Manganese, HR

DOC316.53.01554

Periodate Method **Method 10319**

0.1 to 25.0 mg/L as Mn **Chemkey® Reagents**

Scope and application: For soluble manganese in drinking 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

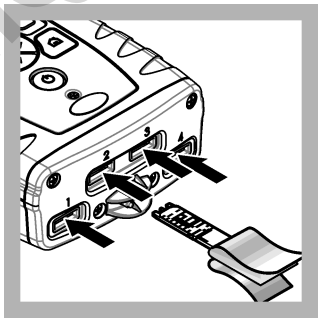
Description	Quantity
Manganese High Range Chemkey Reagents	1

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

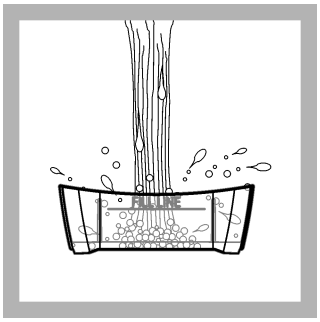
Test procedure



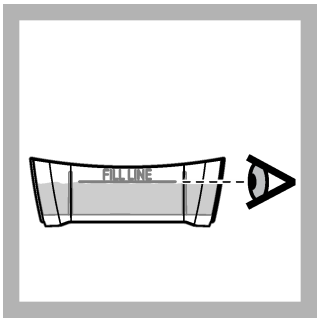
1. Peel back the packaging to show the end of the Chemkey. Do not touch the Chemkey with hands.



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

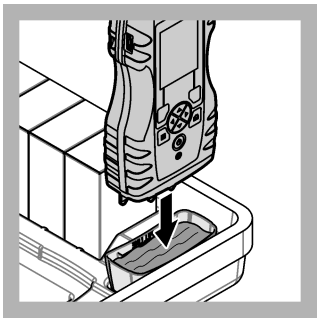


3. Rinse the sample cup with the sample.

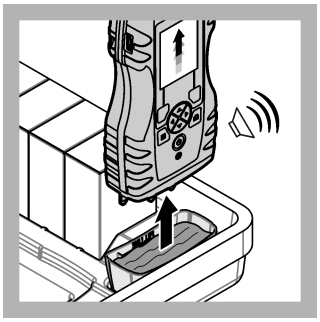


4. Fill the sample cup to the fill-line with sample.

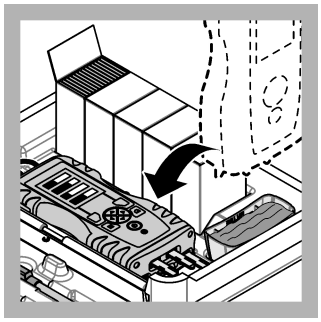
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5. Put the meter into the sample cup.



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 manganese determination at or below the given concentration.

Table 1 Non-interfering substances

Substance	Maximum level tested	Substance	Maximum level tested
Alkalinity (as $CaCO_3$)	1000 mg/L	Magnesium (as $CaCO_3$)	250 mg/L
Aluminum (Al^{3+})	0.5 mg/L	Monochloramine (as Cl_2)	5.0 mg/L
Calcium (as $CaCO_3$)	1000 mg/L	Nitrate (NO_3^-–N)	50 mg/L
Chloride (Cl^-)	1200 mg/L	Phosphate (as PO_4^{3-})	4.0 mg/L
Copper (Cu^{2+})	2.0 mg/L	Sodium (as Na^+)	500 mg/L
Fluoride (F^-)	4.0 mg/L	Sulfate (SO_4^{2-})	1000 mg/L
Free Chlorine (as Cl_2)	5.0 mg/L	Zinc (Zn^{2+})	5.0 mg/L
Iron (Fe^{2+})	1.0 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:

- 1000 mg/L manganese standard solution
- 1-L volumetric flask, Class A
- 10-mL volumetric pipet, Class A and pipet filler safety bulb
- Deionized water

1. Prepare a 10.0-mg/L manganese standard solution as follows:

a. Use a pipet to add 10.00 mL of 1000-mg/L manganese 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
10.0 mg/L Mn	9.7 to 10.3 mg/L Mn	0.2 mg/L Mn

Summary of method

The manganese in the sample is oxidized to permanganate by sodium periodate after the sample is buffered. The intensity of the purple color is proportional to the manganese concentration.

Consumables and replacement items

Description	Quantity/Test	Unit	Item no.
Manganese High Range Chemkey® Reagents	1	25/pkg	3007000
Sample cup	1	each	9418100

Recommended standards

Description	Unit	Item no.
Water, deionized	4 L	27256
Manganese Standard Solution, 1000 mg/L	100 mL	1279142

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

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