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Hanna Chemical Test Kits

Single or Combination Kits

Hanna test kits are a simple way to perform an accurate chemical analysis. The wide variety of single parameter test kits presented in this section includes colorimetric, checker disc, titration and turbidimetric methods.

Quick and easy to use, Hanna colorimetric chemical test kits are the ideal solution for water analysis of many chemical parameters. The kits are equipped with a transparent container which has the color scale right next to the sample being tested. This makes the color comparison process simple and error free. The reagents are either liquid or powder, depending on the parameter to be measured.

Hanna Checker® Disc test kits use the technology of colorimetric kits to provide greater accuracy and resolution. The Checker® Disc is a color comparison wheel shaded from dark to light in proportion to the concentration of the chemical parameter being tested. The user just needs to put both the blank and the reacted cuvettes inside the Checker® Disc. By turning the wheel, the user can then visually find the concentration that best equals the reacted sample. This technique enhances resolution and accuracy.

Titration test kits are easy to use without any loss of resolution and accuracy. To determine the concentration of the chemical parameter, these kits utilize a titration technique which consists of counting the number of drops of titrant necessary to cause a color change in the sample. Dropper bottles make titration extremely quick and easy without compromising accuracy. The endpoint can be determined with enhanced accuracy and simplicity.

Hanna test kits are supplied ready to use, complete with all the necessary accessories. They are designed to help you to work better, faster and safer. All Hanna chemical test kits use color-coded dropper bottles which are easy to recognize during analysis.

With some kits, a plastic beaker is provided featuring a ported cap to prevent spills and waste.

Every kit is manufactured according to the highest quality standards and a Safety Data Sheet (SDS) is available for each product, online.

Designed for Specific Applications

Hanna combination chemical test kits are tailor made for specific applications:

Includes all you need

Hanna test kits include all the necessary reagents and accessories for their specific application.

Ideal for field measurements

Multiparameter test kits from Hanna are equipped with a hard carrying case helps to keep your equipment neat, organized and easy to carry around in the field. Our carrying cases are rugged, built to last, and easily refilled with replacement reagents as needed.

Comprehensive Instructions

Every chemical test kit is supplied with a comprehensive, easy-to-understand instruction manual. The manuals guide you through the analysis step-by-step, making it easy for even non-technical personnel to perform tests.

One more advantage: Hanna's exclusive pHep® for pH measurements

For those kits that offer pH measurements, Hanna has included the exclusive pHep® electronic tester so that your pH analysis will always be quick and reliable. Traditional pH test strips have limited accuracy and do not cover the entire pH range. Due to the pHep®'s long life, high accuracy and extended range, these problems are avoided.



HI3814

Environmental Monitoring Test Kit

Ideal for Professionals and Students

The HI3814 is a chemical test kit that determines that uses titration and direct measurement to measure six parameters common in environmental testing: acidity, alkalinity, carbon dioxide, hardness, dissolved oxygen, and pH. The HI3814 is supplied with all of the necessary reagents and equipment to perform each analysis, and all reagents are individually available as they run out.

[See page 9.34](#)

HI3896

Hanna Soil Test Kit

The chemical composition of soil includes pH and chemical elements. Soil analysis is necessary for better management of fertilization and to know the residues of fertilizers in relation to the crop, tillage and the most suitable plant choice for soil composition. An analysis can highlight shortages and help the understanding of the causes of an abnormal growth. By using the Hanna soil test, it is possible to measure pH and the most important elements for plant growth: nitrogen (N), phosphorus (P) and potassium (K).

Testing the soil during each crop cycle and comparing the results with plant growth can be a useful information for subsequent cultivations.

[See page 9.31](#)

HI3899BP

Backpack Lab® Marine Science Educational Test Kit

Backpack Lab® is designed with all the necessary components in one place, reducing the chance of misplacing an item. Ideal for transporting, this durable backpack is great to take to the field for accurate on-site measurements.

This kit is designed to provide a complete unit for teachers to introduce students to important marine science topics. The teacher's guide provides detailed background information for marine science lessons and activities that can be adapted to various grade levels. Field tests are included to complement classroom lessons. All materials fit easily into the supplied backpack for easy transport.

[See page 9.42](#)



Single Parameter Test Kits

	Parameter	Method	Range	# of Tests	Code	Page	
Acidity	Acidity (as % Oleic acid)	titration	0.00 - 1.00 % acidity	6	HI3897	9.8	
	Acidity (as CaCO ₃) Methyl/Orange and Total	titration	0-100 mg/L (ppm); 0-500 mg/L (ppm)	110 avg.	HI3820	9.10	
Alkalinity	Alkalinity (as CaCO ₃) Phenolphthalein and Total	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	HI3811	9.10	
Ammonia	Ammonia (as NH ₃ -N) (Fresh Water)	colorimetric	0.0-2.5 mg/L (ppm)	25 avg.	HI3824	9.11	
	Ammonia (as NH ₃ -N) (Saltwater)	colorimetric	0.0-2.5 mg/L (ppm)	25 avg.	HI3826	9.11	
Boron	Boron	titration	0.0-5.0 mg/L (ppm)	100	HI38074	9.12	
Bromine	Bromine	colorimetric	0.0-3.0 mg/L (ppm)	60 avg.	HI3830	9.12	
Carbon Dioxide	Carbon Dioxide	titration	0.0-10.0 mg/L (ppm); 0.0-50.0 mg/L (ppm); 0-100 mg/L (ppm)	110 avg.	HI3818	9.13	
Chloride	Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm); 0-1000 mg/L (ppm)	110 avg.	HI3815	9.13	
Chlorine	Chlorine Free	colorimetric	0.0-2.0 mg/L (ppm)	50 avg.	HI3829F	9.14	
	Chlorine Free	colorimetric	0.0-2.5 mg/L (ppm)	50 avg.	HI3831F	9.14	
	Chlorine Free	checker disc	0.0-3.5 mg/L (ppm)	100	HI3875	9.15	
	Chlorine Free	checker disc	0.00-0.70 mg/L (ppm); 0.0-3.5 mg/L (ppm)	200	HI38018	9.15	
	Chlorine Free & Total	checker disc	0.00-0.70 mg/L (ppm); 0.0-3.5 mg/L (ppm)	200	HI38017	9.16	
	Chlorine Free & Total	checker disc	0.00-0.70 mg/L (ppm); 0.0-3.5 mg/L (ppm); 0.0-10.0 mg/L (ppm)	200	HI38020	9.16	
	Chlorine Total	colorimetric	0.0-2.5 mg/L (ppm)	50 avg.	HI3831T	9.17	
	Chlorine Total	titration	10-200 mg/L (ppm)	100	HI38023	9.17	
	Chromium	Chromium (as CrVI)	colorimetric	0.0-1.0 mg/L (ppm)	100 avg.	HI3846	9.18
	Copper	Copper	colorimetric	0.0-2.5 mg/L (ppm)	100	HI3847	9.18
Formaldehyde	Formaldehyde	titration	0-1%; 0-10%	110 avg.	HI3838	9.19	
Glycol	Glycol	visual	Present/Absent	25	HI3859	9.19	
Hardness	Hardness (as CaCO ₃) Total	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	HI3812	9.20	
	Hardness (as CaCO ₃) Total	titration	0-30 gpg	100	HI38033	9.20	
	Hardness (as CaCO ₃) Total	titration	0-150 mg/L (ppm)	50 avg.	HI3840	9.21	
	Hardness (as CaCO ₃) Total	titration	40-500 mg/L (ppm)	50 avg.	HI3841	9.21	
	Hardness (as CaCO ₃) Total	titration	400-3000 mg/L (ppm)	50 avg.	HI3842	9.21	
Hydrogen Peroxide	Hydrogen Peroxide	titration	0.00-2.00 mg/L; 0.0-10.0 mg/L	100 avg.	HI3844	9.22	
Hypochlorite	Hypochlorite (as Cl ₂)	titration	50-150 g/L (ppt)	100 avg.	HI3843	9.22	
Iron	Iron	colorimetric	0-5 mg/L (ppm)	50 avg.	HI3834	9.23	
	Iron	checker disc	0.00-1.00 mg/L (ppm)	100	HI38039	9.23	
	Iron	checker disc	0.0-5.0 mg/L (ppm)	100	HI38040	9.24	
	Iron	checker disc	0.0-10.0 mg/L (ppm)	100	HI38041	9.24	
Nitrate	Nitrate (as NO ₃ ⁻ -N)	colorimetric	0-50 mg/L (ppm)	100	HI3874	9.25	
	Nitrate (as NO ₃ ⁻ -N) (Irrigation Water and Soil)	checker disc	water: 0-50 mg/L (ppm); soil: 0-60 mg/L (ppm)	100 100	HI38050	9.25	
Nitrite	Nitrite (as NO ₂ ⁻ -N)	colorimetric	0.0-1.0 mg/L (ppm)	100	HI3873	9.26	

	Parameter	Method	Range	# of Tests	Code	Page
Oxygen, Dissolved	Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110 avg.	HI3810	9.26
Ozone	Ozone	checker disc	0.0-2.3 mg/L (ppm)	100	HI38054	9.27
Phosphate	Phosphate (PO ₄ ³⁻)	colorimetric	0-5 mg/L (ppm)	50	HI3833	9.27
	Phosphate (PO ₄ ³⁻)	checker disc	0.00-1.00 mg/L (ppm); 0.0-5.0 mg/L (ppm); 0-50 mg/L (ppm)	100	HI38061	9.28
Salinity	Salinity	titration	0.0-40.0 g/kg (ppt)	110 avg.	HI3835	9.28
Silica, HR	Silica as (SiO ₂)	checker disc	0-40 mg/L (ppm); 0-800 mg/L (ppm)	100	HI38067	9.29
	Sulfate (as SO ₄ ²⁻)	turbidimetric	20-100 mg/L (ppm)	100	HI38000	9.29
Sulfate	Sulfate (as SO ₄ ²⁻)	titration	100-1000 mg/L (ppm); 1000-10000 mg/L (ppm)	200	HI38001	9.30
	Sulfite	Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm); 0-200 mg/L (ppm)	110 avg.	HI3822

Multiparameter Test Kits

	Parameter	Method	Range	# of Tests	Page
HI3895 Agriculture Test Kit, Basic	Nitrogen	colorimetric	traces, low, medium, high	10	9.31
	Phosphorus	colorimetric	traces, low, medium, high	10	
	pH	colorimetric	4 to 9 pH	10	
	Potassium	turbidimetric	traces, low, medium, high	10	
HI3896 Agriculture Test Kit, Professional	Nitrogen	colorimetric	traces, low, medium, high	25	9.31
	Phosphorus	colorimetric	traces, low, medium, high	25	
	pH	colorimetric	4 to 9 pH	25	
	Potassium	turbidimetric	traces, low, medium, high	25	
HI3827 Boiler and Feedwater Test Kit	Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	9.32
	Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm); 0-1000 mg/L (ppm)	110 avg.	
	Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	
	Phosphate	colorimetric	0-5 mg/L (ppm)	50	
	pH	electronic pH tester	0.0-14.0 pH	life of the meter	
	Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm); 0-200 mg/L (ppm)	110 avg.	
HI3821 Cooling and Boiler Combination Test Kit	Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	9.33
	Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm); 0-1000 mg/L (ppm)	110 avg.	
	Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	
	Phosphate	colorimetric	0-5 mg/L (ppm)	50 avg.	
	Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110 avg.	
	Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm); 0-200 mg/L (ppm)	110 avg.	
HI3814 Environmental Monitoring Test Kit	Acidity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-500 mg/L (ppm)	110 avg.	9.34
	Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	
	Carbon Dioxide	titration	0.0-10.0 mg/L (ppm); 0.0-50.0 mg/L (ppm); 0-100 mg/L (ppm)	110 avg.	
	Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	
	Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110 avg.	
	pH	electronic pH tester	0.0-14.0 pH	life of the meter	
HI3823 Marine Test Kit	Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	9.35
	Carbon Dioxide	titration	0.0-10.0 mg/L (ppm); 0.0-50.0 mg/L (ppm); 0-100 mg/L (ppm)	110 avg.	
	Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	
	Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110 avg.	
	pH	electronic pH tester	0.0-14.0 pH	life of the meter	
	Salinity	titration	0.0-40.0 g/kg	110 avg.	
HI3887 Quick-check Swimming Pool Test Kit	Free Chlorine	colorimetric	0-2.5 mg/L (ppm)	50 avg.	9.36
	pH	colorimetric	6.0-8.5 pH	100 avg.	
HI3817 Water Quality Test Kit	Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	9.37
	Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm); 0-1000 mg/L (ppm)	110 avg.	
	Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100 avg.	
	Iron	colorimetric	0-5 mg/L (ppm)	50	
	pH	electronic pH tester	0.0-14.0 pH	life of the meter	
	Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm); 0-200 mg/L (ppm)	110 avg.	



Backpack Lab® Multiparameter Test Kits

HI3817BP Backpack Lab® Water Quality Educational Test Kit

Parameter	Method	Range	# of Tests	Page
Acidity (CaCO ₃)	titration	0-100 mg/L (ppm); 0-500 mg/L (ppm)	110	
Alkalinity (CaCO ₃) Phenolphthalein & Total	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110	
Carbon Dioxide	titration	0.0-10.0 mg/L (ppm); 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)	110	
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110	
Hardness (CaCO ₃)	titration	0.0-30.0 mg/L (ppm); 0-300 mg/L (ppm)	100	
Nitrate (NO ₃ ⁻ -N)	colorimetric	0-50 mg/L (ppm)	100	
Phosphate	colorimetric	0-5 mg/L (ppm)	50	9.38
pH	Hanna electronic Combo tester	-2 to 16 pH	life of meter	
EC	Hanna electronic Combo tester	0-3999 µS/cm	life of meter	
TDS	Hanna electronic Combo tester	0-2000 ppm	life of meter	
Temperature	Hanna electronic Combo tester	-5-60.0°C	life of meter	
Turbidity	secchi disc	-	-	

HI3896BP Backpack Lab® Soil Quality Educational Test Kit

Nitrogen	colorimetric	traces, low, medium, high	50	
Phosphorus	colorimetric	traces, low, medium, high	50	
Potassium	turbidimetric	traces, low, medium, high	50	
	colorimetric	4 to 9 pH (1 pH increments)	50	
pH	Hanna electronic Combo tester	-2 to 16 pH	life of meter	9.40
EC	Hanna electronic Combo tester	0 to 3999 µS/cm	life of meter	
TDS	Hanna electronic Combo tester	0 to 2000 ppm	life of meter	
Temperature	Hanna electronic Combo tester	-50.0 to 220°C	life of meter	

HI3899BP Backpack Lab® Marine Science Educational Test Kit

Acidity (CaCO ₃)	titration	0-100 mg/L (ppm); 0-500 mg/L (ppm)	110 avg.	
Alkalinity (CaCO ₃) Phenolphthalein & Total	titration	0-100 mg/L (ppm); 0-300 mg/L (ppm)	110 avg.	
Ammonia (as NH ₃ -N)	colorimetric	0.0-2.5 mg/L (ppm)	25 avg.	
Carbon Dioxide (CO ₂)	titration	0.0-10.0 mg/L (ppm); 0.0-50.0 mg/L (ppm)	110 avg.	
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	110 avg.	
Nitrite	colorimetric	0.0-9.0 mg/L (ppm)	100	
Nitrate (NO ₃ ⁻ -N)	colorimetric	0-50 mg/L (ppm)	100	
Phosphate (PO ₄ ³⁻)	colorimetric	0-5 mg/L (ppm)	50	9.42
Salinity	titration	0.0-40.0 g/kg	110 avg.	
pH	Hanna electronic Combo tester	-2 to 16 pH	life of meter	
EC	Hanna electronic Combo tester	0-3999 µS/cm	life of meter	
TDS	Hanna electronic Combo tester	0-2000 ppm	life of meter	
Temperature	Hanna electronic Combo tester	-5-60.0°C	life of meter	
Turbidity	secchi disc	-	-	

HI3897

Olive Oil Acidity Test Kit

Now there is an easy, affordable and accurate way to determine the quality, classification and freshness of your olive oil.

