1.00809.0001

Spectroquant®

Fluoride Cell Test

F^-

1. Method

In a buffered, weakly acidic solution, fluoride ions react with alizarin complexone and lanthanum(III) to form a violet complex that is determined photometrically.
The method is analogous to EPA 340.3 and APHA 4500-F^- E.

2. Measuring range and number of determinations

Measurement in	Measuring range mg/l F^-	Number of determinations
reaction cell	**0.10 - 1.80**	25
50-mm rectangular cell	0.025 - 0.500	

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

3. Applications

This test does not measure any complex fluorine compounds as occur in some cases in galvanic waste water.

Sample material:
Groundwater, surface water, and brackish water
Drinking water and mineral water
Wastewater and percolating water
This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked in solutions containing 1 (0.25) and 0 mg/l F^-. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. The values in parentheses apply for the measuring range 0.025 - 0.500 mg/l F^- (see section 7).

Concentrations of foreign substances in mg/l or %					
Ag^+	**1 (1)**	**Mn^{2+}**	**10 (10)**	**EDTA**	**10 (10)**
Al^{3+}	**0.1 (0.1)**	NH_4^+	1000 (1000)	**Free chlorine**	**10 (10)**
Ca^{2+}	250 (250)	**Ni^{2+}**	**0.1 (0.1)**	Anionic surfactants[1]	1000 (1000)
Cd^{2+}	**10 (10)**	NO_2^-	1000 (1000)	**Cationic surfactants[2]**	**10 (10)**
CN^-	**10 (10)**	**Pb^{2+}**	**1 (0.2)**	Nonionic surfactants[3]	1000 (1000)
CO_3^{2-}	500 (250)	PO_4^{3-}	20 **(10)**	Na-acetate	10 % (10 %)
Cr^{3+}	**10 (0.1)**	**S^{2-}**	**10 (10)**	NaCl	10 % (10 %)
$Cr_2O_7^{2-}$	100	SiO_3^{2-}	500 (500)	$NaNO_3$	10 % (10 %)
Cu^{2+}	**0.2 (0.1)**	**Zn^{2+}**	**0.2 (0.2)**	Na_2SO_4	10 % (10 %)
Fe^{3+}	**0.2 (0.1)**				
Hg^{2+}	**1 (1)**				
Mg^{2+}	250 **(5)**				

[1] tested with Na-dodecyl sulfate
[2] tested with N-cetyl-N,N,N-trimethylammonium bromide
[3] tested with Triton® X-100

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

Other reagents and accessories:
MColorpHast™ Universal indicator strips pH 0 - 14, Cat. No. 109535
Sodium hydroxide solution 1 mol/l TitriPUR®, Cat. No. 109137
Sulfuric acid 0.5 mol/l TitriPUR®, Cat. No. 109072
Water for analysis EMSURE®, Cat. No. 116754
Fluoride standard solution CertiPUR®, 1000 mg/l F^-, Cat. No. 119814

Pipette for a pipetting volume of 5.0 ml
Pipette for a pipetting volume of 10 ml
Rectangular cells 50 mm (2 pcs), Cat. No. 114944

6. Preparation

- **The pH must be within the range 3 - 8.**
  Adjust, if necessary, with sodium hydroxide solution or sulfuric acid.
- Filter turbid samples.

7. Procedure

Measuring range 0.10 - 1.80 mg/l F^-:

Pretreated sample (**10 - 40 °C**)	**5.0 ml**	Pipette into a **reaction cell**, close the cell, and mix.
Reagent F-1K	1 level blue microspoon (in the cap of the F-1K bottle)	Add and shake **vigorously until the reagent is completely dissolved**.
Leave to stand for 15 min (reaction time), then **shake the cell anew**, and measure the sample in the photometer.		

Measuring range 0.025 - 0.500 mg/l F^-:

	Measurement sample	**Blank** (only 1x per series)	
Pretreated sample (**10 - 40 °C**)	**10 ml**	-	Pipette into a **reaction cell**, close the cell, and mix.
Distilled water[1] (**10 - 40 °C**)	-	**10 ml**	Pipette into a **reaction cell**, close the cell, and mix.
Reagent F-1K	1 level blue microspoon (in the cap of the F-1K bottle)	1 level blue microspoon (in the cap of the F-1K bottle)	Add, close the cell tightly, and shake **vigorously until the reagent is completely dissolved**.
Leave to stand for 15 min (reaction time), then **shake the cell anew**. Subsequently fill the measurement sample and the blank into **two separate 50-mm rectangular cells** and measure in the photometer.			

[1] It is recommended to use water for analysis EMSURE®, Cat. No. 116754.

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 4.4 - 4.7.
- The color of the measurement solution remains stable for at least 60 min after the end of the reaction time stated above.
- In the event of fluoride concentrations exceeding 5 mg/l, other reaction products are formed and false-low readings are yielded. In such cases it is advisable to conduct a plausibility check of the measurement results by diluting the sample (1:2, 1:10).

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 dilute fluoride standard solution containing 0.250 or 1.00 mg/l F^- 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:

	Measuring range mg/l F^-	
	0.025 - 0.500	**0.10 - 1.80**
Standard deviation of the method (mg/l F^-)	± 0.0058	± 0.009
Coefficient of variation of the method (%)	± 2.2	± 1.0
Confidence interval (mg/l F^-)	± 0.014	± 0.03
Number of lots	2	2

Characteristic data of the procedure:

	Measuring range mg/l F^-	
	0.025 - 0.500	**0.10 - 1.80**
Sensitivity: Absorbance 0.010 A corresponds to (mg/l F^-)	0.003	0.01
Accuracy of a measurement value (mg/l F^-)	max. ± 0.024	max. ± 0.06

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

9. Notes

- Reclose the reagent bottle immediately after use.
- **Information on disposal can be obtained at www.disposal-test-kits.com.**

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www.analytical-test-kits.com

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