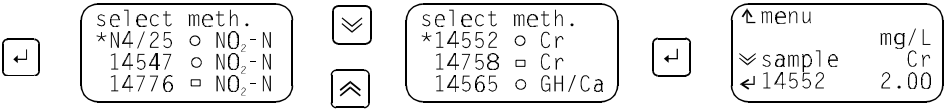
Select
filter position 4.



Check display:
14552 set?

If required: Set method 14552.

MPM 2010 / MPM 3000

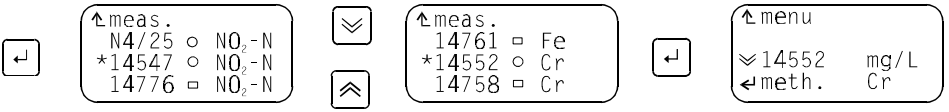


Enter selection of methods:
Press key.

Scroll until 14552 is set.

Confirm:
Press key.

MultiLab P5

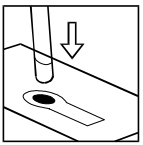


Enter selection of methods:
Press key.

Scroll until 14552 is set.

Confirm:
Press key.

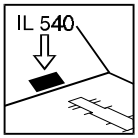
Measurement



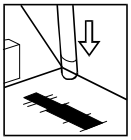
No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500



Insert
filter IL 690 into
filter compartment;
lettering shows to
user.



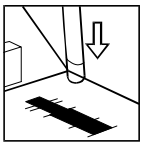
Insert cell with
zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor 00.95.**



Test sample:
Insert cell with
test sample.

M

Press key:
Concentration in mg/l
is displayed.

Sample blank solution (in case of colored samples only)

Pipette 5 ml of
sample into an
empty round cell
(RK 14/25, WTW
order no. 250621).

Add 6 drops of **Cr-3K,**
close with screw cap
and mix.
Leave for 1 minute.

Measurement:
(see instruction manual
of the meter:
“Correction of sample blank
value“).

Model

14553 Copper (Cu)

Order number	250 408		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of copper with cuprizone in an ammoniacal medium.		
Application	Ground water, drinking water, surface water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 4 to 10 with diluted caustic soda lye or sulphuric acid.
	Overconcentrations of > 50 mg/l Cu lead to other reaction products causing minor results.	Action:	Plausibility check by analysis of diluted samples.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5°C to 25°C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

Measuring range

	Measuring range	Sample volume	Cell
Copper	**0.10 - 8.00 mg/l Cu**	5 ml	14 mm

Analysis: Procedure

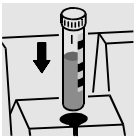
Pipette 5 ml of sample into a reaction cell and mix.

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

Reaction time: 5 minutes.

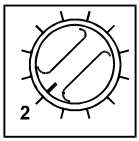
Measurement **(The color of the test sample remains stable for at least 30 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

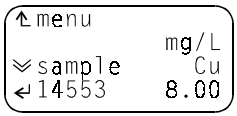


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



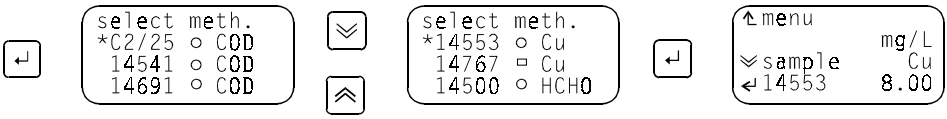
Select filter position 2.



Check display: 14553 set?

If required: set method 14553.

MPM 2010 / MPM 3000

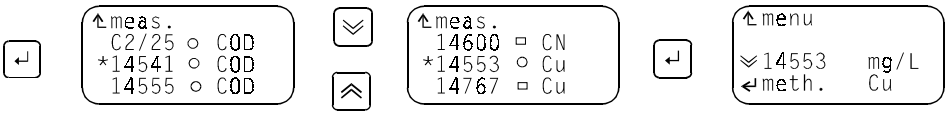


Enter selection of methods: Press key.

Scroll until 14553 is set.

Confirm: Press key.

MultiLab P5

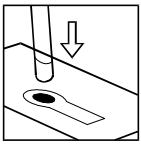


Enter selection of methods: Press key.

Scroll until 14553 is set.

Confirm: Press key.

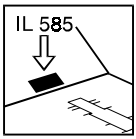
Measurement



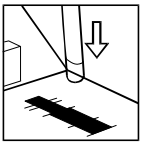
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 585 into filter compartment; lettering shows to user.



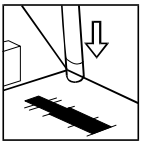
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 03.60**.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 5 ml of sample into a reaction cell and mix.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Note: After the determination of the sample blank value, use the solution as test solution. Continue with paragraph "Analysis: Procedure" with the addition of 5 drops of the **Cu-1K** reagent.

Model

14554 Nickel (Ni)

Order number	250 409		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of Nickel with diacetyl dioxime after oxidation.		
Application	Drinking water Wastewater		
Interferences	Strongly alkaline sample solutions	Action:	Adjust to pH 3 to 8 using diluted sulfuric acid.
	Turbid samples	Action:	Filter sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	If possible perform determination immediately after sampling. Preservation by adding 2 ml of 25 % sulfuric acid per liter of sample.		

Measuring range

	Measuring range	Sample volume	Cell
Nickel	**0.10 - 6.00 mg/l Ni**	5 ml	14 mm

Analysis: Procedure

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

Reaction time: 1 minute.

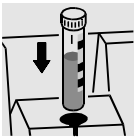
Add 2 drops of **Ni-1K** and mix.

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

Reaction time: 2 minutes.

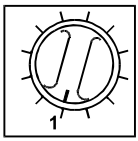
Measurement **(The color of the test sample remains stable for at least 15 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

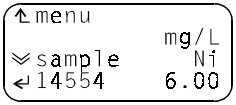


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



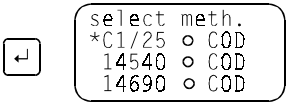
Select
filter position 1.



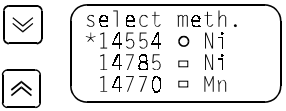
Check display:
14554 set?

If required: Set method 14554.

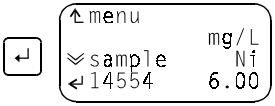
MPM 2010 / MPM 3000



Enter selection of methods:
Press key.

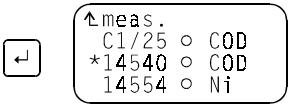


Scroll until 14554 is set.

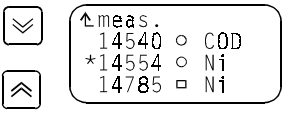


Confirm:
Press key.

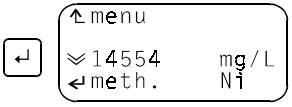
MultiLab P5



Enter selection of methods:
Press key.

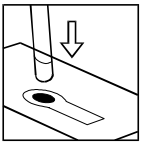


Scroll until 14554 is set.



Confirm:
Press key.

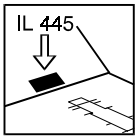
Measurement



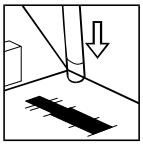
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 445 into filter compartment; lettering shows to user.



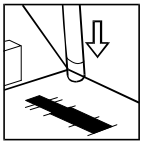
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 03.80**.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

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

Reaction time: 1 minute.

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

Reaction time: 2 minutes.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Model

14555 COD 500-10000

Chemical Oxygen Demand

Order number	250 309
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulfuric acid and silver sulfate as catalyst.
Application	Wastewater Production control
Interferences	Chloride > 5000 mg/l Action: Dilute sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C **store upright in a dark place!** (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation by acidulating to pH 2: 2 days stable. by deep-freezing to -18 °C: 2 weeks stable.

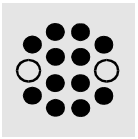
Measuring range

	Measuring range	Sample volume	Cell
COD 10000	**500 - 10000 mg/l COD**	1 ml	14 mm

Analysis: Procedure

Sway a reaction cell so that sediment is suspended.

Carefully pipette 1 ml of sample solution into the reaction cell, close tight with screw cap and mix vigorously.
Caution, cell gets very hot!



Heat reaction cell in thermoreactor at 148 °C for 2 hours.

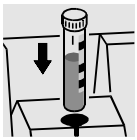
Remove cell from thermoreactor and place in a round cell rack to cool.

After approx. 10 min cooling time sway cell again.

Place cell in the rack again and allow to cool to room temperature
(very important!).

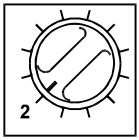
Measurement **(The color of the test sample remains stable for several days!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

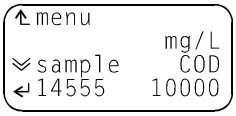


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



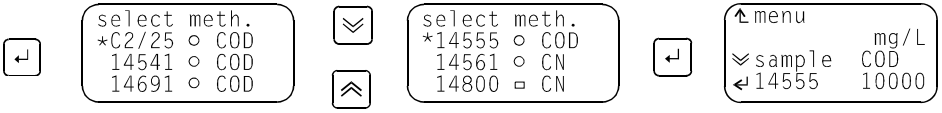
Select
filter position 2.



Check display:
14555 set?

If required: set method 14555.

MPM 2010 / MPM 3000

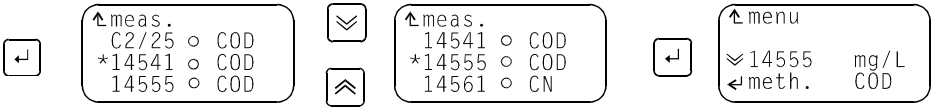


Enter selection of methods:
Press key.

Scroll until 14555 is set.

Confirm:
Press key.

MultiLab P5

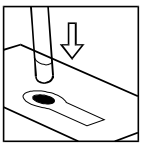


Enter selection of methods:
Press key.

Scroll until 14555 is set.

Confirm:
Press key.

Measurement

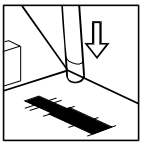


Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500

Insert
filter IL 585 into filter compartment, lettering shows to user.



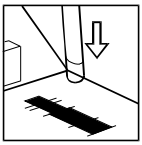
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor 4545**.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration
in mg/l is displayed.

Model

14556 Nitrate (NO_3)

Nitrate Nitrogen (NO_3-N)

Order number	250 411
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of nitrate nitrogen using phenol derivate in the presence of choride.
Application	**Seawater and brackish water** Drinking water Wastewater
Interferences	Nitrite > 1 mg/l Action: 10 ml of sample + 0.5 g amido-sulphuric acid, wait for 10 minutes.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation: by cooling to 4°C 24 hours stable by acidulating to pH 2 2 weeks stable.

Measuring range

	Measuring range	Sample volume	Cell
Nitrate Nitrogen	**0.10 - 3.00 mg/l NO_3-N**	2 ml	14 mm
Nitrate	**0.5 - 15.0 mgl NO_3**	2 ml	14 mm

Analysis: Procedure

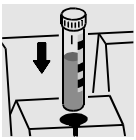
Add 1 blue micro-spoonful of **NO_3-1K** into a reaction cell.
Caution, foams strongly (wear eye protection and protective gloves!).

Immediately add 2.0 ml of sample with a pipette, close with screw cap and mix.
Caution, cell grows hot!

Reaction time: 15 minutes.

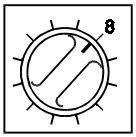
Measurement **(Exactly observe the reaction time! The color of the test sample does not remain stable, the measured value increases!)**

PhotoLab S12
PhotoLab Spektral

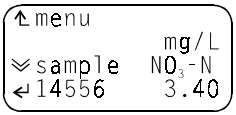


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



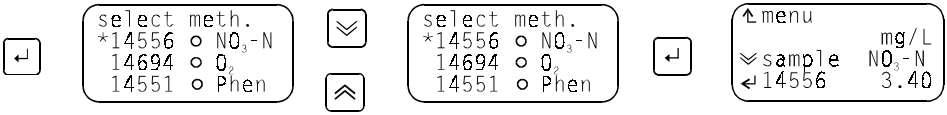
Select
filter position 8.



Check display:
14556 set?

If necessary: Set method 14556.

MPM 3000

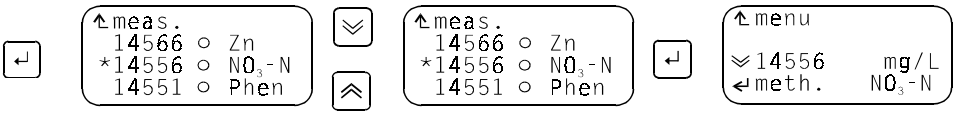


Enter selection of methods:
Press key.

Scroll until 14556 is set.

Confirm:
Press key.

MultiLab P5

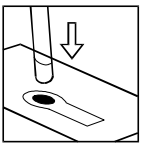


Enter selection of methods:
Press key.

Scroll until 14556 is set.

Confirm:
Press key.

Measurement



No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

These photometers do not support the measurement.

Sample blank solution (In case of colored or turbid samples only)

Pipette 2 ml of sample solution into a reaction cell and mix.

Reaction time: 15 minutes.

Measure (see operating manual of the meter: “Sample blank value correction“).

Model

14557 Fluoride (F)

Order number	250 365
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of fluoride with lanthanum alizarin complexone (complex fluoride compounds are not determined).
Application	Ground water Drinking water Wastewater and leakage water
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions Action: Adjust to pH 5 to 8 with diluted caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	If possible, perform determination immediately after sampling.

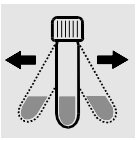
Measuring range

	Measuring range	Sample volume	Cell
Fluoride	**0.10 - 1.50 mg/l F**	5 ml	14 mm

Analysis: Procedure

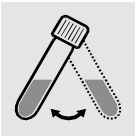
Pipette 5.0 ml
of sample
into a reaction cell
and mix.

With the blue measurer,
add 1 dose of **F-1K**,
close with screw cap.



Shake cell vigorously
to dissolve solids.

Reaction time:
5 minutes.

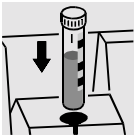


Sway cell before
measuring.

- Replace the black screw cap of the **F-1K** reagent bottle **with the blue measurer**. Place the reagent bottle **vertically** on the opening of the cell. **Before dosing** the reagent, make sure the slide is **pulled out completely**. When dosing the reagent, always press the slide into the measurer **up to the stop**.
- **Before longer periods of disuse, close the bottle with the black screw cap again.**

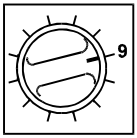
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

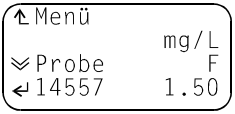


Insert cell in the
cell shaft.
Read measured value

MPM 3000
MultiLab P5



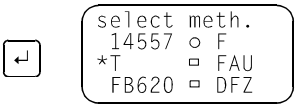
Select filter position 9.



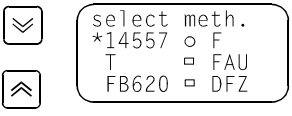
Check display: 14557 set?

If necessary: Set method 14557.

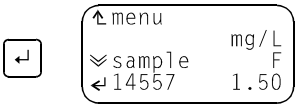
MPM 3000



Enter selection of methods: Press key.

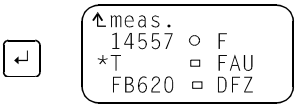


Scroll until 14557 is set.

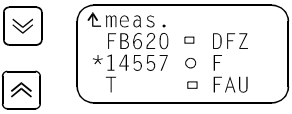


Confirm: Press key.

MultiLab P5



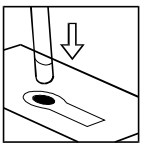
Enter selection of methods: Press key.



Scroll until 14557 is set.

Confirm: Press key.

Measurement

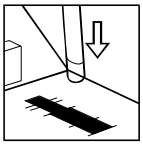


Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500

Insert filter IL 620 into filter compartment; lettering shows to user.



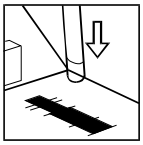
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 01.32**.



Test sample: Insert cell with test sample.

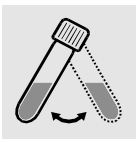
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 5 ml of sample into a reaction cell and mix.

Reaction time: 5 minutes.



Sway cell before measuring.

Measurement (see instruction manual of the meter: “Correction of sample blank value“).

Model

14559 Ammonium (NH_4)

Ammonium Nitrogen (NH_4-N)

Order number	250 424		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of Ammonium Nitrogen with sodium dichlorisocyanurate and phenolderivate (Indophenol method).		
Applicability	Drinking water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 4 to13 using caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Preservation by cooling down to 4°C: 6 hours stable.		

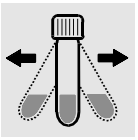
Measuring range

	Measuring range	Sample volume	Cell
Ammonium Nitrogen	**4.0 - 80.0 mg/l NH_4-N**	0.1 ml	14 mm
Ammonium	**5.0 - 100.0 mg/l NH_4**	0.1 ml	14 mm

Analysis: Procedure

Pipette 0.1 ml of sample solution into a reaction cell and mix.

With the blue measurer add 1 dose of **NH_4-1K**, close with screw cap.



Shake cell well to dissolve solids.

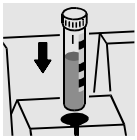
Reaction time 15 minutes.

Notes:

- Replace the black screw cap of the NH_4-1K reagent bottle with the blue measurer. Place the reagent bottle **vertically** on the opening of the cell. When dosing the reagent, always press the slide into the measurer **up to the stop**.
- **Immediately after taking out the reagent, close the bottle with the black screw cap again.**
- Keep the NH_4-1K reagent dry.

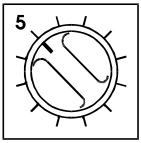
Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral



Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5

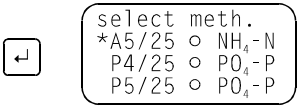


Select filter position 5.

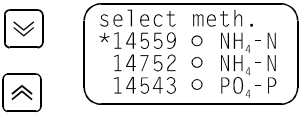
Check display: 14559 set?

If required: Set method 14559.

MPM 2010 / MPM 3000



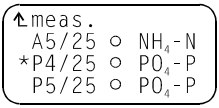
Enter selection of methods: Press key.



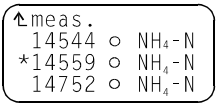
Scroll until 14559 is set.

Confirm: Press key.

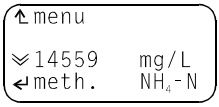
MultiLab P5



Enter selection of methods: Press key.

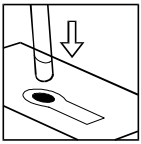


Scroll until 14559 is set.



Confirm: Press key.

Measurement



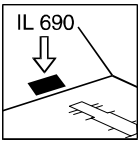
Insert cell.
Read measured value.

No zero adjustment required.

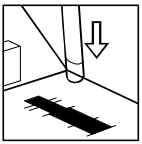
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NH_4-N	4.0 - 77.0 mg/l	0.1 ml	14 mm	039.7
NH_4	5.0 - 100.0 mg/l	0.1 ml	14 mm	051.2

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment; lettering shows to user.



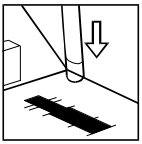
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 0.1 ml of sample solution into a reaction cell and mix.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Note: After determination of the sample blank value use the solution as measuring solution. Continue in paragraph "Analysis: Procedure" with adding 1 dose of NH_4-1K reagent.

Model

14560 COD 4-40

Chemical Oxygen Demand

Order number	250 303
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulfuric acid and silver sulfate as catalyst.
Application	Low-rate wastewater with max. 40 mg/l COD and 1000 mg/l chloride. Wastewater Production control Surface water
Interferences	Chloride > 1000 mg/l Action: Sample dilution.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C **store upright in a dark place!** (Observe expiry date on the label!).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation by acidulating to pH 2: 2 days stable. by deep-freezing to -18 °C: 2 weeks stable.

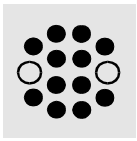
Measuring range

	Measuring range	Sample volume	Cell
COD 40	**4.0 - 40.0 mg/l C**OD	3 ml	14 mm

Analysis: Procedure

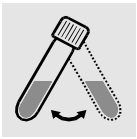
Sway a reaction cell so that sediment is suspended.

Carefully pipette 3 ml of sample solution into the reaction cell, close tight with screw cap and mix vigorously.
Caution, cell gets very hot!



Heat reaction cell in thermoreactor at 148 °C for 2 hours.

Remove cell from thermoreactor and place in a round cell rack to cool.

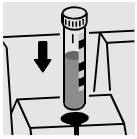


After approx. 10 min cooling time sway cell again.

Place cell in the rack again and allow to cool to room temperature
(very important!).

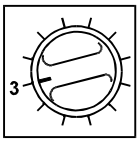
Measurement **(The color of the test sample remains stable for several days!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

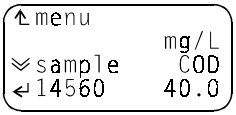


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



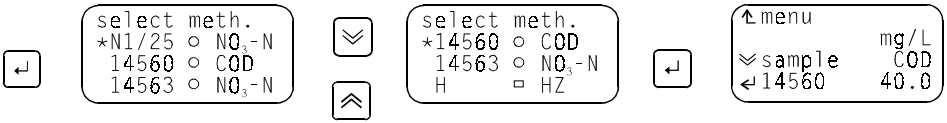
Select
filter position 3.



Check display:
14560 set?

If required: set method 14560.

MPM 2010 / MPM 3000

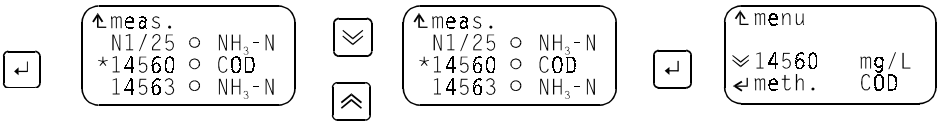


Enter selection of methods:
Press key.

Scroll until 14560 is set.

Confirm:
Press key.

MultiLab P5

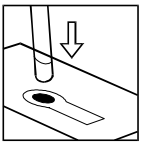


Enter selection of methods:
Press key.

Scroll until 14560 is set.

Confirm:
Press key.

Measurement



Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500

For technical reasons,
these photometers cannot
measure at the required
wavelength of 340 nm!

Model

14561 Free **Cyanide (CN)**

Order number	250 344		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of cyanide using barbituric acid.		
Application	Ground water, drinking water, surface water Industrial water, percolating water Wastewater especially from electroplating and metal-processing industries		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 2 to 10 using diluted caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

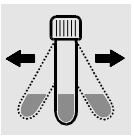
Measuring range

	Measuring range	Sample volume	Cell
Cyanide	**0.010 - 0.500 mg/l CN**	5 ml	14 mm

Analysis: Procedure

Pipette 5 ml of sample into a reaction cell and dissolve solids.

Add 1 blue microspoonful of **CN-3K**, close with screw cap.

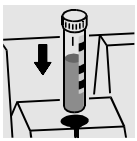


Shake cell vigorously to dissolve solids.

Reaction time: 10 minutes.

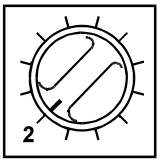
Measurement (The color of the test sample remains stable for at least 15 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

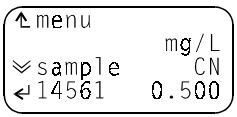


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



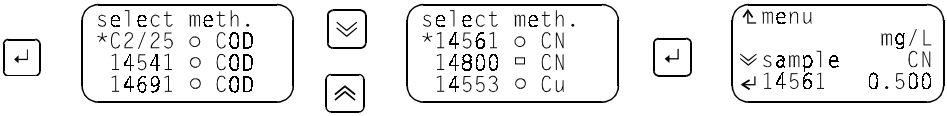
Select filter position 2.



Check display: 14561 set?

If necessary set method 14561.

MPM 2010 / MPM 3000

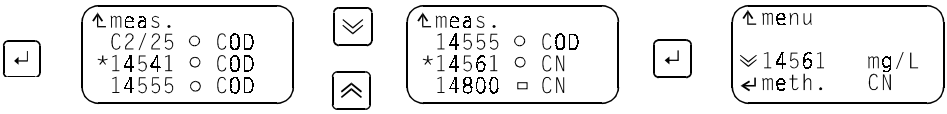


Enter selection of methods:
Press key.

Scroll until 14561 is set.

Confirm:
Press key.

MultiLab P5



Enter selection of methods:
Press key.

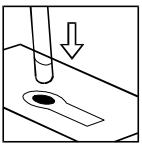
Scroll until 14561 is set.

Confirm:
Press key.

Measuring range for MPM 2010/3000 / MultiLab P5 and MPM 1000/1500

	Measuring range	Sample volume	Cell
Cyanide	**0.025 - 0.500 mg/l CN**	5 ml	14 mm

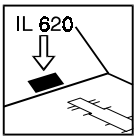
Measurement



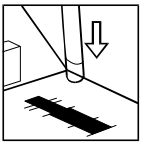
No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500



Insert filter IL 620 into filter compartment, lettering shows to user.



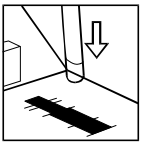
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 0.313**.



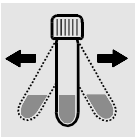
Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 5 ml of sample into a reaction cell.



Shake cell vigorously to dissolve solids.

Reaction time: 10 minutes.