Acidity (as % oleic acid) is the most fundamental measurement of olive oil. It is the primary indicator of olive oil purity and freshness.

The quality of olive oil is directly related to the degree of breakdown of the fatty acids in the oil. As the bound fatty acids break down, free fatty acids are formed, which increase the % acidity of the oil. Acidity, is a measure of the free fatty acid present in the oil, which is directly related to its purity.

The quality of olive oil can be adversely affected during either maturation or by environmental conditions. Mishandling, processing and bruising during harvesting can also contribute to a breakdown of fatty acids and an increase in free acidity. Improper and/or long-term storage can cause olive oil to break down and become rancid. Regular acidity testing is the best way to ensure and maintain quality and freshness.

Normally, testing acidity is a complicated process requiring the use of various chemicals in a laboratory environment. Hanna has simplified this process in an easy-to-understand test kit that can be used by almost anyone to produce quick and accurate results.

Studies have shown that the quality of olive oil has a direct impact on its health benefits. Extra Virgin Olive Oil contains higher levels of antioxidants, particularly phenols and vitamin E (because it is less processed). Antioxidants can help prevent oxidation damage to body tissue caused by free radicals. Studies have also shown that the oxidation of LDL (bad) cholesterol is associated with the hardening of arteries that can lead to heart disease.

With the HI3897 test kit, it is possible to easily and accurately test the quality of olive oil at various stages of processing and storage to monitor and maintain the highest quality.



Acidity, defined as percent oleic acid, is a parameter that indicates olive oil freshness. A high acidity value indicates the oil quality has diminished and is at risk of becoming rancid.

Acidity is used to discriminate an extra virgin olive oil from all other olive oils. According to the CEE 2568/91 regulation, olive oil is considered extra virgin when its acidity level is below 1%. A low acidity value also indicates a natural extraction process occurred soon after olive harvesting.

The HI3897 kit utilizes a titration method where the endpoint is visually determined when the color changes from yellow-green to pink.



The HI180 is a compact and lightweight magnetic stirrer which incorporates electronic controls that allow the user to regulate the speed with precision. In addition to speed control, Hanna's Speedsafe™ system will assure that the maximum speed is never exceeded.

Chemical Parameters

Olive Storage Period (between harvesting and extraction)	within 48 hours	2 to 4 days	over 4 days
Acidity (as % oleic acid)	0.3	0.4	0.5



Sensory Quality of Olive Oil

The sensory analysis of virgin olive oil is based on a panel test, developed by the International Olive Oil Council. The rating is awarded on the basis of a scale of points running from 0, which indicates that the oil has extreme defects, to 9, which indicates that the oil has no defects at all. See the following chart for sensory ratings of each grade of olive oil.

- Extra Virgin Oil >6.5
- Virgin >5.5
- Ordinary Virgin >3.5
- Virgin Lampante <3.5

Specifications	HI3897
Range	0.00 to 1.00 % acidity
Smallest Increment	0.01 mL = 0.01%
Method	titration
Sample Size	4.6 mL or 4 g
Number of Tests	6
Dimensions (kit)	112 x 390 x 318 mm (4.4 x 15.4 x 12.5")

Specifications	HI180 Magnetic Stirrer (included)
Maximum Stirring Capacity	1 L (0.26 g)
Speed Range	100 rpm min.; 1000 rpm max
Installation Category	II
Cover Material	ABS plastic
Environment	0 to 50°C (32 to 122°F) 95% RH max
Dimensions	dia. 137 mm x 51 mm (h) (5.39 x 2")
Weight	640 g (1.4 lbs.)
Ordering Information	HI3897 is supplied with 6 ready-to-use bottles of organic solvent, HI180I/MB magnetic stirrer, calibrated syringe for oil dosing, calibrated syringe for titrant dosing with tip, titrant (20 mL bottle), rugged carrying case and instructions.
Reagents	HI3897-010 Replacement reagents for 10 tests.

In accordance with the European Community (EC) reg. CEE2568/91 quality classification of olive oil based on acidity (expressed as percent oleic acid) is as follows:

- **Extra Virgin Olive Oil: Acidity \leq 1%**
 - "Perfect flavor and odor", with a maximum acidity, expressed as oleic acid, of 1 g/100 g
- **Virgin Olive Oil: Acidity 1 - 2%**
 - "Perfect flavor and odor", with a maximum acidity, expressed as oleic acid, of 2 g/100 g
- **Ordinary Virgin Olive Oil: Acidity 2 - 3.3% (tolerance of 10%)**
 - "Good flavor and odor", with a maximum acidity, expressed as oleic acid, of 3.3 g/100 g
- **Virgin Lampante Olive Oil: + 3.3%. Not fit for human consumption**
 - "Off flavor and odor", with a maximum acidity, expressed as oleic acid, > 3.3 g/100 g

Additional Technical Information:

Olive oil is a complex compound made of fatty acids, vitamins, volatile components, water soluble components and microscopic bits of olive. The three primary fatty acids (triglycerides) are oleic, linoleic, and linolenic.

- Palmitic Acid (16:0) = 7.5 - 20%
- Oleic Acid (18:1) = 55 - 85% olive oil composition
- Linoleic Acid (18:2) = 3.5 - 21.00% olive oil composition
- Linolenic Acid (18:3) = 0.0 - 1.5% olive oil composition

Oleic acid makes up 55 to 85% of olive oil. Oleic acid is the most abundant fatty acid found in nature.

Studies show that high concentrations of oleic acid can lower blood levels of total and LDL (bad) cholesterol, reducing the long term risk of heart disease.

Olive Oil Acid Composition

- Palmitic Acid (16:0) = 7.5 - 20%
- Palmitoleic Acid (16:1) = 0.3 - 3.5%
- Stearic Acid (18:0) = 0.5 - 5.0%
- Oleic Acid (18:1) = 55.0 - 83.0 %
- Linoleic Acid (18:2) = 3.5 - 21.0%
- Linolenic Acid (18:3) = 0.0 - 1.5%
- Others = 1.5 - 3.2%

HI3820

Acidity Test Kit

The HI3820 is a titration-based chemical test kit that determines the acidity concentration in two ranges: 0 to 100 mg/L and 0 to 500 mg/L CaCO₃. The HI3820 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0 to 100 mg/L are determined to 1 mg/L resolution.
 - Readings from 0 to 500 mg/L are determined to 5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3820-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Acidity is the quantitative capacity of a water sample to neutralize a base to a predetermined pH value. Therefore, the greater acidity, the more potentially corrosive the water. Acidity can be caused by mineral acids, organic acids, and carbon dioxide in the form of carbonic acid. Today, our water supplies are becoming more contaminated with corrosive chemicals from industrial dumping and ever-growing amounts of carbon dioxide in the atmosphere. Acidity measurements are an essential monitoring device to define and control pollution in sewers, lakes, and rivers. Acidity of water is equally important to monitor in soils and fish farming to ensure an adequate growing environment.



Specifications	HI3820 Acidity (as CaCO ₃ *)
Type	titration
Range	0-100 mg/L (ppm) 0-500 mg/L (ppm)
Smallest Increment	1 mg/L (ppm) 5 mg/L (ppm)
Method	methyl-orange/phenolphthalein
Number of Tests	110 avg.
Ordering Information	HI3820 test kit comes with 10 mL dechlorinating reagent, 10 mL bromophenol blue indicator, 10 mL phenolphthalein indicator, 120 mL acidity titrant, 10 mL calibrated vessel, 50 mL calibrated vessel, and calibrated syringe with tip.
Reagent	HI3820-100 Acidity (as CaCO ₃), 110 tests avg

HI3811

Alkalinity Test Kit

The HI3811 is a titration-based chemical test kit that determines the alkalinity concentration in samples within a 0 to 100 mg/L (ppm) CaCO₃ or 0 to 300 mg/L CaCO₃ range. The HI3811 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beakers, plastic syringe, phenolphthalein indicator, and bromophenol blue indicator.
- **High resolution**
 - Readings from 0 to 100 mg/L are determined to 1 mg/L resolution
 - Readings from 0 to 300 mg/L are determined to 3 mg/L resolution
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3811-100 can be ordered to replace the reagents supplied with the kit

Significance of Use

Alkalinity is the quantitative capacity of a water sample to neutralize an acid to a set pH. This measurement is very important in determining the corrosive characteristics of water due primarily to hydroxide, carbonate, and bicarbonate ions. Other sources of alkalinity can be from anions that can be hydrolyzed such as phosphates, silicates, borates, fluoride, and salts of some organic acids. Alkalinity is critical in the treatments of drinking water, wastewater, boiler and cooling systems, and soils.

Alkalinity can be measured as Phenolphthalein Alkalinity and Total Alkalinity. The Phenolphthalein Alkalinity is determined by neutralizing the sample to a pH of 8.3 using a dilute hydrochloric acid solution and a phenolphthalein indicator. This process converts hydroxide ions to water, and carbonate ions to bicarbonate ions:



Since bicarbonate ions can be converted to carbonic acid with additional hydrochloric acid, the Phenolphthalein Alkalinity measures total hydroxide ions, but only half of the bicarbonate contribution. To completely convert the carbonate ions, hydrochloric acid is added until the sample pH is 4.5, which is known as Total Alkalinity:



Specifications	HI3811 Alkalinity (as CaCO ₃ *)
Type	titration
Range	0-100 mg/L (ppm) 0-300 mg/L (ppm)
Smallest Increment	1 mg/L (ppm) 3 mg/L (ppm)
Method	phenolphthalein/bromphenol blue
Number of Tests	110 avg.
Ordering Information	HI3811 test kit comes with 10 mL phenolphthalein indicator, 10 mL bromophenol blue indicator, 120 mL alkalinity titrant, 10 mL calibrated vessel, 50 mL calibrated vessel, and calibrated syringe with tip.
Reagent	HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg

* 1 gpg = 17 ppm CaCO₃

HI3824

Ammonia Test Kit

for Fresh Water

The HI3824 is a colorimetric chemical test kit that determines the ammonia concentration in fresh water within a 0.0 to 2.5 mg/L (ppm) range as $\text{NH}_3\text{-N}$. The HI3824 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 25 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent dropper bottles.
- **High resolution**
 - Readings from 0.0 to 2.5 mg/L $\text{NH}_3\text{-N}$ are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3824-025 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Groundwater normally contains ammonia due to bacterial decay of plants and animals. However, concentrations of ammonia in rivers and drinking water reservoirs may indicate the presence of agricultural runoff or urban pollution. When the concentration of ammonia is high enough, it can alter the smell and taste of water. In industrial applications, high concentrations of ammonia can cause corrosion in pipes. Ammonia is also monitored in fresh water aquariums and fish farming applications because of its toxicity to fish.



Specifications	HI3824 Ammonia (as $\text{NH}_3\text{-N}$) in fresh water
Type	colorimetric
Range	0.0-2.5 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	Nessler
Number of Tests	25 avg.
Ordering Information	HI3824 test kit comes with 20 mL plastic beaker, color comparison cube, 20 mL ammonia reagent 1 (for fresh water) and 20 mL Nessler reagent.
Reagent	HI3824-025 Ammonia (fresh water) (as $\text{NH}_3\text{-N}$), 25 tests avg

HI3826

Ammonia Test Kit

for Seawater

The HI3826 is a colorimetric chemical test kit that determines the ammonia concentration in seawater within a 0.0 to 2.5 mg/L (ppm) range as $\text{NH}_3\text{-N}$. The HI3826 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 25 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent dropper bottles.
- **High resolution**
 - Readings from 0.0 to 2.5 mg/L $\text{NH}_3\text{-N}$ are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3826-025 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Concentrations of ammonia in rivers, estuaries, and bays may indicate the presence of agricultural runoff or urban pollution. When the concentration of ammonia is high enough, it can prove toxic to aquatic life, affecting the survival, growth, and reproduction rates of various marine species. In industrial applications, high concentrations of ammonia can cause corrosion in pipes.



Specifications	HI3826 Ammonia (as $\text{NH}_3\text{-N}$) in saltwater
Type	colorimetric
Range	0.0-2.5 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	Nessler
Number of Tests	25 avg.
Ordering Information	HI3826 test kit comes with 20 mL plastic beaker, color comparison cube, 20 mL ammonia reagent 1 (for seawater) and 20 mL Nessler reagent.
Reagent	HI3826-025 Ammonia (seawater) (as $\text{NH}_3\text{-N}$), 25 tests avg

HI38074

Boron Test Kit

The HI38074 is a titration-based chemical test kit that determines the boron concentration in irrigation water within a 0 to 5 mg/L (ppm) range. The HI38074 is supplied with all of the necessary reagents and equipment to perform the analysis, including the HI98103 Checker pH meter. The HI 98103 Checker pH meter is used for sample preparation and for the determination of the pH titration endpoint. The HI38074 contains enough reagents for perform 100 tests.

Complete setup

- All required materials are included with the test kit, such as the sample beaker, plastic pipettes, pH adjustment reagents, and pocket pH meter.
- **High resolution**
 - Readings from 0 to 5 mg/L are determined to 0.2 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38074-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Boron is one of the micronutrients essential for plant growth. It may be present naturally in water, or it may find its way into a watercourse through industrial waste effluents. Boron in excess of 2.0 mg/L in irrigation water can be detrimental to plant growth, and some plants may even be adversely affected by concentrations lower than 1.0 mg/L.

