

1.14622.0001

Spectroquant® Tin Cell Test

Sn

1. Method

In acidic solution, in the presence of a cationic surfactant tin(IV) reacts with pyrocatechol violet to form a blue complex that is determined photometrically.

2. Measuring range and number of determinations

Measuring range	Number of determinations
0.10 - 2.50 mg/l Sn	25

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

3. Applications

With the exception of tin(IV) oxide this test measures the total tin content, because tin is present as tin(IV) in real samples and reacts also in complex-bound form.

Sample material:

Wastewater
Electroplating-bath solutions

4. Influence of foreign substances

This was checked in solutions containing 1 and 0 mg/l Sn. 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⁺	5 ¹⁾	Fe³⁺	10	S²⁻	5
Al ³⁺	1000	Hg²⁺	5	SCN ⁻	50
Ca ²⁺	1000	Mg²⁺	1000	SiO ₃ ²⁻	1000
Cd ²⁺	1000	Mn²⁺	1000	SO ₃ ²⁻	100
CN ⁻	100	MoO₄²⁻	0.1	S ₂ O ₃ ²⁻	50
CO ₃ ²⁻	500	NH₄⁺	1000	S ₂ O ₈ ²⁻	1000
Cr ³⁺	50 ²⁾	Ni²⁺	500 ²⁾	Zn ²⁺	1000
Cr₂O₇²⁻	1	NO₂⁻	10		
Cu ²⁺	100 ²⁾	Pb²⁺	1000		
F ⁻	1000	PO₄³⁻	1000		
				EDTA	1000
				NTA	1000
				Free chlorine	5
				Hydrazine	1000
				Surfactants ³⁾	1000
				Na-acetate	0.1 %
				NaCl	20 %
				NaNO ₃	20 %
				Na ₂ SO ₄	20 %

¹⁾ Turbidity occurs at higher concentrations.

²⁾ At higher concentrations the intrinsic colouration interferes with the determination.

³⁾ tested with nonionic, cationic, and anionic surfactants

5. Reagents and auxiliaries

Please note the warnings on the packaging materials!

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 Sn-1K
25 reaction cells
1 sheet of round stickers for numbering the cells

Other reagents and accessories:

Water for on-line analysis, Cat. No. 101051
Sulfuric acid 95 - 97 % for analysis EMSURE®, Cat. No. 100731
MQuant™ Tin Test, Cat. No. 110028,
measuring range 10 - 200 mg/l Sn
MColorpHast™ pH-indicator strips pH 0 - 6.0, Cat. No. 109531
Sulfuric acid 0.5 mol/l TitriPUR®, Cat. No. 109072

Pipette for a pipetting volume of 5.0 ml

6. Preparation

- Analyze immediately after sampling.
- Sample preparation for the determination of tin in electroplating baths (Wear eye protection!):**

In a 1000-ml volumetric flask first place 800 ml of distilled water¹⁾ and afterwards carefully 25 ml of sulfuric acid 95 - 97 % and mix. Subsequently add exactly 1.00 ml of the tin-bath solution to be tested with a pipette, make up to the mark with distilled water¹⁾, and mix thoroughly (dilution 1 + 999, dilution factor 1000).
Check whether the tin content of this solution is within the measuring range.

¹⁾ It is recommended to use water for on-line analysis, Cat. No. 101051.

- Check the tin content with the MQuant™ Tin Test.
Samples containing more than 2.50 mg/l Sn must be diluted with distilled water immediately before the measurement.
- The pH must be below 3.**
Adjust, if necessary, with sulfuric acid.
- Filter turbid samples.

7. Procedure

Reagent Sn-1K	6 drops ¹⁾	Place into a reaction cell and mix.
Pretreated sample (10 - 40 °C)	5.0 ml	Add with pipette, close the cell, and mix. The pH must be within the range 1.5 - 3.5. Check with Acilit® indicator strips. Adjust the pH, if necessary, with sulfuric acid.
Leave to stand for exactly 15 min (reaction time), then measure the sample in the photometer.		

¹⁾ Hold the bottle vertically while adding the reagent!

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 1.5 - 3.5.
- The color of the measurement solution remains stable for only a short time.** (After 30 min the measurement value would have increased by 5 %.)

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, a freshly prepared tin standard solution containing 1.00 mg/l Sn (application see the website) can be used. Sample-dependent interferences (matrix effects) can be determined by means of standard addition.

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 Sn)	± 0.026
Coefficient of variation of the method (%)	± 1.9
Confidence interval (mg/l Sn)	± 0.06
Number of lots	12

Characteristic data of the procedure:

Sensitivity: Absorbance 0.010 A corresponds to (mg/l Sn)	0.01
Accuracy of a measurement value (mg/l Sn)	max. ± 0.08

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

9. Notes

- Reclose the reagent bottle 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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