

HI83399

Multiparameter Photometer with COD for Water and Wastewater

with Digital pH Electrode Input

HI83399 benchtop photometer measures 40 different key water and wastewater quality parameters using 77 different methods that allow for multiple ranges and variations in chemistry for specific applications. The Chemical Oxygen Demand (COD) parameter is included for industrial and municipal wastewater treatment. The Phosphorous and Nitrogen parameters included are beneficial to municipal wastewater treatment customers that need to monitor their biological and chemical nutrient removal process. This photometer features an innovative optical system that uses LEDs, narrow band interference filters, focusing lens and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source ensures accurate and repeatable photometric readings every time.

To save valuable laboratory benchtop space, the HI83399 doubles as a professional pH meter with its digital pH/temperature electrode input. Now one meter can be used for both photometric and pH measurements.

• Water and wastewater treatment digestion parameters

- Allows measurement of COD, Total Nitrogen and Total Phosphorus

• Advanced optical system

- Innovative optical design that utilizes a reference detector and focusing lens to eliminate errors from changes in the light source and from imperfections in the glass cuvette.

• Backlit 128 x 64 Pixel Graphic LCD Display

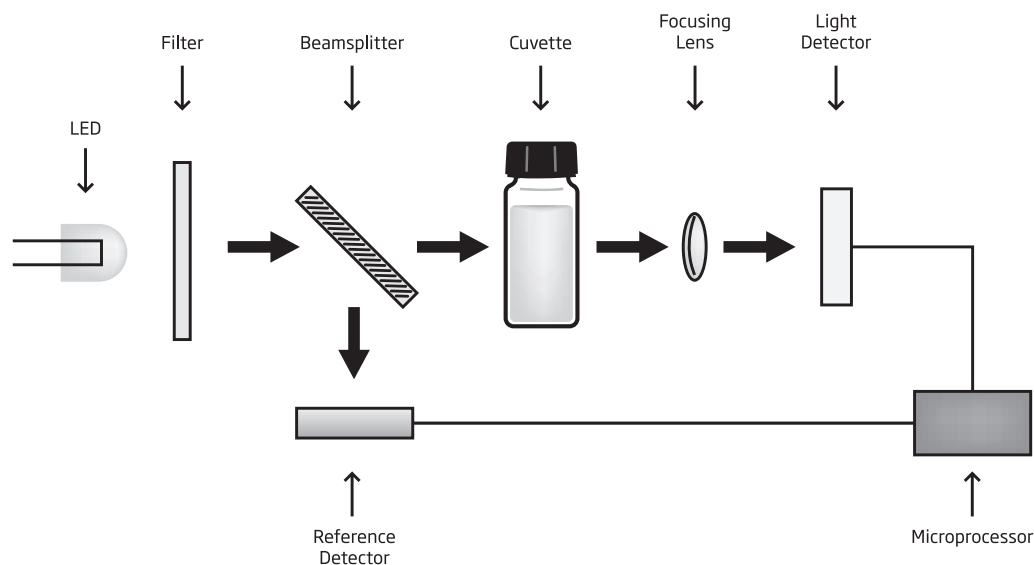
- Backlit graphic display allows for easy viewing in low light conditions
- The 128 x 64 Pixel LCD allows for a simplified user interface with virtual keys and on-screen help to guide the user through use of the meter

• Built-in Reaction Timer for Photometric Measurements

- The measurement is taken after the countdown timer expires.



- Countdown timer ensures that all readings are taken at the appropriate reaction intervals regardless of user for better consistency in measurements
- **Absorbance mode**
 - Hanna's exclusive CAL Check cuvettes for validation of light source and detector
 - Allows for the user to plot concentration versus absorbance for a specific wavelength for use with user supplied chemistry or for teaching principles of photometry
- **Units of Measure**
 - Appropriate unit of measure along with chemical form is displayed along with reading
- **Result Conversion**
 - Automatically convert readings to other chemical forms with the touch of a button
- **Cuvette Cover**
 - Aids in preventing stray light from affecting measurements
- **Digital pH Electrode Input**
 - Measure pH and temperature with a single probe
 - Good Laboratory Practice (GLP) to track calibration information including date, time, buffers used, offset and slope for traceability
- pH CAL Check alerts user to potential problems during the calibration process
- Space saving having a pH meter and photometer built into one meter
- **Data Logging**
 - Up to 1000 photometric and pH readings can be stored by simply pressing the dedicated LOG button. Logged readings are just as easily recalled by pressing the RCL button
 - Sample ID and User ID information can be added to a logged reading using alphanumeric keypad
- **Connectivity**
 - Logged readings can be quickly and easily transferred to a flash drive using the USB-A host port or to a computer using the micro USB-B port
 - Data is exported as a .CSV file for use with common spreadsheet programs
- **Rechargeable Battery**
 - Li-polymer rechargeable battery lasts for 500 measurements or 50 hours of pH measurement
- **Battery Status Indicator**
 - Indicates the amount of battery life left
- **Error Messages**
 - Photometric error messages
 - pH calibration messages include clean electrode, check buffer and check probe