Measure (see operating manual of the photometer: “Sample blank value correction“)

Model

14561 Readily released **Cyanide (CN)**

Order number	250 344		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of cyanide using barbituric acid.		
Application	Ground water, drinking water, surface water Industrial water, percolating water Wastewater especially from electroplating and metal-processing industries		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 2 to 10 using diluted caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

Measuring range

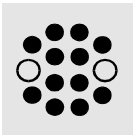
	Measuring range	Sample volume	Cell
Cyanide	**0.010 - 0.500 mg/l CN**	5 ml	14 mm

Analysis: Procedure

Sample preparation

Pipette 10 ml of sample into an empty reaction cell (RK 14/25, WTW order no. 250 621).

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



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

Remove cell from the thermoreactor, place in the cell rack to cool to room temperature.

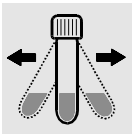
Sway cell before opening.

Add 3 drops of **CN-2K** and mix.

Measuring preparation

Pipette 5 ml of the prepared sample into a reaction cell and dissolve solids.

Add 1 blue microspoonful of **CN-3K**, close with screw cap.

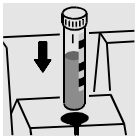


Shake cell vigorously to dissolve solids.

Reaction time: 10 minutes.

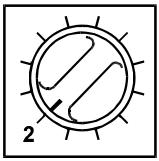
Measurement **(The color of the test sample remains stable for at least 15 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

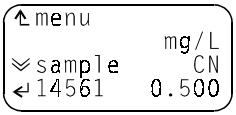


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



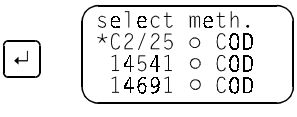
Select
filter position 2.



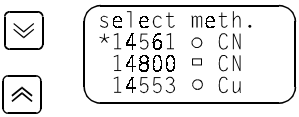
Check display:
14561 set?

If necessary set method 14561.

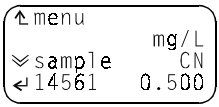
MPM 2010 / MPM 3000



Enter selection of methods:
Press key.

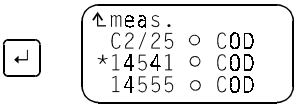


Scroll until 14561 is set.

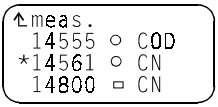


Confirm:
Press key.

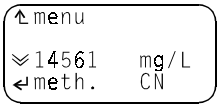
MultiLab P5



Enter selection of methods:
Press key.



Scroll until 14561 is set.



Confirm:
Press key.

Measuring range for MPM 2010/3000 / MultiLab P5 and MPM 1000/1500

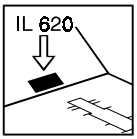
	Measuring range	Sample volume	Cell
Cyanide	**0.025 - 0.500 mg/l CN**	5 ml	14 mm

Measurement

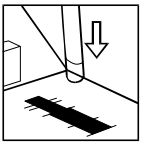
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 620 into filter compartment, lettering shows to user.



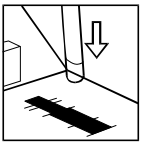
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 0.313**.



Test sample: Insert cell with test sample.

M

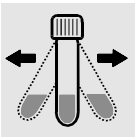
Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Sample preparation (as in paragraph "Analysis: Procedure")

Measuring preparation

Pipette 5 ml of the prepared sample into a reaction cell.



Shake cell vigorously to dissolve solids.

Reaction time: 10 minutes.

Measure (see operating manual of the photometer: "Sample blank value correction")

Model

14562 Potassium

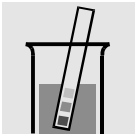
Order number	250 407		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination with sodium tetraphenyloborate in alkaline solution		
Application	Drinking water, mineral water, curative water Groundwater, spring water, well water Surface water, soils, seawater.		
Störfaktoren	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 3 to 12 using diluted caustic soda lye or sulphuric acid.
	Ammonium content > 50 mg/l	Action:	Predilute the sample.
	Turbid sample solutions	Action:	Filter the sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

Measuring range

	Measuring range	Sample volume	Cell
Potassium	**5.0 - 50.0 mg/l K**	2 ml	14 mm

Analysis: Procedure

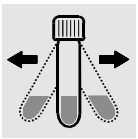
Pipette 2.0 ml of sample into a reaction cell and mix.



Check pH value. Specified range: 10.5 to 11.5.

Add 6 drops of **K-1K** and mix.

Add 1 blue micro-spoonful of **K-2K**, close with screw cap.

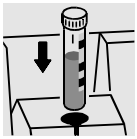


Shake the cell vigorously to dissolve the solids.

Reaction time: 5 minutes.

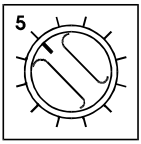
Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

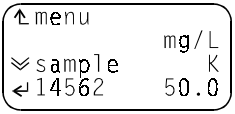


Insert cell in the cell shaft. Read measured value.

MPM 2010
MPM 3000
MultiLab P5



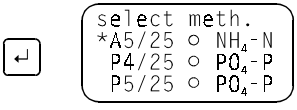
Select
filter position 5.



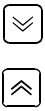
Check display:
14562 set?

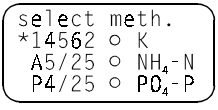
If required: Set method 14562.

MPM 2010 / MPM 3000

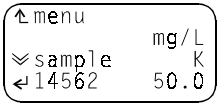


Enter selection of methods:
Press key.



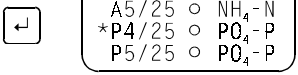


Scroll until 14562 is set.

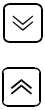


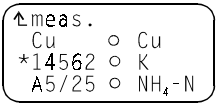
Confirm:
Press key.

MultiLab P5

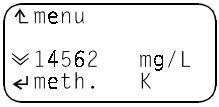


Enter selection of methods:
Press key.



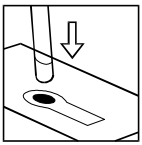


Scroll until 14562 is set.



Confirm:
Press key.

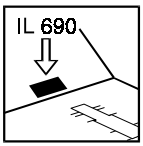
Measurement



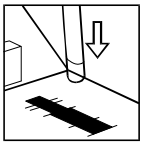
Insert cell.
Read measured
value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



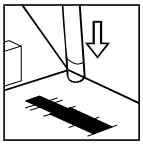
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 029.5**.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 2 ml of sample into a reaction cell and mix.

Check pH value. Specified range: 10.5 to 11.5. If necessary, adjust with caustic soda lye.

Add 6 drops of **K-1K** and mix.

Reaction time: 5 minutes.

Measure
(see operating manual of the meter:
“Correction of sample blank value“).

Model

14564 Sulfate (SO_4)

Order number	250 415		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Turbidity measurement as barium sulfate.		
Application	Groundwater Drinking water Wastewater Seawater		
Interferences	Turbidities	Action:	Filter sample using a membrane filter.
	Check pH value of the sample, required range pH 2 to 10	Action:	If necessary, correct pH value, by adding diluted caustic soda lye or hydrochloric acid drop by drop.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Preservation not required.		

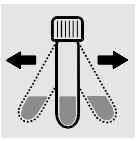
Measuring range

	Measuring range	Sample volume	Cell
Sulfate	**100 - 1000 mg/l SO_4**	1 ml	14 mm

Analysis: Procedure

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

With the green measurer add 1 dose of **SO_4-1K**, close with screw cap.

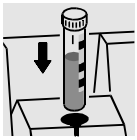


Shake cell well to dissolve solids.

Reaction time:
2 minutes,
<u>then measure **immediately**</u>.

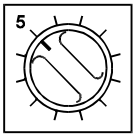
Measurement **(The color of the test sample remains stable for at least 10 minutes!) Better: measure after exactly 2 minutes.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

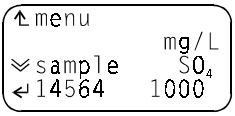


Insert cell in the cell shaft.
Read measured value.

MPM 2010

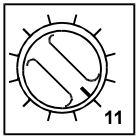


Select filter position 5 (690 nm).

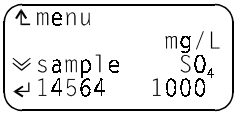


Check display: 14564 set?

MPM 3000
MultiLab P5



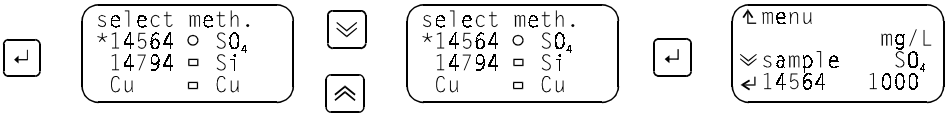
Select filter position 11 (820 nm).



Check display: 14564 set?

If required: Set method 14564.

MPM 2010 / MPM 3000

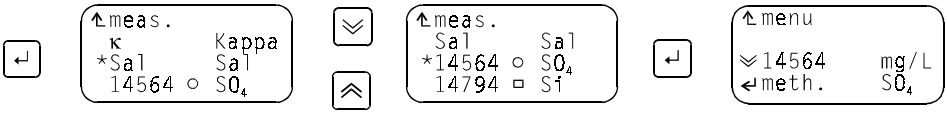


Enter selection of methods: Press key.

Scroll until 14564 is set.

Confirm: Press key.

MultiLab P5

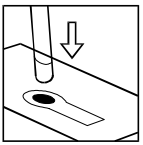


Enter selection of methods: Press key.

Scroll until 14564 is set.

Confirm: Press key.

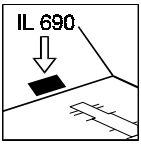
Measurement



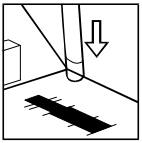
No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment; lettering shows to user.



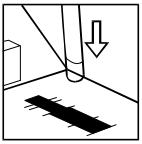
Insert cell with zero solution (5 ml sample solution in empty cell, white screw cap).

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 0735.**



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored samples only)

Filter turbid solutions.

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

Reaction time: 2 minutes.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Model

14565 Total Hardness (Ca + Mg)

Order number	250 405		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	In an alkaline solution, calcium and magnesium react with phthalein purple to a violet dye which is photometrically determined.		
Application	Ground water and surface water Drinking water Mineral water and medicinal water Boiler water.		
Interferences	Strongly acidic samples Strongly alkaline samples	Action:	Adjust to pH 5 to 8 using caustic soda lye or hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At +2 °C to +8 °C (observe expiry date on the label).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling. The sample temperature should be in the range 15 °C to 25 °C.		

Measuring range

	Measuring range	Sample volume	Cell
Total Hardness	**5 - 150 mg/l GH/Ca** **0.7 - 22.0 °d**	0.2 ml	14 mm

Analysis: Procedure

Important: Remove the packet from the refrigerator at least 30 minutes before use so that it can achieve room temperature.

Determination of total hardness

Pipette 0.2 ml of sample into a reaction cell and mix.

With a pipette add 0.2 ml of **H-1K,** close with screw cap and mix.

Reaction time: 10 minutes, then measure (see below).
Measured value A (Total hardness, = Ca content + Mg content).

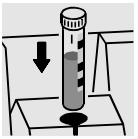
Differenciating between Ca and Mg hardness

With a pipette add 0.2 ml of **H-2K** into the cell already measured, close with screw cap and mix.

Measure again immediately (see below).
Measured value B (Mg content).
Ca content = Value A – value B.

Measurement **(The color of the test sample remains stable only for a short time. Therefore, keep the times mentioned exactly.)**

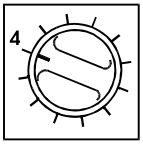
PhotoLab S6
PhotoLab S12
PhotoLab Spektral



Insert cell in the cell shaft.
Read measured value.

Differenciating between Ca and Mg hardness
Set the photometer to difference measurement before measuring (select the citation form). First measure the total hardness, then press the enter key, add H-2K to the same reaction cell and measure the magnesium hardness. After pressing the enter key once again, the individual values for Calcium and Magnesium hardness are displayed.

MPM 2010
MPM 3000
MultiLab P5

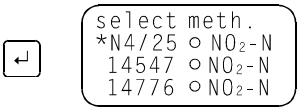


Select
filter position 4.

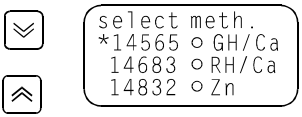
Check display:
14565 set?

If necessary, set method 14565.

MPM 2010 / MPM 3000



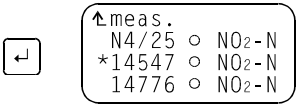
Enter selection of methods:
Press key.



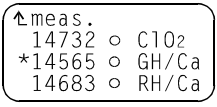
Scroll until 14565 is set.

Confirm:
Press key.

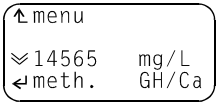
MultiLab P5



Enter selection of methods:
Press key.

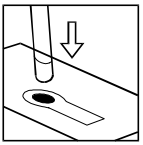


Scroll until 14565 is set.



Confirm:
Press key.

Measurement



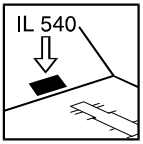
Insert cell.
Read measured value.

No zero adjustment required.

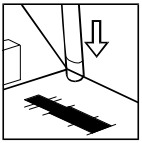
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
GH/Ca	5.0 - 140.0 mg/l	0.2 ml	14 mm	0160

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment; lettering shows to user.



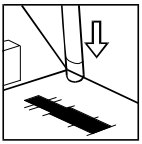
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** according to above table.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Model

14566 Zinc (Zn)

Order number	250 417
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of zinc using pyridylazoresorcin (PAR) in alkaline solution.
Application	Ground water, drinking water, surface water, industrial water Wastewater, especially from electroplating and metal-processing industries Percolating water, sewage sludge, soil.
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 4 to 10 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Used reagent sets may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform determination immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Zinc	**0.20 - 5.00 mg/l Zn**	0.5 ml	14 mm
Zinc sensitive *	**0.050 - 0.500 mg/l Zn**	5 ml	50 mm

***** (PhotoLab S12 or PhotoLab Spektral only – see also operating manual of the photometer, section “Analysis Regulations“).

Analysis: Procedure

Add 5 drops of **Zn-1K** into a reaction cell and mix.

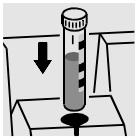
With a pipette add 0.5 ml of sample and mix.

Add 5 drops of **Zn-2K,** close with screw cap and mix.

Reaction time: 15 minutes.

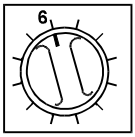
Measurement (The color of the test sample remains stable for at least 30 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

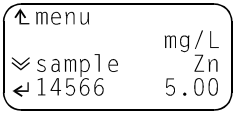


Insert cell in the cell shaft.
Read measured value.

MPM 2010

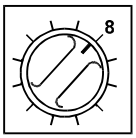


Select filter position 6.

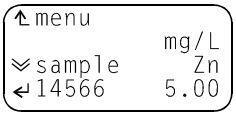


Check display: 14566 set?

MPM 3000
MultiLab P5



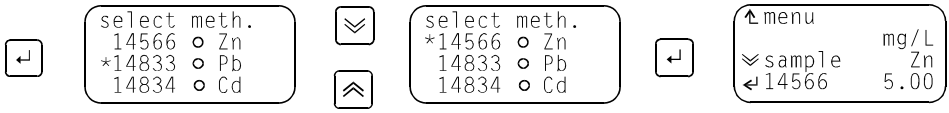
Select filter position 8.



Check display: 14566 set?

If required: Set method 14566.

MPM 2010

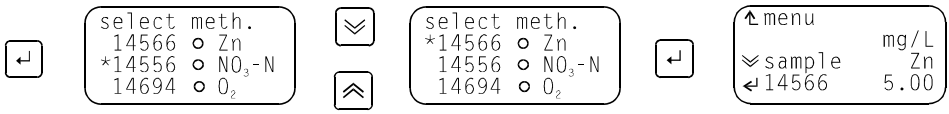


Enter selection of methods:
Press key.

Scroll until 14566 is set.

Confirm:
Press key.

MPM 3000

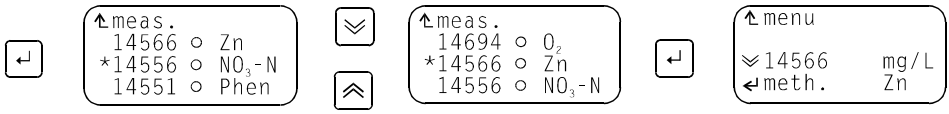


Enter selection of methods:
Press key.

Scroll until 14566 is set.

Confirm:
Press key.

MultiLab P5



Enter selection of methods:
Press key.

Scroll until 14566 is set.

Confirm:
Press key.

Measurement

No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

These photometers do not support the measurement.

Sample blank solution (In case of colored or turbid samples only)

Pipette 0.5 ml of sample into an empty round cell (RK 14/25, WTW order no. 250 621).

With a pipette add 3.5 ml of distilled water.

Add 5 drops of **Zn-2K** and mix.

Reaction time: 15 minutes.

Measure: (see operating manual of the meter: „Sample blank value correction“).

Model

14622 Tin

Order number	250 401
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	In the presence of a cationic surfactant in acidic solution, tin (IV) reacts wih pyrocatechol violet to form a blue complex, the concentration of which is determined photometrically.
Application	Wastewater Galvanic bath solutions
Interferences	Turbid samples Action: Filter the sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform analysis immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Tin	**0.10 - 2.50 mg/l Sn**	5 ml	14 mm

Analysis: Procedure

Add 6 drops of **Sn-1K** into a reaction cell and mix.

With a pipette add 5 ml of sample and mix.

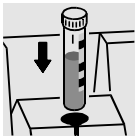
Check pH value of the sample. Specified range: pH 1.5 to 3.5.

If necessary, correct pH value by adding diluted sulphuric acid drop by drop.

Reaction time: 15 minutes.

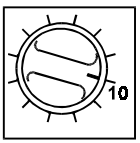
Measurement

PhotoLab S12
PhotoLab Spektral

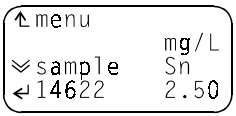


Insert cell in the cell shaft. Read measured value.

MPM 3000
MultiLab P5



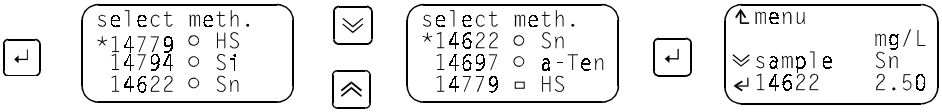
Select filter position 10.



Check display: 14622 set?

If required: set method 14622.

MPM 3000

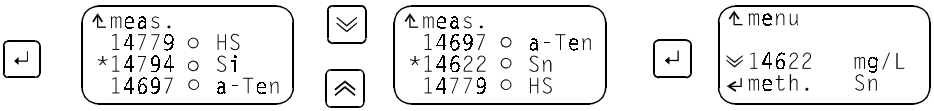


Enter selection of methods:
Press key.

Scroll until 14622 is set.

Confirm:
Press key.

MultiLab P5



Enter selection of methods:
Press key.

Scroll until 14622 is set.

Confirm:
Press key.

Measurement

No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

These photometers are not supported.

Model

14678 Formaldehyde

Order number	250 331
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of formaldehyde using chromotropic acid in sulphuric acid.
Application	Disinfectants Preservatives Process wastewater, e. g. from the synthetic materials industry After special sample preparation: Cosmetic products Textile fabrics Chip boards (DIN 120) Room air.
Interferences	Turbid samples Action: Filter the samples.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform analysis immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Formaldehyde	**0.10 - 9.00 mg/l HCHO**	3 ml	10 mm
Formaldehyde	**0.05 - 4.00 mg/l HCHO**	3 ml	20 mm
Formaldehyde	**0.02 - 1.50 mg/l HCHO**	6 ml	50 mm

Analysis: Procedure

Notes:

- The temperature of the sample and the HCHO-1 reagent must be in the range 20 °C to 25 °C.
- For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Pipette 3 ml of **HCHO-1** into an empty round cell (RK14/25, WTW order no. 250621).

Add 1 green micro-spoonful of **HCHO-2**, close with screw cap.

Shake the cell vigorously to dissolve the solids.

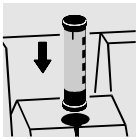
With a pipette add 3 ml of sample, close with screw cap and mix.

Reaction time: 10 minutes.

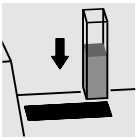
Transfer the solution into the required cell.

Measurement **(The color of the test sample remains stable for at least 100 minutes.)**

PhotoLab S12
PhotoLab Spektral

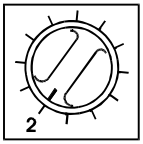


Select method with AutoSelector.

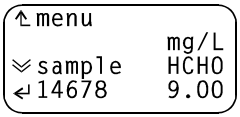


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



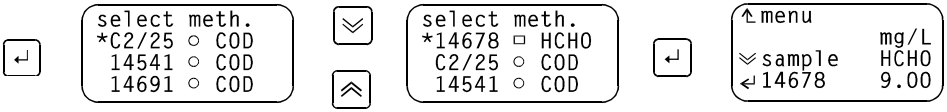
Select
filter position 2.



Check display:
14678 set?

If necessary: set method 14678.

MPM 3000

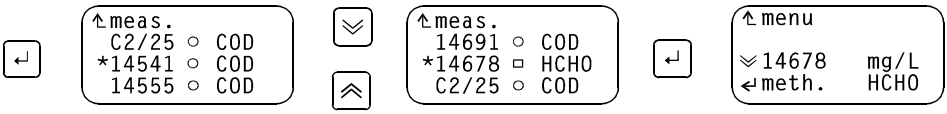


Enter selection of methods:
Press key.

Scroll until 14678 is set.

Confirm:
Press key.

MultiLab P5

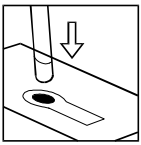


Enter selection of methods:
Press key.

Scroll until 14678 is set.

Confirm:
Press key.

Measurement



No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

These photometers
are not supported.

Model

14683 Residual Hardness (Ca)

Order number	250 404		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	In an alkaline solution, calcium and magnesium react with phthalein purple to a violet dye which is photometrically determined.		
Application	Checking ion exchanger facilities for production of completely demineralized water.		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 5 to 8 using caustic soda lye or hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At +2 °C to +8 °C (observe expiry date on the label).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling. The sample temperature should be in the range 15 °C to 25 °C.		

Measuring range

	Measuring range	Sample volume	Cell
Residual Hardness	**0.50 - 5.00 mg/l RH/Ca**	4 ml	14 mm

Analysis: Procedure

Important: Remove the packet from the refrigerator at least 30 minutes before use so that it can achieve room temperature.

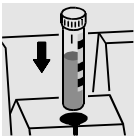
Pipette 4 ml of sample into a reaction cell and mix.

With a pipette add 0.2 ml of **RH-1K,** close with screw cap and mix.

Reaction time: 10 minutes.

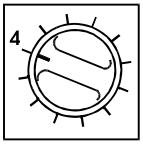
Measurement **(The color of the test sample remains stable only for a short time. Therefore, keep the times mentioned exactly.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

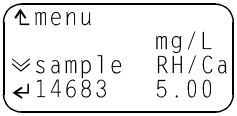


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



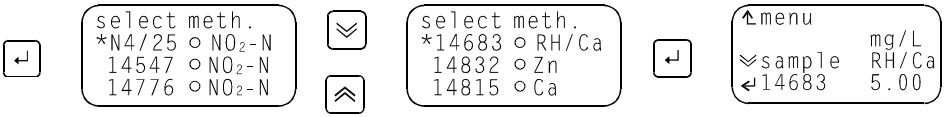
Select
filter position 4.



Check display:
14683 set?

If necessary, set method 14683.

MPM 2010 / MPM 3000

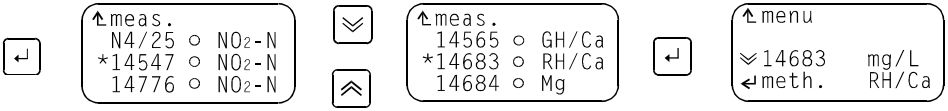


Enter selection of methods:
Press key.

Scroll until 14683 is set.

Confirm:
Press key.

MultiLab P5

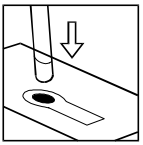


Enter selection of methods:
Press key.

Scroll until 14683 is set.

Confirm:
Press key.

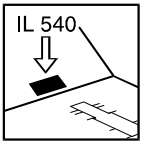
Measurement



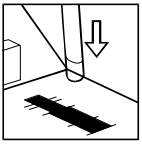
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 540 into filter compartment; lettering shows to user.



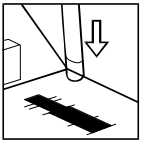
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** 14.30.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Model

14684 Magnesium (Mg)

Order number	250 354
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	In an alkaline solution, magnesium and phthalein purple react to a violet dye which is photometrically determined.
Application	Ground water and surface water Drinking water Mineral water and medicinal water Boiler water.
Interferences	Strongly acidic samples Strongly alkaline samples Action: Adjust to pH 5 to 8 using caustic soda lye or hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At +2 °C to +8 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform determination immediately after sampling. The sample temperature should be in the range 15 °C to 25 °C.

Measuring range

	Measuring range	Sample volume	Cell
Magnesium	**5.0 - 50.0 mg/l Mg**	0.2 ml	14 mm

Analysis: Procedure

Important: Remove the packet from the refrigerator at least 30 minutes before use so that it can achieve room temperature.

