

Instruction Sheet

Thermo Scientific Orion AQUAfast AC4070 Chlorine (Free & Total) Ampoules

This instruction sheet provides step-by-step instructions for using the Thermo Scientific™ Orion™ AQUAfast™ AC4070 Chlorine (Free & Total) Auto-Test Ampoules with the Orion AQUAfast AQ4000 colorimeter. The Orion AQUAfast Auto-Test ampoules are designed for use with the Orion AQUAfast AQ4000 colorimeter. Auto-Test ampoules contain a pre-measured amount of liquid reagent and easily fill with the correct volume of sample for simplified reagent and sample mixing. Each ampoule contains an Auto-ID barcode that is read by the AQ4000 colorimeter and used to automatically identify the test parameter and initiate the test. For complete setup and operation instructions for the colorimeter, consult the Orion AQUAfast AQ4000 colorimeter user guide.

Product: AC4070
Revision Date: April 6, 2015
256445-001 Revision B

Product Information

AC4070 Chlorine (Free & Total) Auto-Test Ampoules

0.4 – 5.0 mg/L

Program ID# 022

Kits with lot numbers higher than 84250 have been reformulated and have a lower reagent fill level. To use these kits, update your Orion AQUAfast AQ4000 colorimeter with the latest Software Revision 14, downloadable in our website at www.thermoscientific.com/water.

Test Method Overview

The Chlorine (Free & Total) Auto-Test method 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) oxidize the iodide to iodine. The iodine then oxidizes DPD to the pink colored species. Results are expressed in ppm (mg/Liter) Cl₂.

Halogens, ozone and halogenating agents will produce high test results. Chlorine, at greater than 500 ppm, may prevent color development.

1. APHA Standard Methods, 18th ed., Method 4500-Cl G (1992)
2. EPA Methods for Chemical Analysis of Water and Wastes, Method 330.5 (1983)

Safety Information

Read the Safety Data Sheet (SDS) before performing this test. Wear safety glasses and gloves.

Test Procedure

Note: Before testing, zero the Orion AQUAfast AQ4000 colorimeter using a sealed zero vial from the Orion AQUAfast Zero Auto-Test Kit, Cat. No. AQ4ZER. If the sample is colored, use the sample cup provided to dilute the sample using the following steps: 1) Add 10 mL of sample and 5 mL of deionized water to the sample cup for a total of 15 mL. 2) Transfer the diluted sample to a clean, dry screw top vial from the Zero Auto-Test Kit and use that vial to zero the meter. 3) See the AQ4000 colorimeter user guide for details on the zero procedure for the colorimeter. Discard the diluted sample after the zero procedure. Repeat for each colored sample. Re-zero with the sealed zero vial before testing any colorless samples.

Free Chlorine Test Procedure

1. Fill the sample cup to the 25 mL mark with the sample. *See Figure 1.*
2. Place the Auto-Test ampoule in the sample cup. Snap the tip by pressing the ampoule against the side of the cup. The ampoule will fill leaving a small bubble to facilitate mixing. *See Figure 2.*
3. Mix the contents of the ampoule by inverting it several times, allowing the bubble to travel from end to end each time. Tap the bottom of the ampoule on a hard surface to cause any tiny bubbles that have collected on the ampoule wall to rise to the top of the liquid in the ampoule. Wipe all liquid from the exterior of the ampoule.
4. Insert the ampoule into the AQ4000 colorimeter. Align the ▼ on the Auto-Test ampoule with the ◆ on the adapter to obtain a continuous beeping and view ***** across the display. If ***** and beeping are not observed, rotate the ampoule to the right or left to initiate the measurement.
5. Immediately cover the ampoule with the colorimeter's light cover.
6. The AQ4000 will begin a 1 minute countdown. After the countdown is completed, the AQ4000 will automatically proceed to the measure mode.
7. Record the concentration reading from the AQ4000 display as either mg/L or ppm Cl₂ or log measurement into the data logger by pressing the log key.

Total Chlorine Test Procedure

1. Add 5 drops of Chlorine Activator solution to an empty sample cup. *See Figure 3.*
2. Fill the sample cup to the 25 mL mark with the sample. *See Figure 1.*
3. Immediately perform the Free Chlorine Test Procedure, beginning with step 3.

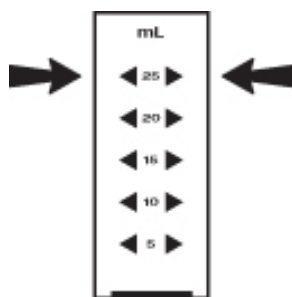


Figure 1:

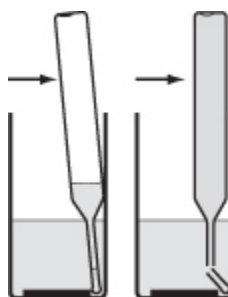


Figure 2:



Figure 3:

Ordering Information

Cat. No.	Description
AC4070	Orion AQUAfast Chlorine (Free & Total) Auto-Test Kit, 30 Ampoules
AC4010	Orion AQUAfast Ammonia as N Ultra Low Range Auto-Test Kit, 30 Ampoules
AC4078	Orion AQUAfast Iron (Total & Soluble) Auto-Test Kit, 30 Ampoules
AC4046	Orion AQUAfast Nitrite as N Auto-Test Kit, 30 Ampoules
AC4082	Orion AQUAfast Sulfate Auto-Test Kit, 30 Ampoules
AC4016	Orion AQUAfast Sulfide (Soluble) Auto-Test Kit, 30 Ampoules
AQ4ZER	Orion AQUAfast Zero Vial Auto-Test Kit
AQ4CBL	Orion AQUAfast RS232 Cable for AQ4000 Colorimeter
AQ4000	Orion AQUAfast AQ4000 Colorimeter, Includes 4 AA Batteries, 16 mm Vial, Zero Vial Auto-Test Kit, 16 mm Vial Adapter, 13 mm Vial Adapter, Field Case, User Guide, Tablet Tampering Stir Rod, Vial Cleaning Brush

For a complete listing of all available Thermo Scientific Orion AQUAfast reagents, colorimeters and accessories, please visit www.thermoscientific.com/water.

Contact Information

Thank you for your continued support of Thermo Scientific Orion products. Please visit www.thermoscientific.com/water to view the Orion meter, electrode, sensor and solution products and download product literature, user guides and software updates. To access additional product support files, please visit our [Online Library](#).

For any questions or if you require assistance, contact our Technical Support Specialists:

Email wai.techservbev@thermofisher.com

Within the United States, call 1-800-225-1480

Outside the United States, call +1-978-232-6000

For additional product information, contact your local authorized dealer, local Thermo Scientific Orion technical sales representative or contact us using the Water and Lab Products (WLP) contact information below.

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