Supelco®

1.14833.0001

Spectroquant®

Lead Cell Test

Pb

1. Method

In alkaline solution lead(II) ions react with 4-(2'-pyridylazo)resorcinol (PAR) to form a red complex that is determined photometrically.

2. Measuring range and number of determinations

Measuring range	Number of determinations
0.10 - 5.00 mg/l Pb	25

For programming data for selected photometers / spectrophotometers see www.service-test-kits.com.

3. Applications

This test measures only lead(II) ions. Samples must be decomposed by digestion before undissolved or complex-bound lead can be measured (see section 6).

Sample material:
Groundwater and surface water
Drinking water and mineral water
Industrial water
Wastewater and percolating water
Sewage sludge after appropriate sample preteatment
Soils after appropriate sample preteatment
This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked individually in solutions containing 2 and 0 mg/l Pb. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l or %							
Ag^+	100	Cu^{2+}	100	NH_4^+	1000	**EDTA**	**0.1**
Al^{3+}	1000	F^-	1000	Ni^{2+}	100	Surfactants[2]	1000
Ca^{2+}	**70 (500[1])**	**Fe^{3+}**	**2**	NO_2^-	100	Na-acetate	10 %
Cd^{2+}	100	Hg^{2+}	50	PO_4^{3-}	1000	NaCl	20 %
Cr^{3+}	**10**	**Mg^{2+}**	**100 (250[1])**	Zn^{2+}	100	$NaNO_3$	20 %
$Cr_2O_7^{2-}$	50	**Mn^{2+}**	**0.1**			Na_2SO_4	1 %

[1] applicable for determination acc. to **procedure B**
[2] tested with nonionic, cationic, and anionic surfactants

5. Reagents and auxiliaries

Please note the warnings on the packaging materials! Caution! The reaction cells contain potassium cyanide!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

Package contents:
1 bottle of reagent Pb-1K
1 bottle of reagent Pb-2K
25 reaction cells
1 sheet of round stickers for numbering the cells

Other reagents and accessories:
Nitric acid 65 % for analysis EMSURE®, Cat. No. 100456
Spectroquant® Crack Set 10C, Cat. No. 114688
+ thermoreactor
or
Spectroquant® Crack Set 10, Cat. No. 114687
+ empty cells 16 mm with screw caps (25 pcs), Cat. No. 114724
+ thermoreactor
MQuant® Total Hardness Test, Cat. No.110025,
measuring range <4 - >26 °e (<3 - >21 °d)
MQuant® Universal indicator strips pH 0 - 14, Cat. No. 109535
Ammonia solution 25 % for analysis EMSURE®, Cat. No. 105432
Nitric acid Titrisol® for 1 mol/l, Cat. No. 109966
Spectroquant® CombiCheck 100, Cat. No. 118701

Pipette for a pipetting volume of 5.0 ml

6. Preparation

- Analyze immediately after sampling. Otherwise preserve with nitric acid 65 % (1 ml nitric acid per 1 l of sample solution).
- Undissolved or complex-bound lead can be determined after pretreatment of the sample using one of the Spectroquant® Crack Sets.
- Check the hardness of water with the MQuant® Total Hardness Test. The procedure for the lead determination depends on the hardness of the water to be tested (see section 7).
- **The pH must be within the range 3 - 6.**
  Adjust, if necessary, with dilute ammonia solution or nitric acid.
- Filter turbid samples.

7. Procedure

Procedure A for the determination of lead **in soft to medium hard waters** with a Ca^{2+} content lower than 70 mg/l (approx. 12.3 °e ≙ 10 °d):

Caution! The reaction cells contain potassium cyanide! At all costs adhere to the specified dosage sequence!		
Reagent Pb-1K	5 drops[1]	Place into a reaction cell, **close the cell tightly,** and mix.
Pretreated sample (**10 - 40 °C**)	5.0 ml	Add with pipette, **immediately close** the cell **tightly**, and mix.
Measure the sample in the photometer: **result A**		

[1] **Hold the bottle vertically while adding the reagent!**

Procedure B for the determination of lead **in hard to very hard waters** with a Ca^{2+} content between 70 and 500 mg/l (approx. 12.3 and 87.5 °e ≙ 10 and 70 °d):

Determine result A according to procedure A. Using **the same reaction cell**, continue as follows:		
Reagent Pb-2K	1 level grey microspoon (in the cap of the Pb-2K bottle)	**Carefully** open the reaction cell. Add, **close the cell tightly**, and shake **until the reagent is completely dissolved**.
Measure the sample anew: **result B** **Lead content in mg/l = result A - result B**		

Notes on the measurement:

- If **procedure B** is used, the temperatures of the respective measurement solutions must be identical for measured result A and measured result B.
- For photometric measurement the cells must be clean.
  Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-high readings.
- The pH of the measurement solution must be within the range 8.0 - 10.0.
- The color of the measurement solution remains stable for at least 60 min.

8. Analytical quality assurance

recommended before each measurement series
To check the photometric measurement system (test reagents, measurement device, handling) and the mode of working, Spectroquant® CombiCheck 100 can be used. Besides a **standard solution** with 2.00 mg/l Pb^{2+}, this article also contains an **addition solution** for determining sample-dependent interferences (**matrix effects**).
Additional notes see under **www.qa-test-kits.com**.
For quality and batch certificates for Spectroquant® test kits see the website, where you will find all data in production control, that are determined in accordance with ISO 8466-1 and DIN 38402 A51.

9. Notes

- Reclose the reagent bottles immediately after use.
- **The test reagents must not be run off with the wastewater! Information on disposal can be obtained at www.disposal-test-kits.com.**

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