Fluoride

DOC316.53.01550

Colorimetric Method

Method 10312

0.10 to 4.00 mg/L as F

Chemkey® Reagents

Scope and application: For drinking water. [1]

[1] EPA approved for drinking water cited at 40 CFR 141, Appendix A

Test preparation

Before starting

Make sure that the sample is colorless and the turbidity value is less than 20 NTU.
Use a new Chemkey for each measurement.
Do not touch the Chemkey with hands.
Do not move the Chemkey after it is installed in the meter.
The display shows a progress bar with the time that remains until the measurement is completed. Different parameters have different reaction times.
The meter automatically identifies the type of Chemkey(s) that is installed.
Refer to the meter documentation for additional information.
The Chemkeys are articles and have no MSDS/SDS.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

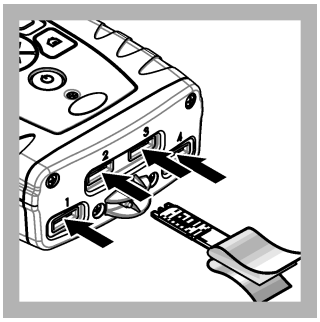
Items to collect

Description	Quantity
Fluoride Chemkey Reagents	1

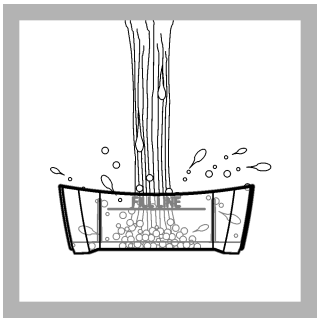
Refer to Consumables and replacement items on page 3 for order information.

Test procedure

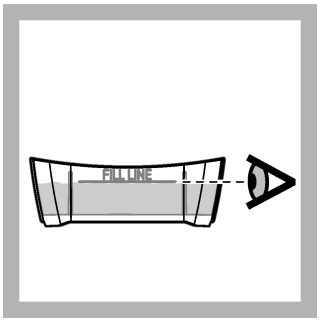
1. Peel back the packaging to show the end of the Chemkey. Do not touch the Chemkey with hands.



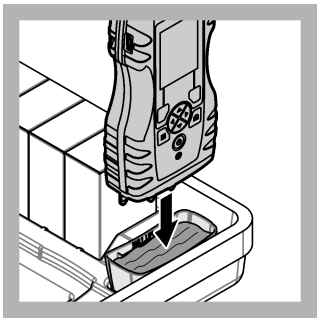
2. Put the Chemkey quickly in one movement into any slot. Carefully remove the packaging from the Chemkey.



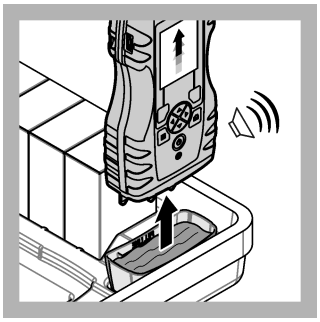
3. Rinse the sample cup with the sample.



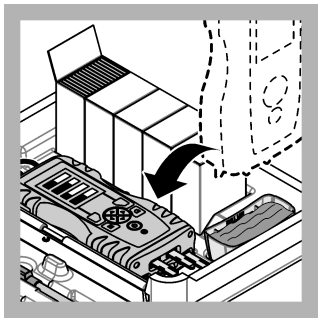
4. Fill the sample cup to the fill-line with sample.



5. Put the meter into the sample cup.



6. Wait for the sound alert and/or the meter removal animation (within 1 to 2 seconds), then immediately remove the meter from the sample cup.



7. Put the meter back into the case. Wait for the measurement to complete.

Interferences

The substances that are shown in Table 1 interfere in the fluoride determination.

Table 1 Interfering substances

Interfering substance	Interference level
Aluminum (Al^{3+})	Negative interference of 0.10 mg/L F with approximately 0.10 mg/L of dissolved Al.
Sulfate (SO_4^{2-})	Positive interference of 0.10 mg/L with approximately 750 mg/L of SO_4.

The substances that are shown in Table 2 do not interfere in the fluoride determination at or below the given concentration.

Table 2 Non-interfering substances

Substance	Maximum level tested	Substance	Maximum level tested
Alkalinity (as $CaCO_3$)	1000 mg/L	Manganese (Mn^{2+})	0.2 mg/L
Calcium (as $CaCO_3$)	1000 mg/L	Monochloramine (as Cl_2)	5.0 mg/L
Chloride (Cl^-)	1200 mg/L	Nitrate (NO_3^-–N)	50 mg/L
Copper (Cu^{2+})	2.0 mg/L	Phosphate (as PO_4^{3-})	4.0 mg/L
Free Chlorine (as Cl_2)	5.0 mg/L	Sodium (as Na^+)	500 mg/L
Iron (Fe^{2+})	1.0 mg/L	Zinc (Zn^{2+})	5.0 mg/L
Magnesium (as $CaCO_3$)	250 mg/L		

Accuracy check

Standard solution method

Use the standard solution method to validate the test procedure, the reagents and the instrument.

Items to collect:

- Standard solution within the test range

1. Use the test procedure to measure the concentration of the standard solution.
2. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard calibration adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are small variations in the reagents or instruments.*

Method performance

The method performance data that follows was derived from laboratory tests during ideal test conditions. Users can get different results under different test conditions.

Standard	Precision (95% confidence interval)	Sensitivity Concentration change per 0.010 Abs change
1.00 mg/L F	0.91 to 1.09 mg/L F	0.04 mg/L F

Summary of method

The fluoride selectively reacts with an analyte in solution to release an indicator. The intensity of the signal is in proportion to the quantity of fluoride in the sample.

Consumables and replacement items

Description	Quantity/Test	Unit	Item no.
Fluoride Chemkey® Reagents	1	25/pkg	9878000
Sample cup	1	each	9418100

Recommended standards

Description	Unit	Item no.
Fluoride Standard Solution, 0.2 mg/L F^-	500 mL	40502
Fluoride Standard Solution, 0.5 mg/L F^-	500 mL	40505
Fluoride Standard Solution, 0.8 mg/L F^-	500 mL	40508
Fluoride Standard Solution, 1.0 mg/L F^-	1000 mL	29153
Fluoride Standard Solution, 1.0 mg/L F^-	500 mL	29149
Fluoride Standard Solution, 1.2 mg/L F^-	500 mL	40512
Fluoride Standard Solution, 1.5 mg/L F^-	500 mL	40515
Fluoride Standard Solution, 2.0 mg/L F^-	500 mL	40520
Fluoride Standard Solution, 100 mg/L F^-	500 mL	23249

FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:
In the U.S.A. – **Call toll-free 800-227-4224**
Outside the U.S.A. – **Contact the HACH office or distributor serving you.**
On the Worldwide Web – **www.hach.com**; E-mail – **techhelp@hach.com**

HACH COMPANY
WORLD HEADQUARTERS
Telephone: (970) 669-3050
FAX: (970) 669-2932

03/2024, Edition 3