Improved Optical System

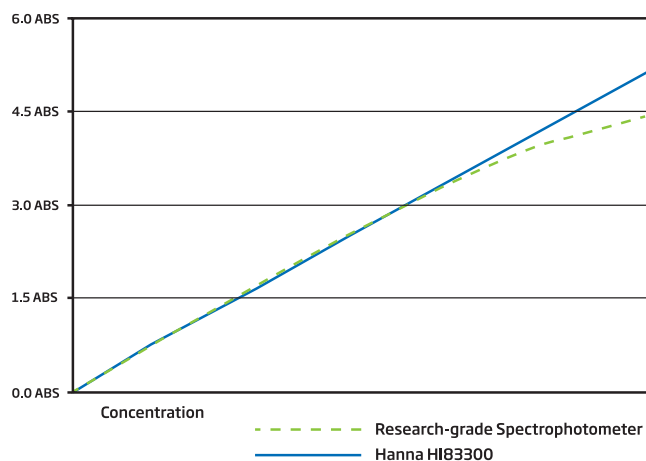
HI83300 family is designed with an innovative optical system that incorporates a beam splitter so that light can be used for absorbance readings and for a reference detector. The reference detector monitors the intensity of light and modulates when there is drift due to power fluctuation or the heating of the optical components. Each part has an important role in providing unparalleled performance from a photometer.

High Efficiency LED Light Source

An LED light source offers superior performance as compared to a tungsten lamp. LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce very little heat, which could otherwise affect the optical components and electronic stability.

Quality Narrow Band Interference Filters

The narrow band interference filter not only ensures greater wavelength accuracy (± 1 nm) but is also extremely efficient, allowing a brighter, stronger signal to be transmitted. The end result is increased measurement stability and less wavelength error.



- Better linearity than research-grade spectrophotometers

Reference Detector for a Stable Light Source

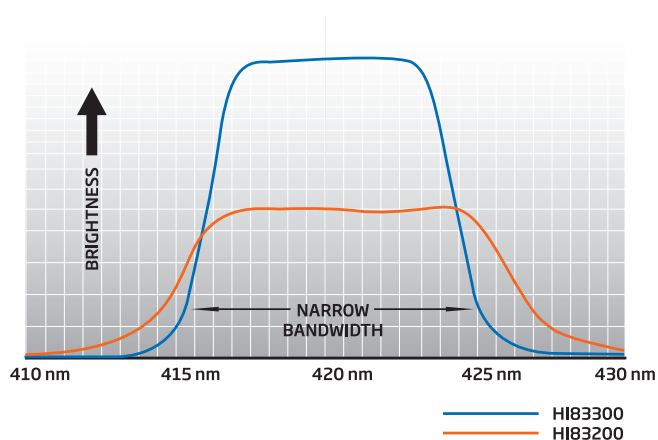
A beam splitter is used as part of the internal reference system of the HI83300 photometer. The reference detector compensates for any drift due to power fluctuations or ambient temperature changes. Now you can rely on a stable source of light.

Large Cuvette Size

The sample cell of the HI83300 fits a round, glass cuvette with a 25 mm path length. Along with the advanced optical components, the larger size of the cuvette greatly reduces errors in rotation from the indexing mark of the cuvettes. The relatively long path length of the sample cuvette allows the light to pass through more of the sample solution, ensuring accurate measurements even in low absorbance samples.

Focusing Lens for Greater Light Yield

Adding a focusing lens to the optical path allows for the collection of all of the light that exits the cuvette and focusing the light on the silicon photo detector. This innovative approach to photometric measurements cancels the errors from imperfections and scratches present in the glass cuvette eliminating the need to index the cuvette.



- Improved optical filters – higher wavelength accuracy and light throughput



Cuvette Adapter

The HI83399 is supplied with a 16 mm cuvette adapter that accepts digestion vials.



Digestion Vial Methods

Compatible with COD (EPA, ISO, and mercury free methods), Nitrogen and Phosphorous reagents packaged in 16 mm digestion vial. Reagents are sold separately.



COD Reactor for Digestion Vials

A COD reactor is used to heat the digestion vials. The digestion vials must be heated to a specific temperature for a period of time making the HI839800 an important accessory required to have a complete wastewater treatment monitoring system. HI839800 sold separately.

Connectivity



① pH Connectivity

Any of our digital pH electrodes can be connected to the HI83300 family by a 3.5 mm input. Plugging in an electrode has never been easier; there are no alignment issues or broken pins. Simply connect the electrode and start taking measurements.

