

# Spectrophotometers for water and wastewater analysis

Built on the foundation of 60 years of spectroscopy experience, the next generation Orion AquaMate Spectrophotometers combine exceptional performance with a contemporary design

Thermo Scientific™ Orion™ AquaMate™ 7100 Visible and 8100 UV-Visible Spectrophotometers are designed to meet the specific needs of water and waste water analysis laboratories. Features include:

- 260 preprogrammed test methods, and flexibility to program your own custom methods
- Round, square and rectangular vial holders
- Intuitive operating software, including performance verification testing designed to meet GLP and GMP standards
- Choice of two models for mid- or large-range wavelength readings
- 7-inch, high-resolution glove-friendly touchscreen interface

## Preprogrammed test methods

Orion AquaMate 7100 Visible and 8100 UV-Visible Spectrophotometers include over 260 preprogrammed methods for easy and convenient measurements using Thermo Scientific™ Orion™ AQUAfast™, Merck, and CHEMetrics reagents.

The preprogrammed test methods allow simple, accurate analysis of acid capacity, alkalinity, aluminum, ammonia, ammonium, antimony, AOX, arsenic, BOD, boron, bromine, cadmium, calcium, chloride, chlorine, chlorine dioxide, chromate, chromium, COD, color, copper, cyanide,



**Orion AquaMate 8100 UV-Visible Spectrophotometer**

cyanuric acid, DEHA, detergents, dissolved oxygen, fluoride, formaldehyde, gold, hardness, hydrazine, hydrogen peroxide, iodine, iron, lead, magnesium, manganese, mercury, molybdate, molybdenum, monochloramine, nickel, nitrate, nitrite, nitrogen, oxygen, oxygen scavengers, ozone, palladium, pH, phenol, phosphate, platinum, potassium, silica, silver, sodium, sulfate, sulfide, sulfite, surfactants, suspended solids, tin, TOC.

Volatile organic acids and zinc can also be measured using Orion AQUAfast, Merck, and CHEMetrics reagents and assorted vial sizes. The instruments allow a one point adjustment on any preprogrammed method to correct for variations in batch reagent chemistries. Preprogrammed methods can also be adapted for new chemistries or operators can create their own custom methods.

All preprogrammed methods are preloaded on the included USB memory stick to allow operators to add or remove methods as desired. Custom methods using the standard curve function can be uploaded through the USB, making it possible for most colorimetric reagents to be used. Making it possible for most colorimetric reagents to be used. Visit [thermofisher.com/aquamateuvvis](http://thermofisher.com/aquamateuvvis) for the most current list of US EPA compliant reagent chemistry methods.

To aid in loading, transferring and storing methods and data, Orion AquaMate Spectrophotometers feature three USB connection ports. The ports may be used with a USB memory stick, to transfer data directly to a computer, or to connect to an external printer for printing hard copies of data produced by the spectrophotometer.

### **Performance verification testing**

Orion AquaMate 7100 Visible and 8100 UV-Visible Spectrophotometers include performance verification tests that ensure wavelength accuracy and instrument functionality. In accordance with GLP and GMP, each verification report gives the time, date and instrument serial number. The built-in wavelength accuracy test is compatible with either the internal lamp or external calibrated standards.

### **Variety of vial holder options**

The instruments allow the ultimate flexibility in vial sizes and accommodate a wide range of round, square and rectangular vials with three vial holder options. Each vial holder turret can be easily installed and replaced in the instrument sample compartment.

Magnetically retained, easy to clean vial holders are available for 12 to 25 mm round, 10 mm square and 20 to 100 mm rectangular vials. An adjustable round vial holder is also included/available that accommodates 13 to 24 mm round vials.

### **Choice of two models for your water analysis needs**

The Orion AquaMate 7100 Visible Spectrophotometer measures a range from 325 to 1100 nm wavelengths for water and wastewater testing. The 5.0 nm spectral bandwidth is ideal for most routine concentration measurements.

Additional benefits of the Orion AquaMate 7100 Visible Spectrophotometer include:

- Cost-effective visible only measurements
- Small footprint and lightweight design
- The tungsten-halogen lamp offers 1,000 hours of light testing.
- Similar performance features as the Orion AquaMate 8100 UV-Visible Spectrophotometer

The Orion AquaMate 8100 UV-Visible Spectrophotometer measures a range from 190 to 1100 nm wavelengths for the most extensive measurement options.

Additional benefits of the Orion AquaMate 8100 UV-Visible Spectrophotometer include:

- Dual-beam optical geometry for more accurate measurements
- High-intensity XENON Lamp
- Flexible bandwidth
- Fast wavelength scanning

### **Dual-beam optics for more accurate measurements**

The XENON flash lamp provides very intense light, allowing a beam splitter to extract and measure a small portion of light to an internal reference detector without a loss of performance in sample measurement. This provides simultaneous measurement of the sample with real-time reference beam correction for each flash of the lamp.

The dual beam optical configuration ensures each measurement is as accurate as possible with reference beam correction on each data point, no drift over long measurements and no peak shift with scan speed changes. The optical geometry offers enhanced data quality throughout the entire UV to near IR region of the spectrum. The XENON flash lamp fires pulses of light only when taking a measurement.

### **XENON flash lamp for increased lifespan**

The XENON lamp in the Orion AquaMate 8100 UV-Visible Spectrophotometer provides excellent performance over the entire wavelength range of 190 to 1100 nm. It also provides intense light in the UV region of the spectrum adding sensitivity for life science, environmental and organic chemistry applications.

