

HI83314

# Multiparameter Photometer with COD for Wastewater

with Digital pH Electrode Input

HI83314 benchtop photometer measures 10 different key wastewater quality parameters using 20 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 LED's, 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 HI83314 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.



## Specifications

Measurement Channels	5 x optical channels; 1 x digital electrode channel (pH measurement)	
Absorbance	Range	0.000 to 4.000 Abs
	Resolution	0.001 Abs
	Accuracy	±0.003 Abs (at 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 Type	round, 24.6 mm diameter and 16 mm diameter
pH	Number of Methods	128 max
	Range	-2.00 to 16.00 pH (±1000 mV)*
	Resolution	0.01 pH (0.1 mV)
Temperature	Temperature Compensation	Automatic (-5.0 to 100.0°C; 23.0 to 212.0°F)*
	Range	-20 to 120°C (-4.0 to 248.0 °F)
Additional Specifications	Resolution	0.1 °C (0.1 °F)
	pH electrode	digital pH electrode (not included)
	Logging	1000 readings (mixed photometer and electrode); log on demand with user name and sample ID optional input
	Display	128 x 64 pixel LCD with backlight
	Connectivity	USB-A host for flash drive; micro-USB-B for power and computer connectivity
	Battery Life	3.7 VDC Li-polymer rechargeable battery / >500 photometric measurements or 50 hours of continuous pH measurement
	Power Supply	5 VDC USB 2.0 power adapter with USB-A to micro-USB-B cable (included)
	Environment	0 to 50°C (32 to 122°F); 0 to 95% RH, non-condensing
	Dimensions	206 x 177 x 97 mm (8.1 x 7.0 x 3.8 in.)
	Weight	1.0 kg (2.2 lbs.)

- **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.