The United States Department of Agriculture (USDA) reports the following classification:

Boron (ppm) Effect on crops

- < 0.5 good (except for very sensitive crops)
- 0.5 to 2.0 some risks (many crops must be excluded)
- > 2.0 dangerous (may only be used for very tolerant crops)



Specifications	HI38074 Boron
Type	titration
Range	0.0-5.0 mg/L (ppm)
Smallest Increment	0.2 mg/L (ppm)
Method	boric acid
Number of Tests	100 avg.
Ordering Information	HI38074 test kit comes with reagent for 100 tests, HI98103 Checker pocket pH meter, pH 4.01 (1 sachet), pH 7.01 (1 sachet), screwdriver, 120 mL bottle with cap, 50 mL calibrated vessel, and 1 mL plastic pipettes (2).
Reagent	HI38074-100 Boron, 100 tests avg

HI3830

Bromine Test Kit

The HI3830 is a colorimetric chemical test kit that determines the bromine concentration in samples within a 0.0 to 3.0 mg/L (ppm) Br₂ range. The HI3830 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 60 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent dropper bottles.
- **High resolution**
 - Readings from 0.0 to 3.0 mg/L Br₂ are determined to 0.6 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3830-060 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Bromine is less volatile and more stable than chlorine, making it a good choice as a disinfectant in pools, spas, and hot tubs, and a sanitizing agent in drinking water systems. Like chlorine, excess amounts of bromine in water can be dangerous to health and can cause eye irritation. Daily monitoring of bromine concentration prevents damage to equipment and contributes to the optimization and efficiency of the process while providing for increased user safety.



Specifications	HI3830 Bromine (as Br ₂)
Type	colorimetric
Range	0.0-3.0 mg/L (ppm)
Smallest Increment	0.6 mg/L (ppm)
Method	DPD
Number of Tests	60 avg.
Ordering Information	HI3830 test kit comes with 30 mL reagent 1, 20 mL reagent 2, color comparison cube, and plastic vessel.
Reagent	HI3830-060 Bromine, 60 tests avg

HI3818

Carbon Dioxide Test Kit

The HI3818 is a titration-based chemical test kit that determines the carbon dioxide concentration in three ranges: 0.0 to 10.0 mg/L CO₂, 0.0 to 50.0 mg/L CO₂, and 0 to 100 mg/L CO₂. The HI3818 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as two sample beakers, reagent dropper bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0.0 to 10.0 mg/L CO₂ are determined to 0.1 mg/L resolution.
 - Readings from 0.0 to 50.0 mg/L CO₂ are determined to 0.5 mg/L resolution.
 - Readings from 0 to 100 mg/L CO₂ are determined to 1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3818-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Lakes and rivers naturally contain carbon dioxide concentrations less than 10 mg/L. However, stagnant or polluted water can generate large amounts of carbon dioxide due to organic or mineral decomposition. Higher amounts of carbon dioxide can make the water corrosive and toxic to aquatic organisms. Monitoring carbon dioxide levels is also critical in the manmade environment. Carbon dioxide is added to drinking water during the final stages of the purification process. In water softening systems, a delicate balance of carbon dioxide must be maintained to prevent corrosion or encrustation of pipes and storage tanks.



Specifications	HI3818 Carbon Dioxide (as CO ₂)
Type	titration
Range	0.0-10.0 mg/L (ppm) 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)
Smallest Increment	0.1 mg/L (ppm) 0.5 mg/L (ppm) 1 mg/L (ppm)
Method	phenolphthalein
Number of Tests	100 avg.
Ordering Information	HI3818 test kit comes with 10 mL phenolphthalein indicator, 120 mL carbon dioxide reagent, 10 mL calibrated vessel, 50 mL calibrated vessel and calibrated syringe with tip.
Reagent	HI3818-100 Carbon Dioxide, 110 tests avg

HI3815

Chloride Test Kit

The HI3815 is a titration-based chemical test kit that determines the chloride concentration within two ranges: 0 to 100 mg/L Cl⁻ and 0 to 1000 mg/L Cl⁻. The HI3815 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent solutions, and calibrated syringe.
- **High resolution**
 - Readings from 0 to 100 mg/L are determined to 1 mg/L resolution.
 - Readings from 0 to 1000 mg/L are determined to 10 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3815-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Chloride ions are one of the major inorganic anions in water and wastewater. Although high concentrations of chloride in water are not known to be toxic to humans, its regulation is mainly due to taste. It is essential to monitor chloride concentration in boiler systems to prevent damage of metal parts. In high levels, chloride can corrode stainless steel and be toxic to plant life.



Specifications	HI3815 Chloride (as Cl ⁻)
Type	titration
Range	0-100 mg/L (ppm) 0-1000 mg/L (ppm)
Smallest Increment	1 mg/L (ppm) 10 mg/L (ppm)
Method	mercuric nitrate
Number of Tests	110 avg.
Ordering Information	HI3815 test kit comes with 15 mL diphenylcarbazone indicator, 30 mL nitric acid solution, 120 mL mercuric nitrate solution, 50 mL calibrated vessel, 10 mL calibrated vessel, calibrated syringe with tip.
Reagent	HI3815-100 Chloride, 110 tests avg

HI3829F

Free Chlorine Test Kit

With Color Cube

The HI3829F is a colorimetric chemical test kit that determines the free chlorine concentration within a 0.0 to 2.0 mg/L (ppm) range. The HI3829F is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent packets and dropper bottles.
- **High resolution**
 - Readings from 0.0 to 2.0 mg/L are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3829F-050 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Disinfection is a process of killing disease-causing organisms (or pathogens). Chlorine (Cl_2) is a very desirable disinfectant because, when mixed with pure water, it reacts to form hypochlorous acid (HOCl) and hydrochloric acid (HCl). HOCl (free active chlorine) is the most effective form of chlorine for disinfection of pools, spas, and drinking water.

Drinking water municipalities add elemental chlorine to the water supply as chlorine gas, liquid sodium hypochlorite, or dry calcium hypochlorite. In water these form free chlorine ions, which destroy disease-causing pathogens, reduce odor, eliminate bacteria and help to remove unwanted elements. The USEPA requires that residual disinfectant is present in finished drinking water to ensure there is disinfectant available throughout the distribution system, with chlorine acting as one of the disinfectants that provides said residual.



Specifications	HI3829F Free Chlorine (as Cl_2)
Type	colorimetric
Range	0.0 to 2.0 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	DPD
Number of Tests	50 avg.
Ordering Information	HI3829F test kit comes with color comparison cube, 20 mL reagent 1 and 15 mL reagent 2
Reagent	HI3829F-050 free chlorine, 50 tests avg.

HI3831F

Free Chlorine Test Kit

With Color Cube

The HI3831F is a colorimetric chemical test kit that determines the free chlorine concentration within a 0.0 to 2.5 mg/L (ppm) range. The HI3831F is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent packets and dropper bottles.
- **High resolution**
 - Readings from 0.0 to 2.5 mg/L are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3831F-050 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Disinfection is a process of killing disease-causing organisms (or pathogens). Chlorine (Cl_2) is a very desirable disinfectant because, when mixed with pure water, it reacts to form hypochlorous acid (HOCl) and hydrochloric acid (HCl). HOCl (free active chlorine) is the most effective form of chlorine for disinfection of pools, spas, and drinking water.

Drinking water municipalities add elemental chlorine to the water supply as chlorine gas, liquid sodium hypochlorite, or dry calcium hypochlorite. In water these form free chlorine ions, which destroy disease-causing pathogens, reduce odor, eliminate bacteria and help to remove unwanted elements. The USEPA requires that residual disinfectant is present in finished drinking water to ensure there is disinfectant available throughout the distribution system, with chlorine acting as one of the disinfectants that provides said residual. However, the EPA has also set a maximum contaminant level of 4.0 mg/L for free chlorine due to potential health effects above this level.



Specifications	HI3831F Free Chlorine (as Cl_2)
Type	colorimetric
Range	0.0 to 2.5 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	DPD
Number of Tests	50 avg.
Ordering Information	HI3831F test kit comes with color comparison cube, 20 mL reagent 1 and 15 mL reagent 2.
Reagent	HI3831F-050 free chlorine, 50 tests avg.

HI3875

Free Chlorine Test Kit

Medium Range with Checker® Disc

The HI3875 is a chemical test kit that determines the free chlorine concentration within a 0.0 to 3.5 mg/L (ppm) range. The HI3875 is supplied with all of the necessary reagents and equipment to perform the analysis, including the Checker® disc for accurate determination. The test kit contains enough reagents to perform approximately 100 tests.

• Complete setup

- All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.

• High resolution

- Readings from 0.0 to 3.5 mg/L are determined to 0.1 mg/L resolution.

• Replacement reagents available

- There is no need to buy a new kit when reagents are exhausted. The HI3875-100 can be ordered to replace the reagents supplied with the kit.



Significance of Use

Disinfection is a process of killing disease-causing organisms (or pathogens). Chlorine (Cl₂) is a very desirable disinfectant because, when mixed with pure water, it reacts to form hypochlorous acid (HOCl) and hydrochloric acid (HCl). HOCl (free active chlorine) is the most effective form of chlorine for disinfection of pools, spas, and drinking water.

Drinking water municipalities add elemental chlorine to the water supply as chlorine gas, liquid sodium hypochlorite, or dry calcium hypochlorite. In water these form free chlorine ions, which destroy disease-causing pathogens, reduce odor, eliminate bacteria and help to remove unwanted elements. The USEPA requires that residual disinfectant is present in finished drinking water to ensure there is disinfectant available throughout the distribution system, with chlorine acting as one of the disinfectants that provides said residual. However, the EPA has also set a maximum contaminant level of 4.0 mg/L for free chlorine due to potential health effects above this level.

Specifications	HI3875 Free Chlorine (as Cl ₂)
Type	checker disc
Range	0.0-3.5 mg/L (ppm)
Smallest Increment	0.1 mg/L (ppm)
Method	DPD
Number of Tests	100 avg.
Ordering Information	HI3875 test kit comes with HI93701-0 free Cl reagent (100 packets), 500 mL deionized water, checker disc, glass vials with caps (2) and 3 mL plastic pipette.
Reagent	HI3875-100 free chlorine, 100 tests avg.

HI38018

Free Chlorine Test Kit

Low and Medium Range with Checker® Disc

The HI38018 is a chemical test kit that determines the free chlorine concentration in two ranges: 0.00 to 0.70 mg/L and 0.0 to 3.5 mg/L. The HI38018 is supplied with all of the necessary reagents and equipment to perform the analysis, including the Checker® disc for accurate determination. The test kit contains enough reagents to perform approximately 200 tests.

• Complete setup

- All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.

• High resolution

- Readings from 0.00 to 0.70 mg/L are determined to 0.02 mg/L resolution.
- Readings from 0.0 to 3.5 mg/L are determined to 0.1 mg/L resolution.

• Replacement reagents available

- There is no need to buy a new kit when reagents are exhausted. The HI38018-200 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Disinfection is a process of killing disease-causing organisms (or pathogens). Chlorine (Cl₂) is a very desirable disinfectant because, when mixed with pure water, it reacts to form hypochlorous acid (HOCl) and hydrochloric acid (HCl). HOCl (free active chlorine) is the most effective form of chlorine for disinfection of pools, spas, and drinking water.

Drinking water municipalities add elemental chlorine to the water supply as chlorine gas, liquid sodium hypochlorite, or dry calcium hypochlorite. In water these form free chlorine ions, which destroy disease-causing pathogens, reduce odor, eliminate bacteria and help to remove unwanted elements. The USEPA requires that residual disinfectant is present in finished drinking water to ensure there is disinfectant available throughout the distribution system, with chlorine acting as one of the disinfectants that provides said residual. However, the EPA has also set a maximum contaminant level of 4.0 mg/L for free chlorine due to potential health effects above this level.



Specifications	HI38018 Free Chlorine (as Cl ₂)
Type	checker disc
Range	0.00-0.70 mg/L (ppm) 0.0-3.5 mg/L (ppm)
Smallest Increment	0.02 mg/L (ppm) 0.1 mg/L (ppm)
Method	DPD
Number of Tests	200 avg.
Ordering Information	HI38018 test kit comes with HI93701-0 free chlorine reagent (200 packets), demineralizer bottle with cap for 12 L, checker disc, glass vials with caps (2) and 3 mL plastic pipettes.
Reagent	HI38018-200 free chlorine, 200 tests avg.

HI38017

Free & Total Chlorine Test Kit

Low and Medium Range with Checker® Disc

The HI38017 is a chemical test kit that determines the free and total chlorine concentration in two ranges: 0.00 to 0.70 mg/L and 0.0 to 3.5 mg/L. The HI38017 is supplied with all of the necessary reagents and equipment to perform both analyses, including the Checker® disc for accurate determination. The test kit contains enough reagents for perform approximately 200 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.00 to 0.70 mg/L are determined to 0.02 mg/L resolution.
 - Readings from 0.0 to 3.5 mg/L are determined to 0.1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38017-200 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Chlorine is the most commonly used water disinfectant in applications such as drinking water and wastewater treatment, pool and spa sanitization, and food processing and sterilization. Chlorine present in water binds with bacteria, leaving only a part of the original quantity (free chlorine) to continue its disinfecting action. If the free chlorine level is improper with respect to pH, water will have an unpleasant taste and odor and the disinfecting potential of the chlorine will be diminished.

Free chlorine reacts with ammonium ions and organic compounds to form chlorine compounds; this results in diminished disinfecting capabilities compared with free chlorine. Chlorine compounds together with chloramines form combined chlorine. Combined chlorine and free chlorine together result in total chlorine. While free chlorine has a much higher disinfectant potential, combined chlorine has a much higher stability and lower volatility.



Specifications	HI38017 Free & Total Chlorine (as Cl ₂)
Type	checker disc
Range	0.00-0.70 mg/L (ppm) 0.0-3.5 mg/L (ppm)
Smallest Increment	0.02 mg/L (ppm) 0.1 mg/L (ppm)
Method	DPD
Number of Tests	200 avg.
Ordering Information	HI38017 test kit comes with HI93701-0 free chlorine reagent (100 packets), HI93711-0 total chlorine reagent (100 packets), demineralizer bottle with filter cap for 12 L, checker disc, glass vials with caps (2) and 3 mL plastic pipettes
Reagent	HI38017-200 free & total chlorine, 200 tests avg.

HI38020

Free & Total Chlorine Test Kit

Low, Medium and High Range with Checker® Disc

The HI38020 is a chemical test kit that determines the free and total chlorine concentration in three ranges: 0.00 to 0.70 mg/L, 0.0 to 3.5 mg/L, and 0.0 to 10.0 mg/L. The HI38020 is supplied with all of the necessary reagents and equipment to perform both analyses, including the Checker® disc for accurate determination. The test kit contains enough reagents for perform approximately 200 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.00 to 0.70 mg/L are determined to 0.02 mg/L resolution.
 - Readings from 0.0 to 3.5 mg/L are determined to 0.1 mg/L resolution.
 - Readings from 0.0 to 10.0 mg/L are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38020-200 can be ordered to replace the reagents supplied with the kit.