The XENON lamp typically provides three to five years of maintenance-free performance\*, since it runs only when taking a measurement. This saves an average of **\$2,400** in maintenance costs\*\* over five years compared with a traditional light instrument.

The XENON flash lamp requires no warm-up for instant measurements. The lamp helps prevent damage to sensitive samples by flashing, versus continuous exposure to intense UV light and helps ensure sample temperature stability, since it does not change the compartment temperature.

### **Flexible nm bandwidth**

The Orion AquaMate 8100 UV-Visible Spectrophotometer balances regulatory compliance with sensitivity. A 1.8 nm spectral bandwidth provides optimal system resolution, permitting more light energy to reach the sample, thus resulting in lower detection limits and superior signal-to-noise performance.

### **Fast wavelength scanning**

The Orion AquaMate 8100 UV-Visible Spectrophotometer is equipped with enhanced wavelength scanning technology that acquires high quality spectral data quickly. The instrument accelerates through wavelength scans at speeds up to 1600 nm/min. The exceptionally large photometric range allows accurate measurements of small absorbance changes even when using highly absorbing blank samples. Scan data can be analyzed to determine peak and valley wavelength. The scan data can also be saved to the USB memory stick.

**Orion AquaMate Spectrophotometers include a one year warranty against defects in material and workmanship.**



**A high intensity XENON lamp and dual beam optical geometry allow the Orion AquaMate 8100 UV-Visible Spectrophotometer to deliver precise readings throughout the entire UV-Visible range**

\*Xenon flash lamp lifetime estimates are derived using engineering data and a typical spectrophotometer use case.

\*\*Based on an analysis comparing the Tungsten Halogen lamp provided in the Orion Aquamate Visible Spectrophotometer and the XENON flash lamp provided in the Orion Aquamate UV-Visible Spectrophotometer

## Product specifications and ordering information

	Orion AquaMate UV-Visible Spectrophotometer Cat. No. 8100	Orion AquaMate Visible Spectrophotometer Cat. No. 7100
<b>Optical Design</b>	Dual beam	Dual beam
<b>Spectral Bandwidth</b>	2.0 nm	5.0 nm
<b>Light Source (Typical Lifetime)</b>	XENON flash lamp (5 years typical)	Tungsten-halogen lamp (1000 hours typical)
<b>Detector</b>	Dual silicon photodiodes	Dual silicon photodiodes
<b>Wavelength</b>		
Range	190 to 1100 nm	325 to 1100 nm
Accuracy	0.5 nm	0.5 nm
Repeatability	<±0.2 nm	<±0.2 nm
Scanning Speed	Slow, medium and fast (up to 1600 nm/min)	Automatic— up to 1800 nm/min
Data Resolution	0.2 nm, 0.5 nm, 1 nm, 2 nm, 5 nm	0.2 nm, 0.5 nm, 1 nm, 2 nm, 5 nm
<b>Photometric</b>		
Measurement Modes	Absorbance, % transmittance, concentration	Absorbance, % transmittance, concentration
Range	-2A to +3.5A; <1000 %T to 0 %T; 9999 C	-3A to +3.5A; >1000 %T to 0 %T; 9999 C
Accuracy	±0.002A at 0.5A, ±0.004A at 1.0A, ±0.008A at 2.0A	±0.002A at 0.5A, ±0.004A at 1.0A, ±0.008A at 2.0A
Noise	≤0.00020A at 0A at 260 and 500 nm ≤0.00030A at 1A at 260 and 500 nm ≤0.00040A at 2A at 260 and 500 nm	≤0.00020A at 0A at 260 and 500 nm ≤0.00030A at 1A at 260 and 500 nm ≤0.00040A at 2A at 260 and 500 nm
Drift	<0.0005 A/hr	<0.0010A/Hr
<b>Stray Light</b>	< 1.0%T 198 nm (KCl) , <0.05%T at 220 nm (NaI), <0.03%T at 340 nm (NaNO <sub>2</sub> )	<0.05%T at 340 nm and 400 nm
<b>Display</b>	7-inch color touchscreen, fixed, high definition, 800 × 1280 pixels	7-inch color touchscreen, fixed, high definition, 800 × 1280 pixels
<b>Keypad</b>	Glove compatible touchscreen	Glove compatible touchscreen
<b>Connectivity</b>	USB type A port for USB stick (front panel), Duplex USB type B port for computer (rear panel), Print via USB, Etheret or Wi-Fi	USB type A port for USB stick (front panel), Duplex USB type B port for computer (rear panel), Print via USB, Etheret or Wi-Fi
<b>Dimensions (LxWxH)</b>	5.5 × 38.5 × 19.5 cm	5.5 × 38.5 × 19.5 cm
<b>Weight</b>	7.5 kg	7.5 kg
<b>Power Requirements</b>	External AC to DC converter. Voltage and Frequency (Hz) selected automatically, 100–240 volts, 50–60 Hz.	External AC to DC converter. Voltage and Frequency (Hz) selected automatically, 100–240 volts, 50–60 Hz.

Visit [thermofisher.com/aquamateuvvis](http://thermofisher.com/aquamateuvvis) for a complete list of Orion AQUAfast reagent chemistries.

Find out more at [thermofisher.com/aquamate](http://thermofisher.com/aquamate)