Pipette 0.2 ml of sample into a reaction cell and mix.

With a pipette add 0.2 ml of **Mg-1K,** close with screw cap and mix.

Reaction time: 10 minutes.

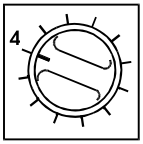
With a pipette add 0.2 ml of **Mg-2K**, close with screw cap and mix.

Measurement **(The color of the test sample remains stable only for a short time. Therefore, keep the times mentioned exactly.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

Insert cell in the cell shaft. Read measured value.

MPM 2010
MPM 3000
MultiLab P5

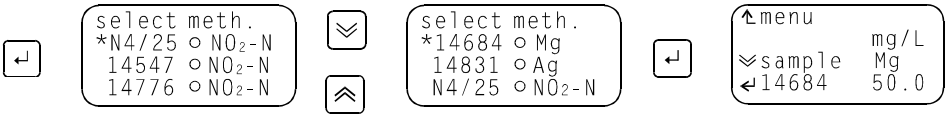


Select
filter position 4.

Check display:
14684 set?

If necessary, set method 14684.

MPM 2010 / MPM 3000

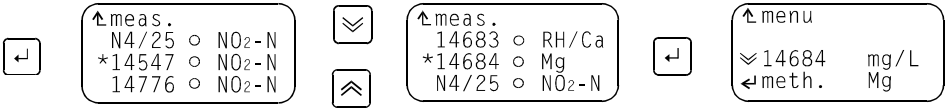


Enter selection of methods:
Press key.

Scroll until 14684 is set.

Confirm:
Press key.

MultiLab P5

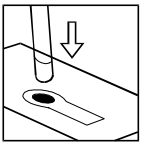


Enter selection of methods:
Press key.

Scroll until 14684 is set.

Confirm:
Press key.

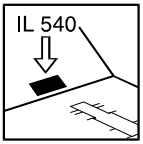
Measurement



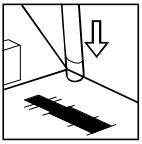
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 540 into filter compartment; lettering shows to user.



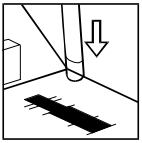
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** 160.0.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Model

14690 COD 50 - 500

Chemical Oxygen Demand

Order number	250 304
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulfuric acid and silver sulfate as catalyst.
Application	Ground water and surface water Wastewater Production control
Interferences	Chloride > 2500 mg/l Action: Predilute the sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C **store upright in a dark place** (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform analysis immediately after sampling.

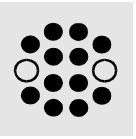
Measuring range

	Measuring range	Sample volume	Cell
COD 500	**50 - 500 mg/l COD**	2 ml	14 mm

Analysis: Procedure

Sway a reaction cell so that the sediment is suspended.

Carefully pipette 2 ml of sample solution into the reaction cell, close it tightly with the screw cap and mix vigorously.
Caution, the cell gets very hot!



Heat the reaction cell in a thermoreactor at 148 °C for 2 hours.

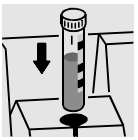
Remove the cell from the thermoreactor and place it in a round cell rack to cool.

After approx. 10 min cooling time sway the cell again.

Place the cell in the rack again and let it cool to room temperature **(very important!).**

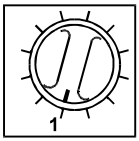
Measurement **(The color of the test sample remains stable for several days.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

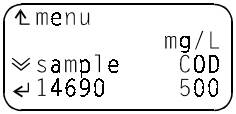


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



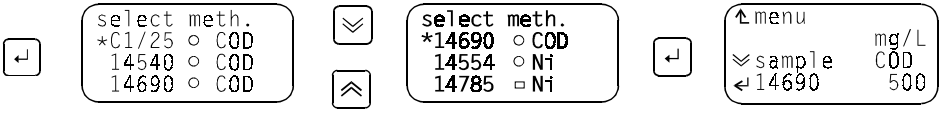
Select
filter position 1.



Check display:
14690 set?

If required: set method 14690.

MPM 2010 / MPM 3000

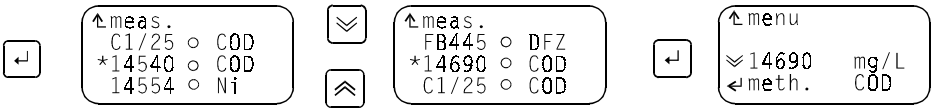


Enter selection of methods:
Press key.

Scroll until 14690 is set.

Confirm:
Press key.

MultiLab P5

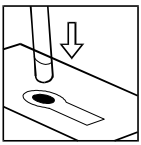


Enter selection of methods:
Press key.

Scroll until 14690 is set.

Confirm:
Press key.

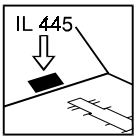
Measurement



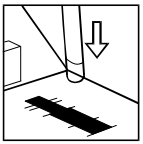
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 445 into
filter compartment,
lettering shows to
user.



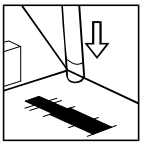
Insert cell with
zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor 0400**.



Test sample:
Insert cell with
test sample.

M

Press key:
Concentration
in mg/l is displayed.

Model

14691 COD 300 - 3500

Chemical Oxygen Demand

Order number	250 351
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulfuric acid and silver sulfate as catalyst.
Application	Wastewater Production control
Interferences	Chloride > 2500 mg/l Action: Predilute the sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C **store upright in a dark place** (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform analysis immediately after sampling.

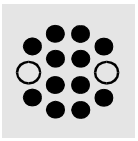
Measuring range

	Measuring range	Sample volume	Cell
COD 3500	**300 - 3500 mg/l COD**	2 ml	14 mm

Analysis: Procedure

Sway a reaction cell so that the sediment is suspended.

Carefully pipette 2 ml of sample solution into the reaction cell, close it tightly with the screw cap and mix vigorously.
Caution, the cell gets very hot!



Heat the reaction cell in a thermoreactor at 148 °C for 2 hours.

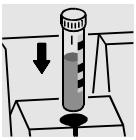
Remove the cell from the thermoreactor and place it in a round cell rack to cool.

After approx. 10 min cooling time sway the cell again.

Place cell in the rack again and let it cool to room temperature **(very important!).**

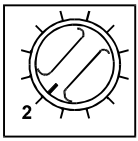
Measurement **(The color of the test sample remains stable for several days.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral



Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



Select
filter position 2.

Program a user-defined
method.

Programming a user-defined method:

MPM 2010 / MPM 3000
The methods are programmed using the WTW Multi/Achat program and the PC.

MultiLab P5
User-defined methods can also be input directly via the instrument keyboard.

Method data for the 14691 COD test:

Name	14691 new
Wavelength (nm)	585
Dimension	mg/l
Citation form	COD
Zero point	0.095
Slope	0.00031
Start of measuring range	300 mg/l
End of measuring range	3500 mg/l
Reference cell	Round, 16 mm
Resolution	10 mg/l

MPM 1000 **MPM 1500**	These photometers are not supported.

Model

14694 Oxygen Cell Test (O_2)

Order number	250 403
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Oxygen oxidizes Mn(II) to Mn(III). In an alkaline solution, the latter and Titriplex®II form a red color complex. This color complex is photometrically determined (modified Winkler method).
Application	Ground water and surface water Drinking water
Interferences	Strongly alkaline or strongly acidic sample solutions — Action: Adjust to pH 6 to 8 using nitric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At +5 °C to +25 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform determination immediately after sampling.

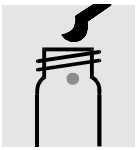
Measuring range

	Measuring range	Sample volume	Cell
Oxygen	**0.5 - 12.0 mg/l O_2**	1 cell filling	14 mm

Analysis: Procedure

Fill the cell air bubble free (important) and completely with the water sample.

Place the filled cell into the cell rack.



Add 1 glass pearl.

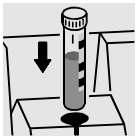
Add 5 drops of **O_2-1K**.

Add 5 drops of **O_2-2K**, close with screw cap and shake for 10 seconds.

Add 10 drops of **O_2-3K,** close cell, mix, and clean the cell outside. Measure immediately.

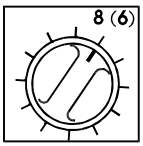
Measurement **(The color of the test sample remains stable only for a short time. Therefore, keep the times mentioned exactly, then measure immediately.)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

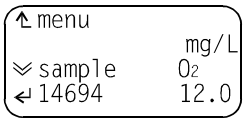


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



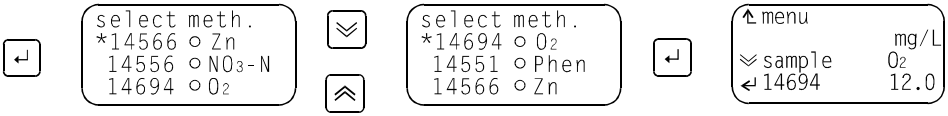
Select
filter position 8
(with MPM 2010:
filter position 6).



Check display:
14694 set?

If necessary, set method 14694.

MPM 2010 / MPM 3000

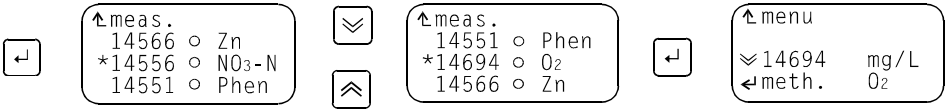


Enter selection of methods:
Press key.

Scroll until 14694 is set.

Confirm:
Press key.

MultiLab P5

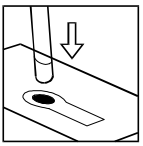


Enter selection of methods:
Press key.

Scroll until 14694 is set.

Confirm:
Press key.

Measurement

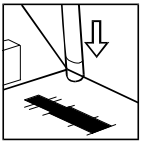


No zero adjustment required.

Insert cell.
Read measured value.

MPM 1000
MPM 1500

Insert
filter IL 520 into filter compartment; lettering shows to user.



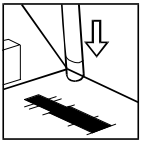
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** 014.0.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Model

14697 Surfactants (anionic)

Order number	250 333
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Anionic surfactants of the sulfonate and sulfate type react with the cationic dye methylene blue to form an ion pair that is then extracted with chloroform. The blue color of the chloroform phase is determined photometrically.
Application	Surface water Water for industrial use Inflow and outflow of wastewater treatment plants Wastewater, especially from the textile and leather industry Percolating water

Interferences		
Turbid samples	Action:	Filter the sample
>2.0 mg/L methylene blue active substances	Action:	Dilute sample with distilled water
Strongly acidic or strongly alkaline samples	Action:	Adjust pH value to pH 5 to 11 using diluted caustic soda lye or hydrochloric acid drop by drop.

Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Perform analysis immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Surfactants (anionic)	**0.05 - 2.00 mg/l a-Ten**	5 ml	14 mm

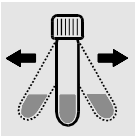
Analysis: Procedure

Note: The temperature of the sample and the reaction cell should be in the range 10 °C to 20 °C.

Add 5 ml of sample into a reaction cell, **do not mix.**

Add 3 drops of **T-1K, do not mix.**

Add 2 drops of **T-2K,** close with screw cap.

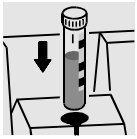


Shake the cell for 30 seconds.

Reaction time: 5 minutes.

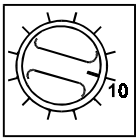
Measurement **(The color of the test sample remains stable for at least 10 minutes.)**

PhotoLab S12
PhotoLab Spektral

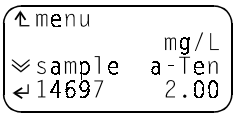


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



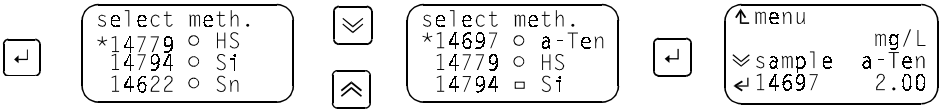
Select filter position 10.



Check display: 14697 set?

If required: set method 14697.

MPM 3000

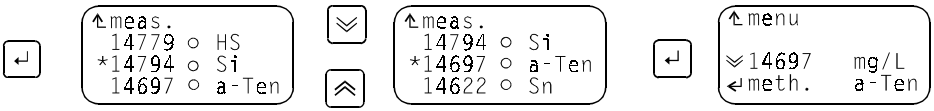


Enter selection of methods:
Press key.

Scroll until 14697 is set.

Confirm:
Press key.

MultiLab P5

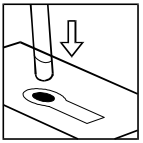


Enter selection of methods:
Press key.

Scroll until 14697 is set.

Confirm:
Press key.

Measurement



Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500 These photometers are not supported.

Model

14729 Total **Phosphate**

Total **Phosphorus (P)**

Order number	250 334
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination as molybdenum blue after acidic hydrolysis and oxidation at 100°C, better 120°C.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 0 to 10 using sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation not required.

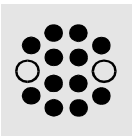
Measuring range

	Measuring range	Sample volume	Cell
Total Phosphate Phosphorus	**0.5 - 25.0 mg/l PO_4-P**	1 ml	14 mm
Total Phosphorus	**0.5 - 25.0 mg/l P_{total}**	1 ml	14 mm
Total Phosphate	**1.5 - 75.0 mg/l PO_4**	1 ml	14 mm

Analysis: Procedure

Pipette 1 ml of sample solution into a reaction cell and mix.

Add 1 dose of **P-1K** with the green measurer, close with screw cap.

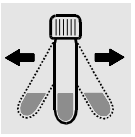


Heat cell in the thermoreaktor for 30 minutes at 120 °C (100 °C).

Remove cell from the thermoreactor, allow to cool to room temperature in the cell rack.

Add 5 drops of **P-2K,** mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.

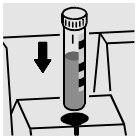


Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

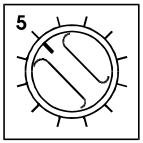
Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

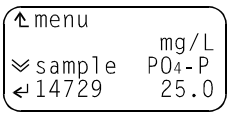


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



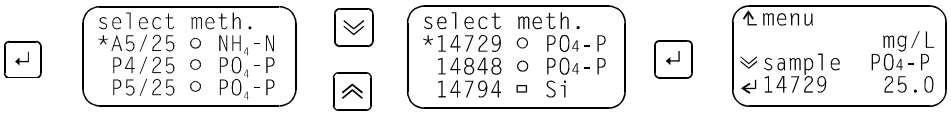
Select filter position 5.



Check display: 14729 set?

If required: Set method 14729.

MPM 2010 / MPM 3000

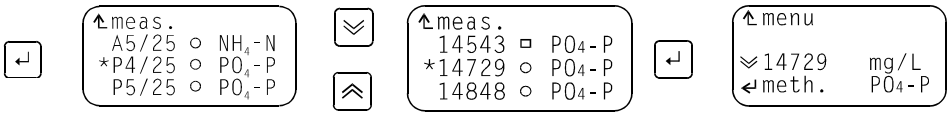


Enter selection of methods:
Press key.

Scroll until 14729 is set.

Confirm:
Press key.

MultiLab P5

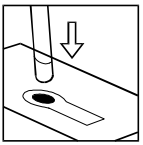


Enter selection of methods:
Press key.

Scroll until 14729 is set.

Confirm:
Press key.

Measurement



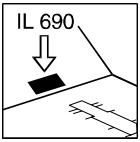
No zero adjustment required.

Insert cell.
Read measured value.

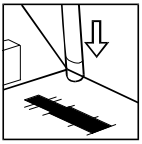
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	1.0 - 24.0 mg/l	1 ml	14 mm	008.3
P_{total}	1.0 - 24.0 mg/l	1 ml	14 mm	008.3
PO_4	3.1 - 73.6 mg/l	1 ml	14 mm	025.6

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



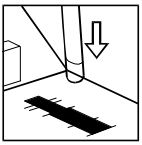
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table



Test sample: Insert cell with test sample.

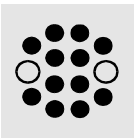
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 1 ml of sample into a reaction cell, mix.

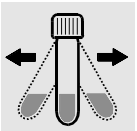
Add 1 dose of **P-1K** with the green measurer, close with screw cap.



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

Remove cell from the thermoreactor, allow to cool to room temperature in the cell rack.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.



Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

Measure: (see operating manual of the meter: „Sample blank value correction“).

Model

14729 Ortho **Phosphate (PO_4)**

Ortho **Phosphate Phosphorus (PO_4-P)**

Order number	250 334
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination as molybdenum blue.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions — Action: Adjust to pH 0 to 10 using sulphuric acid or caustic soda lye. Strongly acidic sample solutions
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.
Sample material	Preservation not required.

Measuring range

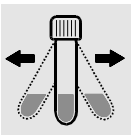
	Measuring range	Sample volume	Cell
Ortho Phosphate Phosphorus	**0.5 - 25.0 mg/l PO_4-P**	1 ml	14 mm
Ortho Phosphate	**1.5 - 75.0 mg/l PO_4**	1 ml	14 mm

Analysis: Procedure

Pipette 1 ml of sample solution into a reaction cell and mix.

Add 5 drops of **P-2K,** close with screw cap and mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.

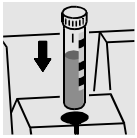


Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

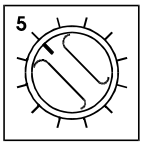
Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

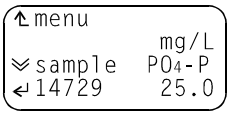


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



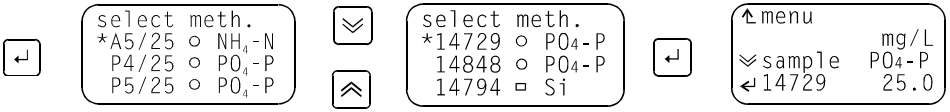
Select filter position 5.



Check display: 14729 set?

If required: Set method 14729.

MPM 2010 / MPM 3000

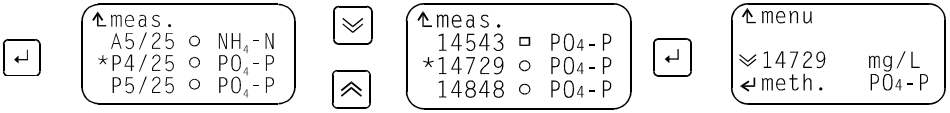


Enter selection of methods:
Press key.

Scroll until 14729 is set.

Confirm:
Press key.

MultiLab P5

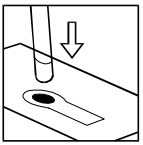


Enter selection of methods:
Press key.

Scroll until 14729 is set.

Confirm:
Press key.

Measurement



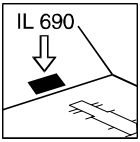
No zero adjustment required.

Insert cell.
Read measured value.

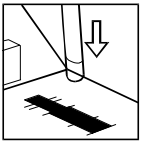
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	1.0 - 24.0 mg/l	1 ml	14 mm	008.3
PO_4	3.1 - 73.6 mg/l	1 ml	14 mm	025.6

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



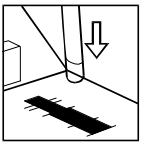
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



Test sample: Insert cell with test sample.

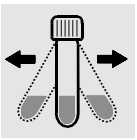
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 1 ml of sample into a reaction cell, mix.

Add 1 dose of **P-3K** with the blue measurer, close with screw cap.



Shake cell vigorously to dissolve solids.

Reaction time: 5 minutes.

Measure:
(see operating manual of the meter: „Sample blank value correction“).

Model

14731 Hydrogen Peroxide (H_2O_2)

Order number	250 402		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	In a sulphuric solution, hydrogen peroxide, hydrogen peroxide containing combinations, and a titanium alcoholate form yellow peroxo titanium acids, the concentration of which is photometrically measured.		
Application	Disinfectant solutions and rinsing solutions Drinking water Wastewater.		
Interferences	Strongly alkaline sample solutions	Action:	Adjust to pH 0 to 10 using diluted sulfuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At +5 °C to +25 °C (observe expiry date on the label).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

Measuring range

	Measuring range	Sample volume	Cell
Hydrogen Peroxide	**2.0 - 20.0 mg/l H_2O_2**	10 ml	14 mm

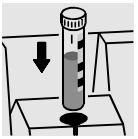
Analysis: Procedure

Pipette 10 ml of sample into a reaction cell and mix.

Reaction time: 2 minutes.

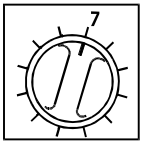
Measurement (The color of the test sample remains stable for at least 20 minutes.)

PhotoLab S12
PhotoLab Spektral

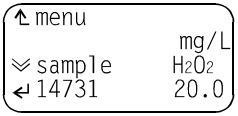


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



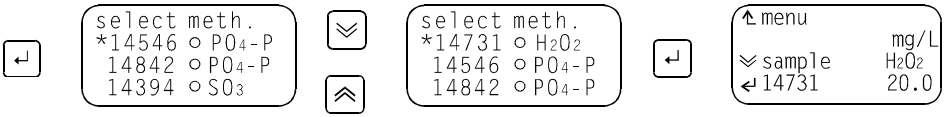
Select
filter position 7.



Check display:
14731 set?

If necessary, set method 14731.

MPM 3000

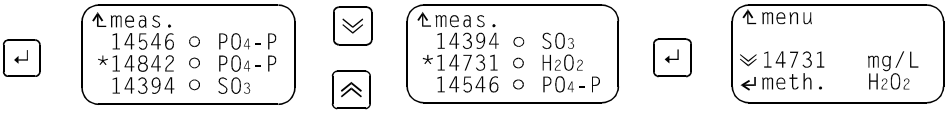


Enter selection of methods:
Press key.

Scroll until 14731 is set.

Confirm:
Press key.

MultiLab P5

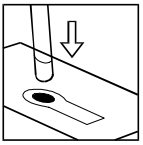


Enter selection of methods:
Press key.

Scroll until 14731 is set.

Confirm:
Press key.

Measurement



No zero adjustment required.

Insert cell.
Read measured value.

MPM 2010 **MPM 1000** **MPM 1500**	These photometers are not supported.

Model

14752 Ammonium (NH_4)

Ammonium Nitrogen (NH_4-N)

Order number	250 426
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of the ammonium nitrogen using indophenol blue (Berthelot´s reaction).
Application	Drinking water Wastewater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 4 to 13 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Preservation by adding 5 drops of 0.2 % mercury(II)-nitrate solution per liter of sample.

Measuring range

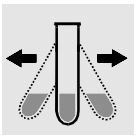
	Measuring range	Sample volume	Cell
Ammonium Nitrogen	**0.05 - 3.00 mg/l NH_4-N**	5 ml	10 mm
Ammonium	**0.06 - 3.90 mg/l NH_4**	5 ml	10 mm
Ammonium Nitrogen	**0.03 - 1.50 mg/l NH_4-N**	5 ml	20 mm
Ammonium	**0.04 - 1.90 mg/l NH_4**	5 ml	20 mm
Ammonium Nitrogen	**0.010 - 0.500 mg/l NH_4-N**	10 ml	50 mm
Ammonium	**0.010 - 0.650 mg/l NH_4**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

With a pipette add 0.6 ml of **NH_4-1B** and mix.

Add 1 blue microspoonful of **NH_4-2B**.

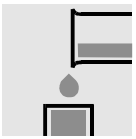


Shake vigorously to dissolve solids.

Reaction time: 5 minutes.

Add 4 drops of **NH_4-3B** and mix.

Reaction time: 5 minutes.

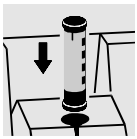


Transfer solution into the required cell.

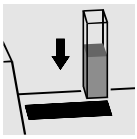
Important: For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S12
PhotoLab Spektral

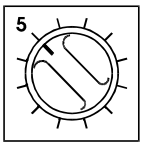


Select method with AutoSelector.

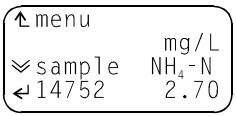


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



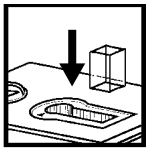
Select filter position 5.



Check display: 14752 set?

If required: Set method 14752 (see operating manual of the meter).

Measurement



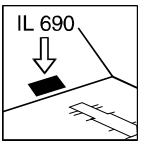
No zero adjustment required.

Insert cell.
Read measured value.

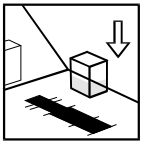
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
NH_4-N	0.10 - 2.70 mg/l	MPM 2010	5 ml	14 mm	00.93
NH_4	0.13 - 3.48 mg/l		5 ml	14 mm	01.20
NH_4-N	0.05 - 2.70 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	01.23
NH_4	0.06 - 3.50 mg/l		5 ml	10 mm	01.59
NH_4-N	0.03 - 1.35 mg/l		5 ml	20 mm	00.62
NH_4	0.04 - 1.70 mg/l		5 ml	20 mm	00.80
NH_4-N	0.010 - 0.540 mg/l		10 ml	50 mm	0.246
NH_4	0.013 - 0.700 mg/l		10 ml	50 mm	0.317

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



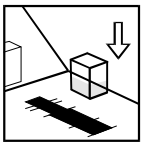
Insert cell with blank sample.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

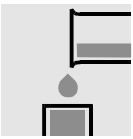
Pipette 5 ml of sample solution into an empty test tube.