② Dual Power Supply

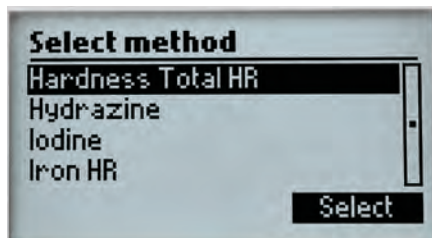
The HI83399 is equipped with a rechargeable lithium ion battery that lasts up to 500

photometer measurements or 50 hours of continuous pH measurements. A power supply can also be plugged into the micro USB port at the back of the meter.

② ③ USB Connectivity

Both a USB and micro USB port are located on the HI83399. Each of these ports can be used to transfer data via flash drive or direct connection to a PC or MAC. Data is transferred as CSV files for easy processing and widespread compatibility.

Photometer Capabilities



Concentration Measurement Function

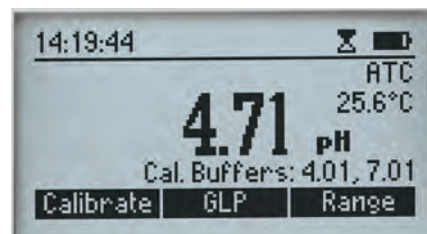
Users can access the menu of measurement methods with the simple press of a button. Low, medium, and high range methods of several parameters are available for users to obtain a high accuracy reading. Each method is assigned a concentration unit of measure. Parameters can be expressed in different chemical forms based on their preference.

CAL Check Functionality

Hanna's exclusive CAL Check feature allows for performance verification of the independent measuring channels. Our CAL Check standard vials are developed to simulate a specific absorbance value at each wavelength to verify its accuracy.

Built-in Reaction Timer

Reaction time is of key importance when performing colorimetric measurements, which is why the built-in timer of the HI83300 is an ideal feature. The countdown timer displays the time remaining until a measurement will be taken, ensuring consistent results between measurements and users.



pH Measurement

The HI83300 family offers the ability to connect a digital pH electrode. Users can connect any sensor from our extensive line of digital pH electrodes. Whether a user requires a glass or plastic body, a spheric or conic tip shape, or the ability for safe use with food samples, our digital electrode offering is suitable for nearly everyone.



Large Cuvettes

The sample cell of these meters fits a round, glass cuvette with a 25 mm path length. The relatively long path length of the sample cuvette allows the light to pass through more of the sample solution, ensuring accurate measurements even in low absorbance samples. This cuvette size also provides a larger opening, making it easier for users to dispense ready-made liquid or powder reagents into the sample.

An affixed, light-blocking cover panel closes over the sample cell, reducing stray light from affecting any measurement readings.



Absorbance Measurement Mode

Users can select to calibrate and measure samples in absorbance mode for each wavelength used by the meter. This mode is a convenient way for users to develop their own calibration curves and measure samples with customized chemistries.

Data Management Capabilities

User ID and Sample ID

An alphanumeric keypad can be used to enter sample ID and user ID to be stored with the measurement reading. The recall key allows the user to review the data along with the date and time that the reading was taken.



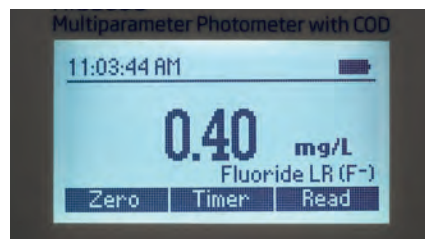
Data Management

The HI83399 can store up to 1000 photometer and pH electrode readings, which can be logged by pressing the LOG key on the face of the meter. pH readings are logged along with comprehensive GLP (Good Laboratory Practice) information such as date, time, calibration buffers, and electrode offset and slope.

USB for Data Transfer

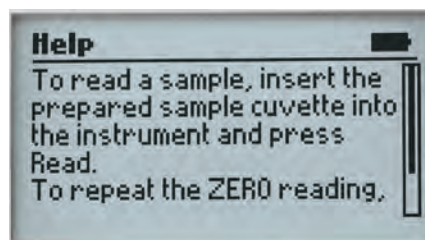
Two USB ports are provided for transferring data. One port allows the data to be transferred to a flash drive while the other USB is used for direct connection to a computer. All data is transferred as a .csv file that can be used with many spreadsheet programs for documentation.

Display Features



Backlit Graphic LCD Display

A backlit, graphic LCD display provides an easy to read, user-friendly interface.



Intuitive Display

With virtual keys, a battery status indicator, and practical error messages, users will find the meter interface intuitive. On-screen guides provide information relating to the current meter operation, and can be used at any stage in the setup or measurement process to show contextual help.