Significance of Use

Chlorine is the most commonly used water disinfectant in applications such as drinking water and wastewater treatment, pool and spa sanitization, and food processing and sterilization. Chlorine present in water binds with bacteria, leaving only a part of the original quantity (free chlorine) to continue its disinfecting action. If the free chlorine level is improper with respect to pH, water will have an unpleasant taste and odor and the disinfecting potential of the chlorine will be diminished.

Free chlorine reacts with ammonium ions and organic compounds to form chlorine compounds; this results in diminished disinfecting capabilities compared with free chlorine. Chlorine compounds together with chloramines form combined chlorine. Combined chlorine and free chlorine together result in total chlorine. While free chlorine has a much higher disinfectant potential, combined chlorine has a much higher stability and lower volatility.

Specifications	HI38020 Free & Total Chlorine (as Cl ₂)
Type	checker disc
Range	0.00-0.70 mg/L (ppm) 0.0-3.5 mg/L (ppm) 0.0-10.0 mg/L (ppm)
Smallest Increment	0.02 mg/L (ppm) 0.1 mg/L (ppm) 0.5 mg/L (ppm)
Method	DPD
Number of Tests	200 avg.
Ordering Information	HI38020 test kit comes with HI93701-0 free chlorine reagent (100 packets), HI93711-0 total chlorine reagent (100 packets), demineralizer bottle with filter cap for 12 L, checker disc, glass vials with caps (2) and 3 mL plastic pipettes
Reagent	HI38020-200 free & total chlorine, 200 tests avg.

HI3831T

Total Chlorine Test Kit

with Color Cube

The HI3831T is a colorimetric chemical test kit that determines the total chlorine concentration within a 0.0 to 2.5 mg/L (ppm) range. The HI3831T is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent packets and dropper bottles.
- **High resolution**
 - Readings from 0.0 to 2.5 mg/L are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3831T-050 can be ordered to replace the reagents supplied with the kit.

Significance of Use

The chlorination of water supplies and polluted waters is used mainly to destroy or deactivate disease-producing microorganisms. Chlorine also serves to improve the quality of drinking waters, as it reacts with ammonia, iron, manganese, sulfide, and some organic substances. Nevertheless, high amounts of chlorine will produce adverse effects like the formation of compounds which are potentially carcinogenic (e.g. chloroform) or harmful to aquatic life (e.g. chloramines). It remains essential to control the amount of added chlorine in order to fulfill the primary purpose of disinfecting while also minimizing any adverse effects.



Specifications	HI3831T Total Chlorine (as Cl ₂)
Type	colorimetric
Range	0.0-2.5 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	DPD
Number of Tests	50 avg.
Ordering Information	HI3831T test kits comes with color comparison cube, 20 mL chlorine reagent 1, 15 mL chlorine reagent 2 and 15 mL chlorine reagent 3
Reagent	HI3831T-050 total chlorine, 50 tests avg.

HI38023

Total Chlorine Test Kit

Extended Range

The HI38023 is a titration-based chemical test kit that determines the total chlorine concentration within a 10 to 200 mg/L (ppm) range. The HI38023 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles and packets, spoon, and plastic syringe.
- **High resolution**
 - Readings from 10 to 200 mg/L are determined to 10 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38023-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

The chlorination of water supplies and polluted waters is used mainly to destroy or deactivate disease-producing microorganisms. Chlorine also serves to improve the quality of drinking waters, as it reacts with ammonia, iron, manganese, sulfide, and some organic substances. Nevertheless, high amounts of chlorine will produce adverse effects like the formation of compounds which are potentially carcinogenic (e.g. chloroform) or harmful to aquatic life (e.g. chloramines). It remains essential to control the amount of added chlorine in order to fulfill the primary purpose of disinfecting while also minimizing any adverse effects.



Specifications	HI38023 Total Chlorine (as Cl ₂)
Type	titration
Range	10-200 mg/L (ppm)
Smallest Increment	10 mg/L (ppm)
Method	iodometric
Number of Tests	100 avg.
Ordering Information	HI38023 test kit comes with 30 mL potassium iodide solution, sulfamic reagent (100 packets), 25 mL starch indicator, 100 mL thiosulfate reagent, 50 mL calibrated vessel, 1 mL syringe with tip, 1 mL plastic pipette and spoon.
Reagent	HI38023-100 total chlorine extended range, 100 tests avg.

HI3846

Chromium Test Kit

The HI3846 is a colorimetric chemical test kit that determines the chromium concentration in samples within a 0.0 to 1.0 mg/L (ppm) range as CrVI. The HI3846 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the color comparison cube and reagent packets.
- **High resolution**
 - Readings from 0.0 to 1.0 mg/L CrVI are determined to 0.2 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3846-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Chromium salts are widely used in industrial processes such as metal finishing and plating, as well as in the leather industry as a tanning agent, and in the manufacture of paints, dyes, explosives, and ceramics. Chromium may enter a water supply through the discharge of waste from these industries or from chromate-treated cooling waters, where it is frequently added for corrosion control. The hexavalent state of chromium, CrVI, is toxic to humans, animals, and aquatic life; it can produce lung tumors when inhaled and readily induces skin sensitization.

HI3847

Copper Test Kit

The HI3847 is a colorimetric chemical test kit that determines the copper concentration in samples within a 0 to 2.5 mg/L (ppm) range. The HI3847 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the color comparison cube and reagent packets.
- **High resolution**
 - Readings from 0 to 2.5 mg/L are determined to 0.5 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3847-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Copper is an essential trace element in for plant metabolism as well as the human diet, with a daily requirement of around 2.0 mg. Due to its malleability, thermal and electrical conductivity, and corrosion resistance, copper is also used in a variety of industrial and technological applications. Copper may also be present in natural water and effluents due to widespread use to control biological growths in reservoirs and distribution pipes.



Specifications	HI3846 Chromium (as CrVI)
Type	colorimetric
Range	0.0-1.0 mg/L (ppm)
Smallest Increment	0.2 mg/L (ppm)
Method	diphenylcarbohydrazide
Number of Tests	100 avg.
Ordering Information	HI3846 test kit comes with HI3846-0 reagent (100 packets) and color comparison cube.
Reagent	HI3846-100 chromium VI, 100 tests avg.

Specifications	HI3847 Copper
Type	colorimetric
Range	0.0-2.5 mg/L (ppm)
Smallest Increment	0.5 mg/L (ppm)
Method	bicinchoninic acid
Number of Tests	100 avg.
Ordering Information	HI3847 test kit comes with HI3847-0 reagent (100 packets) and color comparison cube.
Reagent	HI3847-100 copper, 100 tests avg.

HI3838

Formaldehyde Test Kit

The HI3838 is a titration-based chemical test kit that determines the formaldehyde concentration in two ranges: 0.00 to 1.00% and 0.0 to 10.0%. The HI3838 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0.00 to 1.00% are determined to 0.01% resolution.
 - Readings from 0.00 to 10.0% are determined to 0.1% resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3838-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Formaldehyde is an important organic compound used to make many materials and chemical compounds. Its role in many industries varies from holding dyes onto fabrics, to assisting in the electroplating of metals. Formaldehyde is also used in biological preservation, drug testing, and photograph development. Each application uses different levels of formaldehyde and requires monitoring to optimize its given purpose. Formaldehyde is also a large consideration for human health. Due to its widespread use, there are regulations in place for formaldehyde limits within workplaces to avoid overexposure.



Specifications	HI3838 Formaldehyde (as CH ₂ O)
Type	titration
Range	0.0 to 1.0% Formaldehyde; 0 to 10% Formaldehyde
Smallest Increment	0.1% (0.0 to 1.0% range); 1% (0 to 10% range)
Method	sodium sulfite / hydrochloric acid
Number of Tests	110 avg.
Ordering Information	HI3838 test kit comes with 15 mL Alizarin Yellow R indicator, 30 g sodium sulfite, 120 mL titrant solution, plastic spoon, plastic bottle, 10 mL calibrated vessel, demineralizer bottle with filter cap, calibrated titration syringe with tip and plungers.
Reagent	HI3838-100 formaldehyde, 110 tests avg.

HI3859

Glycol Yes/No Test Kit

Use the HI3859 glycol standard 0.025% included in the kit to easily recognize a positive result in the form of an intense purple color. Ethylene glycol and other glycols are determined by a two-step reaction:

Step One: Glycol is oxidized to two carbonyl groups under acidic conditions.

Step Two: The carbonyl groups react with the indicator to give a highly colored solution.

The test detects traces of glycol above 30 ppm.



Specifications	HI3859 Glycol
Type	visual
Range	present/absent
Smallest Increment	–
Method	oxidation of glycolic group
Number of Tests	25 avg.
Ordering Information	HI3859 test kit comes with 125 mL glycol reagent A, 25 packets glycol reagent B, 25 packets glycol reagent C, 25 mL glycol standard 0.025%, 3 mL plastic pipette, 1 mL plastic pipettes (25), 10 mL glass vials with caps (2) and brush.
Reagent	HI3859-025 glycol, 25 tests avg.

HI3812

Total Hardness Test Kit

The HI3812 is a titration-based chemical test kit that determines the total hardness concentration in two ranges: 0.0 to 30.0 mg/L and 0 to 300 mg/L. The HI3812 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles, and plastic syringe.
- **High resolution**
 - Readings from 0.0 to 30.0 mg/L are determined to 0.3 mg/L resolution.
 - Readings from 0 to 300 mg/L are determined to 3 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3812-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in the water causing the precipitation was later found to be primarily calcium and magnesium. Thus, water hardness is actually a quantitative measure of these ions in the water. It is also now known that certain other ion species, such as iron, zinc, and manganese contribute to the overall water hardness. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes.



Specifications	HI3812 Total Hardness (*as CaCO ₃)
Type	titration
Range	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)
Smallest Increment	0.3 mg/L (ppm) 3 mg/L (ppm)
Method	EDTA
Number of Tests	100 avg.
Ordering Information	HI3812 test kit comes with 30 mL hardness buffer, 10 mL calmagite indicator, 120 mL EDTA solution, 20 mL plastic beaker with cap, 50 mL plastic beaker with cap and 1 mL syringe with tip.
Reagent	HI3812-100 total hardness (*as CaCO ₃), 100 tests avg.

HI38033

Total Hardness Test Kit

The HI38033 is a titration-based chemical test kit that determines the total hardness concentration within the 0 to 30 grains per gallon (gpg) range. The HI38033 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, plastic pipette, and reagent dropper bottles.
- **High resolution**
 - Readings from 0 to 30 gpg are determined to 1 gpg resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38033-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in the water causing the precipitation was later found to be primarily calcium and magnesium. Thus, water hardness is actually a quantitative measure of these ions in the water. It is also now known that certain other ion species, such as iron, zinc, and manganese contribute to the overall water hardness. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes.



Specifications	HI38033 Total Hardness (*as CaCO ₃)
Type	titration
Range	0-30 gpg
Smallest Increment	1 gpg
Method	EDTA
Number of Tests	100 avg.
Ordering Information	HI38033 test kit comes with 30 mL buffer solution, 10 mL calmagite indicator, 75 mL EDTA solution (2), 20 mL plastic beaker with cap and 1 mL plastic pipette.
Reagent	HI38033-100 total hardness (*as CaCO ₃), 100 tests avg.

*1 gpg = 17 ppm CaCO₃



HI3840

Total Hardness Test Kit

Low Range

The HI3840 is a titration-based chemical test kit that determines the total hardness concentration within the 0 to 150 mg/L range. The HI3840 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker and reagent dropper bottle.
- **High resolution**
 - Readings from 0 to 150 mg/L are determined to 5 mg/L resolution.

Significance of Use

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in the water causing the precipitation was later found to be primarily calcium and magnesium. Thus, water hardness is actually a quantitative measure of these ions in the water. It is also now known that certain other ion species, such as iron, zinc, and manganese contribute to the overall water hardness. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes.

Specifications	HI3840 Total Hardness (*as CaCO ₃)
Type	titration
Range	0-150 mg/L (ppm)
Smallest Increment	5 mg/L (ppm)
Method	EDTA
Number of Tests	50 avg.
Ordering Information	HI3840 test kit comes with 30 mL hardness LR reagent, 10 mL calmagite indicator, and 50 mL calibrated vessel.



HI3841

Total Hardness Test Kit

Medium Range

The HI3841 is a titration-based chemical test kit that determines the total hardness concentration within the 40 to 500 mg/L range. The HI3841 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker and reagent dropper bottle.
- **High resolution**
 - Readings from 40 to 500 mg/L are determined to 20 mg/L resolution.

Significance of Use

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in the water causing the precipitation was later found to be primarily calcium and magnesium. Thus, water hardness is actually a quantitative measure of these ions in the water. It is also now known that certain other ion species, such as iron, zinc, and manganese contribute to the overall water hardness. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes.

Specifications	HI3841 Total Hardness (*as CaCO ₃)
Type	titration
Range	40-500 mg/L (ppm)
Smallest Increment	20 mg/L (ppm)
Method	EDTA
Number of Tests	50 avg.
Ordering Information	HI3841 test kit comes with 30 mL hardness MR reagent, 10 mL calmagite indicator, and 50 mL calibrated vessel.



HI3842

Total Hardness Test Kit

High Range

The HI3842 is a titration-based chemical test kit that determines the total hardness concentration within the 400 to 3000 mg/L range. The HI3842 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker and reagent dropper bottle.
- **High resolution**
 - Readings from 400 to 3000 mg/L are determined to 100 mg/L resolution.

Significance of Use

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in the water causing the precipitation was later found to be primarily calcium and magnesium. Thus, water hardness is actually a quantitative measure of these ions in the water. It is also now known that certain other ion species, such as iron, zinc, and manganese contribute to the overall water hardness. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes.

Specifications	HI3842 Total Hardness (*as CaCO ₃)
Type	titration
Range	400-3000 mg/L (ppm)
Smallest Increment	100 mg/L (ppm)
Method	EDTA
Number of Tests	50 avg.
Ordering Information	HI3842 test kit comes with 30 mL hardness HR reagent, 10 mL calmagite indicator, and 50 mL calibrated vessel.

HI3844

Hydrogen Peroxide Test Kit

The HI3844 is a titration-based chemical test kit that determines the hydrogen peroxide concentration in two ranges: 0.00 to 2.00 mg/L and 0.0 to 10.0 mg/L. The HI3844 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

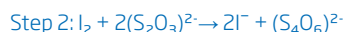
- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles, spoon, and plastic pipettes.
- **High resolution**
 - Readings from 0.00 to 2.00 mg/L are determined to 0.25 mg/L resolution.
 - Readings from 0.0 to 10.0 mg/L are determined to 1.0 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3844-100 can be ordered to replace the reagents supplied with the kit.