With a pipette add 0.6 ml of **NH_4-1B** and mix.

Add 1 blue microspoonful of **NH_4-2B**.

Shake vigorously to dissolve solids.

Reaction time: 5 minutes at room temperature.



Transfer the solution into the required cell.

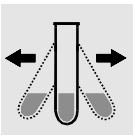
Measure (see operating manual of the meter: “Sample blank value correction“).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

With a pipette add 0.6 ml of **NH_4-1**B and mix.

Add 1 blue microspoonful of **NH_4-2B**.

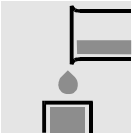


Shake vigorously to dissolve solids.

Reaction time: 5 minutes.

Add 4 drops of **NH_4-3B** and mix.

Reaction time: 5 minutes.



Transfer the solution into the required cell and measure (see above).

Model

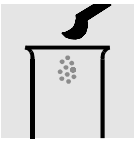
14758 Chromium (VI)

Order number	250 433		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of chromium (VI) using diphenyl carbazide.		
Application	Drinking water Wastewater Seawater.		
Interferences	Strongly alkaline sample solutions	Action:	Adjust to pH 1 to 9 using diluted sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination immediately.		

Measuring range

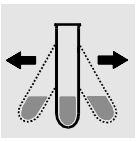
	Measuring range	Sample volume	Cell
Chromium	**0.10 - 3.00 mg/l Cr**	5 ml	10 mm
Chromium	**0.03 - 1.50 mg/l Cr**	5 ml	20 mm
Chromium	**0.010 - 0.600 mg/l Cr**	10 ml	50 mm

Analysis: Procedure



Add 1 grey micro-spoonful of **Cr-1A** into a dry test tube.

Add 6 drops of **Cr-2A**.



Shake the tube vigorously to dissolve the solids.

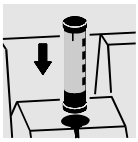
With a pipette add 5 ml of sample and mix.

Transfer the solution into the required cell.

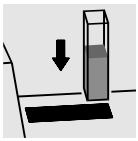
Important:	For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S12
PhotoLab Spektral

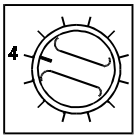


Select method with AutoSelector.

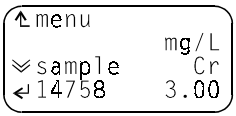


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



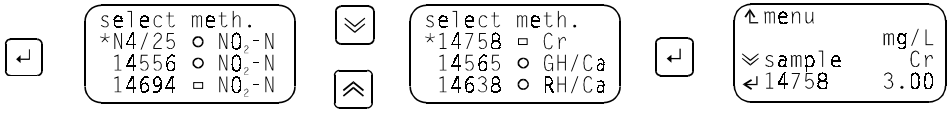
Select filter position 4.



Check display: 14758 set?

If required: Set method 14758.

MPM 2010 / MPM 3000

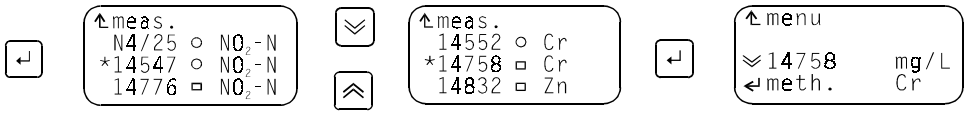


Enter selection of methods:
Press key.

Scroll until 14758 is set.

Confirm:
Press key.

MultiLab P5

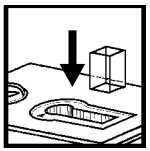


Enter selection of methods:
Press key.

Scroll until 14758 is set.

Confirm:
Press key.

Measurement



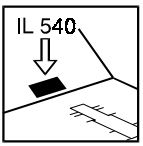
Insert cell.
Read measured value.

No zero adjustment required.

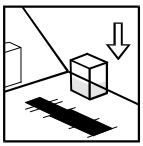
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range			Sample volume	Cell	Factor MPM 1000/1500
Cr	0.05 - 2.00 mg/l	MPM 2010		5 ml	14 mm	00.95
Cr	0.05 - 3.00 mg/l	MPM 3000, MultiLab P5		5 ml	10 mm	01.25
Cr	0.03 - 1.50 mg/l			5 ml	20 mm	00.63
Cr	0.010 - 0.600 mg/l			10 ml	50 mm	0.250

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment, lettering shows to user.

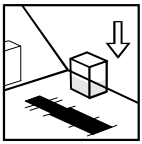


Insert cell with blank sample.

Press key:
Zero adjustment.

F

Press key:
Enter **factors** according to above table.



Test sample:
Insert cell with test sample.

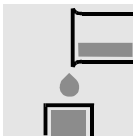
M

Press key:
Concentration in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Add 6 drops of **Cr-2A** reagent into a dry test tube.

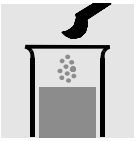
With a pipette add 5 ml of sample solution and mix.



Transfer the solution into the required cell.

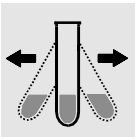
Measure
(see operating manual of the meter: „Correction of sample blank value“)

Blank sample for photometer MPM 1500/1000 (zero adjustment)



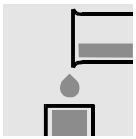
Add 1 grey micro-spoonful of **Cr-1A** into a dry test tube.

Add 6 drops of **Cr-2A**.



Shake test tube vigorously to dissolve solids.

With a pipette add 5 ml of distilled water and mix.



Transfer the solution into the required cell.

Measure
(s. o.)

Model

14761 Iron (Fe)

Iron Oxide (Fe_2O_3)

Order number	250 435
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of iron using ferrospectral in a thioglycolate buffer.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions — Action: Adjust to pH 1 to 10 using diluted hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform determination immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Iron	**0.05 - 5.00 mg/l Fe**	5 ml	10 mm
Iron	**0.03 - 2.50 mg/l Fe**	5 ml	20 mm
Iron	**0.005 - 1.000 mg/l Fe**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

Add 3 drops of **Fe-AN** and mix.

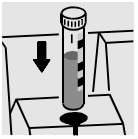
Reaction time: 3 minutes.

Transfer solution into the required cell.

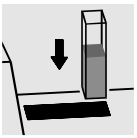
Important: For measuring in a 50 mm cell, the quantities of sample and reagent Fe-AN each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

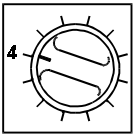


Select method with AutoSelector.

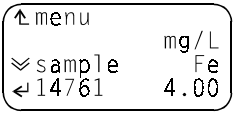


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



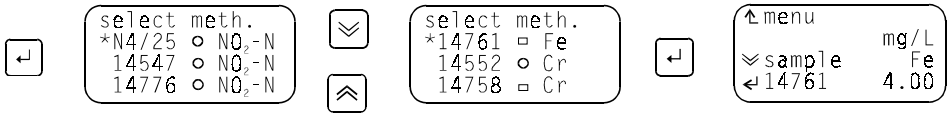
Select filter position 4.



Check display: 14761 set?

If necessary set method 14761.

MPM 2010 / MPM 3000

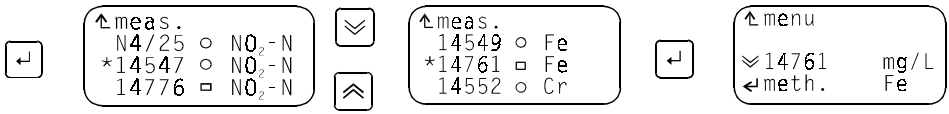


Enter selection of methods:
Press key.

Scroll until 14761 is set.

Confirm:
Press key.

MultiLab P5

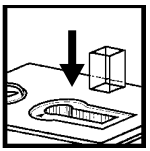


Enter selection of methods:
Press key.

Scroll until 14761 is set.

Confirm:
Press key.

Measurement



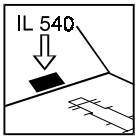
No zero adjustment required.

Insert cell.
Read measured value.

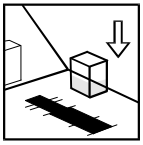
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
Fe	0.10 - 4.00 mg/l	MPM 2010	5 ml	14 mm	01.85
Fe_2O_3	0.14 - 5.72 mg/l		5 ml	14 mm	02.65
Fe	0.10 - 4.00 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	02.50
Fe_2O_3	0.14 - 5.72 mg/l		5 ml	10 mm	03.57
Fe	0.05 - 2.00 mg/l		5 ml	20 mm	01.25
Fe_2O_3	0.07 - 2.86 mg/l		5 ml	20 mm	01.79
Fe	0.020 - 0.800 mg/l		10 ml	50 mm	0.500
Fe_2O_3	0.028 - 1.144 mg/l		10 ml	50 mm	0.715

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment, lettering shows to user.



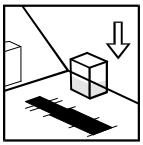
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.

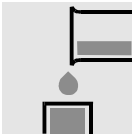


Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)



Pipette 5 ml of sample into the required cell.

Measure (see operating manual of the photometer: “Sample blank value correction“)

Blank sample for photometer MPM 1500/1000 (Zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

Add 3 drops of **Fe-AN** and mix.

Reaction time: 3 minutes.

Transfer solution into the required cell.
Measure (see above).

Model

14767 Copper (Cu)

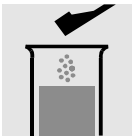
Order number	250 441		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of copper with cuprizone in alkaline medium.		
Application	Drinking water Wastewater Seawater		
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 7 to 9.5 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Preservation by adding 2 ml of nitric acid per liter of sample.		

Measuring range

	Measuring range	Sample volume	Cell
Copper	**0.10 - 6.00 mg/l Cu**	5 ml	10 mm
Copper	**0.05 - 3.00 mg/l Cu**	5 ml	20 mm
Copper	**0.02 - 1.20 mg/l Cu**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into an empty test tube.



Add one green metering spoon of **Cu-1A** and dissolve solids.

Check pH value of the sample. Specified range: pH 7.0 to 9.5.

If necessary, correct pH value by adding diluted caustic soda lye or sulphuric acid drop by drop.

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

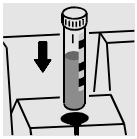
Reaction time: 5 minutes.

Transfer the solution into the required cell.

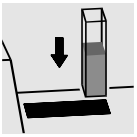
Important:	Very high concentrations of copper in the sample will lead to turquoise-colored solutions (test sample should be blue) and too low results; in this case the sample has to be diluted. For measurements in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 30 minutes.)**

PhotoLab S12
PhotoLab Spektral

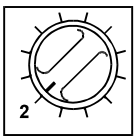


Select method with AutoSelector.

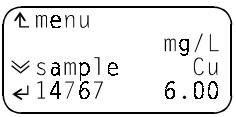


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



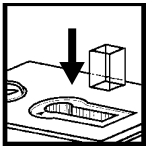
Select filter position 2.



Check display: 14767 set?

If necessary: Set method 14767 (see operating manual of the photometer).

Measurement



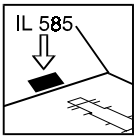
No zero adjustment required.

Insert cell.
Read measured value.

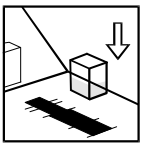
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range			Sample volume	Cell	Factor MPM 1000/1500
Cu	0.20 - 6.00 mg/l	MPM 2010		5 ml	14 mm	03.57
Cu	0.25 - 6.00 mg/l	MPM 3000, MultiLab P5		5 ml	10 mm	04.55
Cu	0.13 - 3.00 mg/l			5 ml	20 mm	02.27
Cu	0.05 - 1.20 mg/l			10 ml	50 mm	00.91

MPM 1000
MPM 1500



Insert filter IL 585 into filter compartment, lettering shows to user.



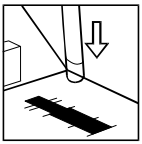
Insert cell with **blank sample**.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



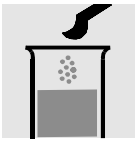
Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

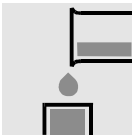
Sample blank solution (in case of colored or turbid samples only)

Pipette 5 ml of sample into an empty test tube.



Add 1 green micro-spoonful of **Cu-1A** and mix.

Reaction time: 5 minutes.



Transfer the solution into the required cell.

Measure (see instruction manual of the meter: „Correction of sample blank value“).

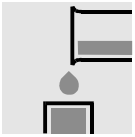
Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

Add 1 green micro-spoonful of **Cu-1A** and dissolve it.

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

Reaction time: 5 minutes.



Transfer the solution into the required cell.

Measure (see above).

Model

14770 Manganese (Mn)

Order number	250 442
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of manganese using formaldioxime.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 3 to 10 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform determination as soon as possible. Preservation by adding 2 ml of 25 % sulphuric acid per liter of sample; it must be neutralized by adding 2 drops of 2 N caustic soda lye per 10 ml of sample before the analysis.

Measuring range

	Measuring range	Sample volume	Cell
Manganese	**0.5 - 10.0 mg/l Mn**	5 ml	10 mm
Manganese	**0.25 - 5.00 mg/l Mn**	5 ml	20 mm
Manganese	**0.01 - 2.00 mg/l Mn**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

Add 4 drops of **Mn-1A** and mix.

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

Reaction time: 2 minutes.

Add 2 drops of **Mn-3A** and mix.

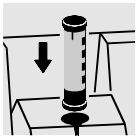
Reaction time: 2 minutes.

Transfer the solution into the required cell.

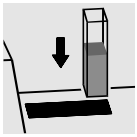
Important:	For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S12
PhotoLab Spektral

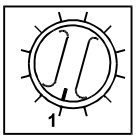


Select method with AutoSelector.

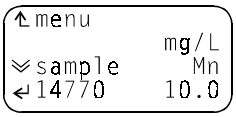


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



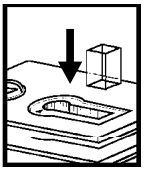
Select filter position 1.



Check display: 14770 set?

If required: Set method 14770 (see instruction manual of the photometer).

Measurement



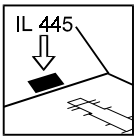
No zero adjustment required.

Insert cell.
Read measured value.

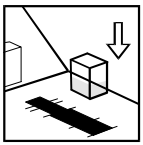
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range			Sample volume	Cell	Factor MPM 1000/1500
Mn	0.5 - 10.0 mg/l	MPM 2010		5 ml	14 mm	004.3
Mn	0.05 - 10.00 mg/l	MPM 3000, MultiLab P5		5 ml	10 mm	05.62
Mn	0.03 - 5.00 mg/l			5 ml	20 mm	02.80
Mn	0.01 - 2.00 mg/l			10 ml	50 mm	01.12

MPM 1000
MPM 1500



Insert filter IL 445 into filter compartment, lettering shows to user.



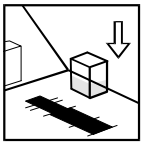
Insert cell with **blank sample**.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

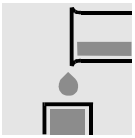
Pipette 5 ml of sample into an empty test tube.

Add 4 drops of **Mn-1A** and mix.

Reaction time: 2 minutes.

Add 2 drops of **Mn-3A** and mix.

Reaction time: 2 minutes.



Transfer the solution into the required cell.

Measure (see operating mnual of the meter: „Correction of sample blank value“).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

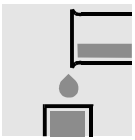
Add 4 drops of **Mn-1A** and mix.

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

Reaction time: 2 minutes.

Add 3 drops of **Mn-3A** and mix.

Reaction time: 2 minutes.



Transfer the solution into the required cell.

Measure (see above).

Model

14773 Nitrate (NO_3)

Nitrate-Nitrogen (NO_3-N)

Order number	250 444		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of nitrate with nitrospectral in concentrated sulfuric acid.		
Application	Drinking water Wastewater		
Interferences	Nitrite > 2 mg/l.	Action:	10 ml of sample + approx. 0.5 g amido-sulfuric acid, wait for 10 minutes
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Preservation	by cooling to 4 °C: by acidulating to pH 2:	24 hours stable. 2 weeks stable.

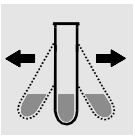
Measuring range

	Measuring range	Sample volume	Cell
Nitrate-Nitrogen	**0.5 - 20.0 mg/l NO_3-N**	1.5 ml	10 mm
Nitrate	**2.0 - 90.0 mg/l NO_3**	1.5 ml	10 mm
Nitrate-Nitrogen	**0.3 - 10.0 mg/l NO_3-N**	1.5 ml	20 mm
Nitrate	**1.0 - 45.0 mg/l NO_3**	1.5 ml	20 mm

Analysis: Procedure

Add 1 blue microspoonful of **NO_3-1A** into an empty, dry round cell (RK 14/25, WTW order no. 250 621).

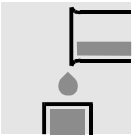
With a pipette add 5 ml of **NO_3-2A**.



Shake vigorously for 1 minute to dissolve solids.

With a pipette add 1.5 ml of sample and mix. **Caution, cell gets very hot!**

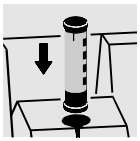
Reaction time: 10 minutes.



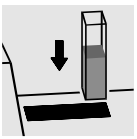
Pour solution into the required cell.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

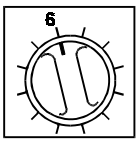


Select method with AutoSelector.

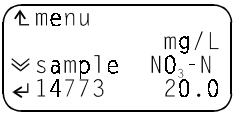


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



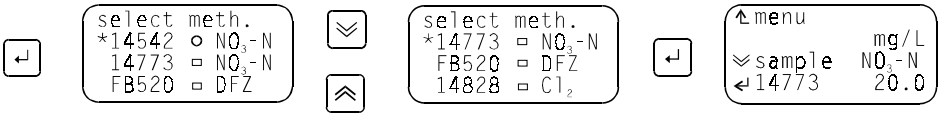
Select filter position 6.



Check display: 14773 set?

If required: Set method 14773.

MPM 2010 / MPM 3000

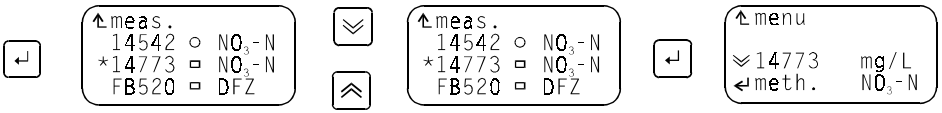


Enter selection of methods: Press key.

Scroll until 14773 is set.

Confirm: Press key.

MultiLab P5

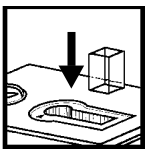


Enter selection of methods: Press key.

Scroll until 14773 is set.

Confirm: Press key.

Measurement



No zero adjustment required.

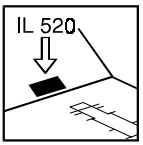
Insert cell.
Read measured value.

Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

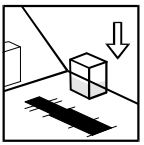
	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
NO_3-N	1.0 - 20.0 mg/l	MPM 2010	1.5 ml	14 mm	007.4
NO_3	4.4 - 88.5 mg/l		1.5 ml	14 mm	033.0
NO_3-N	1.0 - 20.0 mg/l	MPM 3000, MultiLab P5	1.5 ml	10 mm	009.4
NO_3	4.4 - 88.5 mg/l		1.5 ml	10 mm	041.8
NO_3-N	0.5 - 10.0 mg/l		1.5 ml	20 mm	004.7
NO_3	2.2 - 44.3 mg/l		1.5 ml	20 mm	020.9
NO_3-N	0.20 - 4.00 mg/l		3.0 ml	50 mm	01.88
NO_3	0.90 - 17.70 mg/l		3.0 ml	50 mm	08.40

Important: For measurements in 50 mm cells, sample volume and the quantities of the reagents NO_3-1A and NO_3-2A must be doubled.

MPM 1000
MPM 1500



Insert filter IL 520 into filter compartment, lettering shows to user.

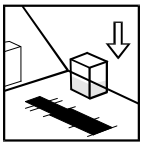


Insert cell with blank sample.

Press key: **Zero adjustment.**

F

Press key:
Enter **factors** according to above table.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Add 5 ml of **NO_3-2A** into an empty, dry round cell.

With a pipette add 1.5 ml of sample and mix **immediately**. **Caution, cell gets very hot!**

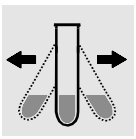
Reaction time:
10 minutes.

Measurement:
(see instruction manual of the meter: "Correction of sample blank value").

Blank value for photometer MPM 1500/1000 (zero adjustment)

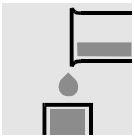
Add 1 blue microspoonful of **NO_3-1A** into an empty, dry round cell.

With a pipette add 5 ml of **NO_3-2A**.



Shake vigorously for 1 minute to dissolve solids **completely**.

With a pipette add 1.5 ml of distilled water and mix **immediately**. **Caution, cell gets very hot!**



If necessary pour solution into the required cell.

Reaction time:
10 minutes.

Measurement
(see above).

Model

14776 Nitrite (NO_2)

Nitrite Nitrogen (NO_2-N)

Order number	250 445
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of nitrite using sulphanilic acid and 1-naphthylamine.
Application	Drinking water Wastewater Seawater
Interference	Strongly acidic sample solutions Strongly alkaline sample solutions Action: Adjust to pH 2 to 10 using caustic soda lye or diluted hydrochloric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform determination immediately after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Nitrite Nitrogen	**0.02 - 1.00 mg/l NO_2-N**	5 ml	10 mm
Nitrite	**0.10 - 3.00 mg/l NO_2**	5 ml	10 mm
Nitrite Nitrogen	**0.010 - 0.500 mg/l NO_2-N**	5 ml	20 mm
Nitrite	**0.03 - 1.60 mg/l NO_2**	5 ml	20 mm
Nitrite Nitrogen	**0.005 - 0.200 mg/l NO_2-N**	10 ml	50 mm
Nitrite	**0.015 - 0.650 mg/l NO_2**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

Add 1 blue microspoonful of **NO_2-AN**.

Shake vigorously to dissolve solids.

Check pH value of the sample. Specified range: pH 2.0 to 2.5.

If required, correct pH value by adding diluted caustic soda lye or sulphuric acid drop by drop.

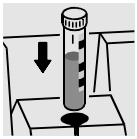
Reaction time: 10 Minuten.

Transfer solution into the required cell.

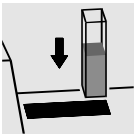
Important: For measuring in the 50 mm cell, the quantities of sample and reagent NO_2-AN each have to be doubled.

Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S12
PhotoLab Spektral

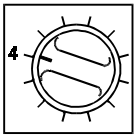


Select method with AutoSelector.

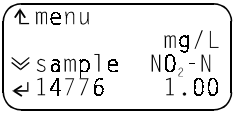


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



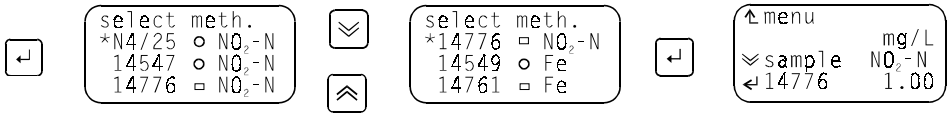
Select filter position 4.



Check display: 14776 set?

If required: Set method 14776.

MPM 2010 / MPM 3000

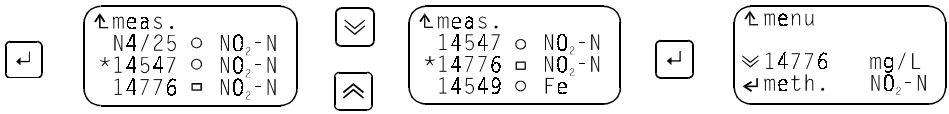


Enter selection of methods: Press key.

Scroll until 14776 is set.

Confirm: Press key.

MultiLab P5

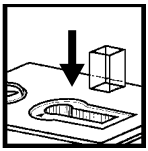


Enter selection of methods: Press key.

Scroll until 14776 is set.

Confirm: Press key.

Measurement



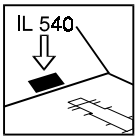
Insert cell. Read measured value.

No zero adjustment required.

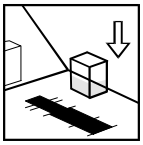
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
NO_2-N	0.020 - 0.600 mg/l	MPM 2010	5 ml	14 mm	0.299
NO_2	0.046 - 2.000 mg/l		5 ml	14 mm	0.979
NO_2-N	0.05 - 1.00 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	04.00
NO_2	0.16 - 3.28 mg/l		5 ml	10 mm	01.31
NO_2-N	0.025 - 0.500 mg/l		5 ml	20 mm	0.200
NO_2	0.08 - 1.64 mg/l		5 ml	20 mm	00.66
NO_2-N	0.010 - 0.200 mg/l		10 ml	50 mm	0.080
NO_2	0.033 - 0.657 mg/l		10 ml	50 mm	0.262

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment, letterig shows to user.



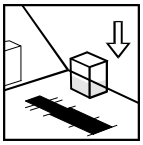
Insert cell with blank sample.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.

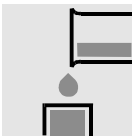


Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

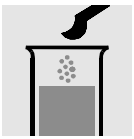


Fill 5 ml of sample into an empty cell.

Measure (see operating manual of the meter: “Sample blank value correction“).

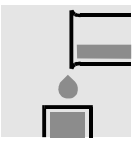
Blank sample for photometer MPM 1500/1000 (Zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.



