



Boiler Treatment Control Test Kit

BTC-2 (2350400)

DOC326.97.00096

Test preparation

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

- 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, bottle or flask with sample before each test. Rinse with deionized water after each 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.
- To verify the test accuracy, use a standard solution (buffer solution for pH test) as the sample.

pH

- Chlorine can interfere with the test for pH. To remove chlorine from the sample, add 1 drop of 0.1 N sodium thiosulfate solution to the 5-mL sample, mix, then add the pH indicator. The sodium thiosulfate removes a maximum of 50 mg/L chlorine from the sample.

Phosphate

- Use the filtration procedure for samples that contain turbidity.
- For best results, clean the tubes and bottles with 6.0 N (1:1) hydrochloric acid solution, then rinse with deionized water.
- To determine metaphosphate, use the digestion procedure to determine the total inorganic phosphate. Subtract the result of an orthophosphate test (without digestion) from the total inorganic phosphate result.
- Undissolved reagent does not have an effect on test accuracy.
- To record the test result as mg/L P, divide the mg/L PO₄ test result by 3.

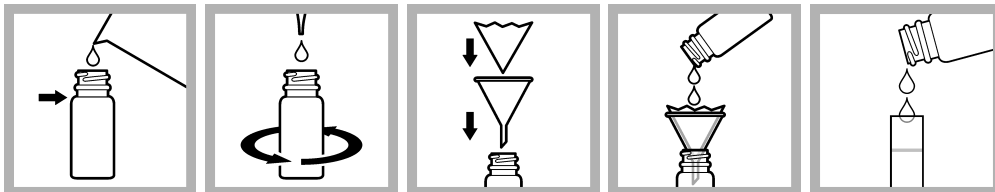
Sulfite

- To record the test result as mg/L SO₃, multiply the mg/L Na₂SO₃ test result by 0.64.

Sample collection

- Collect samples in clean glass or plastic bottles.
- Analyze the samples at room temperature as soon as possible for best results.

Filtration procedure for turbid samples



1. Fill a bottle to the shoulder with sample.

2. Add one drop of Filtration Aid Solution. Swirl to mix.

3. Put the filter paper in the funnel. Put the funnel on a second bottle.

4. Pour the sample from the first bottle into the funnel.

5. Use the filtered sample in the test procedure. Record the results as soluble phosphate.

Replacement items

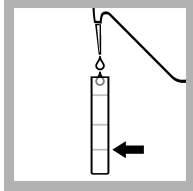
NOTE: *Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.*

Description	Unit	Item no.
Bottle, square, 29 mL, with 10, 15, 20 and 23-mL marks	6/pkg	232706
Clamp, test tube holder	each	63400
Color comparator box	each	173200
Color disc, pH, thymol blue, 7.4–9.6 pH units	each	9263500
Color disc, phosphate, 0–40 mg/L	each	9262100
Cookit stove with Heatab fuel tablets	each	220600
Cookit support cover	each	217900
Demineralizer bottle, 473-mL capacity	each	2184600
Dropper, glass, 0.5- and 1.0-mL marks	5/pkg	1419705
Dropper, glass, 0.5- and 1.0-mL marks	6/pkg	2318506
Filter paper, 2–3 micron, pleated, 12.5 cm	100/pkg	189457
Filtration aid solution, 29-mL dropper bottle	29 mL	104633
Flask, Erlenmeyer, 50 mL	each	50541
Flask, Erlenmeyer, 125 mL	each	50543
Funnel, poly, 65 mm	each	108367
Glass viewing tubes, 18 mm	6/pkg	173006
Heatab dry fuel tablets for Cookit stove	21/pkg	220700
PhosVer® 3 Phosphate Reagent Powder Pillows, 5 mL	100/pkg	220999
Sodium hydroxide standard solution, 5.0 N	100 mL MDB	245032
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106
Sulfite 1 Reagent Powder Pillows	100/pkg	220399
Sulfamic Acid Powder Pillows	100/pkg	105599
Sulfite 3 Reagent	100 mL MDB	70532
Sulfuric acid standard solution, 5.25 N	100 mL MDB	244932
Thymol blue pH indicator solution	100 mL MDB	25732

