Iron, Dissolved

DOC316.53.01511

Chemkey 1,10-Phenanthroline Method

Method 10281

0.05 to 3.00 mg/L as Fe

Chemkey® Reagents

Scope and application: For drinking water and boiler water.

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

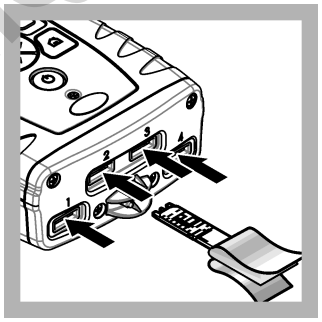
Description	Quantity
Dissolved Iron Chemkey Reagents	1

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

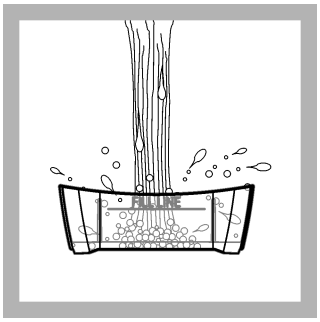
Test procedure



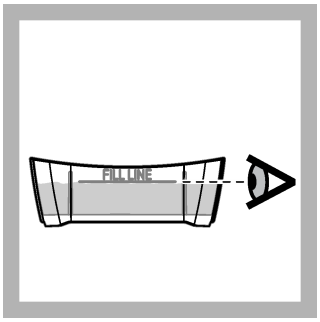
1. Peel back the packaging to show the end of the Chemkey. Do not touch the Chemkey with hands.



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

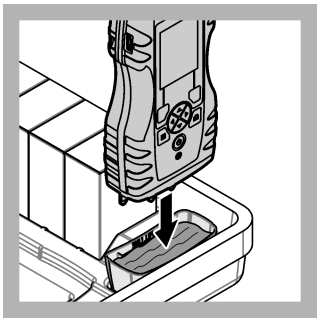


3. Rinse the sample cup with the sample.

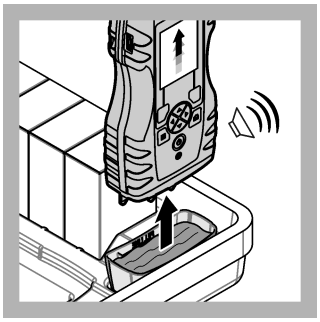


4. Fill the sample cup to the fill-line with sample.

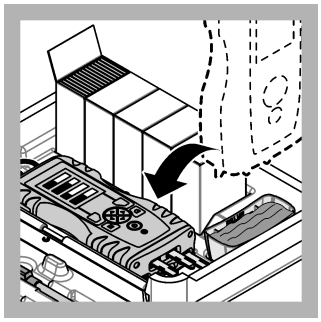
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5. Put the meter into the sample cup.



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 do not interfere in the dissolved iron determination at or below the given concentration.

Table 1 Non-interfering substances

Substance	Maximum level tested	Substance	Maximum level tested
Alkalinity (as $CaCO_3$)	700 mg/L	Monochloramine (as Cl_2)	3.0 mg/L
Aluminum (Al^{3+})	0.2 mg/L	Nitrate (NO_3^-–N)	50 mg/L
Calcium (as $CaCO_3$)	1000 mg/L	Phosphate (PO_4^{3-})	20 mg/L
Chloride (Cl^-)	1200 mg/L	Potassium (K^+)	100 mg/L
Copper (Cu^{2+})	1.0 mg/L	Silica (SiO_2)	20 mg/L
Fluoride (F^-)	4.0 mg/L	Sodium (Na^+)	3000 mg/L
Magnesium (as $CaCO_3$)	1000 mg/L	Sulfate (SO_4^{2-})	1000 mg/L
Manganese (Mn^{2+})	0.50 mg/L	Zinc (Zn^{2+})	5.0 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:

- 100-mg/L Iron Standard Solution
- 200-mL volumetric flask, Class A
- Pipet, adjustable volume, 1.0–5.0 mL and pipet tip
- Deionized water

1. Prepare a 1-mg/L iron standard solution as follows:
   a. Use a pipet to add 2.0 mL of the iron standard solution into the volumetric flask.
   b. Dilute to the mark with deionized water. Mix well. Prepare this solution daily.
2. Use the test procedure to measure the concentration of the prepared standard solution.
3. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then*

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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
1.0 ppm Fe (for drinking water applications)	0.97–1.03 mg/L fe	0.034 mg/L Fe
0.25 ppm Fe (for boiler water applications)	0.23–0.27 mg/L Fe	0.034 mg/L Fe

Summary of method

Reagents change all of the dissolved iron to ferrous iron, while insoluble forms of iron are not changed. The ferrous iron reacts with the 1,10-phenathroline indicator in the reagents to form an orange color, which is proportional to the iron concentration.

Consumables and replacement items

Description	Quantity/Test	Unit	Item no.
Iron, Dissolved Chemkey® Reagents	1	25/pkg	8636000
Sample cup	1	each	9418100

Recommended standards

Description	Unit	Item no.
Iron Standard Solution, 100-mg/L Fe	100 mL	1417542

Optional reagents and apparatus

Description	Unit	Item no.
Flask, volumetric, Class A, 200 mL	each	1457445
Pipet, adjustable volume, 1.0–5.0 mL	each	BBP065
Pipet tips, for 1.0–5.0 mL pipet	75/pkg	BBP068
Water, deionized	4 L	27256

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

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