Add 1 blue microspoonful of **NO_2-AN** and dissolve.

Reaction time: 10 minutes.



Transfer solution into the required cell and measure (see above).

Model

14779 Sulfide

Hydrogen sulfide (HS)

Order number	250 450		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of sulfide with N.N-Dimethyl-1.4-phenylene diammonium chloride (DPD) and oxidation with iron(III) to methylene blue (Caro Fischer reaction).		
Application	Drinking water Wastewater		
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 3 to 10 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination as soon as possible.		

Measuring range

	Measuring range	Sample volume	Cell
Sulfide	**0.10 - 1. 50 mg/l S**	5 ml	10 mm
Sulfide	**0.050 - 0.750 mg/l S**	5 ml	20 mm
Sulfide	**0.020 - 0.300 mg/l S**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

Add 1 drop of **HS-1A** and mix.

Add 5 drops of **HS-2A** and mix.

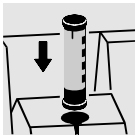
Add 5 drops of **HS-3A** and mix.

Transfer the solution into the required cell.

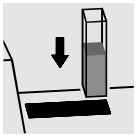
Important:
For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S12
PhotoLab Spektral

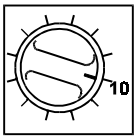


Select method with AutoSelector.

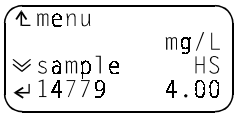


Insert cell in the cell shaft.
Read measured value.

MPM 3000
MultiLab P5



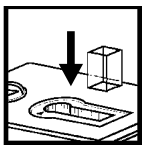
Select filter position 10.



Check display: 14779 set?

If necessary: Set method 14779 (see operating manual of the photometer).

Measurement



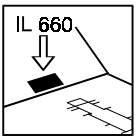
Insert cell.
Read measure value.

No zero adjustment required.

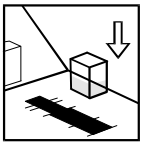
Measuring ranges for MPM 3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
HS	0.02 - 4.00 mg/l	5 ml	10 mm	01.00
HS	0.02 - 1.65 mg/l	5 ml	20 mm	01.00
HS	0.020 - 0.608 mg/l	10 ml	50 mm	1.000

MPM 1000
MPM 1500



Insert filter IL 660 into filter compartment, lettering shows to user.



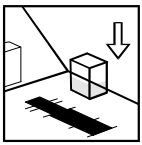
Insert cell with **blank sample** (distilled water + reagents).

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



Test sample: Insert cell with test sample.

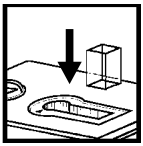
M

Press key: **Absorbance value** is displayed. Take the concentration value from the table below.

Sample blank solution (in case of colored or turbid samples only)

The correction of the sample blank value has to be made manually, even with MPM 3000 and MultiLab P5!

Pipette 5 ml of sample into an empty test tube.



(sample display)

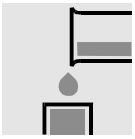
Measure **absorbance** of **sample blank value** (see operating manual of the photometer).

Pipette 5 ml of sample into an empty test tube.

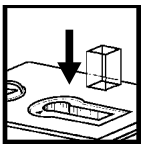
Add 1 drop of **HS-1A** and mix.

Add 5 drops of **HS-2A** and mix.

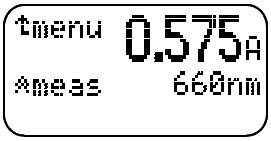
Add 5 drops of **HS-3A** and mix.



Transfer the solution into the required cell.

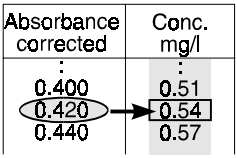


Measure the **absorbance** of the **sample** (see operating manual of the meter).



(sample display)

Absorbance of ***sample***	-	Absorbance of ***sample blank value***	=	Absorbance **corrected**	Result: *corrected absorbance* of the sample.
08.575	-	08.155	=	0.420	(example)



- Look for the *corrected absorbance value* in the table below (if necessary interpolate intermediate values).
- The relevant concentration value, e. g. 0.54 mg/l, corresponds to the **sample concentration corrected** by the sample blank value.

Table for **MPM 3000, MultiLab P5:** **Correction of sample blank value**
MPM 1500/1000: **Reading the hydrogen sulfide concentration**
(valid for 10 mm cell and 5 ml sample volume)

Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**	Absorb. corrected	**Conc. mg/l**
0.020	**0.02**	0.500	**0.65**	0.980	**1.35**	1.460	**2.14**	1.940	**3.07**
0.040	**0.05**	0.520	**0.68**	1.000	**1.38**	1.480	**2.18**	1.960	**3.11**
0.060	**0.07**	0.540	**0.70**	1.020	**1.41**	1.500	**2.21**	1.980	**3.16**
0.080	**0.10**	0.560	**0.73**	1.040	**1.44**	1.520	**2.25**	2.000	**3.20**
0.100	**0.12**	0.580	**0.76**	1.060	**1.47**	1.540	**2.29**	2.020	**3.24**
0.120	**0.15**	0.600	**0.79**	1.080	**1.50**	1.560	**2.32**	2.040	**3.29**
0.140	**0.17**	0.620	**0.82**	1.100	**1.53**	1.580	**2.36**	2.060	**3.33**
0.160	**0.20**	0.640	**0.84**	1.120	**1.57**	1.600	**2.40**	2.080	**3.38**
0.180	**0.22**	0.660	**0.87**	1.140	**1.60**	1.620	**2.43**	2.100	**3.42**
0.200	**0.25**	0.680	**0.90**	1.160	**1.63**	1.640	**2.47**	2.120	**3.47**
0.220	**0.28**	0.700	**0.93**	1.180	**1.66**	1.660	**2.51**	2.140	**3.51**
0.240	**0.30**	0.720	**0.96**	1.200	**1.70**	1.680	**2.55**	2.160	**3.56**
0.260	**0.33**	0.740	**0.99**	1.220	**1.73**	1.700	**2.59**	2.180	**3.60**
0.280	**0.35**	0.760	**1.02**	1.240	**1.76**	1.720	**2.63**	2.200	**3.65**
0.300	**0.38**	0.780	**1.05**	1.260	**1.80**	1.740	**2.66**	2.220	**3.70**
0.320	**0.41**	0.800	**1.08**	1.280	**1.83**	1.760	**2.70**	2.240	**3.74**
0.340	**0.43**	0.820	**1.11**	1.300	**1.86**	1.780	**2.74**	2.260	**3.79**
0.360	**0.46**	0.840	**1.13**	1.320	**1.90**	1.800	**2.78**	2.280	**3.84**
0.380	**0.49**	0.860	**1.16**	1.340	**1.93**	1.820	**2.82**	2.300	**3.89**
0.400	**0.51**	0.880	**1.19**	1.360	**1.97**	1.840	**2.86**	2.320	**3.94**
0.420	**0.54**	0.900	**1.22**	1.380	**2.00**	1.860	**2.90**	2.340	**3.99**
0.440	**0.57**	0.920	**1.26**	1.400	**2.04**	1.880	**2.95**		
0.460	**0.60**	0.940	**1.29**	1.420	**2.07**	1.900	**2.99**		
0.480	**0.62**	0.960	**1.32**	1.440	**2.11**	1.920	**3.03**		

Calculating the concentration when using cells different from the standard 10 mm cell:
When using 20 mm cells divide the corrected absorbance by 2, when using 50 mm cells divide by 5. Then take the concentration value from the table.

Model

14785 Nickel (Ni)

Order number	250 443
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of nickel using dimethyl glyoxime in alkaline medium.
Application	Drinking water Wastewater.
Interferences	Strongly alkaline sample solutions — Action: Adjust to pH 3 to 8 using diluted sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Probenmaterial	Perform determination as soon as possible. Preservation by adding 2 ml of 25 % sulphuric acid per liter of sample; it must be neutralized with 2 drops of 2 N caustic soda lye per 10 ml of sample before the analysis.

Measuring range

	Measuring range	Sample volume	Cell
Nickel	**0.10 - 5.00 mg/l Ni**	5 ml	10 mm
Nickel	**0.05 - 2.50 mg/l Ni**	5 ml	20 mm
Nickel	**0.02 - 1.00 mg/l Ni**	10 ml	50 mm

Analysis: Procedure

Pipette 5.0 ml of sample into a test tube.

Add 1 drop of **Ni-1A** and mix. If the color disappears continue adding drop by drop until a brown coloration persists.

Reaction time: 1 minute.

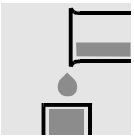
Add 2 drops of **Ni-2A** and mix.

Check pH value. Specified range: pH 10 to 12.

If necessary adjust pH value using diluted caustic soda lye or sulphuric acid.

Add 2 drops of **Ni-3A** and mix.

Reaction time: 2 minutes.

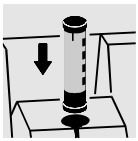


Transfer the solution into the required cell.

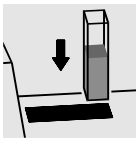
Important:	For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 15 minutes.)**

PhotoLab S12
PhotoLab Spektral

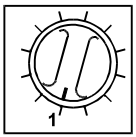


Select method with AutoSelector.

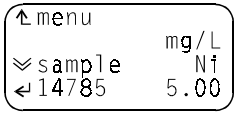


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



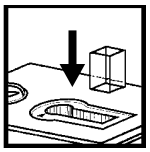
Select
filter position 1.



Check display:
14785 set?

If required: Set method 14785 (see operating manual of the photometer).

Measurement



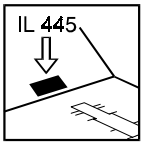
Insert cell.
Read measured value.

No zero adjustment required.

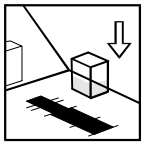
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
Ni	0.20 - 5.00 mg/l	MPM 2010	5 ml	14 mm	03.85
Ni	0.10 - 5.00 mg/l	MPM 3000,	5 ml	20 mm	02.41
Ni	0.04 - 2.00 mg/l	MultiLab P5	10 ml	50 mm	00.96

MPM 1000
MPM 1500



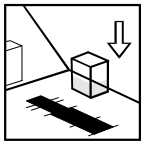
Insert
filter IL 445 into
filter compartment,
lettering shows
to user.



Insert cell with
blank sample.

Press key:
Zero adjustment.

Press key:
Enter **factor**
according to
above table**.**



Test sample:
Insert cell
with test sample.

Press key:
Concentration in
mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 5.0 ml of sample into an empty test tube.

Add 1 drop of **Ni-1A** and mix. If the color disappears continue adding drop by drop until a brown coloration persists.

Reaction time: 1 minute.

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

Check pH value. Specified range: pH 10 to 12.

If necessary adjust pH value using diluted caustic soda lye or sulphuric acid.

Transfer the solution into the required cell.

Measure (see operating manual of the meter: “Correction of sample blank value“).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5.0 ml of distilled water into an empty test tube.

Add 1 drop of **Ni-1A** and mix. If the color disappears continue adding drop by drop until a brown coloration persists.

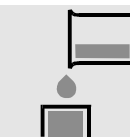
Reaction time: 1 minute.

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

Check pH value. Specified range: pH 10 to 12.

If necessary adjust pH value using diluted caustic soda lye or sulphuric acid.

Add 2 drops of **Ni-3A** and mix.



Transfer the solution into the required cell and, **after 2 minutes,** measure (see above).

Model

14791 Sulfate (SO_4)

Order number	250 449
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of sulfate with barium iodate and tannin in a slightly acidic, aqueous-organic medium.
Application	Drinking water Wastewater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 2 to 10 using diluted hydrochloric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform determination after sampling.

Measuring range

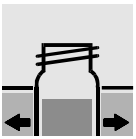
	Measuring range	Sample volume	Cell
Sulfate	**25 - 300 mg/l SO_4**	2.5 ml	10 mm

Analysis: Procedure

Pipette 2.5 ml of sample into an empty round cell (RK 14/25, WTW order no. 250 621).

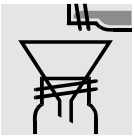
Add 2 drops of **SO_4-1A** and mix.

Add 1 green micro-spoonful of **SO_4-2A** and dissolve solids.



Temper the cell in a water bath for **5 minutes at 40°C**.

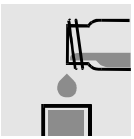
With a pipette add 2.5 ml of **SO_4-3A** and mix.



Filter the contents of the cell using a round filter.

Add 4 drops of **SO_4-4A** to the filtrate and mix.

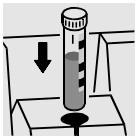
Temper the cell again in the water bath **for 7 minutes at 40°C**.



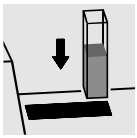
Transfer the solution into the required cell.

Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S12
PhotoLab Spektral

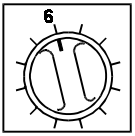


Select method with AutoSelector.

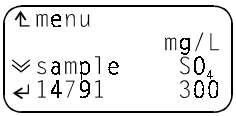


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



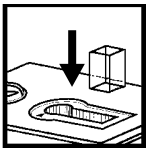
Select
filter position 6.



Check display:
14791 set?

If necessary: Set method 14791 (see operating manual of the photometer).

Measurement



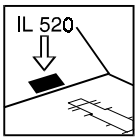
No zero adjustment required.

Insert cell.
Read measured value.

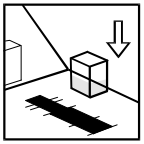
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range				Sample volume	Cell	Factor MPM 1000/1500
SO_4	25	- 300	mg/l	MPM 2010	2.5 ml	14 mm	0179
SO_4	25	- 300	mg/l	MPM 3000, MultiLab P5	2.5 ml	20 mm	0122

MPM 1000
MPM 1500



Insert
filter IL 520 into
filter compartment,
lettering shows
to user.



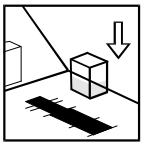
Insert cell with
blank sample.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor**
according to
above table.



Test sample:
Insert cell with
test sample.

M

Press key:
Concentration in
mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 2.5 ml of sample into an empty round cell.

Add 2 drops of **SO_4-1A** and mix.

Add 1 green micro-spoonful of **SO_4-2A** and dissolve solids.

Temper the cell in a water bath at 40°C for 5 minutes.

With a pipette add 2.5 ml of **SO_4-3A** and mix.

Filter the contents of the cell with a round filter.

Temper the cell again in a water bath for 7 at 40°C.

Transfer the solution into the required cell, measure (see operating manual of the meter).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

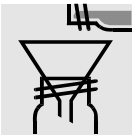
Pipette 2.5 ml of distilled water into an empty round cell.

Add 2 drops of **SO_4-1A** and mix.

Add 1 green micro-spoonful of **SO_4-2A** and mix.

Temper the cell in a water bath for 5 minutes at 40°C.

With a pipette add 2.5 ml of **SO_4-3A** and mix.



Filter the test solution using a round filter.

Add 4 drops of **SO_4-4A** and mix.

Temper the cell again **for 7 minutes** in a water bath **at 40°C**.

Transfer the solution into the required cell, measure (see above).

Model

14794 Silicium (Si)

Silicic acid (SiO_2)

Order number	250 438
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of silicium as ß-silicomolybdic acid.
Application	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 2 to 10 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Preservation by adding 1 ml concentrated sulphuric acid per liter of sample. Store in **plastic bottles!**

Measuring range

	Measuring range	Sample volume	Cell
Silicium	**0.10 - 5.00 mg/l Si**	5 ml	10 mm
Silicium	**0.05 - 2.50 mg/l Si**	5 ml	20 mm
Silicium	**0.005 - 0.950 mg/l Si**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml of sample into an empty test tube.

Add 3 drops of **Si-1A** and mix.

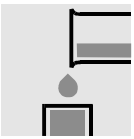
Check pH value, specified range: pH 1.2 to 1.6.

Reaction time: 3 minutes.

Add 3 drops of **Si-2A** and mix.

Add 10 drops of **Si-3A** and mix.

Reaction time: 5 minutes.

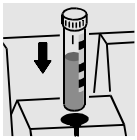


Transfer the solution into the required cell.

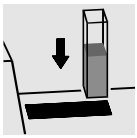
Important:	For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes.)**

PhotoLab S12
PhotoLab Spektral

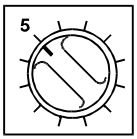


Select method with AutoSelector.

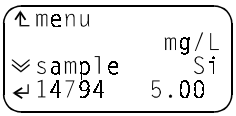


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



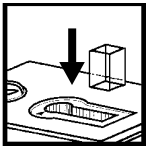
Select filter position.
MPM 3000, MultiLab P5:
5 (690 nm)
10 (660 nm)
11 (820 nm)
MPM 2010:
5 (690nm)



Check display:
14794 set?

If necessary: Set method 14794 (see operating manual of the photometer).

Measurement



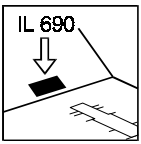
No zero adjustment required.

Insert cell.
Read measured value.

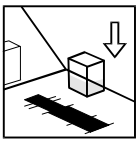
Measuring ranges and filter positions for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range	Filter position		Sample volume	Cell	Factor MPM 1000/1500
Si	0.10 - 5.00 mg/l	5	MPM 2010 MPM 3000, MultiLab P5	5 ml	14 mm	02.60
SiO_2	0.20 - 10.60 mg/l	5		5 ml	14 mm	05.56
Si	0.50 - 5.00 mg/l	10	MPM 3000, MultiLab P5	5 ml	10 mm	not supported
SiO_2	1.1 - 10.7 mg/l	10		5 ml	10 mm	
Si	0.25 - 2.50 mg/l	10		5 ml	20 mm	
SiO_2	0.54 - 5.35 mg/l	10		5 ml	20 mm	
Si	0.010 - 0.800 mg/l	11	MPM 3000, MultiLab P5	10 ml	50 mm	0.255
SiO_2	0.020 - 1.710 mg/l	11		10 ml	50 mm	0.545

MPM 1000
MPM 1500



Insert filter IL 690
(for measuring in the 50 mm cell: filter IL 800) into filter compartment, lettering shows to user.



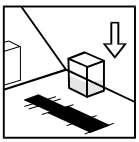
Insert cell with **blank sample**.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** according to above table.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

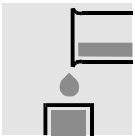
Sample blank solution (in case of colored or turbid samples only)

Pipette 5 ml of sample into an empty test tube.

Add 3 drops of **Si-2A** and mix.

Add 10 drops of **Si-3A** and mix.

Reaction time**:**
5 minutes at room temperature.



Transfer the solution into the required cell.

Measure
(see operating manual of the meter: “Correction of sample blank value“)

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

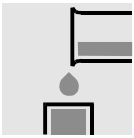
Add 3 drops of **Si-1A** and mix.

Reaction time:
3 minutes.

Add 3 drops of **Si-2A** and mix.

Add 10 drops of **Si-3A** and mix.

Reaction time:
5 minutes.



Transfer the solution into the required cell.

Measure (s. o.)

Model

14815 Calcium (Ca)

Order number	250 428		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of calcium using calcospectral.		
Application	Drinking water Wastewater Seawater		
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 4 to 10 using diluted hydrochloric acid or caustic soda lye.
	Reaction vessels/cells contaminated with tap water will cause overresults	Action:	Pretreat vessels with diluted hydrochloric acid, rinse thoroughly with distilled water.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination as soon as possible.		

Measuring range

	Measuring range	Sample volume	Cell
Calcium	**10 - 160 mg/l Ca**	0.1 ml	10 mm
Calcium	**5 - 80 mg/l Ca**	0.1 ml	20 mm
Calcium sensitive *	**1.0 - 15.0 mg/l Ca**	1 ml	10 mm

* (PhotoLab S12 or PhotoLab Spektral only – see also operating manual of the photometer, section “Analysis specifications“)

Analysis: Procedure

Pipette 0.1 ml
of sample into
a test tube.

With a pipette
add 5 ml of **Ca-1A**
and mix.

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

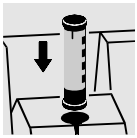
Add 4 drops
of **Ca-3A**
and mix.

Reaction time:
8 minutes.
(Must be observed
exactly.)

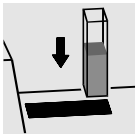
Transfer solution
into the required cell.

Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S12
PhotoLab Spektral

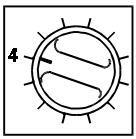


Select method
with AutoSelector.

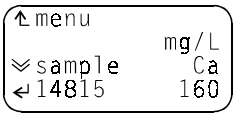


Insert cell in the
cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



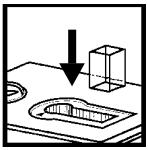
Select
filter position 4.



Check display:
14815 set?

If necessary: Set method 14815 (see instruction manual of the photometer).

Measurement



No zero adjustment required.

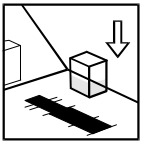
Insert cell.
Read measured value.

Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
Ca	5 - 160 mg/l	MPM 2010	0.1 ml	14 mm	0105
CaO	7 - 224 mg/l		0.1 ml	14 mm	0147
Ca	5 - 160 mg/l	MPM 3000, MultiLab P5	0.1 ml	20 mm	0068
CaO	7 - 224 mg/l		0.1 ml	20 mm	0095

MPM 1000
MPM 1500

Insert filter IL 540 into filter compartment, lettering shows to user.



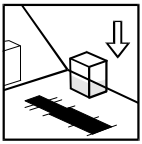
Insert cell with blank sample.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factors** according to above table.



Test sample:
Insert cell with test sample.

M

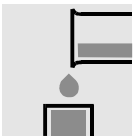
Press key:
Concentration in mg/l is displayed.

Pipette **exactly 0.1 ml** of sample into an empty test tube.

With a pipette add 5 ml of **Ca-1A** and mix.

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

Reaction time 8 minutes.



Transfer solution into the required cell.

Measure (see operating manual of the photometer).

Blank sample for photometer MPM 1500/1000 (Zero adjustment)

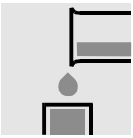
Pipette **exactly 0.1 ml** of distilled water into an empty test tube.

Add 5 ml of **Ca-1A** and mix.

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

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

Reaction time: 8 minutes.



Transfer solution into the required cell.

Measure (see above).

Model

14821 Gold (Au)

Order number	250 436		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of gold using rhodamine b.		
Application	Wastewater Seawater.		
Interferences	Strongly alkaline samples	Action:	Adjust to pH 3 to 9 using hydrochloric acid.
	Free halogens (chlorine, bromine, iodine) cause the color reagent to bleach.	Action:	Add hydrochloric acid to the sample, then evaporate the solution to a few ml, dissolve with distilled water and a bit of 37% hydrochloric acid p. a.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination immediately after sampling.		

Measuring range

	Measuring range	Sample volume	Cell
Gold	**0.5 - 12.0 mg/l Au**	2 ml	10 mm

Analysis: Procedure

Pipette 2 ml of sample into an empty reaction cell (order no. 250621).

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

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

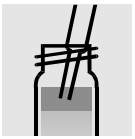
Add 6 drops of **Au-3A** and mix.

With a pipette add 6 ml of **Au-4A** and close with screw cap.

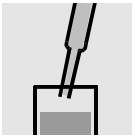
Shake vigorously for 1 minute.

Add 6 drops of **Au-5A** and close with screw cap.

Shake vigorously for 1 minute.



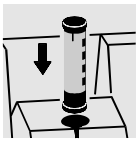
Suck off the clear upper layer using a pasteur pipette.



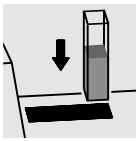
Transfer the layer sucked off into the required cell.

Measurement (The color of the test sample remains stable for at least 45 minutes.)

PhotoLab S12
PhotoLab Spektral

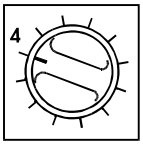


Select method with AutoSelector.

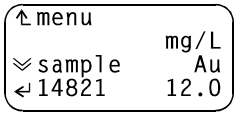


Insert cell in the cell shaft. Read measured value.

MPM 3000
MultiLab P5



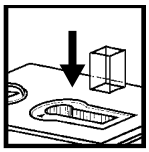
Select
filter position 4.



Check display:
14821 set?

If necessary: Set method 14821 (see operating manual of the photometer).

Measurement



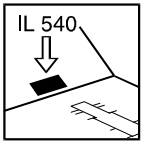
Insert cell.
Read measured value.

No zero adjustment required.

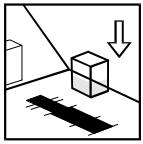
Measuring ranges for MPM 3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range MPM 3000 / MultiLab P5	Sample volume	Cell	Factor MPM 1000/1500
Au	0.5 - 12.0 mg/l	2 ml	10 mm	009.5
Au	0.25 - 6.00 mg/l	2 ml	20 mm	04.75

MPM 1000
MPM 1500



Insert
filter IL 540 into
filter compartment,
lettering shows
to user.



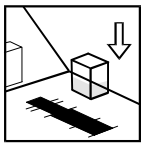
Insert cell
with blank sample.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** according
to above table.



Test sample:
Insert cell
with test sample.

M

Press key:
Concentration
in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 2 ml of sample into an empty round cell (RK 14/25, order no. 250621).

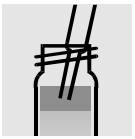
Add 2 drops of **Au-1A** and mix.

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

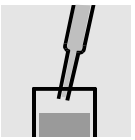
Add 6 drops of **Au-3A** and mix.

With a pipette add 6 ml of **Au-4A,** close with screw cap.

