Phosphate h. TT M325

0.02 - 1.6 mg/L P[b)]

Phosphomolybdenum Blue

Instrument specific information

The test can be performed on the following devices. In addition, the required cuvette and the absorption range of the photometer are indicated.

Instrument Type	Cuvette	λ	Measuring Range
MD 600, MD 610, MD 640, MultiDirect	ø 16 mm	660 nm	0.02 - 1.6 mg/L P[b)]
SpectroDirect, XD 7000, XD 7500	ø 16 mm	890 nm	0.02 - 1.6 mg/L P[b)]

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Phosphate, acid hydrolyzable, Total Set	1 Set	535250
ValidCheck Phosphate 0.3 mg/l PO_4 - 4	1 pc.	48241225
ValidCheck Phosphate 1 mg/l PO_4 - 4	1 pc.	48241425
ValidCheck DW Anions Multistandard Cl/F/NO_3/ PO_4/SO_4	1 pc.	48399312

The following accessories are required.

Accessories	Packaging Unit	Part Number
Thermoreactor RD 125	1 pc.	2418940

Application List

- Waste Water Treatment
- Drinking Water Treatment
- Raw Water Treatment

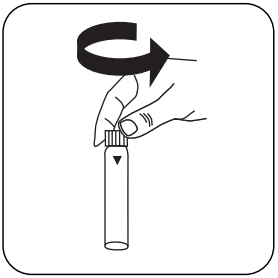
Preparation

1. Strongly buffered samples or samples with extreme pH values should be adjusted to between pH 6 and pH 7 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
2. Ortho-Phosphate ions react with the reagent to form an intense blue colour. Phosphate, which is found in organic and condensed, inorganic (meta-, pyro- and polyphosphate) forms, must therefore be converted into ortho-phosphate ions prior to analysis. The pretreatment of the sample with acid and heat creates the conditions for the hydrolysis of the condensed, inorganic forms. Organically bound phosphate can be converted into ortho-phosphate ions by heating with acid and Persulphate.
   The amount of organically bound phosphate can be calculated:
   mg/L organic Phosphate = mg/L Phosphate, total - mg/L Phosphate, can be hydrolysed in acid.

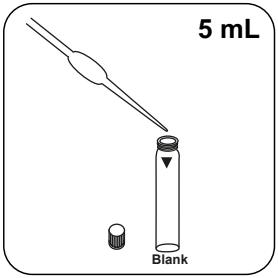
Notes

1. The reagent Vario Phosphat Rgt. F 10 need to be shaked directly after addition like described in the following procedure. If significant time elapsed before shaking precision can be decreased. After 10 to 15 sec. of shaking some parts of the reagent stay undissolved.

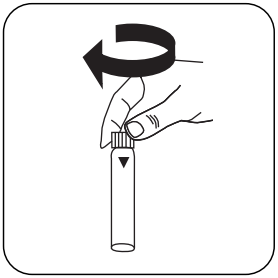
Digestion



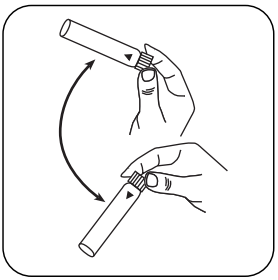
Open a digestion vial **PO_4-P Acid Reagent**.



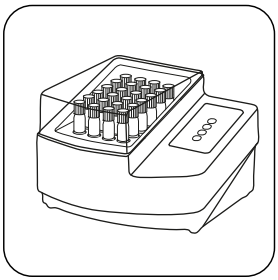
Put **5 mL sample** in the vial.



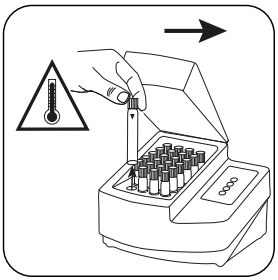
Close vial(s).



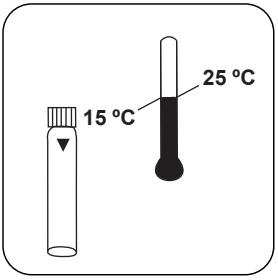
Invert several times to mix the contents.



Seal the vials in the pre-heated thermoreactor for **30 minutes at 100 °C** .



Remove the vial from the thermoreactor. **(Note: vial will be hot!)**

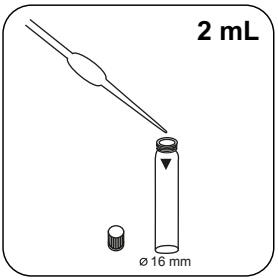


Allow the sample to cool to room temperature.