Specifications

Measurement Channels	5 x optical channels 1 x digital electrode channel (pH measurement)	
Photometer	Range	0.000 to 4.000 Abs
	Resolution	0.001 Abs
	Accuracy	0.003 Abs @ 1.000 Abs
	Light Source	Light Emitting Diode
	Bandpass Filter Bandwidth	8 nm
	Bandpass Filter Wavelength Accuracy	± 1.0 nm
	Light Detector	Silicon photocell
	Cuvette Types	Round, 24.6mm & 16mm diameter
Probe	Number of Methods	90
	Range	-2.00 to 16.00 pH (± 1000.0 mV)*
	Resolution	0.01 pH (0.1 mV)
	Accuracy	±0.01 pH (±0.2 mV) @ 25°C (77°F)
	Temperature Compensation	ATC, -5.0 to 100.0°C (23.0 to 212.0°F)*
	Calibration	two-point, from five available buffers (4.01, 6.86, 7.01, 9.18, 10.01 pH)
Temperature	Electrode	Intelligent pH / temperature electrode
	Range	-20 to 120°C (-4.0 to 248.0 °F)
	Resolution	0.1 °C (0.1 °F)
Additional Specifications	Accuracy	±0.5°C @ 25°C (±0.9°F @ 77°F)
	Logging	1000 readings (mixed photometer and electrode)
	Display	128 x 64 pixel B/W LCD with backlight
	USB-A (Host) functions	Mass-storage host
	USB-B (Device) functions	Power input, mass-storage device
	Battery Life	> 500 photometer measurements or 50 hours of continuous pH measurement
	Power Supply	5 Vdc USB 2.0 power adapter / type micro-Bconnector 3.7 Vdc Li-polymer rechargeable battery, non-serviceable
	Environment	0 to 50°C (32 to 122°F) 0 to 95% RH, non-serviceable
	Dimensions	206 x 177 x 97mm (8.1 x 7.0 x 3.8")
	Weight	1.0 kg (2.2 lbs.)
Ordering Information	HI83399-01 (115V) and HI83399-02 (230V) is supplied with sample cuvette (4 pcs.), sample cuvette cap (4 pcs.), cloth for wiping cuvettes, scissors, USB cable, 5 Vdc power adapter, 16mm vial adapter, 16mm diameter vial with cap (6 pcs.), 60mL glass bottle, instrument quality certificate, and instruction manual.	
Standards	HI83399-11 CAL Check Cuvette Kit for HI83399	

*Limits will be reduced to actual probe / sensor limits.

HI83399 Parameter Specifications

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
Alkalinity	0 to 500 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading at 25 °C	610 nm	Bromocresol Green	HI775-26 Reagents for 25 tests
Alkalinity, Marine	0 to 300 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading at 25 °C	610 nm	Bromocresol Green	HI755-26 Reagents for 25 tests
Aluminum	0.00 to 1.00 mg/L (as Al ³⁺)	0.01 mg/L	±0.04 mg/L ±4% of reading at 25 °C	525 nm	Adaptation of the Aluminon Method	HI93712-01 Reagents for 100 tests HI93712-03 Reagents for 300 tests
Ammonia Low Range	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading at 25 °C	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler Method	HI93700-01 Reagents for 100 tests HI93700-03 Reagents for 300 tests
Ammonia Low Range (13 mm Vial)	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	± 0.10 mg/L or ± 5% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler Method	HI93764A-25 Reagents for 25 tests
Ammonia Medium Range	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	± 0.05 mg/L ± 5% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426, Nessler Method	HI93715-01 Reagents for 100 tests HI93715-03 Reagents for 300 tests
Ammonia High Range	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ± 5% of reading at 25 °C	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426, Nessler Method	HI93733-01 Reagents for 100 tests HI93733-03 Reagents for 300 tests
Ammonia High Range (13 mm Vial)	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	± 1.0 mg/L or ± 5% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler Method	HI93764B-25 Reagents for 25 tests
Bromine	0.00 to 8.00 mg/L (as Br ₂)	0.01 mg/L	±0.08 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, DPD Method	HI93716-01 Reagents for 100 tests HI93716-03 Reagents for 300 tests
Calcium	0 to 400 mg/L (as Ca ²⁺)	1 mg/L	±10 mg/L ±5% of reading at 25 °C	466 nm	Adaptation of the Oxalate Method	HI937521-01 Reagents for 50 tests HI937521-03 Reagents for 150 tests
Calcium, Marine	200 to 600 mg/L (as Ca ²⁺)	1 mg/L	±6% of reading at 25 °C	610 nm	Adaptation of the Zincon Method	HI758-26 Reagents for 25 tests
Chloride	0.0 to 20.0 mg/L (as Cl ⁻)	0.1 mg/L	±0.5 mg/L ±6% of reading at 25 °C	466 nm	Adaptation of the Mercury (II) Thiocyanate Method	HI93753-01 Reagents for 100 tests HI93753-03 Reagents for 300 tests
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading at 25 °C	575 nm	Adaptation of the Chlorophenol Red Method	HI93738-01 Reagents for 100 tests HI93738-03 Reagents for 300 tests
Chlorine Dioxide (Rapid)	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading at 25 °C	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 18th Edition, 4500 ClO ₂ D	HI96779-01 Reagents for 100 tests HI96779-03 Reagents for 300 tests