Shake vigorously for 1 minute



Suck off the clear upper layer using a pasteur pipette.



Transfer the layer sucked off into the required cell.

Measure (see operating manual of the photometer).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 2 ml of distilled water into an empty round cell (RK 14/25, order no. 250621).

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

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

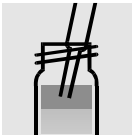
Add 6 drops of **Au-3A** and mix.

With a pipette add 6 ml of **Au-4A**, close with screw cap.

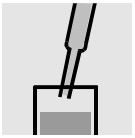
Shake vigorously for 1 minute.

Add 6 drops of **Au-5A**, close with screw cap.

Shake vigorously for 1 minute.



Suck off the clear upper layer using a pasteur pipette.



Transfer the layer sucked off into the required cell.

Measure (see above).

Model

14825 Aluminium (Al)

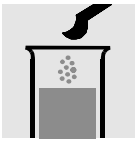
Order number	250 425
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of aluminium using chromazurole S in acetate-buffered solution.
Application	Drinking water Wastewater Seawater.
Interferences	Strongly alkaline sample solutions — Action: Adjust to pH 3 to 10 using diluted sulphuric acid or caustic soda lye. Strongly acidic sample solutions
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Preservation not required.

Measuring range

	Measuring range	Sample volume	Cell
Aluminium	**0.10 - 1.50 mg/l Al**	5 ml	10 mm
Aluminium	**0.05 - 0.75 mg/l Al**	5 ml	20 mm
Aluminium	**0.020 - 0.300 mg/l Al**	10 ml	50 mm

Analysis: Procedure

Pipette 5.0 ml
of sample
into a test tube.

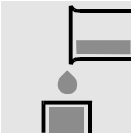


Add 1 blue micro-
spoonful of **Al-1A**
and dissolve solids.

With a pipette add
1.2 ml **Al-2A**
and mix.

Add 6 drops of
Al-4A and mix.

Reaction time:
2 minutes.

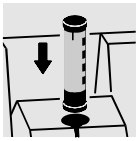


Transfer the solution
into the required cell.

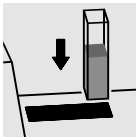
Important:	For measuring in the 50 mm cell the volumes of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 15 minutes.)**

PhotoLab S12
PhotoLab Spektral

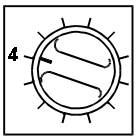


Select method
with AutoSelector.

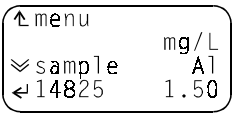


Insert cell in the
cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



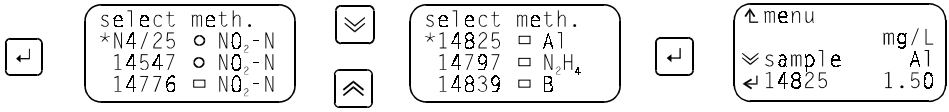
Select
filter position 4.



Check display:
14825 set?

If required: Set method 14825.

MPM 2010 / MPM 3000

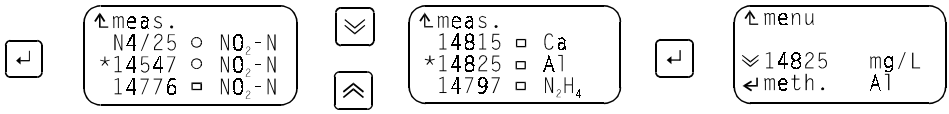


Enter selection of methods:
Press key.

Scroll until 14825 is set.

Confirm:
Press key.

MultiLab P5

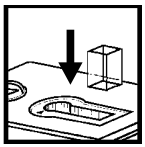


Enter selection of methods:
Press key.

Scroll until 14825 is set.

Confirm:
Press key.

Measurement



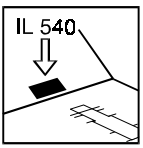
Insert cell.
Read measured value.

No zero adjustment required.

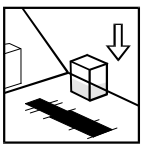
Measuring ranges for MPM 2010/3000 / MultiLab P5 und factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
Al	0.20 - 1.00 mg/l	MPM 2010	5 ml	14 mm	00.44
Al	0.20 - 1.50 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	00.59
Al	0.100 - 0.750 mg/l		5 ml	20 mm	0.294
Al	0.040 - 0.300 mg/l		10 ml	50 mm	0.118

MPM 1000
MPM 1500



Insert
filter IL 540 into
filter compartment,
lettering shows
to user.

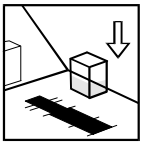


Insert cell with
blank sample.

Press key:
Zero adjustment.

F

Press key:
Enter **factors** according to above table.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

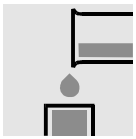
Sample blank solution (with colored or turbid samples only)

Add 5 ml
of sample
into a test tube.

Add 1 blue micro-spoonful of **Al-1A** and dissolve solids.

With a pipette
add 1.2 ml of **Al-2A**
and mix.

Reaction time:
2 minutes.

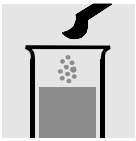


Transfer the solution into the required cell.

Measure
(see operating manual of the meter: „Correction of sample blank value“)

Blank sample for photometer MPM 1500/1000 (zero adjustment)

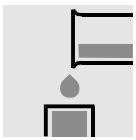
Add 5 ml
of distilled water
into a test tube.



Add 1 blue micro-spoonspul of **Al-1A** and dissolve solids.

With a pipette add
1.2 ml of **Al-2A**
and mix.

Add 6 drops
of **Al-4A**
and mix.



Transfer the solution into the required cell.

Reaction time:
2 minutes.
Measure (see above).

Model

14828 Chlorine (Cl_2)

Free Chlorine and Total Chlorine

Order number	250 429		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of chlorine using dialkyl-p-phenylenediamine.		
Application	Drinking water Wastewater		
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 3 to 9 using diluted sulphuric acid or caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination as soon as possible after sampling.		

Measuring range

	Measuring range	Sample volume	Cell
Chlorine	0.10 - 7.50 mg/l Cl_2	5 ml	10 mm
Chlorine	0.05 - 4.00 mg/l Cl_2	5 ml	20 mm
Chlorine	0.01 - 1.50 mg/l Cl_2	10 ml	50 mm

Analysis: Procedure

Determination of free chlorine

Pipette 5 ml of sample into a test tube.

Add 1 blue micro-spoonful of **Cl_2-1A**.

Shake vigorously to dissolve solids.

Add 2 drops of **Cl_2-3A** and mix.

Reaction time: 1 minute.

Transfer solution into the required cell.

Determination of total chlorine

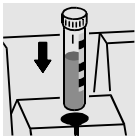
The total chlorine is determined with the same preparation as described above, but add 2 drops of reagent Cl_2-**2A** instead of 2 drops of reagent Cl_2-**3A**.

Important:

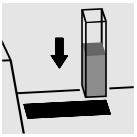
- Very high chlorine concentrations in the sample cause yellow solutions (test sample should be red) and too low values; in these cases the sample has to be diluted.
- For measuring in the 50 mm cell, the quantities of sample and reagents each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

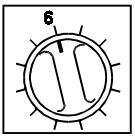


Select method with AutoSelector.

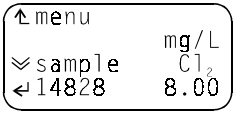


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



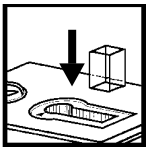
Select
filter position 6.



Check display:
14828 set?

If necessary: Set method 14828 (see operating manual of the photometer).

Measurement



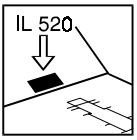
No zero adjustment required.

Insert cell.
Read measured value.

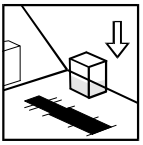
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
Cl_2	0.10 - 7.50 mg/l	MPM 2010	5 ml	14 mm	02.67
Cl_2	0.10 - 8.00 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	03.57
Cl_2	0.05 - 4.00 mg/l		5 ml	20 mm	01.79
Cl_2	0.02 - 1.60 mg/l		10 ml	50 mm	00.71

MPM 1000
MPM 1500



Insert
filter IL 520 into
filter compartment,
lettering shows
to user.

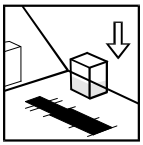


Insert cell with
blank sample.

Press key:
Zero adjustment.

F

Press key:
Enter **factors** according to above table.



Test sample:
Insert cell with test sample.

M

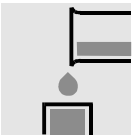
Press key:
Concentration in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 5 ml of test sample into an empty test tube.

Add 2 drops of reagent Cl_2-**3A** (free chlorine) or Cl_2-**2A** (total chlorine) and mix immediately.

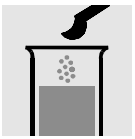
Reaction time:
1 minute.



Transfer solution into the required cell.
Measure (see operating manual of the meter: “Sample blank value correction“).

Blank sample for photometer MPM 1500/1000 (Zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.



Add 1 blue micro-spoonful of **Cl_2-1A** and dissolve immediately.

Add 2 drops of Cl_2-**3A** (free chlorine) or Cl_2-**2A** (total chlorine) and mix immediately.

Reaction time:
1 minute.

Transfer solution into the required cell and measure (see above).

Model

14831 Silver (Ag)

Order number	250 448		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of silver using phenanthroline and eosin in a slightly acidic solution.		
Application	For wastewater especially from the photo and plating industries as well as for production control.		
Interferences	Strongly acidic or strongly alkaline samples	Action:	Adjust to pH 5 to 7 using diluted caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination immediately after sampling. Preservation by adding 1 ml nitric acid per liter of sample.		

Measuring range

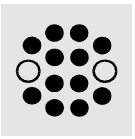
	Measuring range	Sample volume	Cell
Silver	**0.50 - 3.00 mg/l Ag**	10 ml	10 mm
Silver	**0.25 - 1.50 mg/l Ag**	10 ml	20 mm

Analysis: Procedure

Pipette 10 ml of sample into an empty round cell (order no. 250621).

Add 2 drops of **Ag-1**.

Add 1 green microspoonful of **Ag-2**, close with screw cap.



Heat the reaction cell in the thermoreactor for 60 minutes at 120°C (100°C).

Remove cell from the thermoreactor, allow to cool in a cell rack.

Sway the cell before opening it.

Add 3 drops of **Ag-3** and mix.

Check the pH value of the sample. Specified range: pH 4 to 10.

If necessary, adjust pH value drop by drop using diluted caustic soda lye or sulphuric acid.

Add 1 drop of **Ag-4** and mix.

Add 5 drops of **Ag-5** and mix.

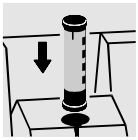
With a pipette add 1 ml of **Ag-6** and mix.

Reaction time: 5 minutes.

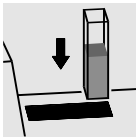
Transfer the solution into the required cell.

Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S12
PhotoLab Spektral

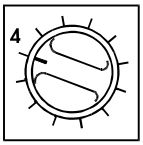


Select method with AutoSelector.

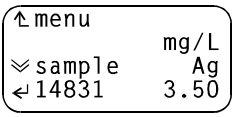


Insert cell in the cell shaft. Read measured value.

MPM 3000
MultiLab P5



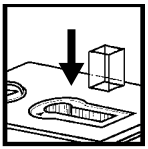
Select
filter position 4.



Check display:
14831 set?

If necessary: Set method 14831 (see operating manual of the photometer).

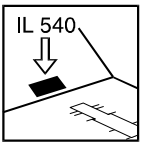
Measurement



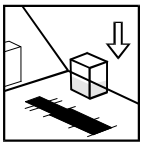
Insert 10 mm cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 540 into
filter compartment,
lettering shows
to user.



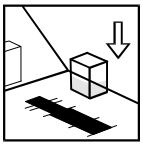
Insert 10 mm cell
with blank sample.

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 03.23.



Test sample:
Insert 10 mm cell
with test sample.

M

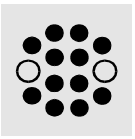
Press key:
Concentration
in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

Pipette 10 ml of sample into an empty round cell (RK 14/25, order no. 250621).

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

Add 1 green microspoonful of **Ag-2** and mix.



Heat the cell in the thermoreactor for 60 minutes at 120°C (100°C).

Remove the cell from the thermo-reactor, let it cool in a cell rack.

Sway the cell before opening it.

Add 3 drops of **Ag-3** and mix.

Check the pH value of the sample. Specified range: pH 4 to 10. If necessary, correct the pH value.

Add 5 drops of **Ag-5** and mix.

Transfer the solution into the required cell.

Reaction time: 5 minutes.

Measure (see operating manual of the photometer: “Correction of sample blank value“)

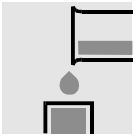
Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 10 ml of distilled water into an empty round cell (RK 14/25, order no. 250621).

Add 1 drop of **Ag-4** and mix.

Add 5 drops of **Ag-5** and mix.

With a pipette add 1 ml of **Ag-6** and mix.



Transfer the solution into the required cell.

Reaction time: 5 minutes.

Measure (see above).

Model

14832 Zinc (Zn)

Order number	250 451		
Safety instructions	Observe danger marks on the individual parts of the kit.		
Method	Determination of zinc with pyridylazonaphthol in alkaline solution.		
Application	Drinking water and groundwater Wastewater especially from electroplating and metal-processing factories.		
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 4 to 10 using diluted sulphuric acid or caustic soda lye.
	Tensides	Action:	Can be eliminated by evaporating.
	Complexing agents	Action:	Sample preparation with Crack-Set 10 (Model 14687, WTW Order No. 250 496)
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (observe expiry date on the label).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Perform determination as soon as possible.		

Measuring range

	Measuring range	Sample volume	Cell
Zinc	**0.05 - 2.50 mg/l Zn**	5 ml	10 mm

Important: The contents of the test tubes and cells must not be drained into the wastewater (the **Zn-2** reagent contains **potassium cyanide**!) and must be disposed of in accordance with official regulations!

Elimination of cyanide:
In a fume cupboard transfer the contents of the test tubes and cells into a separating funnel.
Carefully run off the **lower layer** (aqueous phase) into a wide-necked conical flask, add Perhydrol® (3 ml of Perhydrol® per 100 ml of aqueous phase) and leave to stand for 20 minutes.
Treat the **upper layer** (organic phase) as waste solvent.

Analysis: Procedure

Pipette 5 ml of sample into a test tube with screw cap.

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

Check pH value, specified range: pH 12 to 13.

If necessary adjust pH value with diluted caustic soda lye.

Add 2 drops of **Zn-2** and mix.

Add 5 drops of **Zn-3** and mix.

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

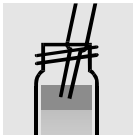
Reaction time: 3 minutes.

Add 1 grey microspoonful of **Zn-5** and dissolve solids.

With a pipette add 5 ml of **Zn-6** (Isobutylmethylketone Mod. 06146, O. no. 250 452) and close the test tube tightly.

Shake vigorously for 30 seconds.

Leave to stand for 2 minutes.

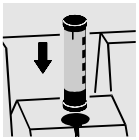


Aspirate the colored-clear upper phase using a pipette.

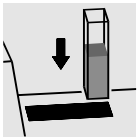
Transfer the solution into the required cell.

Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S12
PhotoLab Spektral

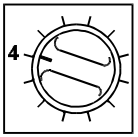


Select method
with AutoSelector.

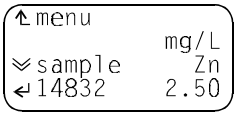


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



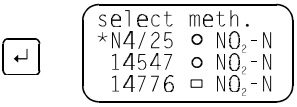
Select
filter position 4.



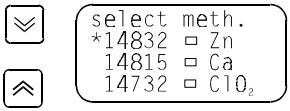
Check display:
14832 set?

If necessary set method 14832.

MPM 2010 / MPM 3000



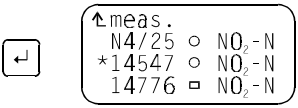
Enter selection of methods:
Press key.



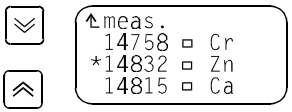
Scroll until 14832 is set.

Confirm:
Press key.

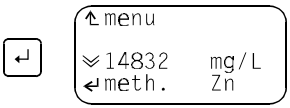
MultiLab P5



Enter selection of methods:
Press key.

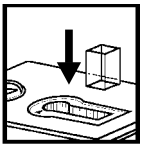


Scroll until 14832 is set.



Confirm:
Press key.

Measurement



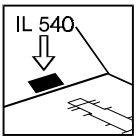
Insert cell.
Read measured
value.

No zero adjustment required.

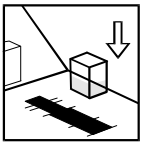
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range				Sample volume	Cell	Factor MPM 1000/1500
Zn	0.05	- 2.50	mg/l	MPM 2010	5 ml	14 mm	01.09
Zn	0.05	- 2.50	mg/l	MPM3000 / MultiLab P5	5 ml	10 mm	01.47

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment, lettering shows to user.



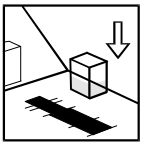
Insert cell with **blank sample**.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored or turbid samples only)

Pipette 5 ml of sample into a test tube with screw cap.

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

Check pH value, specified range: pH 12 to 13.

If necessary adjust pH value with diluted caustic soda lye.

Add 2 drops of **Zn-2** and mix.

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

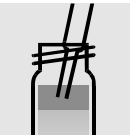
Reaction time: 3 minutes.

Add 1 grey micro-spoonful of **Zn-5** and dissolve solids.

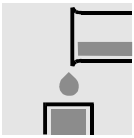
With a pipette add 5 ml of **Zn-6** (Isobutylmethylketone, Mod. 06146, O. no. 250 452) and close the test tube tightly.

Shake vigorously for 30 seconds.

Leave to stand for 2 minutes.



Aspirate the colored-clear upper phase using a pipette.



Transfer the solution into the required cell.

Measure (see operating manual of the photometer).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of sample into a test tube with screw cap.

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

Check pH value, specified range: pH 12 to 13.

If necessary adjust pH value with diluted caustic soda lye.

Add 2 drops of **Zn-2** and mix.

Add 5 drops of **Zn-3** and mix.

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

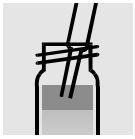
Reaction time: 3 minutes.

Add 1 grey microspoonful of **Zn-5** and dissolve solids.

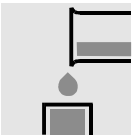
With a pipette add 5 ml of **Zn-6** (Isobutylmethylketone, Mod. 06146, O. no. 250 452) and close the test tube tightly.

Shake vigorously for 30 seconds.

Leave to stand for 2 minutes.



Aspirate the colored-clear upper phase using a pipette.



Transfer the solution into the required cell.

Measure (see above).

Model

14833 Lead (Pb)

Order number	250 313		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of lead using 4-(2-Pyridylazo)-resorcin (PAR) in alkaline solution.		
Application	Drinking water Wastewater		
Interferences	High Ca/Mg contents (Total hardness > 14°dH)	Action:	Sample predilution or difference measurement.
	Strongly alkaline sample solutions Strongly acidic sample solutions	Action:	Adjust to pH 3 to 6 using diluted nitric acid or ammonia solution.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	If possible, perform determination immediately after sampling. Preservation by adding 1 ml 65 % nitric acid per liter of sample.		

Measuring range

	Measuring range	Sample volume	Cell
Lead	**0.10 - 5.00 mg/l Pb**	5 ml	14 mm

The reaction cell contains cyanide! Observe danger notes!

Analysis: Procedure – Total hardness 0 to 14°dH

Add 5 drops of **Pb-1K** into a reaction cell and mix.

With a pipette add 5 ml of sample, close with screw cap and mix.

Measure.

Analysis: Procedure – Total hardness > 14°dH (Difference measurement)

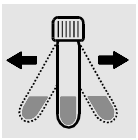
Add 5 drops of **Pb-1K** into a reaction cell and mix.

With a pipette add 5 ml of sample, close with screw cap and mix.

Measure.

Result: Test value A.

Add 1 grey micro-spoonful of **Pb-2K** to the cell already measured, close with screw cap.



Shake cell vigorously to dissolve solids

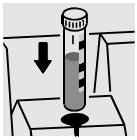
Measure.

Result: Test value B.

mg/l Pb = Test value A - Test value B

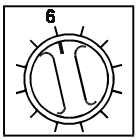
Measurement (The color of the test sample remains stable for at least 60 minutes!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

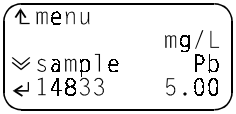


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



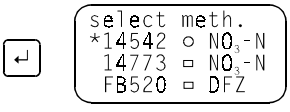
Select filter position 6.



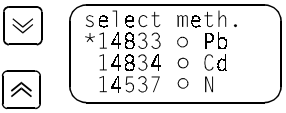
Check display: 14833 set?

If required: Set method 14833.

MPM 2010 / MPM 3000



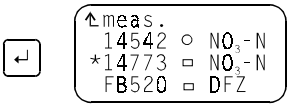
Enter selection of methods: Press key.



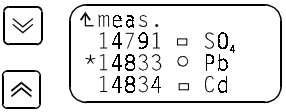
Scroll until 14833 is set.

Confirm: Press key.

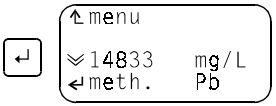
MultiLab P5



Enter selection of methods: Press key.

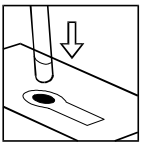


Scroll until 14833 is set.



Confirm: Press key.

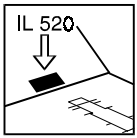
Measurement



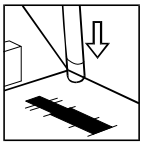
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 520 into filter compartment, lettering shows to user.



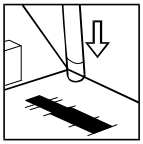
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factor 04.55**.

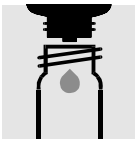


Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

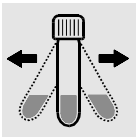
Sample blank solution (With colored or turbid samples only)



Add 5 drops of **Pb-1K** into an empty round cell (RK 14/25, WTW order no. 250 621) and mix.

With a pipette add 5 ml of sample and mix.

Add 1 grey micro-spoonful of **Pb-2K**, close with screw cap.



Shake cell vigorously to dissolve solids.

Measure (see operating manual of the meter: “Sample blank value correction“).

Model

14834 Cadmium (Cd)

Order number	250 314		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of cadmium using cadion derivate in alkaline solution.		
Application	Ground water, drinking water, surface water Wastewater, process water, seepage water Sewage sludge and soil Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 5 to 9 with ammonia solution or nitric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Used round cell tests may be returned - freight and any charges prepaid - for disposal to: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim, or must be disposed of according to local legal requirements.		
Sample material	If possible, perform preservation immediately after sampling. Add 1 ml 65 % nitric acid per liter of sample.		

Measuring range

	Measuring range	Sample volume	Cell
Cadmium	**0.025 - 1.000 mg/l Cd**	5 ml	14 mm
Cadmium sensitive *	**0.010 - 0.300 mg/l Cd**	10 ml	50 mm

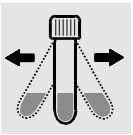
* (PhotoLab S12 or PhotoLab Spektral only – see also operating manual of the photometer, section “Analysis Regulations“)

Analysis: Procedure

Pipette 5 ml of sample into a reaction cell and mix.

Add 3 drops of **Cd-1K** and mix.

Add 1 green micro-spoonful of **Cd-2K,** close with screw cap.

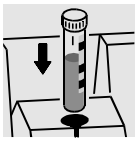


Shake cell vigorously to dissolve solids.

Reaction time: 2 minutes.

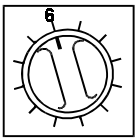
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

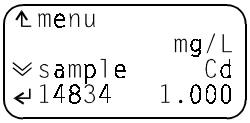


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



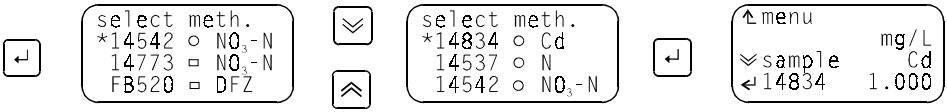
Select
filter position 6.



Check display:
14834 set?

If required: Set method 14834.

MPM 2010 / MPM 3000

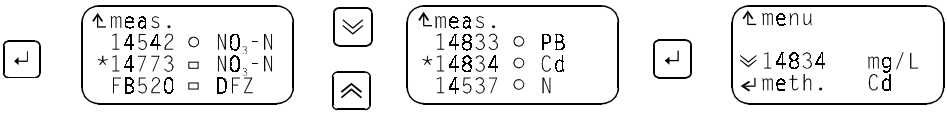


Enter selection of methods:
Press key.

Scroll until 14834 is set.

Confirm:
Press key.

MultiLab P5

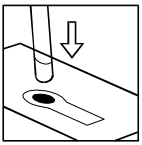


Enter selection of methods:
Press key.

Scroll until 14834 is set.

Confirm:
Press key.

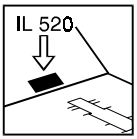
Measurement



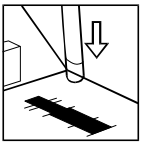
Insert cell.
Read measure value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 520 into
filter compartment,
lettering shows
to user.



