

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.



- **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
- **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
- **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
- **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

## 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 photodiode
	Cuvette Types	Round, 24.6mm & 16mm diameter
	Number of Methods	34
Probe	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)
	Electrode	Intelligent pH / temperature electrode
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C (0.1°F)
	Accuracy	±0.5°C @ 25°C (±0.9°F @ 77°F)
Additional Specifications	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	<b>HI83314-01</b> (115V) and <b>HI83314-02</b> (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.), instrument quality certificate, and instruction manual.	
Standards	<b>HI83314-11</b> CAL Check Cuvette Kit for HI83314	

## HI83314 Parameter Specifications

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
Ammonia Low Range	0.00 to 3.00 mg/L (as NH <sub>3</sub> -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	<b>HI93700-01</b> Reagents for 100 tests <b>HI93700-03</b> Reagents for 300 tests
Ammonia Low Range (13 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 at 25 °C, whichever is greater	420 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler Method	<b>HI93764A-25</b> Reagents for 25 tests
Ammonia Medium Range	0.00 to 10.00 mg/L (as NH <sub>3</sub> -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	<b>HI93715-01</b> Reagents for 100 tests <b>HI93715-03</b> Reagents for 300 tests
Ammonia High Range	0.0 to 100.0 mg/L (as NH <sub>3</sub> -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	<b>HI93733-01</b> Reagents for 100 tests <b>HI93733-03</b> Reagents for 300 tests
Ammonia High Range (13 mm Vial)	0.0 to 100.0 mg/L (as NH <sub>3</sub> -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	<b>HI93764B-25</b> Reagents for 25 tests

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

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
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 at 25 °C	525 nm	Adaptation of the EPA DPD Method 330.5	<b>HI93701-F</b> Reagents for 300 tests (liquid) <b>HI93701-01</b> Reagents for 100 tests (powder) <b>HI93701-03</b> Reagents for 300 tests (powder)
Chlorine, Total	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )	0.01 mg/L	±0.03 mg/L ±3% of reading at 25 °C	525 nm	Adaptation of the EPA DPD Method 330.5	<b>HI93701-T</b> Reagents for 300 tests (liquid) <b>HI93711-01</b> Reagents for 100 total tests (powder) <b>HI93711-03</b> Reagents for 300 total tests (powder)
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	<b>HI96781-25</b> Reagents for 25 tests
Chemical Oxygen Demand Low Range (13 mm Vial)	0 to 150 mg/L (as O <sub>2</sub> )	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	<b>HI93754A-25</b> Reagents EPA Low Range for 24 tests <b>HI93754D-25</b> Reagents Hg Free Low Range for 24 tests <b>HI93754F-25</b> Reagents ISO Low Range for 24 tests
Chemical Oxygen Demand Medium Range (13 mm Vial)	0 to 1500 mg/L (as O <sub>2</sub> )	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	<b>HI93754B-25</b> Reagents EPA Medium Range for 24 tests <b>HI93754E-25</b> Reagents Hg Free Medium Range for 24 tests <b>HI93754G-25</b> Reagents ISO Medium Range for 24 tests
Chemical Oxygen Demand High Range EPA (13 mm Vial)	0 to 15000 mg/L (as O <sub>2</sub> )	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	<b>HI93754C-25</b> Reagents for 24 tests
Chemical Oxygen Demand Ultra High Range (13 mm Vial)	0.0 to 60.0 ppt (as O <sub>2</sub> )	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	<b>HI93754J-25</b> Reagents for 24 tests
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	<b>HI96786-25</b> 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	<b>HI96778-25</b> Reagents for 25 tests
Nitrate (13 mm Vial)	0.0 to 30.0 mg/L (as NO <sub>3</sub> <sup>-</sup> -N)	0.1 mg/L	±1.0 mg/L or ±3% of reading at 25 °C, whichever is greater	420 nm	Chromotropic Acid Method	<b>HI93766-50</b> Reagents for 50 tests
Nitrite Low Range	0 to 600 µg/L (as NO <sub>2</sub> <sup>-</sup> -N)	1 µg/L	±20 µg/L ±4% of reading at 25 °C	466 nm	Adaptation of the EPA Diazotization Method 354.1	<b>HI93707-01</b> Reagents for 100 tests <b>HI93707-03</b> Reagents for 300 tests
Nitrite Low Range (13 mm Vial)	0 to 600 µg/L (as NO <sub>2</sub> <sup>-</sup> -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	<b>HI96783-25</b> Reagents for 25 tests
Nitrite Medium Range (13 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 at 25°C	525 nm	Adaptation of the Standard Method for the Examination of Water and Wastewater, 23rd Edition, 4500B Diazotization Method, Nitrogen Nitrite	<b>HI96784-25</b> Reagents for 25 tests
Nitrite High Range	0 to 150 mg/L (as NO <sub>2</sub> <sup>-</sup> )	1 mg/L	±4 mg/L ±4% of reading at 25 °C	575 nm	Adaptation of the Ferrous Sulfate Method	<b>HI93708-01</b> Reagents for 100 tests <b>HI93708-03</b> 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	<b>HI93767A-50</b> Reagents for up to 49 tests
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	<b>HI93767B-50</b> Reagents for up to 49 tests

Parameter	Range	Resolution	Accuracy	Wavelength	Method	Reagent Code
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	<b>HI93758B-50</b> 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	<b>HI93758A-50</b> 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	<b>HI93763A-50</b> 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	<b>HI93758C-50</b> 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	<b>HI93763B-50</b> Reagents for up to 49 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	<b>HI96782-25</b> 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	<b>HI96785-25</b> 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	<b>HI96780-25</b> Reagents for 24 tests



HI93754A-25



# 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 oxidizing 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

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Chemical Oxygen Demand

accessories



**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



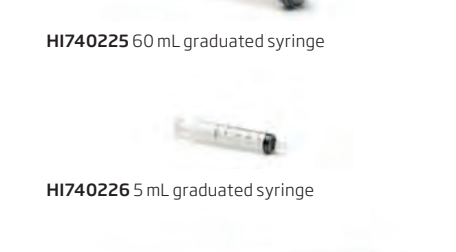
**HI740224** plastic beaker 170 mL (12)



**HI76404A** electrode holder for HI83300 family



**HI731318** cuvette cleaning cloth (4)



**HI740225** 60 mL graduated syringe



**HI11310** digital combination pH electrode



**HI731331** cuvette (4)

**HI731335N** caps for cuvette (4)



**HI93703-55** activated carbon for 50 tests



**HI75110/220U** Voltage adapter from 115 VAC to USB 5 VDC (USA plug)

**HI75110/220E** Voltage adapter from 230 VAC to USB 5 VDC (European plug)



**HI740036P** beaker, plastic 100 mL (10)

**HI740034P** cap for 100 mL plastic beaker (10)