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
Chlorine, Free Ultra Low Range	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the Standard Method 4500-Cl _G	HI95762-01 Reagents for 100 tests HI95762-03 Reagents for 300 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the EPA DPD Method 330.5	HI93701-F Reagents for 300 tests (liquid) HI93701-01 Reagents for 100 tests (powder) HI93701-03 Reagents for 300 tests (powder)
Chlorine, Total Ultra Low Range	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the EPA DPD Method 330.5	HI95761-01 Reagents for 100 tests HI95761-03 Reagents for 300 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the EPA DPD Method 330.5	HI93701-T Reagents for 300 tests (liquid) HI93711-01 Reagents for 100 total tests (powder) HI93711-03 Reagents for 300 total tests (powder)
Chlorine, Total Ultra High Range	0 to 500 mg/L (as Cl ₂)	1 mg/L	±3 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for Examination of Water and Wastewater, 20th Edition, 4500-Cl	HI95771-01 Reagents for 100 tests HI95771-03 Reagents for 300 tests
Chromium (VI) Low Range	0 to 300 µg/L (as Cr(VI))	1 µg/L	±10 µg/L ±4% of reading at 25 °C	525 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1687 Diphenylcarbohydrazide Method	HI93749-01 Reagents for 100 tests HI93749-03 Reagents for 300 tests
Chromium (VI) High Range	0 to 1000 µg/L (as Cr(VI))	1 µg/L	±5 µg/L ±4% of reading at 25 °C	525 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1687-92, Diphenylcarbohydrazide Method	HI93723-01 Reagents for 100 tests HI93723-03 Reagents for 300 tests
Chromium (VI)/Total (13 mm Vial)	0 to 1000 µg/L (as Cr)	1 µg/L	±10 µg/L ±3% of reading	525 nm	Adaptation of the Standard Methods of the Examination of Water and Wastewater, 22nd Edition, 3500-Cr, Diphenylcarbazide Method	HI96781-25 Reagents for 25 tests
Chemical Oxygen Demand Low Range (13 mm Vial)	0 to 150 mg/L (as O ₂)	1 mg/L	±5 mg/L or ±4% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the EPA 410.4 Approved Method for the COD Determination on Surface Waters and Wastewaters	HI93754A-25 Reagents EPA Low Range for 24 tests HI93754D-25 Reagents Hg Free Low Range for 24 tests HI93754F-25 Reagents ISO Low Range for 24 tests
Chemical Oxygen Demand Medium Range (13 mm Vial)	0 to 1500 mg/L (as O ₂)	1 mg/L	±15 mg/L or ±4% of reading at 25 °C, whichever is greater	610 nm	Adaptation of the EPA 410.4 Approved Method for the COD Determination on Surface Waters and Wastewaters	HI93754B-25 Reagents EPA Medium Range for 24 tests HI93754E-25 Reagents Hg Free Medium Range for 24 tests HI93754G-25 Reagents ISO Medium Range for 24 tests
Chemical Oxygen Demand High Range EPA (13 mm Vial)	0 to 15000 mg/L (as O ₂)	1 mg/L	±150 mg/L or ±2% of reading at 25 °C, whichever is greater	610 nm	Adaptation of the EPA 410.4 Approved Method for the COD Determination on Surface Waters and Wastewaters	HI93754C-25 Reagents for 24 tests
Chemical Oxygen Demand Ultra High Range (13 mm Vial)	0.0 to 60.0 ppt (as O ₂)	0.1 ppt	±0.5 ppt ±3% of reading @ 25°C	610 nm	Adaptation of the EPA 410.4 Approved Method for the COD Determination on Surface Waters and Wastewaters	HI93754J-25 Reagents for 24 tests
Color of Water	0 to 500 PCU (Platinum Cobalt Units)	1 PCU	±10 PCU ±5% of reading at 25 °C	420 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Colorimetric Platinum Cobalt Method	–
Copper Low Range	0.000 to 1.500mg/L (as Cu ²⁺)	0.001mg/L	±0.010mg/L ±5% of reading at 25 °C	575 nm	Adaptation of the EPA Method	HI95747-01 Reagents for 100 tests HI95747-03 Reagents for 300 tests
Copper High Range	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading at 25 °C	575 nm	Adaptation of the EPA Method	HI93702-01 Reagents for 100 tests HI93702-03 Reagents for 300 tests
Cyanuric Acid	0 to 80 mg/L (as CYA)	1 mg/L	±1 mg/L ±15% of reading at 25 °C	525 nm	Adaptation of the Turbidimetric Method	HI93722-01 Reagents for 100 tests HI93722-03 Reagents for 300 tests
Fluoride Low Range	0.00 to 2.00 mg/L (as F ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, SPADNS Method	HI93729-01 Reagents for 100 tests HI93729-03 Reagents for 300 tests
Fluoride High Range	0.0 to 20.0 mg/L (as F ⁻)	0.1 mg/L	±0.5 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, SPADNS Method	HI93739-01 Reagents for 100 tests HI93739-03 Reagents for 300 tests
Hardness, Calcium	0.00 to 2.70 mg/L (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Calmagite Method	HI93720-01 Reagents for 100 tests HI93720-03 Reagents for 300 tests
Hardness, Magnesium	0.00 to 2.00 mg/L (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, EDTA Colorimetric Method	HI93719-01 Reagents for 100 tests HI93719-03 Reagents for 300 tests