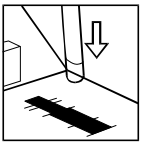
Insert cell with
zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 0.505



Test sample:
Insert cell with
test sample.

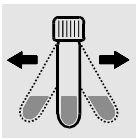
M

Press key:
Concentration in
mg/l is displayed.

Sample blank solution **(With colored or turbid samples only)**

With a pipette add
5 ml of sample into a
reaction cell and mix.

Add 1 green micro-
spoonful of **Cd-2K,**
close with screw cap.



Shake cell vigorously
to dissolve solids.

Reaction time:
2 minutes.

Measure
(see operating manual of
the meter: „Sample blank
value correction“).

Model

14839 Boron (B)

Order number	250 427
Safety instructions	Observe danger marks on the individual parts of the kit.
Method	Determination of boron using curcumin.
Application	Drinking water Wastewater
Interferences	Boron dissolved out of utensils used (Borosilicate glasses) Action: Use utensils made out of soda glass or plastic for sampling and analysis.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (observe expiry date on the label).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Perform determination as soon as possible after sampling.

Measuring range

	Measuring range	Sample volume	Cell
Boron	**0.050 - 0.800 mg/l B**	5 ml	10 mm

Analysis: Procedure

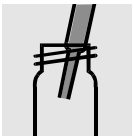
Pipette 5 ml of sample into a glass with screw cap. **(Important: do not use boro-silicate glasses!)**

With a pipette add 1 ml of **B-1A** and mix.

With a pipette add 1.5 ml of **B-2A** and close the glass.

Shake the glass vigorously for 1 minute.

Suck off 0.5 ml of the lower clear layer using a Pasteur pipette.



Transfer the layer sucked off into a dry glass.

With a pipette add 0.8 ml of **B-3A** and mix.

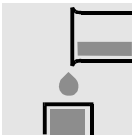
Add 4 drops of **B-4A** and mix.

Add 15 drops of **B-5A** and mix.

Reaction time: 12 minutes.

With a pipette add 6 ml of **B-6A** and mix.

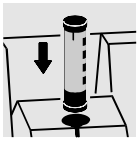
Reaction time: 2 minutes.



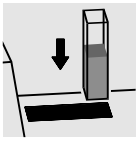
Transfer the solution into the required cell.

Measurement (The color of the test sample remains stable for at least 60 minutes.)

PhotoLab S12
PhotoLab Spektral

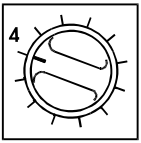


Select method with AutoSelector.

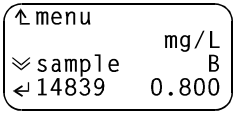


Insert cell in the cell shaft. Read measured value.

MPM 2010
MPM 3000
MultiLab P5



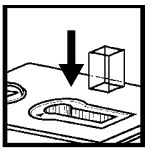
Select
filter position 4.



Check display:
14839 set?

If necessary: Set method 14839 (see operating manual of the photometer).

Measurement



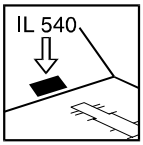
Insert cell.
Read measured value.

No zero adjustment required.

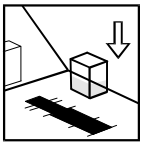
Measuring ranges for MPM MPM 2010/3000 / MultiLab P5; factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
B	0.050 - 0.750 mg/l	MPM 2010	5 ml	14 mm	0.263
B	0.050 - 0.800 mg/l	MPM 3000,	5 ml	10 mm	0.350
B	0.025 - 0.400 mg/l	MultiLab P5	5 ml	20 mm	0.175

MPM 1000
MPM 1500



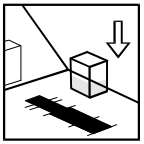
Insert
filter IL 540 into
filter compartment,
lettering shows
to user.



Insert cell
with blank sample.

Press key:
Zero adjustment.

Press key:
Enter **factor** according
to above table.



Test sample:
Insert cell
with test sample.

Press key:
Concentration
in mg/l is displayed.

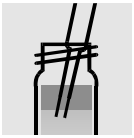
Sample blank solution (in case of colored or turbid samples only)

Pipette 5 ml of sample into an empty glass with screw cap. **(Important: do not use boro-silicate glasses!)**

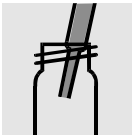
With a pipette add 1 ml of **B-1A** and mix.

With a pipette add 1.5 ml of **B-2A** and close the glass.

Shake the glass vigorously for 1 minute.



Suck off 0.5 ml of the lower clear layer using a Pasteur pipette.



Transfer the layer sucked off into a dry glass.

With a pipette add 0.8 ml of **B-3A** and mix.

Add 15 drops of **B-5A** and mix.

Reaction time: 12 minutes.

With a pipette add 6 ml of **B-6A** and mix.

Reaction time: 2 minutes.

Transfer the solution into the required cell.

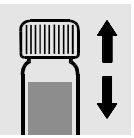
Measure (see operating manual of the meter).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty glass with screw cap. **(Important: do not use boro-silicate glasses!)**

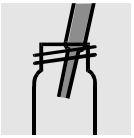
With a pipette add 1 ml of **B-1A** and mix.

With a pipette add 1.5 ml of **B-2A** and close the glass.



Shake the glass vigorously for 1 minute.

Suck off 0.5 ml of the lower clear layer using a Pasteur pipette.



Transfer the layer sucked off into a dry glass.

With a pipette add 0.8 ml of **B-3A** and mix.

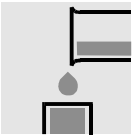
Add 4 drops of **B-4A** and mix.

Add 15 drops of **B-5A** and mix.

Reaction time: 12 minutes.

With a pipette add 6 ml of **B-6A** and mix.

Reaction time: 2 minutes.



Transfer the solution into the required cell.

Measure (see above).

Model

14842 Phosphate 100 (PO_4)

ortho-**Phosphate-Phosphorus (PO_4-P)**

Order number	250 447
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of the yellow phosphoric acid molybdate vanadate complex.
Application	Drinking water Wastewater Seawater
Interferences	Yellow self-coloring of sample solution — Action: add activated carbon, stir intensively, filter
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.
Sample material	Preservation not possible; perform determination as soon as possible.

Measuring range

	Measuring range	Sample volume	Cell
ortho-Phosphate-Phosphorus	**1.0 - 30.0 mg/l PO_4-P**	5 ml	10 mm
ortho-Phosphate	**3.0 - 90.0 mg/l PO_4**	5 ml	10 mm
ortho-Phosphate-Phosphorus	**0.5 - 15.0 mg/l PO_4-P**	5 ml	20 mm
ortho-Phosphate	**1.5 - 45.0 mg/l PO_4**	5 ml	20 mm

Analysis: Procedure

Pipette 5 ml of sample into a test tube.

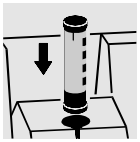
With a pipette add 1.2 ml **P-AH** and mix.

Pour solution into the required cell.

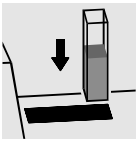
Notes:
- The method determines only *ortho*-phosphate. Determine the content of total phosphorus after oxidation to *ortho*-phosphate.
- For measurements in 50 mm cells, sample volume and volume of the reagents must be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

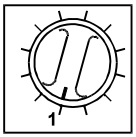


Select method with AutoSelector.

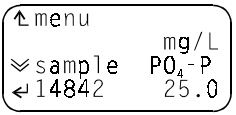


Insert cell in the cell shaft.
Read measured value.

MPM 2010

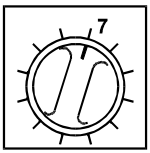


Select filter position 1.

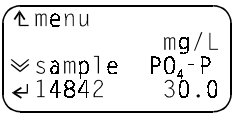


Check display: 14842 set?

MPM 3000
MultiLab P5



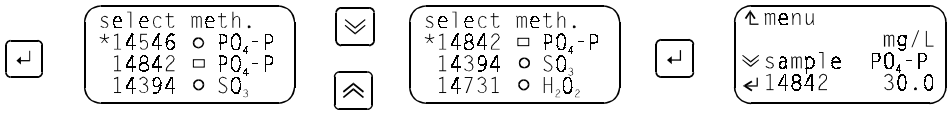
Select filter position 7.



Check display: 14842 set?

If required: set method 14842.

MPM 2010 / MPM 3000

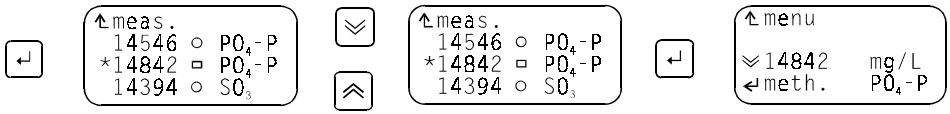


Enter selection of methods: Press key.

Scroll until 14842 is set.

Confirm: Press key.

MultiLab P5

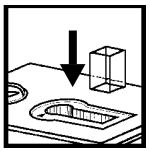


Enter selection of methods: Press key.

Scroll until 14842 is set.

Confirm: Press key.

Measurement



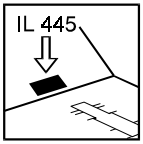
No zero adjustment required.

Insert cell.
Read measured value.

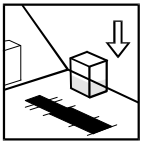
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.5 - 25.0 mg/l	MPM 2010	5 ml	14 mm	030.3
PO_4	1.5 - 76.0 mg/l		5 ml	14 mm	093.0
PO_4-P	1.0 - 30.0 mg/l		5 ml	10 mm	042.4
PO_4	3.1 - 92.0 mg/l		5 ml	10 mm	130.0
PO_4-P	0.5 - 15.0 mg/l	MPM 3000	5 ml	20 mm	021.2
PO_4	1.5 - 46.0 mg/l	MultiLab P5	5 ml	20 mm	065.0
PO_4-P	0.20 - 6.00 mg/l		10 ml	50 mm	08.50
PO_4	0.6 - 18.4 mg/l		10 ml	50 mm	026.0

MPM 1000
MPM 1500



Insert filter IL 445 into filter compartment; lettering shows to user.



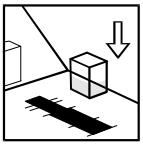
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: **Enter factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (in case of colored or turbid samples only)

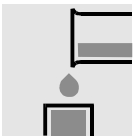
Pipette 5 ml of sample into an empty round cell.

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Blank sample for photometer MPM 1500/1000 (zero adjustment)

Pipette 5 ml of distilled water into an empty round cell (RK14/25, WTW order no. 250621) and mix.

With a pipette add 1.2 ml **P-AH** and mix.



Pour solution into the required cell.

Measurement (see above)

Model

14848 Phosphate 10 (PO_4)

ortho-**Phosphate-Phosphorus (PO_4-P)**

Order number	250 446		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination as molybdenum blue after reduction of molybdato phosphate (determines ortho-phosphate only).		
Application	Drinking water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Strongly alkaline sample solutions	Action:	Adjust to pH 0 to 10 using diluted caustic soda lye or sulphuric acid.
	Turbidities	Action:	Filter sample.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5 °C to 25 °C (Observe expiry date on the label!).		
Disposal	Dispose of test solutions as special waste at appropriate collection points according to local legal requirements.		
Sample material	Preservation not possible, perform determination immediately.		

Measuring range

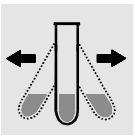
	Measuring range	Sample volume	Cell
ortho-phosphate-phosphorus	**0.05 - 5.00 mg/l PO_4-P**	5 ml	10 mm
phosphate 10	**0.2 - 15.0 mg/l PO_4**	5 ml	10 mm
ortho-phosphate-phosphorus	**0.03 - 2.50 mg/l PO_4-P**	5 ml	20 mm
phosphate 10	**0.10 - 7.50 mg/l PO_4**	5 ml	20 mm
ortho-phosphate-phosphorus	**0.01 - 1.00 mg/l PO_4-P**	10 ml	50 mm
phosphate 10	**0.05 - 3.00 mg/l PO_4**	10 ml	50 mm

Analysis: Procedure

Pipette 5 ml
of sample
into a test tube.

Add 5 drops
of **P-1A**
and mix.

With the blue
measurer add
1 dose of **P-2A**.



Shake vigorously
to dissolve solids.

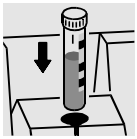
Reaction time:
5 minutes.

Transfer the solution
into the required cell.

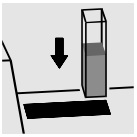
Important: For measurements in the 50 mm cell, the volumes of the sample and the reagents P-1A and P-2A each have to be doubled.

Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S12
PhotoLab Spektral

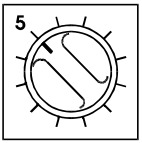


Select method
with AutoSelector.

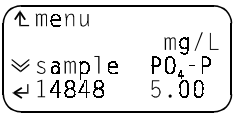


Insert cell in the
cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



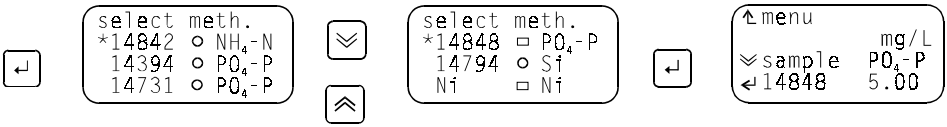
Select
filter position 5.



Check display:
14848 set?

If required: Set method 14848.

MPM 2010 / MPM 3000

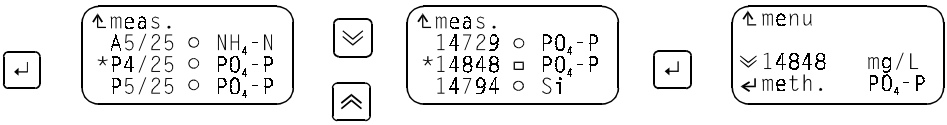


Enter selection of methods:
Press key.

Scroll until 14848 is set.

Confirm:
Press key.

MultiLab P5

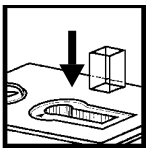


Enter selection of methods:
Press key.

Scroll until 14848 is set.

Confirm:
Press key.

Measurement



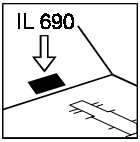
No zero adjustment required.

Insert cell.
Read measured value.

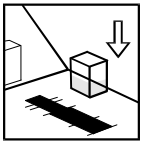
Measuring ranges for MPM 2010/3000 / MultiLab P5 and factors for MPM 1000/1500

	Measuring range		Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.10 - 5.00 mg/l	MPM 2010	5 ml	14 mm	01.64
PO_4	0.3 - 15.3 mg/l		5 ml	14 mm	005.0
PO_4-P	0.10 - 5.00 mg/l	MPM 3000, MultiLab P5	5 ml	10 mm	02.15
PO_4	0.3 - 15.3 mg/l		5 ml	10 mm	006.6
PO_4-P	0.05 - 2.50 mg/l		5 ml	20 mm	01.08
PO_4	0.15 - 7.67 mg/l		5 ml	20 mm	03.30
PO_4-P	0.02 - 1.00 mg/l		10 ml	50 mm	00.43
PO_4	0.06 - 3.07 mg/l		10 ml	50 mm	01.32

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



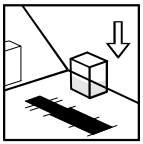
Insert cell with blank sample.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

M

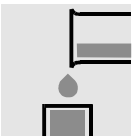
Press key: **Concentration** in mg/l is displayed.

Sample blank solution (In case of colored samples only)

Pipette 5 ml of sample into an empty test tube.

With the blue measurer add 1 dose of **P-2A** and dissolve.

Reaction time: 5 minutes.



Transfer solution into the required cell.

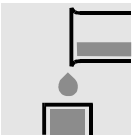
Measure (see operating manual of the meter: “Sample blank value correction“)

Blank sample for photometer MPM 1500/1000 (Zero adjustment)

Pipette 5 ml of distilled water into an empty test tube.

Add 5 drops of **P-1A** and mix.

With the blue measurer add 1 dose of **P-2A** and dissolve.



Transfer solution into the required cell.
After 5 minutes: Measure (see above).

Model

A5/25 Ammonium (NH_4)

Ammonium Nitrogen (NH_4-N)

Order number	250 323		
Safety instructions	Observe danger marks on the individual parts of the kit!		
Method	Determination of Ammonium Nitrogen with sodium dichlorisocyanurate and phenolderivate (Indophenol method).		
Applicability	Drinking water Wastewater Seawater		
Interferences	Strongly acidic sample solutions Buffered sample solutions	Action:	Adjust to pH 9-10 with caustic soda lye.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).		
Storage	At 5°C to 25°C (Observe expiry date on the label!).		
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim		
Sample material	Preservation by cooling down to 4°C: 6 hours stable.		

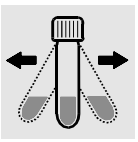
Measuring range

	Measuring range	Sample volume	Cell
Ammonium Nitrogen	**0.20 - 8.00 mg/l NH_4-N**	1 ml	14 mm
Ammonium	**0.25 - 10.00 mg/l NH_4**	1 ml	14 mm

Analysis: Procedure

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

With the blue measurer add 1 dose of **NH_4-2**, close with screw cap.

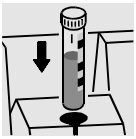


Shake cell well to dissolve solids.

Reaction time 15 minutes.

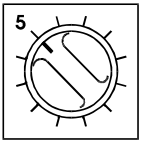
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

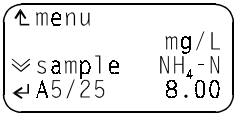


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



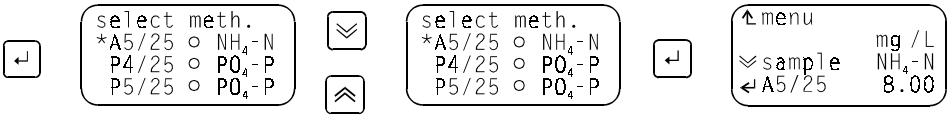
Select filter position 5.



Check display: A5/25 set?

If required: Set method A5/25.

MPM 2010 / MPM 3000

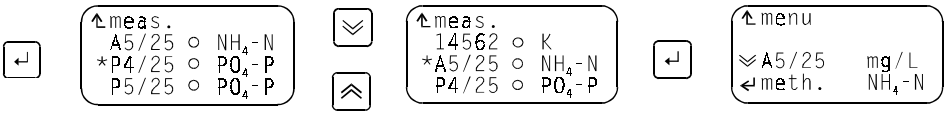


Enter selection of methods: Press key.

Scroll until A5/25 is set.

Confirm: Press key.

MultiLab P5

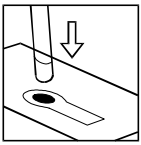


Enter selection of methods: Press key.

Scroll until A5/25 is set.

Confirm: Press key.

Measurement



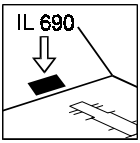
No zero adjustment required.

Insert cell.
Read measured value.

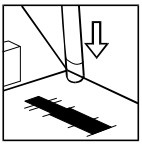
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NH_4-N	0.20 - 8.00 mg/l	1 ml	14 mm	04.40
NH_4	0.25 - 10.00 mg/l	1 ml	14 mm	05.70

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment; lettering shows to user.



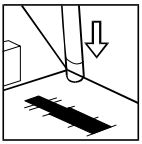
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution **(in case of colored or turbid samples only)**

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

Measurement: (see instruction manual of the meter: “Correction of sample blank value“).

Note: After determination of the sample blank value use the solution as measuring solution.
Continue in paragraph "Analysis: Procedure" with adding 1 dose of NH_4-2 reagent.

Model

C1/25 COD 160

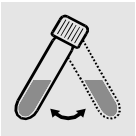
Chemical Oxygen Demand

Order num ber	250 302
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulphuric acid and silver sulphate as catalyst.
Applicability	Low-rate wastewater with max. 160 mg/l COD and 2000 mg/l chloride.
Interferences	Chloride > 2000 mg/l Action: Sample predilution.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C **store upright in a dark place!** (Observe expiry date on the label!)
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	Preservation by acidulating to pH=2: 2 days stable. by deep-freezing to -18°C: 2 weeks stable.

Measuring range

	Measuring range	Sample volume	Cell
COD 160	**15 - 160 mg/l COD**	2 ml	14 mm

Analysis: Procedure



Sway cell so that sediment is suspended.

Carefully pipette 2 ml of sample solution into a reaction cell, close tight with screw cap and mix vigorously.
Caution, cell grows very hot!

Heat reaction cell in thermoreactor at 148°C for 2 hours.

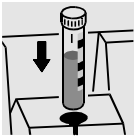
Remove cell from thermoreactor and place in a round cell rack to cool.

After approx. 10 min cooling time sway cell again.

Place cell in the rack again and allow to cool to room temperature
(very important!).

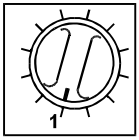
Measurement (The color of the test sample remains stable for several days!)

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

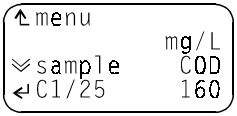


Put cell in the shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



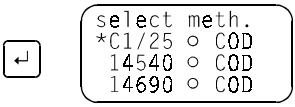
Select filter position 1.



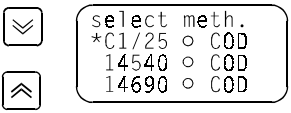
Check display: C1/25 set?

If required: Set method C1/25.

MPM 2010 / MPM 3000



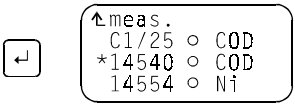
Enter selection of methods: Press key.



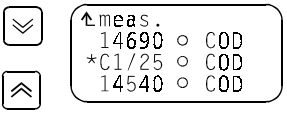
Scroll until C1/25 is set.

Confirm: Press key.

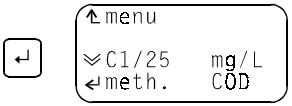
MultiLab P5



Enter selection of methods: Press key.

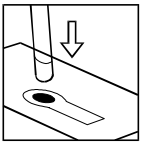


Scroll until C1/25 is set.



Confirm: Press key.

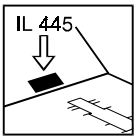
Measurement



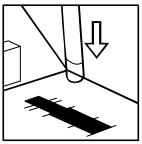
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert
filter IL 445 into
filter compartment;
lettering shows to
user.



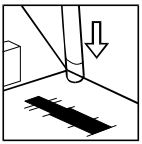
Insert cell with
zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 0227.
.



Test sample:
Insert cell with
test sample.

M

Press key:
Concentration
in mg/l is
displayed.

Model

C2/25 COD 1500

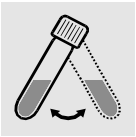
Chemical Oxygen Demand

Order number	250 308
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of the Chemical Oxygen Demand with potassium dichromate in sulphuric acid and silver sulphate as catalyst.
Applicability	Wastewater Production control
Interferences	Chloride > 2000 mg/l Action: Sample predilution
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C **store upright in a dark place!** (Observe expiry date on the label!)
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	Preservation by acidulating to pH=2: 2 days stable. by deep-freezing to -18°C: 2 weeks stable.

Measuring range

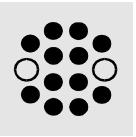
	Measuring range	Sample volume	Cell
COD 1500	**100 - 1500 mg/l COD**	2 ml	14 mm

Analysis: Procedure



Sway cell so that sediment is suspended.

Carefully pipette 2 ml of sample solution into a reaction cell, close tight with screw cap and mix vigorously.
Caution, cell grows very hot!



Heat reaction cell in thermoreactor at 148°C for 2 hours.

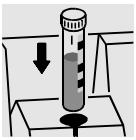
Remove cell from thermoreactor and place in a round cell rack to cool.

After approx. 10 min cooling time sway cell again.

Place cell in the rack again and allow to cool to room temperature
(very important!).

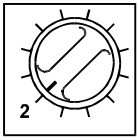
Measurement **(The color of the test sample remains stable for several days!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

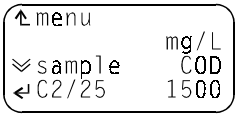


Put cell in the shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



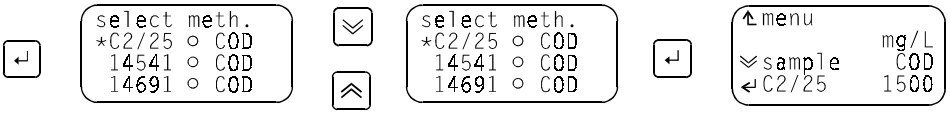
Select
filter position 2.



Check display:
C2/25 set?

If required: Set method C2/25.

MPM 2010 / MPM 3000

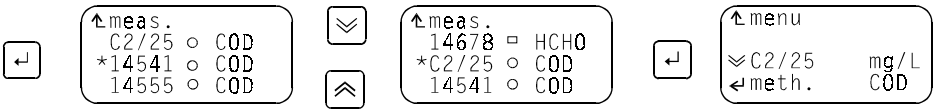


Enter selection of methods:
Press key.

Scroll until C2/25 is set.

Confirm:
Press key.

MultiLab P5

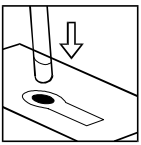


Enter selection of methods:
Press key.

Scroll until C2/25 is set.

Confirm:
Press key.

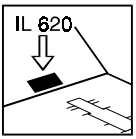
Measurement



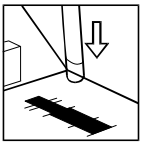
Insert cell.
Read measured value.