- **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

Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) With Narrow Band Interference Filter	Method	Reagent Code
Ammonia LR	0.00 to 3.00 mg/L (as NH <sub>3</sub> -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	<b>HI93700-01</b> 100 tests
Ammonia LR (16 mm vial)	0.00 to 3.00 mg/L (as NH <sub>3</sub> -N)	0.01 mg/L	± 0.10 mg/L or ± 5% of reading, whichever is greater	@ 420 nm	Nessler	<b>HI93764A-25</b> 25 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH <sub>3</sub> -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	<b>HI93715-01</b> 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH <sub>3</sub> -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	<b>HI93733-01</b> 100 tests
Ammonia HR (16 mm vial)	0.0 to 100.0 mg/L (as NH <sub>3</sub> -N)	0.1 mg/L	± 1 mg/L or ± 5% of reading, whichever is greater	@ 420 nm	Nessler	<b>HI93764B-25</b> 25 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	<b>HI93701-01</b> 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl <sup>-</sup> )	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	<b>HI93711-01</b> 100 tests
Chromium, Total and VI (16 mm vial)	0 - 1000 ug/L (as Cr)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diphenylcarbohydrazide	<b>HI96781-25</b> 25 tests
COD LR (16 mm vial)*	0 to 150 mg/L (as O <sub>2</sub> )	1 mg/L	±5 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 420 nm	dichromate ISO dichromate EPA mercury-free dichromate	<b>HI93754A-25</b> 24 tests <b>HI93754D-25</b> 24 tests <b>HI93754F-25</b> 24 tests
COD MR (16 mm vial)*	0 to 1500 mg/L (as O <sub>2</sub> )	1 mg/L	±15 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate ISO dichromate EPA mercury-free dichromate	<b>HI93754B-25</b> 24 tests <b>HI93754E-25</b> 24 tests <b>HI93754G-25</b> 24 tests
COD HR (16 mm vial)*	0 to 15000 mg/L (as O <sub>2</sub> )	1 mg/L	±150 mg/L or ±2% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate	<b>HI93754C-25</b> 24 tests
COD UHR (16 mm vial)	0.0 to 60.0 g/L (as O <sub>2</sub> )	0.1 g/L	±0.5 mg/L ±3% of reading	@ 610 nm	dichromate	<b>HI93754I-25</b> 100 tests
Iron, Total (16 mm vial)	0.00 to 7.00 mg/L (as Fe)	0.01 mg/L	±0.20 mg/L or ± 3%, whichever is greater	@525 nm	phenanthroline	<b>HI96778-25</b> 25 tests
Nitrate (16 mm vial)	0.0 to 30.0 mg/L Nitrate (as NO <sub>3</sub> <sup>-</sup> -N)	0.1 mg/L	±1.0 mg/L or ±3% of reading, whichever is greater	@ 420 nm	chromotropic acid	<b>HI93766-50</b> 50 tests
Nitrite ULR, Marine	0 to 200 µg/L (as NO <sub>2</sub> <sup>-</sup> -N)	1 µg/L	±10 µg/L ±4% of reading	@ 466 nm	diazotization	<b>HI764-25</b> 25 tests
Nitrite LR	0 to 600 µg/L (as NO <sub>2</sub> <sup>-</sup> -N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	<b>HI93707-01</b> 100 tests
Nitrite LR (16 mm vial)	0 to 600 µg/L (as NO <sub>2</sub> <sup>-</sup> -N)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diazotization	<b>HI96783-25</b> 25 tests
Nitrite MR (16 mm vial)	0.00 to 6.00 mg/L (as NO <sub>2</sub> <sup>-</sup> -N)	0.01 mg/L	±0.10 mg/L ±3% of reading	@ 525 nm	diazotization	<b>HI96784-25</b> 25 tests
Nitrite HR	0 to 150 mg/L (as NO <sub>2</sub> <sup>-</sup> -N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	<b>HI93708-01</b> 100 tests
Nitrogen, Total LR (16 mm vial)	0.0 to 25.0 mg/L (as NO <sub>3</sub> <sup>-</sup> -N)	0.1 mg/L	±1.0 mg/L or ±5% of reading, whichever is greater	@ 420 nm	chromotropic acid	<b>HI93767A-50</b> 49 tests
Nitrogen, Total HR (16 mm vial)	0 to 150 mg/L (as N)	1 mg/L	±3 mg/L or ±4% of reading, whichever is greater	@ 420 nm	chromotropic acid	<b>HI93767B-50</b> 49 tests
Phosphorus Reactive LR (16 mm vial)	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±4% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758A-50</b> 50 tests
Phosphorus Reactive HR (16 mm vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±4% of reading, whichever is greater	@ 420 nm	vanadomolybdophosphoric acid	<b>HI93763A-50</b> 49 tests
Phosphorus Acid Hydrolyzable (16 mm vial)	0 to 1.6 mg/L (ppm) (as P)	0.1 mg/L	±0.05 mg/L or ±5% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758B-50</b> 50 tests
Phosphorus, Total LR (16 mm vial)	0.00 to 1.15 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±6% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758C-50</b> 50 tests
Phosphorus, Total HR (16 mm vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±5% of reading, whichever is greater	@ 420 nm	vanadomolybdophosphoric acid	<b>HI93763B-50</b> 49 tests
Surfactants Anionic (16 mm vial)	0.00 to 3.50 mg/L (as SDBS)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 610 nm	methylene blue	<b>HI96782-25</b> 25 tests
Surfactants Nonionic (16 mm vial)	0.00 to 6.00 mg/L (as TRITON X-100)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 610 nm	TBPE	<b>HI96780-25</b> 24 tests
<b>Ordering Information</b>	<b>HI83314-01</b> (115V) and <b>HI83314-02</b> (230V) is supplied with sample cuvettes and caps (4 ea.), digestion vials (6), vial adapter, cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
<b>Standards</b>	<b>HI83314-11</b> CAL Check Cuvette Kit for HI83399					

\*COD Rapid Method available.

## Wastewater Testing Reagents for HI83399 and HI83314

Elemental form of phosphorus is never found alone but in multiple forms of phosphate including reactive, acid hydrolyzable, and total. Phosphate can be expressed as phosphate or phosphate-phosphorous

### Total Chromium and Chromium VI

Environmental pollution with various forms of Cr results from its numerous uses in the chemical industry, production of dyes, wood preservation, leather tanning, chrome plating, manufacturing of various alloys, and many other applications and products. Cr(VI) is the most mobile form of chromium in the environment and is classified as a known human carcinogen. Acidic environments with high organic content promote the reduction of Cr(VI) to nontoxic Cr(III). The opposite process of Cr(VI) formation from Cr(III) also occurs, particularly in the presence of common reducing substance.

### Total Iron

The limit values of metals in water are always specified as total metals. The heavy metal in water can be divided into two main groups: reactive heavy metal and heavy metal complexed with organic and inorganic forms. In the latter case the sample preparation is essential before an analysis of the total metal content is carried out.

Hanna reagents are suitable for the digestion of undissolved and complexed Iron by heating in an acid environment in the presence of an oxidising agent. A comparison of the results obtained before and after the digestion shows whether the digestion is necessary. If the digested sample gives higher measured values, bonded Iron are present in the undigested sample, which are not accessible for analysis before the digestion is carried out.

