



Hardness and Iron Test Kit

HA-77 (202300)

DOC326.97.00084

Test preparation

CAUTION: Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

- To verify the test accuracy, use a standard solution as the sample.

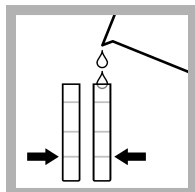
Hardness:

- Hold the dropper vertically above the sample. Do not let the dropper touch the bottle during the titration.
- To record the hardness result as mg/L, multiply the gpg (grains per gallon) value by 17.1.

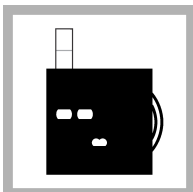
Iron:

- Put the color disc on the center pin in the color comparator box (numbers to the front).
- Use sunlight or a lamp as a light source to find the color match with the color comparator box.
- Rinse the tubes with sample before the test. Rinse the tubes with deionized water after the test.
- If the color match is between two segments, use the value that is in the middle of the two segments.
- If the color disc becomes wet internally, pull apart the flat plastic sides to open the color disc. Remove the thin inner disc. Dry all parts with a soft cloth. Assemble when fully dry.
- Use the indoor light color disc when the light source is fluorescent light. Use the outdoor light color disc when the light source is sunlight.
- Undissolved reagent does not have an effect on test accuracy.
- If the sample is turbid, add one 0.05-g spoon of RoVer Rust Remover to the sample and mix. Wait 5 minutes, then add the FerroVer reagent.
- If the sample contains copper, the sample can develop a yellow, blue or violet color. To remove the copper interference, add one 0.05-g spoon of RoVer Rust Remover to the sample before the FerroVer reagent and mix. Wait 5 minutes, then add the FerroVer reagent.
- Samples that contain high levels of iron can give low results. If high iron levels are possible, dilute the sample as follows. Use a 3-mL syringe to add 2.5 mL of sample to each tube. Dilute the sample to the 5-mL mark with deionized water. Use the diluted sample in the test procedure and multiply the result by 2. To make a larger dilution, add 1 mL of sample to each tube. Dilute the sample to the 5-mL mark with deionized water. Use the diluted sample in the test procedure and multiply the result by 5.

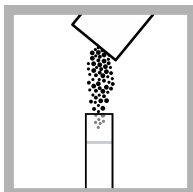
Test procedure—Iron (0–4 mg/L Fe)



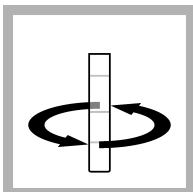
1. Fill two tubes to the first line (5 mL) with sample.



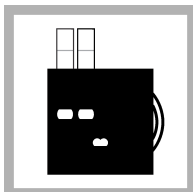
2. Put one tube into the left opening of the color comparator box.



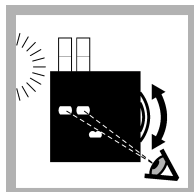
3. Add one FerroVer Iron Reagent Powder Pillow to the second tube.



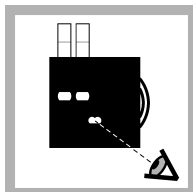
4. Swirl to mix. An orange color develops.



5. Put the second tube into the color comparator box.



6. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.



7. Read the result in mg/L in the scale window.

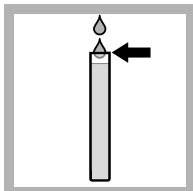
Replacement items

Description	Unit	Item no.
FerroVer® Iron Reagent Powder Pillows, 5 mL	100/pkg	92799
Hardness 1 Buffer Solution	100 mL MDB	42432
Hardness 2 Indicator Solution	100 mL MDB	42532
Hardness 3 Titrant Solution	100 mL MDB	42632
Color disc, iron, indoor light, 0–4 mg/L	each	9262400
Color disc, iron, outdoor light, 0–4 mg/L	each	9263800
Bottle, square, glass, 29 mL	6/pkg	43906
Flask, Erlenmeyer, 125 mL	each	50543
Measuring tube, plastic, 5.83 mL	each	43800
Color comparator box	each	173200
Glass viewing tubes, 18 mm	6/pkg	173006
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106

Optional items

Description	Unit	Item no.
RoVer® Rust Remover	454 g	30001
Spoon, measuring, 0.05 g	each	49200
Standard solution, hardness (20 gpg) and iron (2 mg/L)	500 mL	47949
Syringe, Luer-Lok® Tip, 3 mL	each	4321300
Water, deionized	500 mL	27249

Test procedure—Hardness (0–20 gpg CaCO_3)



1. Fill the measuring tube with sample.



2. Pour the sample into the mixing bottle.



3. Add three drops of the Hardness 1 Buffer Solution.



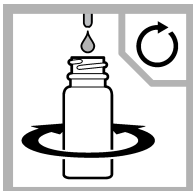
4. Turn the bottle left and right to mix.



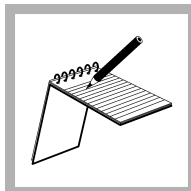
5. Add one drop of the Hardness 2 Indicator Solution. A pink color develops.



6. Turn the bottle left and right to mix.



7. Add the Hardness 3 Titrant Solution by drops. Mix after each drop. Count the drops until the color changes from pink to blue.

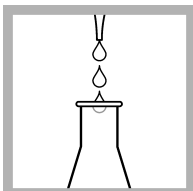


8. Record the number of drops. The number of drops of the titrant solution is the result in gpg.

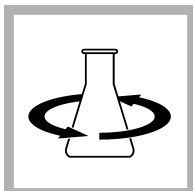
Test procedure—Hardness (0–20 mg/L CaCO_3)



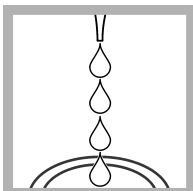
1. Fill the flask to the 100-mL mark with sample.



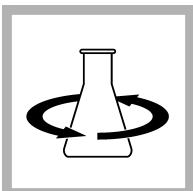
2. Add two full droppers of the Hardness 1 Buffer Solution.



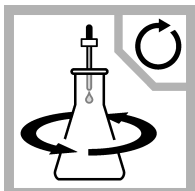
3. Swirl to mix.



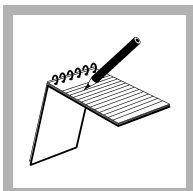
4. Add four drops of the Hardness 2 Indicator Solution. A pink color develops.



5. Swirl to mix.



6. Add the Hardness 3 Titrant Solution by drops. Swirl to mix after each drop. Count the drops until the color changes from pink to blue.



7. Record the number of drops. The number of drops of the titrant solution is the result in mg/L.