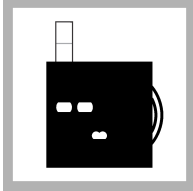
Optional items

Description	Unit	Item no.
Buffer Powder Pillows, pH 9.00 (NIST), colorless	50/pkg	1410766
Phosphate standard solution, 30 mg/L as PO ₄ (NIST)	946 mL	1436716
Sulfite standard solution (equivalent), 15 mg/L as SO ₃ (23.4 mg/L as Na ₂ SO ₃)	500 mL	2408449
Plastic viewing tubes, 18 mm, with caps	4/pkg	4660004
Sodium thiosulfate, 0.1 N	100 mL MDB	32332
Water, deionized	500 mL	27249

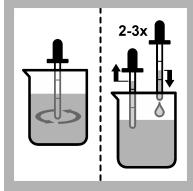
Test procedure—Orthophosphate (0–40 mg/L PO₄)



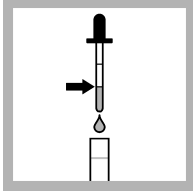
1. Fill a tube to the first line (5 mL) with deionized water.



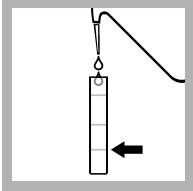
2. Put the tube into the left opening of the color comparator box.



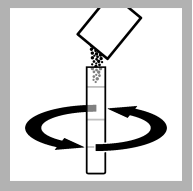
3. Fully rinse the dropper with the sample.



4. Use the dropper to add 0.5-mL of sample to a second tube.



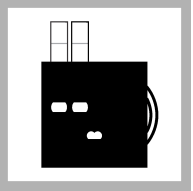
5. Add deionized water to the first line (5 mL) on the second tube.



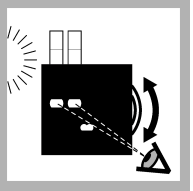
6. Add one PhosVer 3 Phosphate Reagent Powder Pillow to the second tube. Swirl to mix.



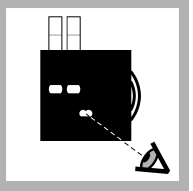
7. Wait 1 minute. Read the result within 5 minutes. A blue color develops.



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

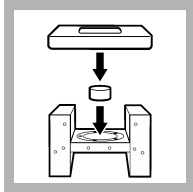


9. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.

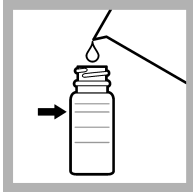


10. Read the result in mg/L in the scale window.

Digestion procedure for total inorganic phosphate



1. Assemble the heating apparatus.



2. Fill the bottle to the 20-mL mark with sample.



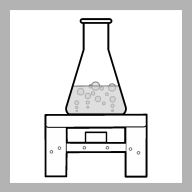
3. Pour the sample into a clean 50-mL Erlenmeyer flask.



4. Use the dropper to add 2.0 mL of 5.25 N sulfuric acid.



5. Swirl to mix.



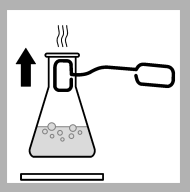
6. Put the flask on the heating apparatus.



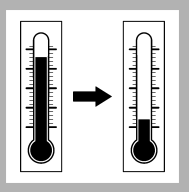
7. Boil the solution for 10 minutes.



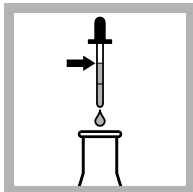
8. Add some deionized water during the boil time, if necessary, to keep some solution in the flask.



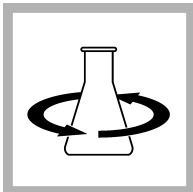
9. Use the clamp to remove the flask.



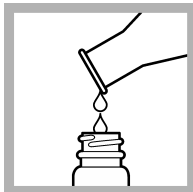
10. Wait until the solution is cool.



11. Use the dropper to add 2.0 mL of 5 N sodium hydroxide.



12. Swirl to mix.



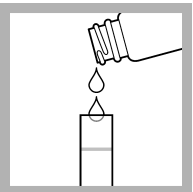
13. Pour the solution into the bottle.