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
Hardness, Total Low Range	0 to 250 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±4% of reading at 25 °C	466 nm	Adaptation of the EPA Method 130.1	HI93735-00 Reagents for 100 tests (LR, 0 to 250mg/L)
						HI93735-0 Reagents for 300 tests (LR - 100 tests, MR - 100 tests, HR - 100 tests)
Hardness, Total Medium Range	200 to 500 mg/L (as CaCO ₃)	1 mg/L	±7 mg/L ±3% of reading at 25 °C	466 nm	Adaptation of the EPA Method 130.1	HI93735-01 Reagents for 100 tests (MR, 200 to 500mg/L)
						HI93735-0 Reagents for 300tests (LR - 100 tests, MR - 100 tests, HR - 100tests)
Hardness, Total High Range	400 to 750 mg/L (as CaCO ₃)	1 mg/L	±10 mg/L ±2% of reading at 25 °C	466 nm	Adaptation of the EPA Method 130.1	HI93735-02 Reagents for 100 tests (HR, 400 to 750mg/L)
						HI93735-0 Reagents for 300 tests (LR - 100 tests, MR - 100 tests, HR - 100 tests)
Hydrazine	0 to 400 µg/L (as N ₂ H ₄)	1 µg/L	±4% of full scale reading at 25 °C	466 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, Method D1385, p-Dimethylaminobenzaldehyde Method	HI93704-01 Reagents for 100 tests HI93704-03 Reagents for 300 tests
Iodine	0.0 to 12.5 mg/L (as I ₂)	0.1 mg/L	±0.1 mg/L ±5% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, DPD Method	HI93718-01 Reagents for 100 tests HI93718-03 Reagents for 300 tests
Iron Low Range	0.000 to 1.600 mg/L (as Fe)	0.001 mg/L	±0.010 mg/L ±8% of reading at 25 °C	575 nm	Adaptation of the TPTZ Method	HI93746-01 Reagents for 50 tests
						HI93746-03 Reagents for 150 tests
Iron High Range	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading at 25 °C	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method	HI93721-01 Reagents for 100 tests
						HI93721-03 Reagents for 300 tests
Iron (II)	0.00 to 6.00 mg/L (as Fe ²⁺)	0.01 mg/L	±0.10 mg/L ±2% of reading at 25 °C	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method	HI96776-01 Reagents for 100 tests HI96776-03 Reagents for 300 tests
Iron(II)/(III)	0.00 to 6.00mg/L (as Fe)	0.01mg/L	±0.10 mg/L ±2% of reading at 25°C	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method	HI96777-01 Reagents for 100tests HI96777-03 Reagents for 300tests
Iron (13 mm Vial)	0.00 to 6.00 mg/L (as Fe)	0.01 mg/L	±0.10 mg/L or ±3% of reading at 25 °C	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method	HI96786-25 Reagents for 25 tests
Iron Total (13 mm Vial)	0.00 to 7.00 mg/L (as Fe)	0.01 mg/L	±0.20 mg/L or ± 3% of reading, whichever is greater	525 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method	HI96778-25 Reagents for 25 tests
Magnesium	0 to 150 mg/L (as Mg ²⁺)	1 mg/L	±5 mg/L ±3% of reading at 25 °C	466 nm	Adaptation of the Calmagite Method	HI937520-01 Reagents for 50 tests
						HI937520-03 Reagents for 150 tests
Manganese Low Range	0 to 300 µg/L (as Mn)	1 µg/L	±10 µg/L ±3% of reading at 25 °C	575 nm	Adaptation of the PAN Method	HI93748-01 Reagents for 50 tests
						HI93748-03 Reagents for 150 tests
Manganese High Range	0.0 to 20.0 mg/L (as Mn)	0.1 mg/L	±0.2 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Periodate Method	HI93709-01 Reagents for 100 tests
						HI93709-03 Reagents for 300 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading at 25 °C	420 nm	Adaptation of the Mercaptoacetic Acid Method	HI93730-01 Reagents for 100 tests HI93730-03 Reagents for 300 tests
Nickel Low Range	0.000 to 1.000 mg/L (as Ni)	0.001 mg/L	±0.010 mg/L ±7% of reading at 25 °C	575 nm	Adaptation of the PAN Method	HI93740-01 Reagents for 50 tests
						HI93740-03 Reagents for 150 tests
Nickel High Range	0.00 to 7.00 g/L (as Ni)	0.01 g/L	±0.07 g/L ±4% of reading at 25 °C	575 nm	Adaptation of the Photometric Method	HI93726-01 Reagents for 100 tests
						HI93726-03 Reagents for 300 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading at 25 °C	525 nm	Adaptation of the Cadmium Reduction Method	HI93728-01 Reagents for 100 tests
						HI93728-03 Reagents for 300 tests
Nitrate (13 mm Vial)	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±1.0 mg/L or ±3% of reading at 25 °C, whichever is greater	420 nm	Chromotropic Acid Method	HI93766-50 Reagents for 50 tests
Nitrite, Marine Ultra Low Range	0 to 200 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ±4% of reading at 25 °C	466 nm	Adaptation of the EPA Diazotization Method 354.1	HI764-25 Reagents for 25 tests
Nitrite Low Range	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±20 µg/L ±4% of reading at 25 °C	466 nm	Adaptation of the EPA Diazotization Method 354.1	HI93707-01 Reagents for 100 tests
						HI93707-03 Reagents for 300 tests
Nitrite Low Range (13 mm Vial)	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ± 3% of reading at 25°C, whichever is greater	525 nm	Adaptation of the Standard Method for the Examination of Water and Wastewater, 23rd Edition, 4500B Diazotization Method, Nitrogen Nitrite	HI96783-25 Reagents for 25 tests
Nitrite Medium Range (13 mm Vial)	0.00 to 6.00 mg/L (as NO ₂ ⁻ -N)	0.01 mg/L	±0.10 mg/L ± 3% of reading at 25°C	525 nm	Adaptation of the Standard Method for the Examination of Water and Wastewater, 23rd Edition, 4500B Diazotization Method, Nitrogen Nitrite	HI96784-25 Reagents for 25 tests
Nitrite High Range	0 to 150 mg/L (as NO ₂ ⁻)	1 mg/L	±4 mg/L ±4% of reading at 25 °C	575 nm	Adaptation of the Ferrous Sulfate Method	HI93708-01 Reagents for 100 tests
						HI93708-03 Reagents for 300 tests
Nitrogen, Total Low Range (13 mm Vial)	0.0 to 25.0 mg/L (as N)	0.1 mg/L	±1.0 mg/L or ±5% of reading at 25 °C, whichever is greater	420 nm	Chromotropic Acid Method	HI93767A-50 Reagents for up to 49 tests

