

APC349  
Phosphorus total

**MR 0,05 – 1,50 mg/L PO<sub>4</sub>-P / 0,15 – 4,50 mg/L PO<sub>4</sub>**

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DOC312.53.94347

### Principle

Phosphate ions react with molybdate and antimony ions in an acidic solution to form an antimonyl phosphomolybdate complex, which is reduced by ascorbic acid to phosphormolybdenum blue

### Range of Application

Waste water, drinking water, boiler water, surface water, process analysis

### Interferences

T1	
5000 mg/l: SO <sub>4</sub> <sup>2-</sup>	50 mg/l: Co <sup>2+</sup> , Fe <sup>2+</sup> ,
2000 mg/l: Cl <sup>-</sup>	Fe <sup>3+</sup> , Zn <sup>2+</sup> , Cu <sup>2+</sup> , Ni <sup>2+</sup> ,
1000 mg/l: K <sup>+</sup> , Na <sup>+</sup>	I <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , Cd <sup>2+</sup> , NH <sub>4</sub> <sup>+</sup> ,
500 mg/l: NO <sub>3</sub> <sup>-</sup>	Mn <sup>2+</sup> , Al <sup>3+</sup> , CO <sub>3</sub> <sup>2-</sup> , SiO <sub>2</sub>
250 mg/l: Ca <sup>2+</sup>	5 mg/l: Sn <sup>4+</sup> , Hg <sup>2+</sup>
100 mg/l: Mg <sup>2+</sup>	2.5 mg/l: Ag <sup>+</sup> , Pb <sup>2+</sup>
	1 mg/l: Cr <sup>3+</sup>
	0.5 mg/l: Cr <sup>6+</sup>

The ions listed in T1 have been individually checked up to the given concentrations and do not cause interference. We have not determined cumulative effects and the influence of other ions.

The measurement results must be subjected to plausibility checks (dilute and/or spike the sample).

Sample Volume	2,0 mL
Reagent B Volume	0,2 mL
Reagent C Volume	0,2 mL
Reagent B Filling	60 mL
Reagent C Filling	30 mL
Reagent D Filling	12 g
Digestion Temperature/Time	120°C/30 min. or 110°C/60 min.
Temperature Sample/sample cuvette	15 – 25°C
pH sample	2 – 10

AP3900 multi with HT-Module can also use:

**Digestion Temperature/Time**                      **170°C/15 min.**

### Please note:

With AP3900 Software Version 1.0.7.5 or higher a digestion temperature of 120°C is possible to be chosen.

So the tests for TP (APC348 / APC349 / APC350) can be run at 120°C/30 min. to save time and to have identical time and temperature as manual handling with LCK348 / LCK349 / LCK350.

There is no change in the quality of the results by switching from 110°C/60 min. to 120°C/30min. procedure. There is no calibration update needed.

## Method Library:

APC349 total is pre-programmed in the method library. Please check under Settings/Software/Application/Methods **Phosphate** and Tests **APC349**.

Settings

General Methods/Tests QC/Blanks Reagents trays Colors Remote messaging Other parameters

Sample profiles Methods Tests Other parameters

Methods definitions:

- Ammonium Chloride
- COD
- COD high
- Formaldehyde
- ISO-COD
- LCA722
- LCA722\_Reagent
- LCK Ammonium
- Nitrate
- Nitrite
- Orthophosphate
- Phenol
- Phosphate**
- Reagent Volume
- Sample Volume
- TN<sub>b</sub>

Add Method

Delete Method

Reading 1 (Concentration):

Low-range test: APC349 Underrange: 0.050 Overrange: 1.500

Middle-range test: APC348 Underrange: 0.500 Overrange: 5.000

High range test: APC350 Underrange: 2.000 Overrange: 20.000

Redo samples with underrange error if possible.

Redo samples with overrange error if possible.

-> High-range cuvette overrange dilution factor: 2

Use default samplevolume if sample is diluted for the test before using lower range test.

Redo samples with other error (barcode/absorption error).

Method priority level: 5

Stir sample in samplecup by default.

Always clean/flush needle after aspirating/dispensing sample.

Waiting time after start processing cuvet before starting processing next cuvet of test: 0 sec.

