pH

Phenol Red Method — Method 10076

6.0 to 8.5 pH units

Scope and application: For water and wastewater

Test preparation

Before starting

The amount of indicator and sample is critical for accurate results and should be measured carefully.
Measurements outside the procedure range will not be accurate by as much as ±2 pH units.
The sample temperature must be between 21–29 °C (70–84 °F) for accurate results.
Always do tests in sample cells. Do not put the instrument in the sample or pour the sample into the cell holder.
Make sure that the sample cells are clean and there are no scratches where the light passes through them.
Rinse the sample cell and cap with the sample three times before the sample cell is filled.
Make sure that there are no fingerprints or liquid on the external surface of the sample cells. Wipe with a lint-free cloth before measurement.
Cold waters can cause condensation on the sample cell or bubbles in the sample cell during color development. Examine the sample cell for condensation or bubbles. Remove condensation with a lint-free cloth. Invert the sample cell to remove bubbles.
Install the instrument cap over the cell holder before ZERO or READ is pushed.
After the test, immediately empty and rinse the sample cell. Rinse the sample cell and cap three times with deionized water.
For the best accuracy, use the Standard Calibration Adjust feature of the instrument to adjust the instrument calibration curve with each new lot of Phenol Red. Use the pH 7.00 buffer solution included in the kit. Do not use colored buffer solutions. Refer to the instrument documentation.
Periodically, measure the pH 7.00 buffer solution to identify the accuracy of the instrument and the method. If the reading is not within 0.1 pH unit of 7.00 pH, use the Standard Calibration Adjust feature of the instrument to adjust the instrument calibration curve.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

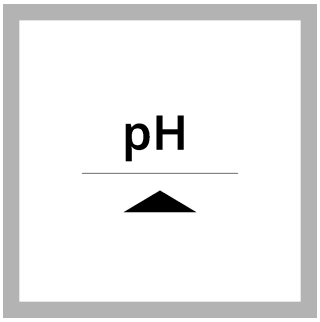
Description	Quantity
Phenol Red Indicator Solution, spec grade	0.5 mL
Dropper with 0.5 and 1.0 mL marks	1
Sample cells, 25-mm (10 mL)	2

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

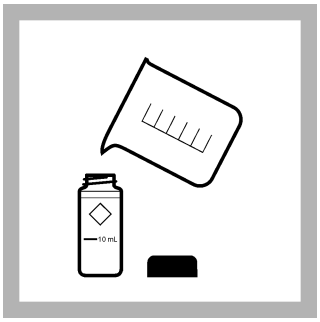
Sample collection

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

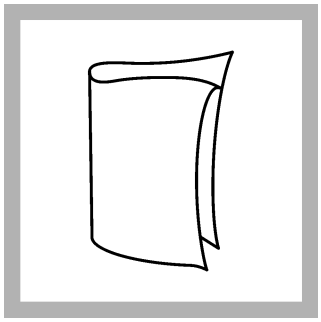
Reagent solution procedure



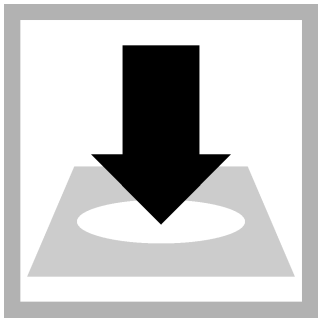
1. Set the instrument to pH.
For DR300, push the up arrow button. For PCII, push the menu button, checkmark button, then the menu button again.



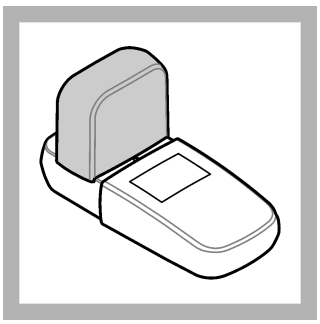
2. Prepare the blank: Rinse a sample cell and cap three times with sample. Fill the sample cell to the 10-mL mark with sample. Close the sample cell.



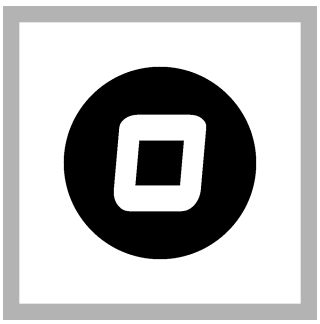
3. Clean the blank sample cell.



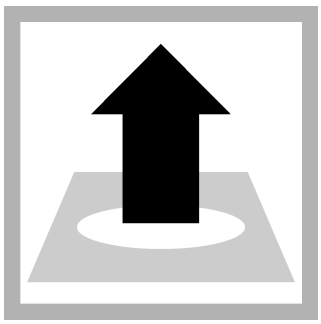
4. Insert the blank into the cell holder. Point the diamond mark on the sample cell toward the keypad.



