

# Instruction Sheet

## *Thermo Scientific Orion AQUAfast AC4004 Nitrate Low Range Ampoules*

This instruction sheet provides step-by-step instructions for using the Thermo Scientific™ Orion™ AQUAfast™ AC4004 Nitrate Low Range 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.

<b>Product: AC4004</b>
<b>Revision Date: February 5, 2021</b>
256425-001 Revision D

## Product Information

AC4004 Nitrate as Nitrogen (N) Low Range Auto-Test Ampoules

0.20 – 1.5 mg/L

Program ID# 012

Revised instructions for lot numbers higher than 69000

Kits with lot numbers higher than 84065 have been reformulated and have a lower reagent fill level. To use these kits, update your Orion AQUAfast AQ4000 colorimeter with the latest Method Version (Revision 14 or greater), downloadable in our website at [www.thermoscientific.com/water](http://www.thermoscientific.com/water).

## Test Method Overview

The Nitrate 1 (as N) LR Auto-Test method employs the cadmium reduction method.<sup>1,2,3</sup> Nitrate is reduced to nitrite in the presence of cadmium. In an acidic solution, the nitrite diazotizes with a primary aromatic amine and then couples with another organic molecule to produce a highly colored azo dye. The resulting pink-orange color is proportional to the nitrate concentration. Results are expressed in ppm (mg/L) NO<sub>3</sub>-N.

Samples containing nitrite will give erroneous, high test results. Samples containing in excess of 2000 ppm chloride will give low test results. Certain metals, chlorine, oil and grease will also give low test results.



1. APHA Standard Methods, 18<sup>th</sup> ed., Method 4500-NO<sub>3</sub><sup>-</sup> E (1992)
2. ASTM D 3867-90, Nitrite-Nitrate in Water, Test Method B
3. EPA Methods for Chemical Analysis of Water and Wastes, Method 353.3 (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.

1. Fill the reaction tube to the 15 mL mark with the sample.
2. Empty the contents of one cadmium powder pack into the reaction tube. See *Figure 1*. Cap the reaction tube and shake it vigorously for exactly 3 minutes. Allow the sample to sit undisturbed for 2 minutes.
3. Pour 10 mL of the sample into the sample cup being careful not to transfer any cadmium particles to the sample cup. See *Figure 2*.
4. 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 3*.
5. Mix the contents of the ampoule by inverting it several times, allowing the bubble to travel from end to end each time. Wipe all liquid from the exterior of the ampoule.
6. 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.
7. Immediately cover the ampoule with the colorimeter's light cover.
8. The AQ4000 will begin a 10 minute countdown. After the countdown is completed, the AQ4000 will automatically proceed to the measure mode.
9. Record the concentration reading from the AQ4000 display as mg/L or ppm NO<sub>3</sub>-N (nitrate as nitrogen) or log the measurement into the data logger by pressing the log key.

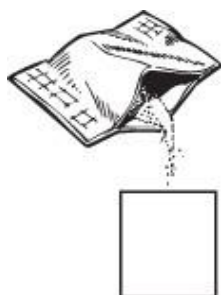


Figure 1:

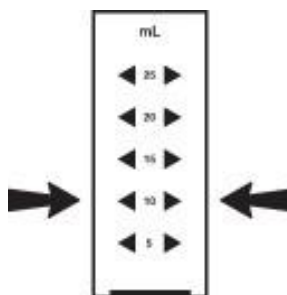


Figure 2:

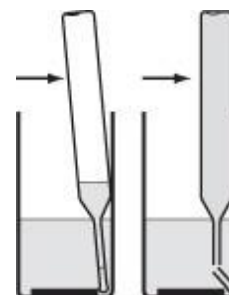


Figure 3:

## Ordering Information

Cat. No.	Description
AC4004	Orion AQUAfast Nitrate as N Low Range Auto-Test Kit, 30 Ampoules
AC4005	Orion AQUAfast Nitrate as N Mid Range Auto-Test Kit, 30 Ampoules
AC4007	Orion AQUAfast Nitrate High Range Auto-Test Kit, 30 Ampoules
AC4070	Orion AQUAfast Chlorine (Free & Total) Auto-Test Kit, 30 Ampoules
AC4078	Orion AQUAfast Iron (Total & Soluble) Auto-Test Kit, 30 Ampoules
AC4082	Orion AQUAfast Sulfate 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](http://www.thermoscientific.com/water).

## Contact Information

Thank you for your continued support of Thermo Scientific Orion products. Please visit [www.thermoscientific.com/water](http://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 the [WLP Online Library](#).

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

Email [wai.techservbev@thermofisher.com](mailto: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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