Significance of Use

Hydrogen peroxide (H₂O₂) is widely used as a disinfectant and as a bleach for textiles, wood pulp, and hair, just to name a few. It is also used as a substitute for chlorine in water and sewage treatment. Most common commercial forms are aqueous solutions containing about 6, 12 and 30% hydrogen peroxide and are referred to as "20-volume," "40-volume," and "100-volume" respectively, referring to the value of oxygen liberated when the solution is boiled. The Hanna test kit can quickly and easily determine concentration in water up to 10 mg/L of hydrogen peroxide. This is due to the fact that it is not affected by stabilizers, which are sometimes added to commercial hydrogen peroxide solutions.

In the HI3844 test kit, hydrogen peroxide reacts slowly with iodide in acid solution (Step 1); thus a 15 minute interval is required to allow the reaction to occur completely. The amount of iodine generated is equivalent to the hydrogen peroxide in the sample. The liberated iodine is then titrated with standard sodium thiosulfate solution that reduces the iodine back to iodide ions (Step 2).



Specifications	HI3844 Hydrogen Peroxide (as H ₂ O ₂)
Type	titration
Range	0.00-2.00 mg/L (ppm) 0.0-10.0 mg/L (ppm)
Smallest Increment	0.25 mg/L (ppm) 1.0 mg/L (ppm)
Method	iodometric
Number of Tests	100 avg.
Ordering Information	HI3844 test kit comes with 100 mL hydrogen peroxide reagent A, 17 g hydrogen peroxide reagent B, 30 mL hydrogen peroxide reagent C, 25 mL hydrogen peroxide reagent D, graduated plastic test tube with cap, 50 mL calibrated plastic vessel, 3 mL plastic pipette, 1 mL plastic pipette and plastic spoon.
Reagent	HI3844-100 hydrogen peroxide, 100 tests avg.

HI3843

Bleach Test Kit

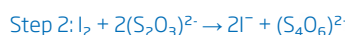
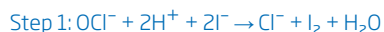
The HI3843 is a titration-based chemical test kit that determines the hypochlorite concentration within the 50 to 150 g/L Cl₂ range. The HI3843 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the Erlenmeyer flask, indicator and reagent bottles and packets, and plastic pipettes.
- **High resolution**
 - Readings from 50 to 150 g/L are determined to 5 g/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3843-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Hypochlorites are common bleaching agents used to whiten textiles and paper and to disinfect solutions. Sodium hypochlorite solution has been traditionally used for the treatment of pool water since it is an inexpensive and readily available form of chlorine. The solution usually contains 10 to 15% available chlorine (equivalent to 100 to 150 g/L), but it rapidly loses its strength during storage. In addition, since it is greatly affected by heat, light, pH, and heavy metals, it needs to be monitored regularly.

An iodometric titration method is used in the HI3843 test kit. The hypochlorite solution is treated with potassium iodide and strongly acidified with acid (Step 1). The amount of iodine generated is equivalent to the chlorine in the sample. The concentration of iodine is then calculated by titration of thiosulfate ions that reduce the iodine back to iodide ions (Step 2).



Specifications	HI3843 Hypochlorite (as Cl ₂)
Type	titration
Range	50-150 g/L (ppt)
Smallest Increment	5 g/L (ppt)
Method	iodometric
Number of Tests	100 avg.
Ordering Information	HI3843 test kit comes with 30 mL potassium iodide solution, 100 packets bleach reagent B, 30 mL bleach reagent C (2), 125 mL glass Erlenmeyer flask and 1 mL plastic pipettes (25).
Reagent	HI3843-100 hypochlorite (bleach), 100 tests avg.

* 1 gpg = 17 ppm CaCO₃

HI3834

Iron Test Kit

Medium Range with Color Cube

The HI3834 is a colorimetric chemical test kit that determines the total iron concentration within a 0 to 5 mg/L (ppm) range. The HI3834 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent packets.
- **High resolution**
 - Readings from 0 to 5 mg/L are determined to 1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3834-050 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. The iron concentration in water needs to be monitored because it becomes harmful above certain levels. In domestic water, for instance, iron can stain laundry, damage kitchenware, favor the growth of certain bacteria, and unpleasantly alter the taste of water. Iron is also an indicator of ongoing corrosion in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.



Specifications	HI3834 Iron (Fe ²⁺ & Fe ³⁺)
Type	colorimetric
Range	0-5 mg/L (ppm)
Smallest Increment	1 mg/L (ppm)
Method	phenanthroline
Number of Tests	50 avg.
Ordering Information	HI3834 test kit comes with 50 packets iron reagent, color comparison cube and 20 mL plastic vessel.
Reagent	HI3834-050 iron, 50 tests avg.

HI38039

Iron Test Kit

Low Range with Checker® Disc

The HI38039 is a colorimetric chemical test kit that determines the total iron concentration within a 0.00 to 1.00 mg/L (ppm) range. The HI38039 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.00 to 1.00 mg/L are determined to 0.02 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38039-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. The iron concentration in water needs to be monitored because it becomes harmful above certain levels. In domestic water, for instance, iron can stain laundry, damage kitchenware, favor the growth of certain bacteria, and unpleasantly alter the taste of water. Iron is also an indicator of ongoing corrosion in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.



Specifications	HI38039 Iron (Fe ²⁺ & Fe ³⁺)
Type	checker disc
Range	0.00-1.00 mg/L (ppm)
Smallest Increment	0.02 mg/L (ppm)
Method	phenanthroline
Number of Tests	100 avg.
Ordering Information	HI38039 test kit comes with 100 packets iron reagent, checker disc, glass vials with caps (2) and 3 mL plastic pipette.
Reagent	HI38039-100 iron LR, 100 tests avg.

HI38040

Iron Test Kit

Medium Range with Checker® Disc

The HI38040 is a colorimetric chemical test kit that determines the total iron concentration within a 0.0 to 5.0 mg/L (ppm) range. The HI38040 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.0 to 5.0 mg/L are determined to 0.1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38040-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. The iron concentration in water needs to be monitored because it becomes harmful above certain levels. In domestic water, for instance, iron can stain laundry, damage kitchenware, favor the growth of certain bacteria, and unpleasantly alter the taste of water. Iron is also an indicator of ongoing corrosion in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.



Specifications	HI38040 Iron (Fe ²⁺ & Fe ³⁺)
Type	checker disc
Range	0.0-5.0 mg/L (ppm)
Smallest Increment	0.1 mg/L (ppm)
Method	phenanthroline
Number of Tests	100 avg.
Ordering Information	HI38040 test kit comes with 100 packets iron reagent, checker disc, glass vials with caps (2) and 3 mL plastic pipette.
Reagent	HI38040-100 iron MR, 100 tests avg.

HI38041

Iron Test Kit

High Range with Checker® Disc

The HI38041 is a colorimetric chemical test kit that determines the total iron concentration within a 0.0 to 10.0 mg/L (ppm) range. The HI38041 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.0 to 10.0 mg/L are determined to 0.2 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38041-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. The iron concentration in water needs to be monitored because it becomes harmful above certain levels. In domestic water, for instance, iron can stain laundry, damage kitchenware, favor the growth of certain bacteria, and unpleasantly alter the taste of water. Iron is also an indicator of ongoing corrosion in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.



Specifications	HI38041 Iron (Fe ²⁺ & Fe ³⁺)
Type	checker disc
Range	0.0-10.0 mg/L (ppm)
Smallest Increment	0.2 mg/L (ppm)
Method	phenanthroline
Number of Tests	100 avg.
Ordering Information	HI38041 test kit comes with 100 packets iron reagent, 500 mL deionized water, checker disc, glass vials with caps (2), 3 mL plastic pipettes and long plastic pipette.
Reagent	HI38041-100 iron HR, 100 tests avg.

HI3874

Nitrate Test Kit

The HI3874 is a colorimetric chemical test kit that determines the nitrate concentration in samples within a 0 to 50 mg/L (ppm) range as nitrate-nitrogen (NO_3^- -N). The HI3874 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass cuvette, color comparison cube, and reagent packets.
- **High resolution**
 - Readings from 0 to 50 mg/L are determined to 10 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3874-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Nitrogen is abundant in the Earth's atmosphere and is present in water in the form of nitrate, nitrite, and ammonia. Plants use nitrogen as a nutrient to build proteins by tracking it in through their root system. Nitrate is formed in water mainly through rainfall, decomposition of organic matter, and runoff from manmade pollutants such as sewage waste and fertilizers. Almost all surface waters have a measurable level of nitrate, and a moderate amount is considered beneficial. Large amounts of nitrate, however, can lead to eutrophication which may result in decreased levels of dissolved oxygen in the water.



Specifications	HI3874 Nitrate (as NO_3^- -N)
Type	colorimetric
Range	0-50 mg/L (ppm)
Smallest Increment	10 mg/L (ppm)
Method	cadmium reduction
Number of Tests	100 avg.
Ordering Information	HI3874 test kit comes with 100 packets nitrate reagent, glass cuvette and color comparison cube.
Reagent	HI3874-100 nitrate (as NO_3^- -N), 100 tests avg.

HI38050

Nitrate Test Kit

for Soil and Irrigation Water

The Hanna HI38050 nitrate test kit for soil and irrigation water makes it possible to determine the need for nitrogen fertilization. It also obtains the best crop response and avoids over-fertilization.

Nitrate is reduced to nitrite in the presence of cadmium. The nitrite thus produced reacts with the reagent to yield an orange compound. The amount of color developed is proportional to the concentration of nitrate present in the aqueous sample.

The Hanna nitrate-nitrogen test can be performed the whole year round, but testing is particularly recommended during spring and late spring, when rainfall and temperature-related bursts of microbiological activity often have great influence on the availability of nitrate-nitrogen.



Specifications	HI38050 Nitrate (as NO_3^- -N) in irrigation water and soil
Type	checker disc
Range	water: 0-50 mg/L (ppm) soil: 0-60 mg/L (ppm)
Smallest Increment	water: 1 mg/L (ppm) soil: 2 mg/L (ppm)
Method	cadmium reduction
Number of Tests	water: 100 avg. soil: 100 avg.
Ordering Information	HI38050 test kit comes with 200 packets nitrogen reagent, checker disc, glass vials with caps (2), 10 g calcium sulfate, demineralizer bottle with filter cap for 12 L, soil sieve, 50 mL plastic test tube with screw cap, large funnel, 100 paper filter discs, brush, 50 mL calibrated vessels (2), 2 g sample cup, 3 mL plastic pipette and spoons (2).
Reagent	HI38050-200 nitrate, soil and irrigation (as NO_3^- -N), 200 tests avg.

HI3873

Nitrite Test Kit

The HI3873 is a colorimetric chemical test kit that determines the nitrite concentration in samples within a 0.0 to 1.0 mg/L (ppm) range as nitrite-nitrogen (NO_2^- -N). The HI3873 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass cuvette, color comparison cube, and reagent packets.
- **High resolution**
 - Readings from 0.0 to 1.0 mg/L are determined to 0.2 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3873-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Nitrites can be harmful to aquatic organisms even in low concentrations and for this reason, they are closely monitored in aquaculture facilities. In cooling towers, however, an adequate amount of nitrites is necessary to prevent corrosion. In high concentrations, they can be harmful to the environment and to humans. They are, therefore, normally monitored to verify the quality of water for domestic use, as well as lakes and ponds.

Nitrites are an intermediate product in the nitrogen cycle and are produced by ammonia oxidation with water, or even originate in industrial waste directly. They must not be present in drinking water.



Specifications	HI3873 Nitrite (as NO_2^- -N)
Type	colorimetric
Range	0.0-1.0 mg/L (ppm)
Smallest Increment	0.2 mg/L (ppm)
Method	chromotropic acid
Number of Tests	100 avg.
Ordering Information	HI3873 test kit comes with 100 packets nitrite reagent, glass cuvette and color comparison cube.
Reagent	HI3873-100 nitrite (as NO_2^- -N), 100 tests avg.

HI3810

Dissolved Oxygen Test Kit



The HI3810 is a titration-based chemical test kit that determines the dissolved oxygen concentration within the 0 to 10 mg/L O_2 range. The HI3810 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass stoppered bottle, indicator and reagent bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0 to 10 mg/L are determined to 0.1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3810-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

The concentration of dissolved oxygen in water is extremely important in nature as well in man's environment. In oceans, lakes, rivers, and other surface water bodies, dissolved oxygen is essential to the growth and development of aquatic life. Without oxygen, water can become toxic due to the anaerobic decaying of organic matter. In man's environment, water must contain at least 2 mg/L of oxygen to protect water pipes from corrosion. However, boiler system water, in many cases, cannot contain greater than 10 mg/L oxygen.

A modified Winkler method is used in the HI3810 test kit. Manganous ions react with oxygen in the presence of potassium hydroxide to form a manganese oxide precipitate (Step 1). An azide is present to prevent any nitrite ions from interfering with the test. With addition of acid, manganese oxide hydroxide oxidizes the iodide to iodine (Step 2). Since the amount of iodine generated is equivalent to the oxygen in the sample, the concentration of iodine is calculated by titration of thiosulfate ions that reduce the iodine back to iodide ions (Step 3).



Specifications	HI3810 Dissolved Oxygen
Type	titration
Range	0.0-10.0 mg/L (ppm)
Smallest Increment	0.1 mg/L (ppm)
Method	modified Winkler
Number of Tests	110 avg.
Ordering Information	HI3810 test kit comes with 30 mL manganous sulfate solution, 30 mL alkali-azide reagent, 30 mL sulfuric acid solution (2), 10 mL starch indicator, 120 mL titrant solution, glass bottle with stopper, 10 mL calibrated vessel and calibrated syringe with tip.
Reagent	HI3810-100 dissolved oxygen, 100 tests avg.

HI38054

Ozone Test Kit

The HI38054 is a chemical test kit that determines the ozone concentration in samples within the 0.0 to 2.3 mg/L range. The HI38054 is supplied with all of the necessary reagents and equipment to perform both analyses, including the Checker® disc for accurate determination. The test kit contains enough reagents to perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.0 to 2.3 mg/L are determined to 0.1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38054-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Ozone is an oxidizing agent used in many industrial and consumer applications. In drinking water, ozone is used for manganese removal, forming a precipitate that can be filtered out in the purification process. Additional organic matter present in drinking water that is responsible for producing odor and color can also be removed by ozone. Ozone also acts as a germicide and is used to manufacture pharmaceuticals, as a deodorizer, and bleaching agent.



Specifications	HI38054 Ozone
Type	checker disc
Range	0.0-2.3 mg/L (ppm)
Smallest Increment	0.1 mg/L (ppm)
Method	DPD
Number of Tests	100 avg.
Ordering Information	HI38054 test kit comes with 100 packets ozone reagent, 500 mL deionized water, checker disc, glass vials with caps (2) and 3 mL plastic pipette.
Reagent	HI38054-100 ozone, 100 tests avg.