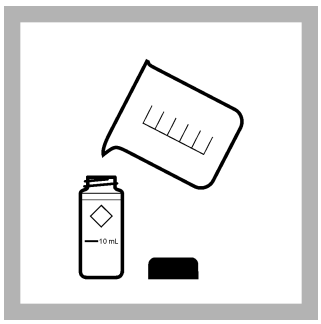
5. Install the instrument cap over the cell holder.



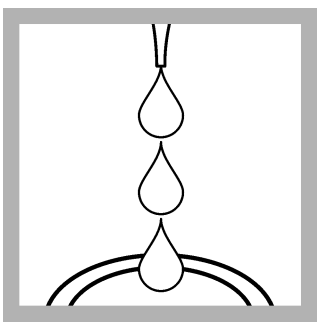
6. Push **ZERO**. The display shows “0.0”.



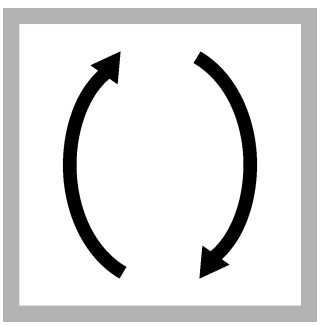
7. Remove the sample cell from the cell holder.



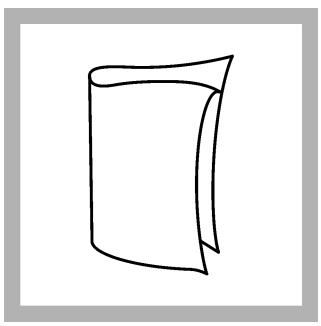
8. Prepare the sample: Rinse a second sample cell and cap three times with sample. Fill the sample cell to the 10-mL mark with sample.



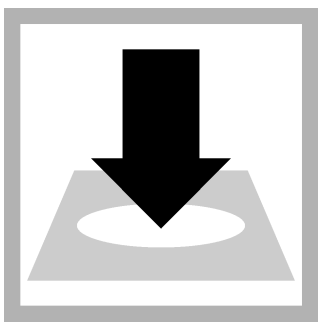
9. Add 0.5 mL of Phenol Red Indicator Solution to the blank.
For the best accuracy, use a clean and dry dropper.



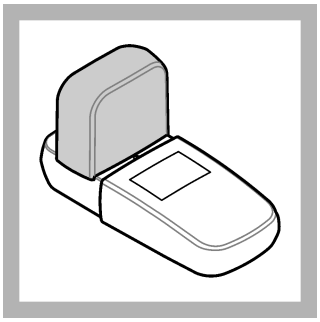
10. Put the stopper on the sample cell. Invert the sample cell to mix.



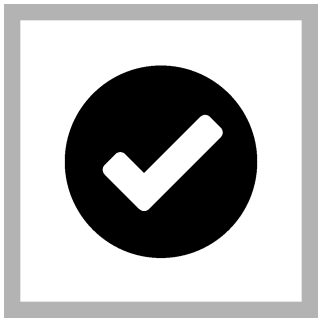
11. Clean the prepared sample cell.



12. Insert the prepared sample into the cell holder. Point the diamond mark on the sample cell toward the keypad.



13. Install the instrument cap over the cell holder.



14. Push **READ**. Results show in pH units.

Interferences

Chlorine does not interfere at levels of 6 mg/L Cl_2 or less. Salt water (seawater) interferes and cannot be analyzed with this method.

Accuracy check

Standard solution method

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

Items to collect:

- pH 7.0 buffer solution, clear

1. Use the test procedure to measure the pH of the standard solution.
2. Compare the expected result to the actual pH 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 that were measured on a DR300 and a Pocket Colorimeter II during ideal test conditions. Users can get different results under different test conditions.

Precision (95% confidence interval)
7.0 ± 0.1 pH units

Summary of method

Proper pH control in drinking water and swimming pools is necessary for many reasons. Bactericidal activity of chlorine is highest when the pH is less than 7.4. Alum-type flocculents, important for clear water, operate best in a pH range of 7.2 to 8.0. To control algae, the pH is kept below 8.0. A sudden rise in pH can identify an increase in algal growth. If the pH goes below 7.0, corrosion of pipes and metal fixtures can occur. Eye irritation is minimized when the pH is kept between 7.2 and 7.6.

Phenol Red is a phthalein indicator that has a transition window of pH 6.0 (yellow) to 8.2 (red). The pH is determined colorimetrically from the change in the absorbance of the alkaline peak.

Consumables and replacement items

Required reagents

Description	Quantity/test	Unit	Item no.
Phenol Red Indicator Solution, spec grade	0.5 mL	50 mL	2657512

Required apparatus

Description	Quantity/Test	Unit	Item no.
Dropper, measuring, 0.5 mL and 1.0 mL, plastic	1	20/pkg	2124720
Sample cells, 10-mL round, 25 mm x 60 mm	2	6/pkg	2427606

Optional reagents and apparatus

Description	Unit	Item no.
pH 7.0 Buffer Solution, colorless	500 mL	1222249
Thermometer, –20 to 110 °C, Non-Mercury	each	2635702

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