

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 pretreatment
Soils after appropriate sample pretreatment
This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked 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.

Concentrations of foreign substances in mg/l or %					
Ag ⁺	100	Cu ²⁺	100	NH ₄ ⁺	1000
Al ³⁺	1000	F ⁻	1000	Ni ²⁺	100
Ca ²⁺	70 (500 ¹⁾)	Fe ³⁺	2	NO ₂ ⁻	100
Cd ²⁺	100	Hg ²⁺	50	PO ₄ ³⁻	1000
Cr ³⁺	10	Mg ²⁺	100 (250 ¹⁾)	Zn ²⁺	100
Cr ₂ O ₇ ²⁻	50	Mn ²⁺	0.1	EDTA	0.1
				Surfactants ²⁾	1000
				Na-acetate	10 %
				NaCl	20 %
				NaNO ₃	20 %
				Na ₂ SO 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)

MColorpHast™ 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 40, Cat. No. 114692

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 Ca²⁺ 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 Ca²⁺ 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:

- 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 40 can be used. Besides a **standard solution** with 2.00 mg/l Pb²⁺, this article also contains an **addition solution** for determining sample-dependent interferences (matrix effects).

Additional notes see under www.qa-test-kits.com.

Characteristic quality data:

In the production control, the following data were determined in accordance with ISO 8466-1 and DIN 38402 A51:

Standard deviation of the method (mg/l Pb)	± 0.016
Coefficient of variation of the method (%)	± 0.62
Confidence interval (mg/l Pb)	± 0.04
Number of lots	26

Characteristic data of the procedure:

Sensitivity: Absorbance 0.010 A corresponds to (mg/l Pb)	0.04
Accuracy of a measurement value (mg/l Pb)	max. ± 0.08

For quality and batch certificates for Spectroquant® test kits see the website.

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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