HI3833

Phosphate Test Kits

with Color Cube

The HI3833 is a colorimetric chemical test kit that determines the phosphate concentration in samples within a 0 to 5 mg/L (ppm) range. The HI3833 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 50 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, color comparison cube, and reagent packets.
- **High resolution**
 - Readings from 0 to 5 mg/L are determined to 1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3833-050 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Phosphates are present in a number of products that are used by humans everyday. Some examples of the effects of phosphates are enhancing the flavor and tartness of cola drinks, as a buffering agent in controlling pH in antifreeze and delaying darkening of cut potatoes used in making french fries. Phosphates are also extensively used in detergents and cleaning fluids because of their ability to soften water and remove soil deposits.

Phosphates are particularly important for the growth and development of plant roots, and hence are one of the most common fertilizers used in agriculture. However, high concentrations of phosphates in agricultural runoff can cause environmental pollution, as they are a primary cause of eutrophication. Local laws govern the use of phosphates and the discharge levels into streams.



Specifications	HI3833 Phosphate (as PO ₄ ³⁻)
Type	colorimetric
Range	0-5 mg/L (ppm)
Smallest Increment	1 mg/L (ppm)
Method	ascorbic acid
Number of Tests	50 avg.
Ordering Information	HI3833 test kit comes with 20 mL plastic beaker, color comparison cube and 50 packets phosphate reagent.
Reagent	HI3833-050 phosphate, 50 tests avg.

HI38061

Phosphate Test Kits

with Checker® Disc

The HI38061 is a chemical test kit that determines the phosphate concentration in three ranges: 0.00 to 1.00 mg/L, 0.0 to 5.0 mg/L, and 0 to 50 mg/L. The HI38061 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent packets, and Checker® disc.
- **High resolution**
 - Readings from 0.00 to 1.00 mg/L are determined to 0.02 mg/L resolution.
 - Readings from 0.0 to 5.0 mg/L are determined to 0.1 mg/L resolution.
 - Readings from 0 to 50 mg/L are determined to 1 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38061-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Phosphates are present in a number of products that are used by humans everyday. Some examples of the effects of phosphates are enhancing the flavor and tartness of cola drinks, as a buffering agent in controlling pH in antifreeze and delaying darkening of cut potatoes used in making french fries. Phosphates are also extensively used in detergents and cleaning fluids because of their ability to soften water and remove soil deposits.

Phosphates are particularly important for the growth and development of plant roots, and hence are one of the most common fertilizers used in agriculture. However, high concentrations of phosphates in agricultural runoff can cause environmental pollution, as they are a primary cause of eutrophication. Local laws govern the use of phosphates and the discharge levels into streams.

Specifications	HI38061 Phosphate (as PO ₄ ³⁻)
Type	checker disc
Range	0.00-1.00 mg/L (ppm) 0.0-5.0 mg/L (ppm) 0-50 mg/L (ppm)
Smallest Increment	0.02 mg/L (ppm) 0.1 mg/L (ppm) 1 mg/L (ppm)
Method	ascorbic acid
Number of Tests	100 avg.
Ordering Information	HI38061 test kit comes with 100 packets phosphate reagent, 500 mL deionized water, checker disc, glass vials with caps (2), 1 mL syringe with tip, 3 mL plastic pipette and long plastic pipette.
Reagent	HI38061-100 phosphate, 100 tests avg.

HI3835

Salinity Test Kit

The HI3835 is a titration-based chemical test kit that measures salinity within the 0.0 to 40.0 g/kg range. The HI3835 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample vial, indicator and reagent bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0.0 to 40.0 g/kg are determined to 0.4 g/kg resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3835-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Salinity is defined as the total solids in water after all carbonates have been converted to oxides, all bromide and iodide have been replaced by chloride, and all organic matter has been oxidized. The salinity value is in g/kg or ppt (parts per thousand). The monitoring of salinity is essential for industrial waste and seawater, as different species of plants and animals thrive varying salinity levels.



Specifications	HI3835 Salinity
Type	titration
Range	0 to 40 g/kg (ppt)
Smallest Increment	4 g/kg for each 0.1 ml of titrant
Method	mercuric nitrate
Number of Tests	110 avg.
Ordering Information	HI3835 test kit comes with 15 mL diphenylcarbazone indicator, 30 mL nitric acid solution, 120 mL titrant solution, plastic vial with cap and 1 mL calibrated syringe with tip.
Reagent	HI3835-100 salinity, 100 tests avg.

HI38067

Silica Test Kit

High Range

The HI38067 is a chemical test kit that determines the silica concentration in two ranges: 0 to 40 mg/L and 0 to 800 mg/L. The HI38067 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass vials, plastic pipette, reagent bottles and packets, and Checker® disc.
- **High resolution**
 - Readings from 0 to 40 mg/L are determined to 1 mg/L resolution.
 - Readings from 0 to 800 mg/L are determined to 40 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38067-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Silica is found in all natural waters in the dissolved mineral form. Silica is only slightly soluble in water and can be found as ionic silica, silicates, or colloidal or suspended particles. The solubility of silica is highly dependent on pH, temperature and pressure. Silica's presence in industrial applications, particularly high pressure turbines, is undesirable because of the scaling caused by the elevated temperature and pressure. Heating systems and reverse osmosis plants also require monitoring of silica to ensure process efficiency.



Specifications	HI38067 Silica (as SiO ₂)
Type	checker disc
Range	0-40 mg/L (ppm) 0-800 mg/L (ppm)
Smallest Increment	1 mg/L (ppm) 40 mg/L (ppm)
Method	heteropoly blue
Number of Tests	100 avg.
Ordering Information	HI38067 test kit comes with 27 mL silica reagent A, 100 packets silica reagent B, 100 packets silica reagent C, demineralizer bottle with filter cap for 12 L, checker disc, glass vials with caps (2), 3 mL plastic pipette and 1 mL syringe with tip.
Reagent	HI38067-100 silica HR (as SiO ₂), 100 tests avg.

HI38000

Sulfate Test Kits

The HI38000 is a chemical test kit that determines the sulfate concentration in two ranges: 20 to 30 mg/L and 30 to 100 mg/L. The HI38000 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the glass test tube, plastic pipette, spoon, and reagent bottles and packets.
- **High resolution**
 - Readings from 20 to 30 mg/L are determined to 5 mg/L resolution.
 - Readings from 30 to 100 mg/L are determined to 10 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38000-10 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Sulfate is widely present within natural waters in different concentrations. Sulfate concentration is to be kept within a strict range for drinking water, especially since this value can be high near mine drainage points. Sulfate is also rigorously tested in the production of beverages such as beer, due to its significant effect upon odor and taste.



Specifications	HI38000 Sulfate (as SO ₄ ²⁻)
Type	turbidimetric
Range	20-30 mg/L (ppm) 30-100 mg/L (ppm)
Smallest Increment	5 mg/L (ppm) 10 mg/L (ppm)
Method	barium chloride
Number of Tests	100 avg.
Ordering Information	HI38000 test kit comes with 100 packets sulfate reagent A, 53 g sulfate reagent B, 10 mL complexing agent, 50 mL glass test tube, 50 mL plastic vessel, 3 mL plastic pipette and spoon.
Reagent	HI38000-10 sulfate, 100 tests avg.

HI38001

Sulfate Test Kits

Low and High Range

The HI38001 is a chemical test kit that determines the sulfate concentration in two ranges: 100 to 1000 mg/L and 1000 to 10000 mg/L. The HI38001 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 200 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beakers, syringes, and reagent bottles and packets.
- **High resolution**
 - Readings from 100 to 1000 mg/L are determined to 10 mg/L resolution.
 - Readings from 1000 to 10000 mg/L are determined to 100 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI38000-10 can be ordered to replace the reagents supplied with the kit.

Significance of Use

Sulfate is widely present within natural waters in different concentrations. Sulfate concentration is to be kept within a strict range for drinking water, especially since this value can be high near mine drainage points. Sulfate is also rigorously tested in the production of beverages such as beer, due to its significant effect upon odor and taste.



Specifications	HI38001 Sulfate (as SO_4^{2-})
Type	titration
Range	100-1000 mg/L (ppm) 1000-10000 mg/L (ppm)
Smallest Increment	10 mg/L (ppm) 100 mg/L (ppm)
Method	barium chloride
Number of Tests	200 avg.
Ordering Information	HI38001 test kit comes with 100 packets sulfate reagent A (2 sets), 100 mL LR sulfate reagent B, 100 mL HR sulfate reagent B, 10 mL sulfate reagent C, 20 mL complexing agent, 30 mL sulfate solution, 50 mL plastic vessels (2) and 1 mL syringes (2).
Reagent	HI38001-10 sulfate LR/HR, 100 tests avg.

HI3822

Sulfite Test Kit

The HI3822 is a chemical test kit that determines the sulfite concentration in two ranges: 0 to 20 mg/L and 0 to 200 mg/L Na_2SO_3 . The HI3822 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 110 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beakers, indicator and reagent bottles, and calibrated syringe.
- **High resolution**
 - Readings from 0 to 20 mg/L are determined to 0.2 mg/L resolution.
 - Readings from 0 to 200 mg/L are determined to 2 mg/L resolution.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The HI3822-100 can be ordered to replace the reagents supplied with the kit.

Significance of Use

There are many reasons to monitor the concentration of sulfite in water. In boiler feed and effluent waters, a sulfite concentration of approximately 20 mg/L must be maintained to prevent pitting and oxidation of metal components. A high level of sulfite results in a lowered pH, thus promoting corrosion. The monitoring of sulfite is important in environmental control as well. Sulfite ions are toxic to aquatic lifeforms; the chemical demand that sulfide produces on oxygen in water can destroy the delicate ecological balance of lakes, rivers and ponds.



Specifications	HI3822 Sulfite (as Na_2SO_3)
Type	titration
Range	0.0-20.0 mg/L (ppm) 0-200 mg/L (ppm)
Smallest Increment	0.2 mg/L (ppm) 2 mg/L (ppm)
Method	iodometric
Number of Tests	110 avg.
Ordering Information	HI3822 test kit comes with 30 mL sulfamic acid solution, 30 mL EDTA reagent, 15 mL sulfuric acid solution, 10 mL starch indicator, 120 mL titrant solution, 20 mL calibrated vessel, 50 mL calibrated vessel and calibrated syringe with tip.
Reagent	HI3822-100 sulfite (as Na_2SO_3), 110 tests avg.

Hanna Soil Test Kit

The chemical composition of soil includes pH and chemical elements. Soil analysis is necessary for better management of fertilization and to know the residues of fertilizers in relation to the crop, tillage and the most suitable plant choice for soil composition. An analysis can highlight shortages and help the understanding of the causes of an abnormal growth. By using the Hanna soil test, it is possible to measure pH and the most important elements for plant growth: nitrogen (N), phosphorus (P) and potassium (K).

Testing the soil during each crop cycle and comparing the results with plant growth can be a useful information for subsequent cultivations.



Specifications	HI3896 Professional Agriculture Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Nitrogen	colorimetric	traces, low, medium, high	–	Ned	25 avg.
Phosphorus	colorimetric	traces, low, medium, high	–	ascorbic acid	25 avg.
pH	colorimetric	4 to 9 pH; 1 pH	–	pH indicator	25 avg.
Potassium	turbidimetric	traces, low, medium, high	–	tetraphenyl-borate	25 avg.
Ordering Information	HI3896 test kit includes 120 mL extraction solution (2), 70 mL pH indicator, 75 powder packets (25 each for N, P & K), 1 mL pipettes (3), test tubes (5), test tube stand, spoon, brush, color cards (4), graduated card and handbook.				
Reagents	HI3896-025 nitrogen, phosphorus, potassium and pH, 25 tests each				

Quick Soil Test Kit

Hanna's quick soil test kit provides growers with an economical way to quickly test pH as well as the three basic elements needed for a healthier plant: nitrogen (N), phosphorus (P) and potassium (K).



Specifications	HI3895 Basic Agriculture Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Nitrogen	colorimetric	traces, low, medium, high	–	Ned	10 avg.
Phosphorus	colorimetric	traces, low, medium, high	–	ascorbic acid	10 avg.
pH	colorimetric	4 to 9 pH; 1 pH	–	pH indicator	10 avg.
Potassium	turbidimetric	traces, low, medium, high	–	tetraphenyl-borate	10 avg.
Ordering Information	HI3895 test kit includes 40 powder packets (10 each for pH, N, P & K), 1 mL plastic pipette, test tubes (4), color cards (4) and one graduated card.				
Reagents	HI3895-010 nitrogen, phosphorus, potassium and pH, 10 tests each				

HI3827

Boiler & Feedwater Test Kit

The HI3827 is a chemical test kit that determines that uses titration, colorimetry, and direct measurement to measure six parameters common to boilers and feedwater testing: alkalinity, chloride, hardness, phosphate, pH, and sulfite. The HI3827 is supplied with all of the necessary reagents and equipment to perform each analysis, and all reagents are individually available as they run out.

- **Complete setup**
 - All required materials are included with the test kit, such as the pH tester, sample beaker, indicator and reagent bottles and packets, and color comparison cube.
- **High resolution**
 - All tests provide a high resolution based on the expected range of measurement.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The reagents for each parameter can be ordered individually.



Significance of Use

Monitoring the alkalinity, chloride, hardness, phosphate, pH, and sulfite concentrations in boiler and feedwater is essential in preventing hazardous or costly situations. These parameters are important in determining the corrosive characteristics of water due to carbonates and chloride. Sulfite is also critical to prevent pitting and oxidation of metal components. A high level of sulfite results in a lowered pH, which can also promote corrosion.

Specifications	HI3827 Test Kit for Boilers				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	1 mg/L (ppm) 3 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.
Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm) 0-1000 mg/L (ppm)	1 mg/L (ppm) 10 mg/L (ppm)	mercuric nitrate	110 avg.
Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	0.3 mg/L (ppm) 3 mg/L (ppm)	EDTA	100 avg.
Phosphate (as PO ₄ ³⁻)	colorimetric	0-5 mg/L (ppm)	1 mg/L (ppm)	ascorbic acid	50 avg
pH	electronic pH tester	0.0-14.0 pH	0.1 pH	-	life of the meter
Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm) 0-200 mg/L (ppm)	0.2 mg/L (ppm) 2 mg/L (ppm)	iodometric	110 avg.
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")				
Ordering Information	HI3827 test kit includes all of the necessary reagents and accessories to perform over 100 tests for every parameter, with the exception of phosphate, which includes reagents for 50 tests, hard carrying cases and instructions.				
Reagents	HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg.		HI70004P pH 4.01 buffer solution, 20 mL sachets (25)		
	HI3815-100 Chloride, 110 tests avg.		HI70007P pH 7.01 buffer solution, 20 mL sachets (25)		
	HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg.		HI70010P pH 10.01 buffer solution, 20 mL sachets (25)		
	HI3833-050 Phosphate, 50 tests avg.		HI3822-100 Sulfite (as Na ₂ SO ₃), 110 tests avg.		