14. Add deionized water to the 20-mL mark.

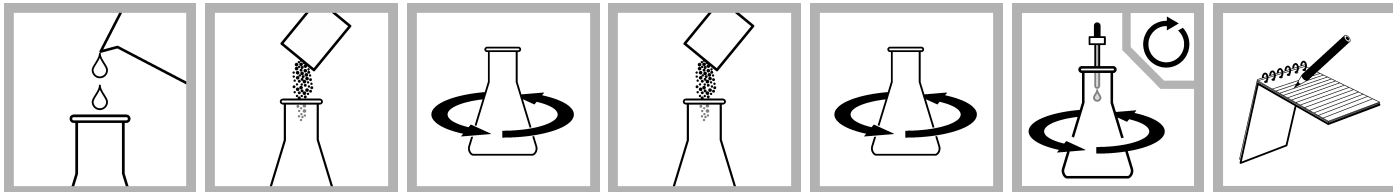


15. Swirl to mix.



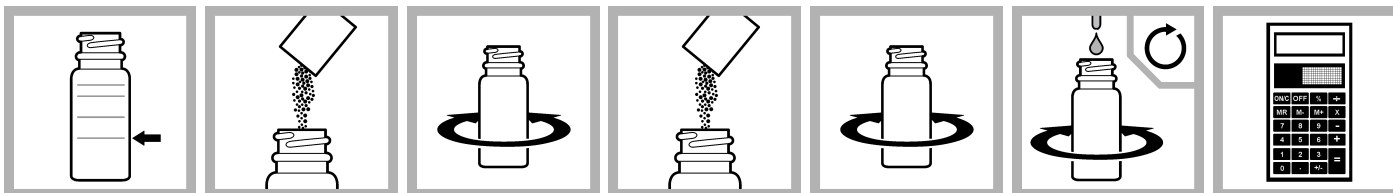
16. Use the digested sample in the test procedure. The result is total inorganic phosphate.

Test procedure—Sulfite (0–20 mg/L Na₂SO₃)



1. Fill the flask to the 100-mL mark with sample.
2. Add one Sulfite 1 Reagent Powder Pillow.
3. Swirl to mix.
4. Add one Sulfamic Acid Reagent Powder Pillow.
5. Swirl to mix.
6. Add the Sulfite 3 Reagent by drops. Mix after each drop. Count the drops until the color changes to grey-blue.
7. Record the number of drops. The number of drops of the titrant solution is equal to the result in mg/L.

Test procedure—Sulfite (0–200 mg/L Na₂SO₃)



1. Fill the bottle to the 10-mL mark with sample.
2. Add one Sulfite 1 Reagent Powder Pillow.
3. Turn the bottle left and right to mix.
4. Add one Sulfamic Acid Reagent Powder Pillow.
5. Turn the bottle left and right to mix.
6. Add the Sulfite 3 Reagent by drops. Mix after each drop. Count the drops until the color changes to grey-blue.
7. Multiply the total number of drops by 10 to get the result in mg/L.

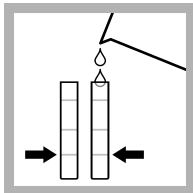
Interferences—Sulfite test

Table 1 shows the substances that can interfere with this test.

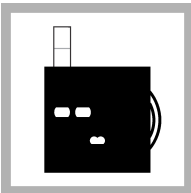
Table 1 Interferences

Interfering substance	Interference level
Metals	Some metals, especially copper, catalyze the oxidation of sulfite to sulfate. Immediately add one Sulfamic Acid Powder Pillow or one Dissolved Oxygen 3 Powder Pillow for each liter of sample during sample collection to prevent the interference.
Nitrite	Reacts with sulfite and causes low results.
Organic compounds	Oxidizable organic compounds can cause high results.
Oxidizable compounds	Cause high results.
Sulfide	Causes high results.

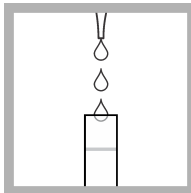
Test procedure—pH (7.4–9.6 pH units)



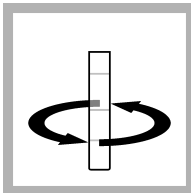
1. Fill two tubes to the first line (5 mL) with sample.



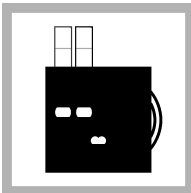
2. Put one tube into the left opening of the color comparator box.



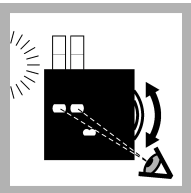
3. Add 6 drops of thymol blue pH indicator solution to the second tube.



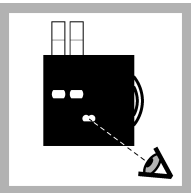
4. Swirl to mix.



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 pH units in the scale window.