No zero adjustment required.

MPM 1000
MPM 1500



Insert filter IL 620 into filter compartment, lettering shows to user.



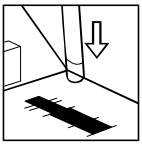
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter
factor 2022.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration
in mg/l is displayed.

Model

N1/25 Nitrate 50 (NO_3)

Nitrate Nitrogen (NO_3-N)

Order number	250 342
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination of Nitrate Nitrogen with 2.6 dimethylphenol in a mixture of sulphuric acid and phosphoric acid.
Applicability	Drinking water Wastewater Surface water
Interferences	Nitrite > 1 mg/l Action: 10 ml sample solution + approx. 0.5 g amido sulphuric acid, wait for 10 minutes.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C (Observe expiry date on the label!).
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	Preservation by cooling to 4°C: 24 hours stable. by acidulating to pH=2: 2 weeks stable.

Measuring range

	Measuring range	Sample volume	Cell
Nitrate Nitrogen	**0.5 - 23.0 mg/l NO_3-N**	0.5 ml	14 mm
Nitrate	**2 - 100 mg/l NO_3**	0.5 ml	14 mm

Analysis: Procedure

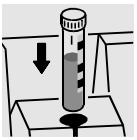
Pipette 0.5 ml of sample solution into a reaction cell; do not mix.

Add 0.5 ml **NO_3-2** with a pipette, close with screw cap and mix.

Reaction time: 10 minutes.

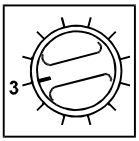
Measurement **(The color of the test sample remains stable for at least 30 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral



Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5

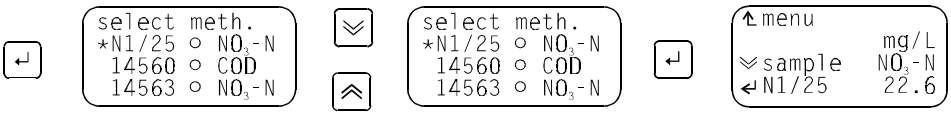


Select filter position 3.

Check display: N1/25 set?

If required: Set method N1/25.

MPM 2010 / MPM 3000

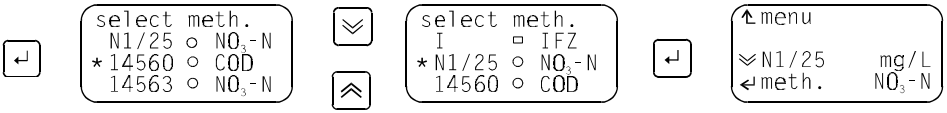


Enter selection of methods: Press key.

Scroll until N1/25 is set.

Confirm: Press key.

MultiLab P5

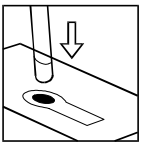


Enter selection of methods: Press key.

Scroll until N1/25 is set.

Confirm: Press key.

Measurement



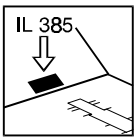
Insert cell.
Read measured value.

No zero adjustment required.

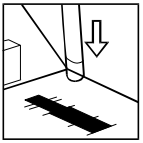
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NO_3-N	0.5 - 23.0 mg/l	0.5 ml	14 mm	033.6
NO_3	2 - 100 mg/l	0.5 ml	14 mm	0149

MPM 1000
MPM 1500



Insert filter IL 385 into filter compartment, lettering shows to user.



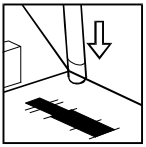
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 0.5 ml of sample solution into a reaction cell; do not mix.

Add 0.5 ml distilled water and mix.

Measure (see instruction manual of the meter: „Sample blank value correction“)

Model

N4/25 Nitrite 2 (NO_2)

Nitrite Nitrogen (NO_2-N)

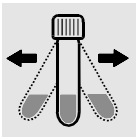
Order number	250 343
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination with sulphanilic acid and N-(1-Naphthyl)-ethylene diamine.
Applicability	Drinking water Wastewater Seawater
Interferences	Free chlorine Organic colloids Humic acids Action: Adjust to pH value 8.5 with caustic soda lye, shake out 100 ml of sample solution with 1 to 2 g nitrite-free activated carbon, filtrate.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C (Observe expiry date on the label!).
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	Preservation by cooling to 4°C: 24 hours stable.

Measuring range

	Measuring range	Sample volume	Cell
Nitrite Nitrogen	**0.020 - 0.600 mg/l NO_2-N**	4 ml	14 mm
Nitrite	**0.05 - 2.00 mg/l NO_2**	4 ml	14 mm

Analysis: Procedure

Pipette 4 ml of sample solution into a reaction cell, close with screw cap.

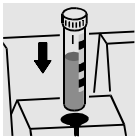


Shake cell vigorously to dissolve solids.

Reaction time: 10 minutes.

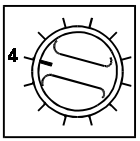
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

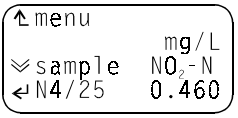


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



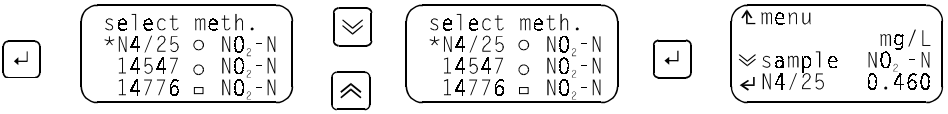
Select filter position 4.



Check display: N4/25 set?

If required: Set method N4/25.

MPM 2010 / MPM 3000

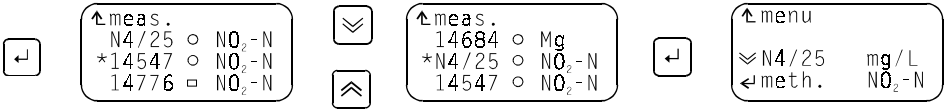


Enter selection of methods: Press key.

Scroll until N4/25 is set.

Confirm: Press key.

MultiLab P5

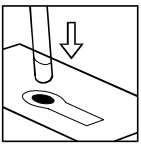


Enter selection of methods:
Press key.

Scroll until N4/25 is set.

Confirm:
Press key.

Measurement



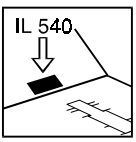
No zero adjustment required.

Insert cell.
Read measured value.

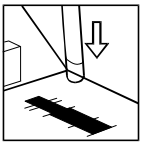
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
NO_2-N	0.020 - 0.600 mg/l	4 ml	14 mm	0.286
NO_2	0.05 - 2.00 mg/l	4 ml	14 mm	00.94

MPM 1000
MPM 1500



Insert filter IL 540 into filter compartment, lettering shows to user.



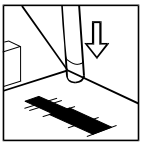
Insert cell with zero solution.

N

Press key:
Zero adjustment.

F

Press key:
Enter **factor** according to above table.



Test sample:
Insert cell with test sample.

M

Press key:
Concentration in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 4 ml of sample solution into an empty reaction cell, close with screw cap. (Empty cell RK14/25: WTW order no. 250 621)

Measurement (see instruction manual of the meter: „Sample blank value correction“).

Model

P4/25 ortho-**Phosphate 10 (PO_4)**

ortho-**Phosphate Phosphorus (PO_4-P)**

Order number	250 366
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination as molybdenum blue.
Applicability	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 3-10 with caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C (Observe expiry date on the label!).
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	A preservation is not possible. Perform determination as soon as possible.

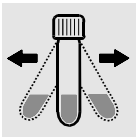
Measuring range

	Measuring range	Sample volume	Cell
Phosphate Phosphorus	**0.05 - 1.50 mg/l PO_4-P**	4 ml	14 mm
Phosphate	**0.20 - 4.50 mg/l PO_4**	4 ml	14 mm
Phosphorus Pentoxide	**0.11 - 3.44 mg/l P_2O_5**	4 ml	14 mm

Analysis: Performance

Pipette 4 ml of sample solution into a reaction cell, mix.

Add 1 dose of **PO_4-3** with the blue measurer, close with screw cap.



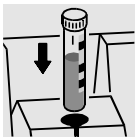
Shake cell vigorously to dissolve solids.

Add 4 drops of **PO_4-4**, mix.

Reaction time: 10 minutes.

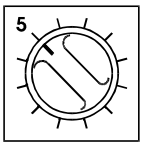
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

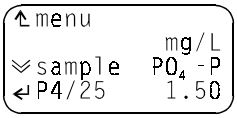


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



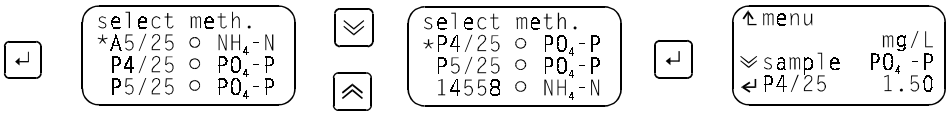
Select filter position 5.



Check display: P4/25 set?

If required: Set method P4/25.

MPM 2010 / MPM 3000

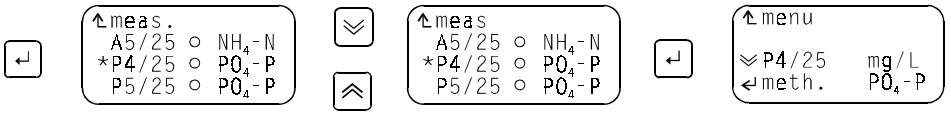


Enter selection of methods:
Press key.

Scroll until P4/25 is set.

Confirm:
Press key.

MultiLab P5

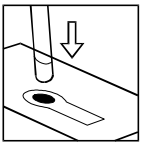


Enter selection of methods:
Press key.

Scroll until P4/25 is set.

Confirm:
Press key.

Measurement



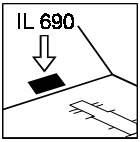
No zero adjustment required.

Insert cell.
Read measured value.

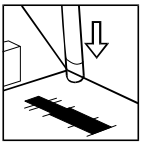
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.05 - 1.50 mg/l	4 ml	14 mm	01.60
PO_4	0.20 - 4.50 mg/l	4 ml	14 mm	04.90
P_2O_5	0.11 - 3.44 mg/l	4 ml	14 mm	03.66

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



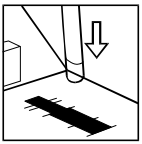
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

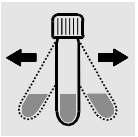
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 4 ml of sample solution into a reaction cell, mix.

Add 1 dose of **PO_4-3** with the blue measurer; close with screw cap.



Shake cell vigorously to dissolve solids.

Measurement:
(see instruction manual of the meter:
„Sample blank value correction“).

Note: After determination of the sample blank value use the solution as measuring solution. Continue in paragraph „Analysis: Procedure" by adding 4 drops of reagent PO_4-4.

Model

P5/25 ortho-**Phosphate 15 (PO_4)**

ortho-**Phosphate Phosphorus (PO_4-P)**

Order number	250 368
Safety instructions	Observe danger marks on the individual parts of the kit!
Method	Determination as molybdenum blue.
Applicability	Drinking water Wastewater Seawater
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions Action: Adjust to pH 3-10 with caustic soda lye or sulphuric acid.
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).
Storage	At 5°C to 25°C (Observe expiry date on the label!).
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim
Sample material	A preservation is not possible. Perform determination as soon as possible.

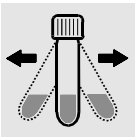
Measuring range

	Measuring range	Sample volume	Cell
Phosphate Phosphorus	**0.3 - 15.0 mg/l PO_4-P**	0.5 ml	14 mm
Phosphate	**1.0 - 45.0 mg/l PO_4**	0.5 ml	14 mm
Phosphorus Pentoxide	**0.7 - 34.4 mg/l P_2O_5**	0.5 ml	14 mm

Analysis: Procedure

Pipette 0.5 ml of sample solution into a reaction cell, mix.

Add 1 dose of **PO_4-3** with the blue measurer, close with screw cap.



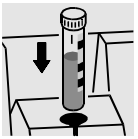
Shake cell vigorously to dissolve solids.

Add 4 drops of **PO_4-4**, mix.

Reaction time: 10 minutes.

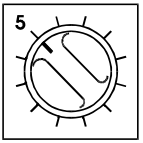
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

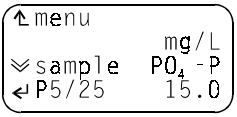


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



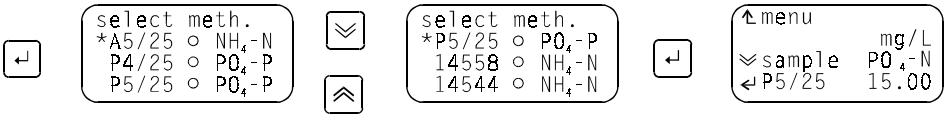
Select filter position 5.



Check display: P5/25 set?

If required: Set method P5/25.

MPM 2010 / MPM 3000

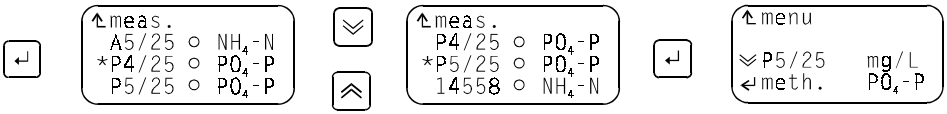


Enter selection of methods:
Press key.

Scroll until P5/25 is set.

Confirm:
Press key.

MultiLab P5

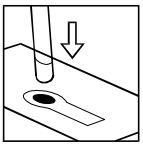


Enter selection of methods:
Press key.

Scroll until P5/25 is set.

Confirm:
Press key.

Measurement



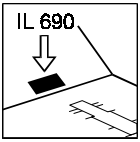
No zero adjustment required.

Insert cell.
Read measured value.

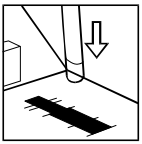
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.3 - 15.0 mg/l	0.5 ml	14 mm	012.8
PO_4	1.0 - 45.0 mg/l	0.5 ml	14 mm	039.4
P_2O_5	0.7 - 34.4 mg/l	0.5 ml	14 mm	029.3

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



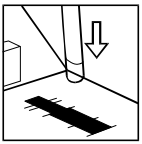
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

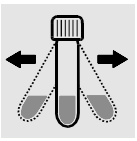
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 0.5 ml of sample solution into a reaction cell, mix.

Add 1 dose of **PO_4-3** with the blue measurer; close with screw cap.



Shake cell vigorously to dissolve solids.

Measurement: (see instruction manual of the meter: „Sample blank value correction“).

Note: After determination of the sample blank value use the solution as measuring solution. Continue in paragraph „Analysis: Procedure" by adding 4 drops of reagent PO_4-4.

Model

P4/25 Total **Phosphate 10 (PO_4)**

Total **Phosphorus (P)**

Order number	250 366	
Safety instructions	Observe danger marks on the individual parts of the kit!	
Method	Determination as molybdenum blue after acidic hydrolysis and oxidation at 100°C, better 120°C.	
Applicability	Drinking water Wastewater Seawater	
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action: Adjust to pH 3-10 with caustic soda lye or sulphuric acid.
	Higher amounts of organic compounds or organic phosphoric compounds	Action: Decomposition with nitric acid/ sulphuric acid
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).	
Storage	At 5°C to 25°C (Observe expiry date on the label!).	
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim	
Sample material	Preservation not required.	

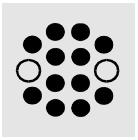
Measuring range

	Measuring range	Sample volume	Cell
Total Phosphate Phosphorus	**0.05 - 1.50 mg/l PO_4-P**	4 ml	14 mm
Total Phosphorus	**0.05 - 1.50 mg/l P_{total}**	4 ml	14 mm
Total Phosphate	**0.20 - 4.50 mg/l PO_4**	4 ml	14 mm
Total Phosphorus Pentoxide	**0.11 - 3.44 mg/l P_2O_5**	4 ml	14 mm

Analysis: Procedure

Pipette 4 ml of sample solution into a reaction cell, mix.

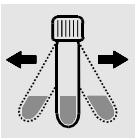
Add 1 dose of **PO_4-2** with the green measurer, close with screw cap.



Heat cell in thermoreactor for 30 minutes at 100°C, better 120 °C.

Remove cell from the thermoreactor, allow to cool to room temperature in the round cell rack.

Add 1 dose of **PO_4-3** with the blue measurer, close with screw cap.



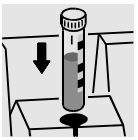
Shake cell vigorously to dissolve solids.

Add 4 drops of **PO_4-4**, mix.

Reaction time: 10 minutes.

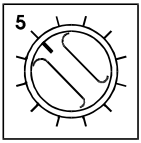
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

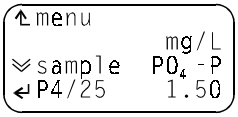


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



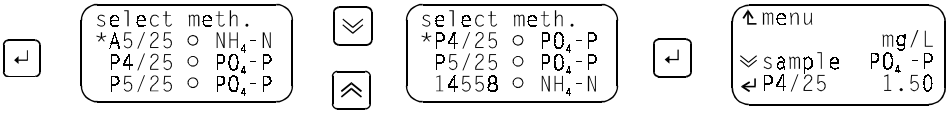
Select
filter position 5.



Check display:
P4/25 set?

If required: Set method P4/25.

MPM 2010 / MPM 3000

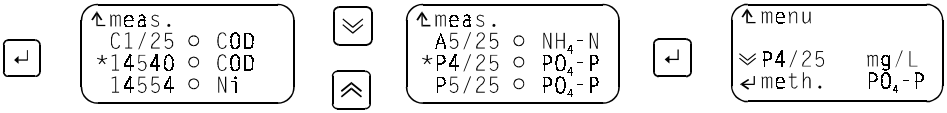


Enter selection of methods:
Press key.

Scroll until P4/25 is set.

Confirm:
Press key.

MultiLab P5

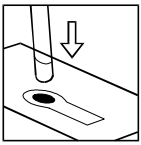


Enter selection of methods:
Press key.

Scroll until P4/25 is set.

Confirm:
Press key.

Measurement



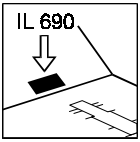
Insert cell.
Read measured value.

No zero adjustment required.

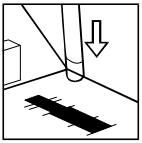
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4 -P	0.05 - 1.50 mg/l	4 ml	14 mm	01.60
P_{total}	0.05 - 1.50 mg/l	4 ml	14 mm	01.60
PO_4	0.20 - 4.50 mg/l	4 ml	14 mm	04.90
P_2O_5	0.11 - 3.44 mg/l	4 ml	14 mm	03.66

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



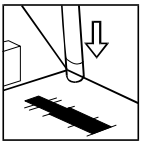
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

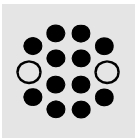
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (Only with colored or turbid samples)

Pipette 4 ml of sample solution into a reaction cell, mix.

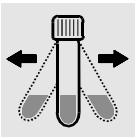
Add 1 dose of **PO_4-2** with the green measurer; close with screw cap.



Heat cell in the thermoreactor for 30 minutes at 100°C, better 120°C.

Remove cell from the thermoreactor, allow to cool to room temperature in the round cell rack.

Add 1 dose of **PO_4-3** with the blue measurer; close with screw cap.



Shake cell vigorously to dissolve solids.

Measurement: (see instruction manual of the meter: „Sample blank value correction“).

Note: After determination of the sample blank value use the solution as measuring solution. Continue in paragraph „Analysis: Procedure" by adding 4 drops of reagent PO_4-4.

Model

P5/25 Total **Phosphate 15 (PO_4)**

Total **Phosphorus (P)**

Order number	250 368	
Safety instructions	Observe danger marks on the individual parts of the kit!	
Method	Determination as molybdenum blue after acidic hydrolysis and oxidation at 100°C, better 120°C.	
Applicability	Drinking water Wastewater Seawater	
Interferences	Strongly alkaline sample solutions Strongly acidic sample solutions	Action: Adjust to pH 3-10 with caustic soda lye or sulphuric acid.
	Higher amounts of organic compounds or organic phosphoric compounds	Action: Decomposition with nitric acid/ sulphuric acid
Procedure characteristics	See lot certificate according to DIN 38402 part 51 (ask for lot certificate when required).	
Storage	At 5°C to 25°C (Observe expiry date on the label!).	
Disposal	Request return forms from: WTW GmbH, Dr.-Karl-Slevogt-Str. 1, D-82362 Weilheim	
Sample material	Preservation not required.	

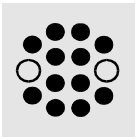
Measuring range

	Measuring range	Sample volume	Cell
Total Phosphate Phosphorus	**0.3 - 15.0 mg/l PO_4-P**	0.5 ml	14 mm
Total Phosphorus	**0.3 - 15.0 mg/l P_{total}**	0.5 ml	14 mm
Total Phosphate	**1.0 - 45.0 mg/l PO_4**	0.5 ml	14 mm
Total Phosphorus Pentoxide	**0.7 - 34.4 mg/l P_2O_5**	0,5 ml	14 mm

Analysis: Procedure

Pipette 0.5 ml of sample solution into a reaction cell, mix.

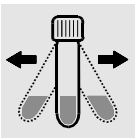
Add 1 dose of **PO_4-2** with the green measurer, close with screw cap.



Heat cell in thermoreactor for 30 minutes at 100°C, better 120°C.

Remove cell from the thermoreactor, allow to cool to room temperature in the round cell rack.

Add 1 dose of **PO_4-3** with the blue measurer, close with screw cap.



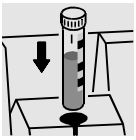
Shake cell vigorously to dissolve solids.

Add 4 drops of **PO_4-4**, mix.

Reaction time: 10 minutes.

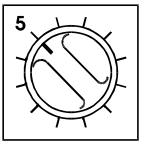
Measurement **(The color of the test sample remains stable for at least 60 minutes!)**

PhotoLab S6
PhotoLab S12
PhotoLab Spektral

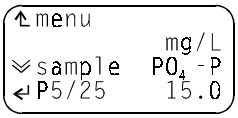


Insert cell in the cell shaft.
Read measured value.

MPM 2010
MPM 3000
MultiLab P5



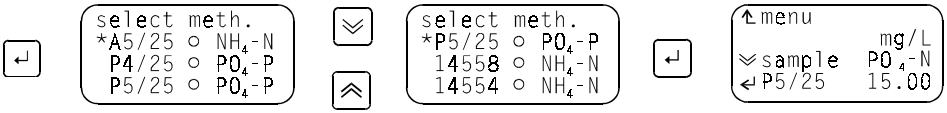
Select
filter position 5.



Check display:
P5/25 set?

If required: Set method P5/25.

MPM 2010 / MPM 3000

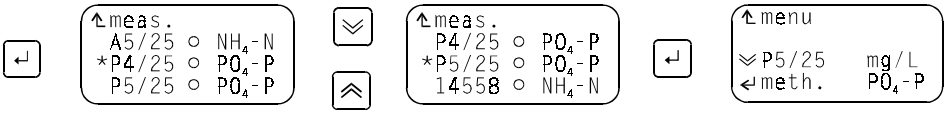


Enter selection of methods:
Press key.

Scroll until P5/25 is set.

Confirm:
Press key.

MultiLab P5



Enter selection of methods:
Press key.

Scroll until P5/25 is set.

Confirm:
Press key.

Measurement

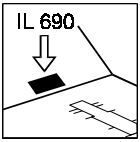
Insert cell.
Read measured value.

No zero adjustment required.

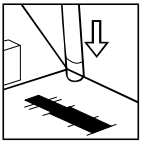
Factors for MPM 1000/1500

	Measuring range	Sample volume	Cell	Factor MPM 1000/1500
PO_4-P	0.3 - 15.0 mg/l	0.5 ml	14 mm	012.8
P_{total}	0.3 - 15.0 mg/l	0.5 ml	14 mm	012.8
PO_4	1.0 - 45.0 mg/l	0.5 ml	14 mm	039.4
P_2O_5	0.7 - 34.4 mg/l	0.5 ml	14 mm	029.3

MPM 1000
MPM 1500



Insert filter IL 690 into filter compartment, lettering shows to user.



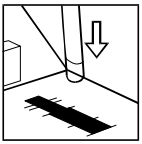
Insert cell with zero solution.

N

Press key: **Zero adjustment.**

F

Press key: Enter **factors** according to above table.



Test sample: Insert cell with test sample.

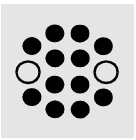
M

Press key: **Concentration** in mg/l is displayed.

Sample blank solution (with colored or turbid samples only)

Pipette 0.5 ml of sample solution into a reaction cell, mix.

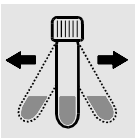
Add 1 dose of **PO_4-2** with the green measurer; close with screw cap.



Heat cell in the thermoreactor for 30 minutes at 100°C, better 120°C.

Remove cell from the thermoreactor, allow to cool to room temperature in the round cell rack.

Add 1 dose of **PO_4-3** with the blue measurer; close with screw cap.



Shake cell vigorously to dissolve solids.

Measurement: (see instruction manual of the meter: „Sample blank value correction“).

Note: After determination of the sample blank value use the solution as measuring solution. Continue with paragraph „Analysis: Procedure" by adding 4 drops of reagent PO_4-4.