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
Nitrogen, Total High Range (13 mm Vial)	10 to 150 mg/L (as N)	1 mg/L	±3 mg/L or ±4% of reading at 25 °C, whichever is greater	420 nm	Chromotropic Acid Method	HI93767B-50 Reagents for up to 49 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading at 25 °C	420 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Azide Modified Winkler Method	HI93732-01 Reagents for 100 tests HI93732-03 Reagents for 300 tests
Oxygen Scavengers (Carbohydrazide)	0.00 to 1.50 mg/L (as Carbohydrazide)	0.01 mg/L	±0.02 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of the Iron Reduction Method	HI96773-01 Reagents for 50 tests HI96773-03 Reagents for 150 tests
Oxygen Scavengers (Diethylhydroxylamine) (DEHA)	0 to 1000 µg/L (as DEHA)	1 µg/L	±5 µg/L ±5% of reading at 25 °C	575 nm	Adaptation of the Iron Reduction Method	HI96773-01 Reagents for 50 tests HI96773-03 Reagents for 150 tests
Oxygen Scavengers (Hydroquinone)	0.00 to 2.50 mg/L (as Hydroquinone)	0.01 mg/L	±0.04 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of Iron Reduction Method	HI96773-01 Reagents for 50 tests HI96773-03 Reagents for 150 tests
Oxygen Scavengers (Iso-ascorbic Acid)	0.00 to 4.50 mg/L (as Iso-Ascorbic Acid)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of the Iron Reduction Method	HI96773-01 Reagents for 50 tests HI96773-03 Reagents for 150 tests
Ozone	0.00 to 2.00 mg/L (as O ₃)	0.01 mg/L	±0.02 mg/L ±3% of reading at 25 °C	525 nm	Colorimetric DPD Method	HI93757-01 Reagents for 100 tests HI93757-03 Reagents for 300 tests HI93703-52 Reagents for 100 tests (Optional)
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH at 25 °C	525 nm	Adaptation of the Phenol Red Method	HI93710-01 Reagents for 100 pH tests HI93710-03 Reagents for 300 pH tests
Phosphate, Marine Ultra Low Range	0 to 200 µg/L (as P)	1 µg/L	±5 µg/L ±5% of reading at 25 °C	610 nm	Adaptation of Standard Methods for the Examination of Water and Wastewater, 20th Edition, Ascorbic Acid Method	HI736-25 Reagents for 25 tests
Phosphate Low Range	0.00 to 2.50 mg/L (as PO ₄ ³⁻)	0.01 mg/L	±0.04 mg/L ±4% of reading at 25 °C	610 nm	Adaptation of the Ascorbic Acid Method	HI93713-01 Reagents for 100 tests HI93713-03 Reagents for 300 tests
Phosphate High Range	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1.0 mg/L ±4% of reading at 25 °C	525 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Amino Acid Method	HI93717-01 Reagents for 100 tests HI93717-03 Reagents for 300 tests
Phosphorus, Acid Hydrolyzable (13 mm Vial)	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±5% of reading at 25 °C, whichever is greater	610 nm	Adaptation of the EPA method 365.2 and Standard Methods for the Examination of Water and Wastewater, 20th Edition, 4500-P-E, Ascorbic Acid Method	HI93758B-50 Reagents for 50 tests
Phosphorus, Reactive Low Range (13 mm Vial)	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±4% of reading at 25 °C, whichever is greater	610 nm	Adaptation of the EPA method 365.2 and Standard Methods for the Examination of Water and Wastewater, 20th Edition, 4500-P-E, Ascorbic Acid Method	HI93758A-50 Reagents for 50 tests