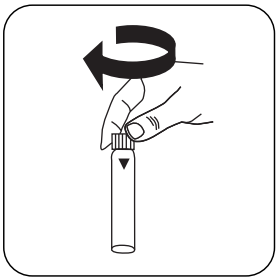
Determination of Phosphate, can be hydrolysed in acid, with Vario Vial Test

Select the method on the device.

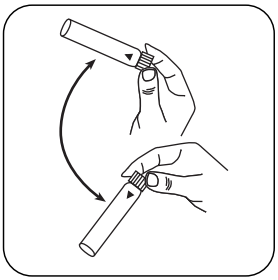
For testing of **Phosphate, acid hydrolyzable, with Vario tube tests,** carry out the described **digestion**.



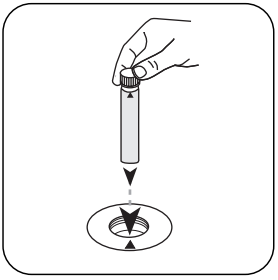
Add **2 mL 1,00 N Sodium Hydroxide solution** to the digested sample.



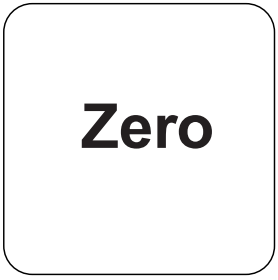
Close vial(s).



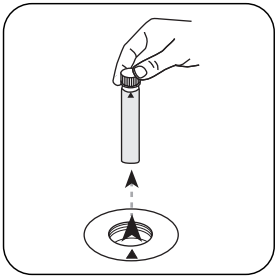
Invert several times to mix the contents.



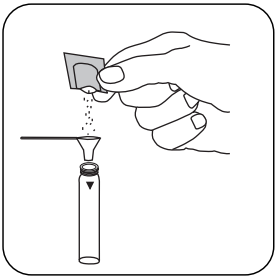
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



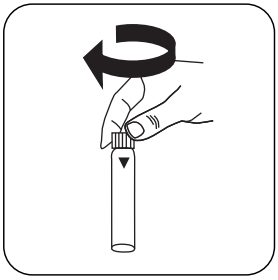
Press the **ZERO** button.



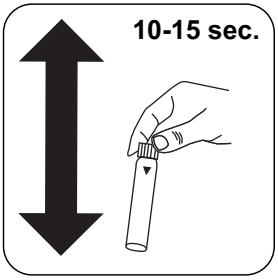
Remove **vial** from the sample chamber.



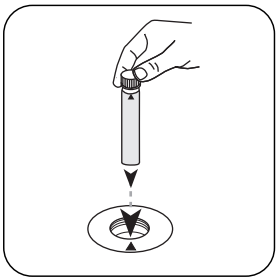
Add **Vario Phosphate Rgt. F10 powder pack**.



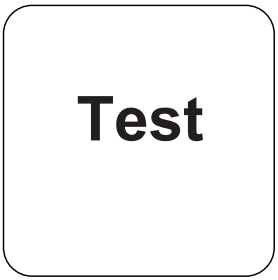
Close vial(s).



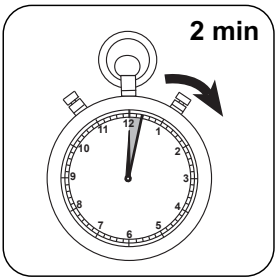
Mix the contents by shaking. (10-15 sec.).



Place **sample vial** in the sample chamber. • Pay attention to the positioning.



Press the **TEST** (XD: **START**)button.



Wait for **2 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically.

The result in mg/L acid hydrolyzable Phosphate appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	P	1
mg/l	PO_4^{3-}	3.0661
mg/l	P_2O_5	2.2913

Chemical Method

Phosphomolybdenum Blue

Appendix

Calibration function for 3rd-party photometers

Conc. = a + b•Abs + c•Abs^2 + d•Abs^3 + e•Abs^4 + f•Abs^5

	ø 16 mm
a	$-1.65745 \cdot 10^{-2}$
b	$1.75186 \cdot 10^{+0}$
c	
d	
e	
f	

Interferences

Persistant Interferences

- Large amounts of unresolved solids can cause non-reproducible measurement results.

Interference	from / [mg/L]
Al	200
AsO_4^{3-}	in all quantities
Cr	100
Cu	10
Fe	100
Ni	300

Interference	from / [mg/L]
H_2S	in all quantities
SiO_2	50
$Si(OH)_4$	10
S^{2-}	in all quantities
Zn	80

According to

ISO 6878-1-1986,
DIN 38405 D11-4
Standard Method 4500-P E
US EPA 365.2

[b] Reactor is necessary for COD (150 °C), TOC (120 °C) and total -chromium, - phosphate, -nitrogen, (100 °C)