OK

Cancel

## Example: Setting 120°C / 30 min.

Settings

General Methods/Tests QC/Blanks/Second-IDs Reagents trays Colors Remote messaging Other parameters

Sample profiles Methods Tests Other parameters

Tests definitions:

- APC114
- APC138
- APC238
- APC303
- APC304
- APC304B
- APC314
- APC338
- APC339
- APC340
- APC341
- APC342
- APC346 I
- APC346 II
- APC348
- APC348<sub>o</sub>
- APC349**
- APC349<sub>o</sub>
- APC350
- APC350<sub>o</sub>
- APC394
- APC400
- APC500
- APC814
- LCA722\_0.5
- LCA722\_2.0
- LCA722\_R\_0.5
- LCA722\_R\_2.0
- LCK014
- LCK049
- LCK1014
- LCK1414
- LCK1714
- LCK1814
- LCK1914

Add test

Delete test

1. Add sample to cuvette Volume (µl): 2000 Speed (µl/s): 500 500 Sampling Z-offset (mm): -1

2. Rotate cap of cuvette

3. Shake cuvette vertical Time (sec): 5 Speed (%): 40

4. Heat cuvette in heater Time (min): 30 Temperature: 120 °C Priority: Normal

5. (Cooling) delay cuvette Time (min): 20 Priority: Normal

6. Add reagent to cuvette Volume (µl): 200 Speed (µl/s): 400 400 Reagent: B 348/349/350

7. Add reagent to cuvette Volume (µl): 200 Speed (µl/s): 400 400 Reagent: C 348/349/350

8. Shake cuvette by inversion Time (sec): 10 Speed inv. (%): 50 Speed rot. (%): 50

9. (Cooling) delay cuvette Time (min): 10 Priority: Normal

10. Measure cuvette

11. None

12. None

13. None

14. None

15. None

Blank measurement needed for test.  Only measure blank.

Re-create blank if re-measurement is needed for test.

Final capping overload (0-99%): 40

Use reaction-cuvette:

Blank extinction: 0 mE.  Use nominal blank absorbance if out of range.

Blank tolerance: 0 mE. Nominal absorbance factor: 0.00

OK

Cancel

## Note

The APC349 total needs a preparation of Reagent C:

Use the delivered spoon and take 2 spoonful of Reagent D into Solution C. Invert it for approximately 30 seconds (until it's solved). This solution is stable for 5 days at room temperature.

## Alternative with AP3900 Multi with HT-Module:

Settings

General | Methods/Tests | QC/Blanks/Second-IDs | Reagents trays | Colors | Remote messaging | Other parameters

Sample profiles | Methods | Tests | Other parameters

Tests definitions:

Step	Action	Volume (µl)	Speed (µl/s)	Speed (mm)	Sampling Z-offset (mm)	Time (sec)	Time (min)	HT Temperature	Priority	Reagent	Speed rot. (%)
1	Add sample to cuvette	2000	500	500	-1				Normal		
2	Rotate cap of cuvette										
3	Shake cuvette vertical					5		40			
4	Heat cuvette in HT-Unit						15	170	Normal		
5	(Cooling) delay cuvette						20		Normal		
6	Add reagent to cuvette	200	400	400						B 348/349/350	
7	Add reagent to cuvette	200	400	400						C 348/349/350	
8	Shake cuvette by inversion					10		50			50
9	(Cooling) delay cuvette						10		Normal		
10	Measure cuvette										
11	None										
12	None										
13	None										
14	None										
15	None										

Blank measurement needed for test.     Only measure blank.  
 Re-create blank if re-measurement is needed for test.

Blank extinction: 0 mE.     Use nominal blank absorbance if out of range.  
 Blank tolerance: 0 mE.    Nominal absorbance factor: 0.00

Final capping overload (0-99%): 40  
 Use reaction-cuvette:

## Run the APC349 total Phosphorous method

Create a Run like described in the QUICK GUIDE

- Place the APC349 cuvettes according to the settings in the Software in the cuvette racks.
- Place the samples according to the settings in the Software in the sample racks
- Place the Reagent B and C according to the settings in the Reagent trays

Settings

General | Methods/Tests | AQC/Blanks | Reagents trays

Tray 1 (Left):

Position	Name	Volume	Re-filled
Position 1:	A 339	50.00	<input checked="" type="checkbox"/>
Position 2:	A 340	5.20	<input type="checkbox"/>
Position 3:		0.00	<input type="checkbox"/>
Position 4:		0.00	<input type="checkbox"/>
Position 5:	B 348/349/350	27.00	<input type="checkbox"/>
Position 6:	C 348/349/350	29.60	<input type="checkbox"/>

Volume in reagents cup:  
 Volume in filled reagents cup: 50 ml.  
 Warning level reagents cup: 5 ml.

Other liquid level settings:  
 Tray definition -> Max. Liquid level: 300  
 10th of mm -> ml: 12

- Check if fresh and enough pipette tips are available
- Check if enough Rinsing/Dilution water is available
- Initialize the AP 3900 multi and the Dispenser



HACH LANGE GMBH  
 Willstätterstraße 11  
 D-40549 Düsseldorf

Tel. +49 (0) 2 11 52 88-0  
 Fax +49 (0) 2 11 52 88-143

info-de@hach.com  
 www.hach.com