### Total Nitrogen

Total Nitrogen is the sum of all forms of nitrogen including organic ammonia, nitrate and nitrite. Organic nitrogen includes amino acids found in all living matter. In order to measure organically bound nitrogen the sample has to be digested with acid and heat to convert to nitrate

that reacts with chromotropic acid to produce a color proportional to concentration. Total nitrogen is a common wastewater parameter since nitrogen is a nutrient that affects biological growth.

### Reactive Phosphorous

Reactive Phosphorous is the simplest form and is known as phosphate or orthophosphate. It is considered reactive since it easily reacts or bonds with cations. Orthophosphate is commonly added to water to inhibit corrosion of pipes in the distribution of water.



### Acid Hydrolyzable Phosphorous

Acid Hydrolyzable Phosphorous also known, as condensed phosphate is a complex form of orthophosphate that are bound together. These forms include polyphosphate, pyrophosphate and metaphosphate, which are used boiler and cooling tower water treatment for corrosion inhibition of pipes.

### Total Phosphorous

Total Phosphorous (Total P) is the sum of all phosphorous including inorganic (orthophosphate and acid hydrolyzable) and organic matter such as the phosphorous found in living matter (i.e. ATP/ADP). In order to measure the organic phosphorous the sample needs to be digested with an acid and heat in order to breakdown the organically bound phosphorous to the simplest form, orthophosphate.

It is seen that there are different forms of phosphate measurement and it is important to use the correct chemistry for the appropriate one to be measured. Phosphorus is a common parameter measured in wastewater treatment since it can cause eutrophication leading to algal blooms in water.

Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (▲ nm) with Narrow Band Interference Filter	Method	Reagent Code
Chromium, Total and VI (16 mm vial)	0 - 1000 ug/L (as Cr)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diphenylcarbohydrazide	<b>HI96781-25</b> 25 tests
Iron, Total (16 mm vial)	0.00 to 7.00 mg/L (as Fe)	0.01 mg/L	±0.20 mg/L or ± 3%, whichever is greater	@525 nm	phenanthroline	<b>HI96778-25</b> 25 tests
Nitrogen, Total LR (16 mm vial)	0.0 to 25.0 mg/L (as NO <sub>3</sub> <sup>-</sup> - N)	0.1 mg/L	±1.0 mg/L or ±5% of reading, whichever is greater	@ 420 nm	chromotropic acid	<b>HI93767A-50</b> 49 tests
Nitrogen, Total HR (16 mm vial)	0 to 150 mg/L (as N)	1 mg/L	±3 mg/L or ±4% of reading, whichever is greater	@ 420 nm	chromotropic acid	<b>HI93767B-50</b> 50 tests
Phosphorus Reactive LR (16 mm vial)	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±4% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758A-50</b> 50 tests
Phosphorus Reactive HR (16 mm vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±4% of reading, whichever is greater	@ 420 nm	vanadomolybdophosphoric acid	<b>HI93763A-50</b> 49 tests
Phosphorus Acid Hydrolyzable (16 mm vial)	0 to 1.6 mg/L (ppm) (as P)	0.1 mg/L	±0.05 mg/L or ±5% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758B-50</b> 50 tests
Phosphorus, Total LR (16 mm vial)	0.00 to 1.15 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±6% of reading, whichever is greater	@ 610 nm	ascorbic acid	<b>HI93758C-50</b> 50 tests
Phosphorus, Total HR (16 mm vial)	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±5% of reading, whichever is greater	@ 420 nm	vanadomolybdophosphoric acid	<b>HI93763B-50</b> 49 tests

# General Accessories for HI83399 and HI83314



HI731340 200 µL automatic pipette



HI731341 1000 µL automatic pipette



HI731342 2000 µL automatic pipette



HI731350 200 µL automatic pipette tips (25)

HI731351 1000 µL automatic pipette tips (25)

HI731352 2000 µL automatic pipette tips (4)



HI83300-100 sample preparation kit consisting of activated carbon for 50 tests, 100 g demineralizer bottle, 170 mL graduated beaker, 100 mL beaker, 3 mL pipette, 60 mL syringe, 5 mL syringe, graduated cylinder, spoon, funnel, paper filters (25)



HI72083300 carrying case for HI83300 family



HI920015 USB to micro USB cable connector



HI740224 plastic beaker 170 mL (12)



HI76404A electrode holder for HI83300 family



HI731318 cuvette cleaning cloth (4)



HI740225 60 mL graduated syringe



HI740226 5 mL graduated syringe



HI731331 cuvette (4)

HI731335N caps for cuvette (4)



HI93703-55 activated carbon for 50 tests



HI11310 digital combination pH electrode



HI740036P beaker, plastic 100 mL (10)

HI740034P cap for 100 mL plastic beaker (10)



HI75110/230 USB power supply