HI3821

Cooling and Boiler Test Kit

The HI3821 is a chemical test kit that determines that uses titration and colorimetry to measure six parameters common to cooling and boiler systems: alkalinity, chloride, hardness, dissolved oxygen, phosphate, and sulfite. The HI3821 is supplied with all of the necessary reagents and equipment to perform each analysis, and all reagents are individually available as they run out.

- **Complete setup**
 - All required materials are included with the test kit, such as the dissolved oxygen glass bottle, sample beaker, indicator and reagent bottles and packets, and color comparison cube.
- **High resolution**
 - All tests provide a high resolution based on the expected range of measurement.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The reagents for each parameter can be ordered individually.

Significance of Use

Corrosion can occur in many key areas of a boiler. It can shorten the life of a boiler, or at the very least, increase the costs associated with maintaining a boiler. Corrosion can form in water heaters, deaerators, superheater tubes, and economizers, among other places. Monitoring the alkalinity, chloride, hardness, dissolved oxygen, phosphate, and sulfite concentrations in cooling and boiler systems is essential in preventing hazardous or costly situations.

Specifications	HI3821 Cooling and Boiler Combination Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	1 mg/L (ppm) 3 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.
Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm) 0-1000 mg/L (ppm)	1 mg/L (ppm) 10 mg/L (ppm)	mercuric nitrate	110 avg.
Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	0.3 mg/L (ppm) 3 mg/L (ppm)	EDTA	100 avg.
Phosphate (as PO ₄ ³⁻)	colorimetric	0-5 mg/L (ppm)	1 mg/L (ppm)	ascorbic acid	50 avg
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	0.1 mg/L (ppm)	modified Winkler	110 avg.
Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm) 0-200 mg/L (ppm)	0.2 mg/L (ppm) 2 mg/L (ppm)	iodometric	110 avg.
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")				
Ordering Information	HI3821 test kit includes all of the necessary reagents and accessories to perform over 100 tests for every parameter, with the exception of phosphate, which includes reagents for 50 tests, hard carrying case and instructions.				
Reagents	HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg.		HI3833-050 Phosphate, 50 tests avg.		
	HI3815-100 Chloride, 110 tests avg.		HI3810-100 Dissolved Oxygen, 110 tests avg.		
	HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg.		HI3822-100 Sulfite (as Na ₂ SO ₃), 110 tests avg.		

HI3814

Environmental Monitoring Test Kit

Ideal for Professionals and Students

The HI3814 is a chemical test kit that determines that uses titration and direct measurement to measure six parameters common in environmental testing: acidity, alkalinity, carbon dioxide, hardness, dissolved oxygen, and pH. The HI3814 is supplied with all of the necessary reagents and equipment to perform each analysis, and all reagents are individually available as they run out.

- **Complete setup**
 - All required materials are included with the test kit, such as the pH tester, sample beaker, indicator and reagent bottles and packets, and glass bottle for dissolved oxygen.
- **High resolution**
 - All tests provide a high resolution based on the expected range of measurement.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The reagents for each parameter can be ordered individually.



Significance of Use

The six most important parameters in environmental applications can be monitored with this combination chemical test kit. They include: acidity, alkalinity, carbon dioxide, dissolved oxygen, hardness, and pH. This kit is ideal not only for professionals, but also for students studying environmental science, as it offers great performance and ease of use. HI3814 is equipped with all the accessories and reagents to perform over 100 tests for each parameter. The pHep®, our popular pH electronic tester, is included for your convenience. This small and easy to use pH meter will provide more accurate and reliable pH readings than conventional litmus paper. The pHep® also has the added benefit of introducing students to the use of a pH meter.

Specifications	HI3814 Environmental Monitoring Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Acidity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-500 mg/L (ppm)	1 mg/L (ppm) 5 mg/L (ppm)	methyl-orange/ phenolphthalein	110 avg.
Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	1 mg/L (ppm) 3 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.
Carbon Dioxide	titration	0.0-10.0 mg/L (ppm) 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)	0.1 mg/L (ppm) 0.5 mg/L (ppm) 1 mg/L (ppm)	phenolphthalein	110 avg.
Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	0.3 mg/L (ppm) 3 mg/L (ppm)	EDTA	100 avg.
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	0.1 mg/L (ppm)	modified Winkler	110 avg.
pH	electronic pH tester	0.0-14.0 pH	0.1 pH	–	life of the meter
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")				
Ordering Information	HI3814 test kit includes all of the necessary reagents and accessories to perform over 100 tests for every parameter, electronic pH tester, hard carrying case and instructions.				
Reagents	HI3820-100 Acidity (as CaCO ₃), 110 tests avg. HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg. HI3818-100 Carbon Dioxide, 110 tests avg. HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg.		HI3810-100 Dissolved Oxygen, 110 tests avg. HI70004P pH 4.01 buffer solution, 20 mL sachets (25) HI70007P pH 7.01 buffer solution, 20 mL sachets (25) HI70010P pH 10.01 buffer solution, 20 mL sachets (25)		



HI3823

Marine Test Kit

HI 3823 provides users with the most important test parameters for aquaculture applications: alkalinity, carbon dioxide, dissolved oxygen, hardness, pH and salinity.

Each of these parameters plays a critical role in the delicate balance of the aquatic environment: alkalinity acts as a stabilizer for pH; carbon dioxide must be monitored because of its toxic effects on fish (every species can tolerate different levels of CO₂); oxygen levels affect fish respiration and incorrect concentrations can slow down their growth rate; hardness is monitored because it diminishes the toxicity level of ammonia; pH also is measured to determine the toxicity level of the water; salinity is important because of its relation to dissolved oxygen.

- **Complete setup**
 - All required materials are included with the test kit, such as the pH tester, sample beaker, indicator and reagent bottles and packets, and glass bottle for dissolved oxygen.
- **High resolution**
 - All tests provide a high resolution based on the expected range of measurement.
- **Replacement reagents available**
 - There is no need to buy a new kit when reagents are exhausted. The reagents for each parameter can be ordered individually.

Specifications	HI3823 Marine Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	1 mg/L (ppm) 3 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.
Carbon Dioxide	titration	0.0-10.0 mg/L (ppm) 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)	0.1 mg/L (ppm) 0.5 mg/L (ppm) 1 mg/L (ppm)	phenolphthalein	110 avg.
Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	0.3 mg/L (ppm) 3 mg/L (ppm)	EDTA	100 avg.
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	0.1 mg/L (ppm)	modified Winkler	110 avg.
pH	electronic pH tester	0.0-14.0 pH	0.1 pH	-	life of the meter
Salinity	titration	0.0-40.0 g/kg	0.4 g/kg	mercuric nitrate	110 avg.
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")				
Ordering Information	HI3823 test kit includes all reagents and accessories necessary to perform over 100 tests for each parameter, electronic pH tester, hard carrying case and instructions.				
Reagents	HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg.		HI70004P pH 4.01 buffer solution, 20 mL sachets (25)		
	HI3818-100 Carbon Dioxide, 110 tests avg.		HI70007P pH 7.01 buffer solution, 20 mL sachets (25)		
	HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg.		HI70010P pH 10.01 buffer solution, 20 mL sachets (25)		
	HI3810-100 Dissolved Oxygen, 110 tests avg.		HI3835-100 Salinity, 100 tests avg.		



HI3887

Quick-Check Swimming Pool Test Kit

Free Chlorine and pH

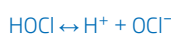
The HI3887 is a colorimetric chemical test kit that determines the free chlorine concentration and pH level in samples within a 0.0 to 2.5 mg/L (ppm) Cl^- range and 6.0 to 8.5 pH range. The HI3887 is supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents to perform approximately 50 tests for free chlorine and 100 tests for pH.

- **Complete setup**
 - All required materials are included with the test kit, such as the color comparison cubes and reagent dropper bottles.
- **High resolution**
 - Free chlorine readings from 0.0 to 2.5 mg/L are determined to 0.5 mg/L resolution.
 - pH readings from 6.0 to 8.5 pH are determined to 0.5 pH resolution.

Significance of Use

Chlorine is one of the most commonly used disinfectants for drinking water, wastewater, and water used for pools and spas. It can be added to in various forms including calcium hypochlorite, sodium

hypochlorite, or in some instances, chlorine gas. When added to water, chlorine creates hypochlorous acid (HOCl) which dissociates into hypochlorite ion (OCl^-).



hypochlorous acid \leftrightarrow hydrogen ion + hypochlorite ion

HOCl is the form of chlorine that acts as a stronger disinfectant as compared to OCl^- . To ensure the added chlorine is effective at sanitizing, the pH of the water must be taken into account. Around pH 7.5, HOCl and OCl^- are present in relatively equal amounts. Below pH 7.5, the equilibrium shifts to favor HOCl; above pH 7.5, the equilibrium shifts to favor OCl^- . Depending on the application, addition of chlorine is effective when added to water with a neutral or slightly acidic pH value.

When chlorine is first added to water, it is available as free chlorine. The measurement of free chlorine signifies the amount available for disinfection. Once chlorine begins to sanitize bacteria and pathogens present in the water, it becomes combined chlorine; combined chlorine is no longer available to act as a disinfectant.

Specifications	HI3887 Quick-Check Swimming Pool Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Free Chlorine	colorimetric	0-2.5 mg/L (ppm)	0.5 mg/L (ppm)	DPD	50 avg.
pH	colorimetric	6.0-8.5 pH	0.5 pH	pH indicator	100 avg.
Ordering Information	HI3887 test kit includes color comparison cubes (2), 20 mL reagent 1, 12 mL reagent 2, 25 mL pH reagent and instructions.				
Reagents	HI3831F-050 free chlorine, 50 tests avg.				



HI3817

Water Quality Test Kit

Accurate and Reliable Water Quality Tests

Monitor the most important chemical parameters in water: alkalinity, chloride, hardness, iron, pH and sulfite with this combination test kit.

The kit has all the reagents needed to perform over 100 tests for each parameter, with the exception of iron, which includes reagents for 50 tests. Reagents may also be purchased individually as they run out (please see our reagent section for a complete listing).

pH measurements are performed with our electronic pHep® pH tester which guarantees more accurate and repeatable readings than litmus paper.

The chemical reagents to perform each test are provided in numerically labeled bottles and are easy to identify.

The kit is supplied with a convenient hard carrying case designed with field applications in mind. It will also keep your test kit neat and organized.

The Hanna HI3817 combination test kit offers all the necessary equipment for accurate and reliable water quality testing.

Specifications	HI3817 Water Quality Test Kit				
Test	Type	Range	Smallest Increment	Method	Number of Tests
Alkalinity (as CaCO ₃)	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	1 mg/L (ppm) 3 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.
Chloride (as Cl ⁻)	titration	0-100 mg/L (ppm) 0-1000 mg/L (ppm)	1 mg/L (ppm) 10 mg/L (ppm)	mercuric nitrate	110 avg.
Hardness (as CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	0.3 mg/L (ppm) 3 mg/L (ppm)	EDTA	100 avg.
Iron	colorimetric	0-5 mg/L (ppm)	1 mg/L (ppm)	phenanthroline	50 avg
pH	electronic pH tester	0.0-14.0 pH	0.1 pH	-	life of the meter
Sulfite (as Na ₂ SO ₃)	titration	0.0-20.0 mg/L (ppm) 0-200 mg/L (ppm)	0.2 mg/L (ppm) 2 mg/L (ppm)	iodometric	110 avg.
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")				
Ordering Information	HI3817 test kit includes all of the necessary reagents and accessories to perform over 100 tests for every parameter, with the exception of iron, which include reagents for 50 tests, electronic pH tester, hard carrying case and instructions.				
Reagents	HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg.		HI70004P pH 4.01 buffer solution, 20 mL sachets (25)		
	HI3815-100 Chloride, 110 tests avg.		HI70007P pH 7.01 buffer solution, 20 mL sachets (25)		
	HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg.		HI70010P pH 10.01 buffer solution, 20 mL sachets (25)		
	HI3834-050 iron, 50 tests avg.		HI3822-100 Sulfite (as Na ₂ SO ₃), 110 tests avg.		



backpacklab.com

Chemical Test Kits

Backpack Lab



Test kits can be replaced individually

A Classroom in a Backpack!

Backpack Lab® Water Quality Educational Test Kit

Backpack Lab Water Quality Educational Test Kit Includes:

- 110 tests each for acidity and alkalinity, 100 tests for carbon dioxide, dissolved oxygen, hardness, nitrate and phosphate
- Hanna's HI98129 Combo pH/EC/TDS/temperature tester
- Secchi disk for turbidity
- Backpack carrying case which holds all components of the kit
- Teacher's manual with a curriculum that meets National Science Teachers Association Standards
- Parameter summary in PDF and PowerPoint format (on included CD)
- Laminated, laboratory instruction cards with step-by-step field test procedures
- Reproducible lab activity worksheets with instructions, goals, hypothesis, and testing procedure results/observations (on included CD)

- A glossary of key terms in PDF format (on included CD)

Hanna offers a series of test kits specifically designed for educators and environmental science students. These portable kits contain well-constructed lessons and activities, and will allow the teacher to get the most out of their classroom time.

Backpack Lab is designed with all the necessary components in one place, reducing the chance of misplacing an item. Ideal for transporting, take this durable backpack to the field for on-site measurements.

The lesson plan and components are tied together by a comprehensive teacher's manual that includes information about each parameter, classroom activities designed to introduce students to each parameter, and detailed field-testing procedures. Hanna chemical test kits and pocket testers provide teachers with a valuable tool in helping students assess the water quality of streams, rivers and lakes.

