Program ID #50-Free, #51-Total

Chlorine Free and Chlorine Total

0-2.00 mg/L

The Orion AQUAfast IV Powder Chemistries are intended for use with the Orion AQ4000 Advanced Colorimeter. For detailed setup and measurement procedures for the Orion AQ4000, consult your colorimeter manual.

NOTE: *The Orion AQ4000 must be zeroed using a vial filled with sample. If the sample is colored, use actual sample. Use the 24 mm glass vials from Orion AC2V24.*

Safety Information

Read MSDS before performing this test procedure. Wear safety glasses and gloves.

AQUAfast IV Zero

1. Turn the colorimeter on by pressing the **power** key.
2. Press **prgm** and select program 50 for the Chlorine Free measurement or program 51 for the Chlorine Total measurement. Press **yes** key.
3. Fill a clean, dry 24 mm vial with 10 mL of sample. **See Fig 1**.
4. Screw the cap onto the vial and wipe the exterior of the vial to ensure it is clean and dry.
5. Insert the zero vial into the Orion AQ4000 sample chamber. No adapters are required. Align the ▲ on the vial to the ▲ on the colorimeter. Cover the vial with the vial cover.
6. Press the **zero** key. The "zero" icon will light up on the upper right hand corner.
7. "WAIT" is then displayed. The result is displayed as "0.000" A4P CL2 F for free chlorine or A4P CL2 T for total chlorine.
8. The colorimeter is now zeroed and ready for measurements.

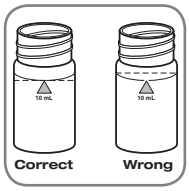

Figure 1

NOTE: *For best results, pipette samples and zero using the sample before each measurement. The Orion AQ4000 must be zeroed before each method.*

Test Procedure

Free Chlorine

1. Using program 50, use the 24 mm vial with 10 mL of sample from the zero procedure. **See Fig 1**.
2. Take one Chlorine Free DPD Powder Pack, tap down gently and tear open in the direction of the text. Add the contents to the sample vial. **See Fig 2**.
3. Screw the cap onto the vial tightly and swirl vigorously to dissolve the powder. A pink color will develop if free chlorine is present. **See Fig 3**.
4. Immediately place the prepared sample into the Orion AQ4000 sample chamber. Cover with the vial cover. **See Fig 4**.
5. Press **meas** key for sample measurement. The result in mg/L or ppm free chlorine will be displayed.

Figure 2

Figure 3

Figure 4

Registered Quality System ISO 9001:2000

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Total Chlorine

1. Using program 51, use the 24 mm vial with 10 mL of sample from the zero procedure. **See Fig 1**.
2. Take one Chlorine Total DPD Powder Pack, tap down gently and tear open in the direction of the text. Add the contents to the sample vial. **See Fig 2**.
3. Screw the cap onto the vial tightly and swirl vigorously to dissolve the powder. A pink color will develop if total chlorine is present. **See Fig 3**.
4. Immediately place the prepared sample into the Orion AQ4000 sample chamber. Cover with the vial cover. **See Fig 4**.
5. Press **meas** key for sample measurement. A two minute countdown will begin. The result in mg/L or ppm total chlorine will be displayed.

NOTE: *If the display flashes "overrng", it is due to high chlorine levels. Dilute a fresh sample and repeat the test. A slight loss of chlorine may occur during dilution. Multiply the result by the dilution factor.*

Test Method

The Chlorine Free and Total Powder Chemistry employs the DPD chemistry.[1,2] Free chlorine oxidizes DPD (N,N-diethyl-p-phenylenediamine) to form a pink colored species in direct proportion to the chlorine concentration. Total chlorine, the sum of free and combined chlorine, is determined by adding an excess of potassium iodide to the sample. Chloramines (combined chlorine) oxidizes the iodide to iodine. The iodine then oxidizes DPD to the pink colored species. Results are expressed in ppm (mg/Liter) Cl_2. Halogens, ozone and halogenating agents will produce high test results.

1. APHA Standard Methods, 18th Edition, Page 4-45, method 4500-Cl G (1992).
2. EPA Methods for Chemical Analysis of Water and Wastes, method 330.5 (1983).

Ordering Information

Cat. No.	Description
AC4P71	Orion AQUAfast IV Chlorine Free DPD, Powder Chemistry, 100 tests
AC4P72	Orion AQUAfast IV Chlorine Total DPD, Powder Chemistry, 100 tests
AC2V24	24 mm Vials, 12 pack
AQ4CBL	Orion AQUAfast IV RS232 Cable
AQ4000	Orion AQUAfast IV Advanced Colorimeter

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256459-001 Rev.A 0108

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