Phosphorus, Reactive High Range (13 mm Vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±4% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th Edition, 4500-P-C, Vanadomolybdophosphoric Acid Method	HI93763A-50 Reagents for up to 49 tests
Phosphorus, Total Low Range (13 mm Vial)	0.00 to 1.15mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±6% of reading at 25 °C, whichever is greater	610 nm	Adaptation of the EPA method 365.2 and Standard Methods for the Examination of Water and Wastewater, 20th Edition, 4500-P-E, Ascorbic Acid Method	HI93758C-50 Reagents for 50 tests
Phosphorus, Total High Range (13 mm Vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±5% of reading at 25 °C, whichever is greater	420 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th Edition, 4500-P-C, Vanadomolybdophosphoric Acid Method	HI93763B-50 Reagents for up to 49 tests
Potassium	0.0 to 20.0 mg/L (as K)	0.1 mg/L	±3 mg/L ±7% of reading at 25 °C	466 nm	Adaptation of the Turbidimetric Tetraphenylborate Method	HI93750-01 Reagents for 100 tests HI93750-03 Reagents for 300 tests
Silica Low Range	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	610 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D859, Heteropoly Molybdenum Blue Method	HI93705-01 Reagents for 100 tests HI93705-03 Reagents for 300 tests
Silica High Range	0 to 200 mg/L (as SiO ₂)	1 mg/L	±1 mg/L ±5% of reading at 25 °C	466 nm	Adaptation of the EPA Method 370.1 for Drinking, Surface and Saline Waters, Domestic and Industrial Wastes and Standard Method 4500-SiO ₂	HI96770-01 Reagents for 100 tests HI96770-03 Reagents for 300 tests
Silver	0.000 to 1.000 mg/L (as Ag)	0.001 mg/L	±0.020 mg/L ±5% of reading at 25 °C	575 nm	Adaptation of the PAN Method	HI93737-01 Reagents for 50 tests HI93737-03 Reagents for 150 tests
Sulfate	0 to 150 mg/L (as SO ₄ ²⁻)	1 mg/L	±5 mg/L ±3% of reading at 25 °C	466 nm	Sulfate is precipitated with barium chloride crystals	HI93751-01 Reagents for 100 tests HI93751-03 Reagents for 300 tests
Surfactants, Anionic	0.00 to 3.50 mg/L (as SDBS)	0.01 mg/L	±0.04 mg/L ±3% of reading at 25 °C	610 nm	Adaptation of the EPA Method 425.1 and Standard Methods for the Examination of Water and Wastewater, 20th Edition, 5540C, Anionic Surfactants as MBAS	HI95769-01 Reagents for 40 tests
Surfactants, Anionic (13 mm Vial)	0.00 to 3.50 mg/L (as SDBS)	0.01 mg/L	±0.10 mg/L ±5% of reading at 25 °C	610 nm	Adaptation of the Standard Method for the Examination of Water and Wastewater, 23rd Edition, 5540C, Anionic Surfactants as MBAS	HI96782-25 Reagents for 25 tests
Surfactants, Cationic (13 mm Vial)	0.00 to 2.50 mg/L (as CTAB)	0.01 mg/L	±0.15 ppm ±3% of reading at 25°C	420 nm	Bromophenol Blue Method	HI96785-25 Reagents for 25 tests
Surfactants, Nonionic (13 mm Vial)	0.00 to 6.00 mg/L (TRITON X-100)	0.01 mg/L	±0.10 mg/L ±5% of reading at 25 °C	610 nm	TBPE Method	HI96780-25 Reagents for 24 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	575 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th Edition, Zincon Method	HI93731-01 Reagents for 100 tests HI93731-03 Reagents for 300 tests