Specifications HI3817BP Backpack Lab Water Quality Test Kit					
Test	Type	Range	Method	Number of Tests	Individual Kit Reorder Code
Acidity (CaCO ₃)	titration	0-100 mg/L (ppm) 0-500 mg/L (ppm)	methyl-orange phenolphthalein	110 avg.	HI3820
Alkalinity (CaCO ₃) Phenolphthalein & Total	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.	HI3811
Carbon Dioxide	titration	0.0-10.0 mg/L (ppm) 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)	phenolphthalein	110 avg.	HI3818
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	modified Winkler	110 avg.	HI3810
Hardness (CaCO ₃)	titration	0.0-30.0 mg/L (ppm) 0-300 mg/L (ppm)	EDTA	100 avg.	HI3812
Nitrate (NO ₃ ⁻ -N)	colorimetric	0-50 mg/L (ppm)	cadmium reduction	100	HI3874
Phosphate	colorimetric	0-5 mg/L (ppm)	ascorbic acid	50	HI3833
Specifications HI98129 Combo pH/EC/TDS/Temperature Tester					
Type	Range	Resolution	Accuracy	Calibration	
pH	0.00 to 14.00 pH	0.01 pH	±0.05 pH	automatic, one or two-point with two sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)	
Conductivity	0 to 3999 µS/cm	1 µS/cm	±2% F.S.	automatic, one point at 1413 µS/cm	
TDS	0 to 2000 mg/L (ppm)	1 mg/L (ppm)	±2% F.S.	automatic, one point at 1382 mg/L (ppm)	
Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	0.1°C / 0.1°F	±0.5°C / ±1°F	-	
Ordering Information	HI3817BP Backpack Lab includes HI98129 Combo pH/EC/TDS/temperature tester, acidity test kit, alkalinity test kit, carbon dioxide test kit, dissolved oxygen test kit, hardness test kit, nitrate test kit, phosphate test kit, set of 10 field test procedures, teacher's resource CD, teacher's guide and backpack.				
Reagents and Solutions only	HI3820-100 Acidity (as CaCO ₃), 110 tests avg. HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg. HI3818-100 Carbon Dioxide, 110 tests avg. HI3810-100 Dissolved Oxygen, 110 tests avg. HI3812-100 Hardness, total (as CaCO ₃), 100 tests avg. HI3874-100 nitrate (as NO ₃ ⁻ -N), 100 tests avg.		HI3833-050 Phosphate, 50 tests avg. HI70004P pH 4.01 buffer solution for HI98129, 20 mL sachets (25) HI70007P pH 7.01 buffer solution for HI98129, 20 mL sachets (25) HI70010P pH 10.01 buffer solution for HI98129, 20 mL sachets (25) HI70031P 1413 µS/cm conductivity calibration solution for HI98129, 20 mL sachets (25) HI70032P 1382 mg/L (ppm) TDS calibration solution for HI98129, 20 mL sachets (25)		

Backpack Lab™ contents subject to change



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Test kits can be replaced individually

A Classroom in a Backpack!

Backpack Lab® Soil Quality Educational Test Kit

Backpack Lab Soil Quality Educational Test Kit Includes:

- Agriculture combination test kit for testing nitrogen, phosphorus, potassium (N,P,K) with enough materials for 50 tests of each parameter
- Hanna's HI98129 Combo pH/EC/TDS/temperature tester
- Hanna's HI145 digital thermometer
- Backpack carrying case which holds all components of the kit
- Teacher's manual with a curriculum that meets National Science Teachers Association Standards
- Parameter summary in PDF and PowerPoint format (on included CD)
- Laminated, laboratory instruction cards with step-by-step field test procedures
- Reproducible lab activity worksheets with instructions, goals, hypothesis and testing procedure results/observations (on included CD)
- A glossary of key terms in PDF format (on included CD)

Hanna introduces a kit specifically assembled for the educator and environmental science student. Using the popular Hanna Agricultural Combination Test Kit (HI3896) as its foundation, the Soil Quality Education Test Kit is designed to provide a complete lesson plan for teachers. Teachers are able to introduce students to important chemical tests for evaluating soil quality and fertility, and relate these measurements to the principles of plant metabolism. Tied together by an extensive teacher's guide, this kit includes in-depth background information about each parameter, classroom activities designed to introduce students to each parameter and field-testing procedures.

The Hanna Agricultural Combination Test Kit addresses important issues related to soil quality and modern agriculture practices. Real-world examples help students understand the relevance of macronutrients and other parameters in everyday life. This kit introduces the student to all major soil quality topics, and is presented in an easy-to-use format that makes lessons accessible, understandable and memorable.

Specifications	HI3896BP Backpack Lab Soil Quality Test Kit				
Test	Type	Range	Method	Number of Tests	Individual Kit Reorder Code
Nitrogen	colorimetric	traces, low, medium, high	Ned	25	HI3896-025
Phosphorus	colorimetric	traces, low, medium, high	ascorbic acid	25	HI3896-025
Potassium	turbidimetric	traces, low, medium, high	tetraphenylborate	25	HI3896-025
pH	colorimetric	4 to 9 pH (1 pH increments)	pH indicators	25	HI3896-025
Specifications	HI98129 Combo pH/EC/TDS/Temperature Tester				
Type	Range	Resolution	Accuracy	Calibration	
pH	0.00 to 14.00 pH	0.01 pH	±0.05 pH	automatic, one or two-point with two sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)	
Conductivity	0 to 3999 µS/cm	1 µS/cm	±2% F.S.	automatic, one point at 1413 µS/cm	
TDS	0 to 2000 mg/L (ppm)	1 mg/L (ppm)	±2% F.S.	automatic, one point at 1382 mg/L (ppm)	
Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	0.1°C / 0.1°F	±0.5°C / ±1°F	-	
Specifications	HI145-00 T-Shaped Thermometer				
Type	Range	Resolution	Accuracy	Probe	
Temperature	-50.0 to 220°C	0.1°C (-50.0 to 199.9°C); 1°C (200 to 220°C)	±0.3°C (-20 to 90°C); ±0.4% F.S. (outside)	stainless steel probe; 125 mm x dia 5 mm (4.9 x dia 0.2")	
Ordering Information	HI3896BP Backpack Lab test kit includes agriculture test kit pro, HI98129 Combo pH/EC/TDS/temperature tester, HI145 digital thermometer, set of 6 field test procedures, teacher's resource CD, teacher's guide and backpack				
Reagents and Solutions only	HI3896-025 nitrogen, phosphorus, potassium and pH, 25 tests each HI70004P pH 4.01 buffer solution for HI98129, 20 mL sachets (25) HI70007P pH 7.01 buffer solution for HI98129, 20 mL sachets (25) HI70010P pH 10.01 buffer solution for HI98129, 20 mL sachets (25) HI70031P 1413 µS/cm conductivity calibration solution for HI98129, 20 mL sachets (25) HI70032P 1382 mg/L (ppm) TDS calibration solution for HI98129, 20 mL sachets (25)				

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Chemical Test Kits

Backpack Lab



Test kits can be replaced individually

A Classroom in a Backpack!

Backpack Lab® Marine Science Educational Test Kit

Backpack Lab® Includes:

- 110 tests each for acidity and alkalinity, 100 tests for ammonia, carbon dioxide, dissolved oxygen, hardness, nitrate, nitrogen, phosphate and salinity
- Hanna's HI98129 Combo pH/EC/TDS/temperature tester
- Hydrometer for salinity
- Secchi disk for turbidity
- Backpack-style carrying case which holds all components of the kit
- Teacher's manual with a curriculum that meets National Science Teachers Association Standards
- Parameter summary in PDF and PowerPoint format (on included CD)
- Laminated, laboratory instruction cards with step-by-step field-test procedures

- Reproducible lab activity worksheets with instructions, goals, hypothesis, and testing procedure results/observations (on included CD)
- A glossary of key terms in PDF format (on included CD)

Backpack Lab is designed with all the necessary components in one place, reducing the chance of misplacing an item. Ideal for transporting, take this durable backpack to the field for on-site measurements.

This kit is designed to provide a complete unit for teachers to introduce students to important marine science topics. The teacher's guide provides detailed background information for marine science lessons and activities that can be adapted to various grade levels. Field tests are included to complement classroom lessons. All materials fit easily into the supplied backpack for convenient transport.

Specifications	HI3899BP Backpack Lab Marine Science Educational Test Kit				
Test	Type	Range	Method	Number of Tests	Individual Kit Reorder Code
Acidity (CaCO ₃)	titration	0-100 mg/L (ppm) 0-500 mg/L (ppm)	methyl-orange phenolphthalein	110 avg.	HI3820
Alkalinity (CaCO ₃) Phenolphthalein & Total	titration	0-100 mg/L (ppm) 0-300 mg/L (ppm)	phenolphthalein/ bromphenol blue	110 avg.	HI3811
Ammonia (as NH ₃ -N) in saltwater	colorimetric	0.0-2.5 mg/L (ppm)	Nessler	25 avg.	HI3826
Carbon Dioxide	titration	0.0-10.0 mg/L (ppm) 0.0-50.0 mg/L (ppm) 0-100 mg/L (ppm)	phenolphthalein	110 avg.	HI3818
Oxygen, Dissolved	titration	0.0-10.0 mg/L (ppm)	modified Winkler	110 avg.	HI3810
Nitrite	colorimetric	0.0-1.0 mg/L (ppm)	chromotropic acid	100	HI3873
Nitrate (NO ₃ ⁻ -N)	colorimetric	0-50 mg/L (ppm)	cadmium reduction	100	HI3874
Phosphate	colorimetric	0-5 mg/L (ppm)	ascorbic acid	50	HI3833
Salinity	titration	0.0-40.0 g/kg	mercuric nitrate	110 avg.	HI3835

Specifications	HI98129 Combo pH/EC/TDS/Temperature Tester			
Type	Range	Resolution	Accuracy	Calibration
pH	0.00 to 14.00 pH	0.01 pH	±0.05 pH	automatic, one or two-point with two sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)
Conductivity	0 to 3999 µS/cm	1 µS/cm	±2% F.S.	automatic, one point at 1413 µS/cm
TDS	0 to 2000 mg/L (ppm)	1 mg/L (ppm)	±2% F.S.	automatic, one point at 1382 mg/L (ppm)
Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	0.1°C / 0.1°F	±0.5°C / ±1°F	–

Ordering Information	HI3899BP Backpack Lab includes acidity test kit, alkalinity test kit, carbon dioxide test kit, ammonia test kit, dissolved oxygen test kit, nitrate test kit, nitrite test kit, phosphate test kit, salinity test kit, secchi disc, hydrometer, HI98129 Combo pH/EC/TDS/temperature tester, set of 6 field test procedures, teacher's resource CD, teacher's guide and backpack.	
Reagents and Solutions only	HI3820-100 Acidity (as CaCO ₃), 110 tests avg. HI3811-100 Alkalinity (as CaCO ₃), 110 tests avg. HI3826-025 Ammonia, seawater (as NH ₃ -N), 25 tests avg. HI3818-100 Carbon Dioxide, 110 tests avg. HI3810-100 Dissolved Oxygen, 110 tests avg. HI3874-100 nitrate (as NO ₃ ⁻ -N), 100 tests avg. HI3873-100 nitrite (as NO ₂ ⁻ -N), 100 tests avg.	HI3833-050 Phosphate, 50 tests avg. HI3835-100 salinity, 100 tests avg. HI70004P pH 4.01 buffer solution for HI98129, 20 mL sachets (25) HI70007P pH 7.01 buffer solution for HI98129, 20 mL sachets (25) HI70010P pH 10.01 buffer solution for HI98129, 20 mL sachets (25) HI70031P 1413 µS/cm conductivity calibration solution for HI98129, 20 mL sachets (25) HI70032P 1382 mg/L (ppm) TDS calibration solution for HI98129, 20 mL sachets (25)

Backpack Lab™ contents subject to change

CTK Code	Test Kit Parameter	Chemical Method	Reagent Code	# Tests	
HI3810	Dissolved Oxygen	Winkler	HI3810-100	110 avg.	
HI3811	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.	
HI3812	Hardness, total (as CaCO ₃)	EDTA titration	HI3812-100	100 avg.	
HI3814	Dissolved Oxygen	Winkler	HI3810-100	110 avg.	
	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.	
	Hardness, Total (as CaCO ₃)	EDTA titration	HI3812-100	100 avg.	
	Carbon Dioxide	phenolphthalein titration	HI3818-100	110 avg.	
	Acidity (as CaCO ₃)	methyl-orange/phenolphthalein	HI3820-100	110 avg.	
	Buffer solution	–	HI70004P	25	
	Buffer solution	–	HI70007P	25	
HI3815	Chloride	mercuric nitrate titration	HI3815-100	110 avg.	
	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.	
	Hardness, total (as CaCO ₃)	EDTA titration	HI3812-100	100 avg.	
	Chloride	mercuric nitrate titration	HI3815-100	110 avg.	
	Sulfite (as Na ₂ SO ₃)	titration	HI3822-100	110 avg.	
	Iron	phenanthroline	HI3834-050	50 avg.	
	Buffer solution	–	HI70004P	25	
HI3817	Buffer solution	–	HI70007P	25	
	Buffer solution	–	HI70010P	25	
	Dissolved Oxygen	Winkler	HI3810-100	110 avg.	
	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.	
	Hardness, total (as CaCO ₃)	EDTA titration	HI3812-100	100 avg.	
	Carbon Dioxide	phenolphthalein titration	HI3818-100	110	
	Acidity (as CaCO ₃)	methyl orange/phenolphthalein	HI3820-100	110	
HI3817BP	Phosphate	ascorbic acid	HI3833-050	50	
	Nitrate (as NO ₃ ⁻ -N)	cadmium reduction	HI3874-100	100	
	Buffer solution	–	HI70004P	25	
	Buffer solution	–	HI70007P	25	
	Buffer solution	–	HI70010P	25	
	EC Calibration Standard	–	HI70031P	25	
	EC Calibration Standard	–	HI7033M	1 bottle (230 mL)	
	HI3818	Carbon Dioxide	phenolphthalein titration	HI3818-100	110 avg.
	HI3820	Acidity (as CaCO ₃)	methyl orange/phenolphthalein	HI3820-100	110 avg.
	HI3821	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.
Chloride		mercuric nitrate titration	HI3815-100	110 avg.	
Hardness, total (as CaCO ₃)		EDTA titration	HI3812-100	100 avg.	
Dissolved Oxygen		Winkler	HI3810-100	110 avg.	
Phosphate		ascorbic acid	HI3833-050	50	
Sulfite (as Na ₂ SO ₃)		titration	HI3822-100	110 avg.	
HI3822	Sulfite (as Na ₂ SO ₃)	titration	HI3822-100	110 avg.	
HI3824	Ammonia (fresh water) (as NH ₃ -N)	Nessler colorimetric	HI3824-025	25 avg.	
HI3826	Ammonia (seawater) (as NH ₃ -N)	Nessler colorimetric	HI3826-025	25 avg.	

CTK Code	Test Kit Parameter	Chemical Method	Reagent Code	# Tests
HI3829F	Chlorine, free	DPD colorimetric	HI3829F-050	50 avg
HI3830	Bromine	DPD colorimetric	HI3830-060	60 avg.
HI3831F	Chlorine, free	DPD colorimetric	HI3831F-050	50 avg
HI3831T	Chlorine, total	DPD colorimetric	HI3831T-050	50 avg
HI3833	Phosphate	ascorbic acid	HI3833-050	50
HI3834	Iron	phenanthroline	HI3834-050	50 avg.
HI3835	Chloride	mercuric nitrate	HI3835-100	110 avg.
HI3838	Formaldehyde	acid titration	HI3838-100	110 avg
HI3840	Hardness LR (as CaCO ₃)	EDTA titration	HI3840	50 avg
HI3841	Hardness MR (as CaCO ₃)	EDTA titration	HI3841	50 avg
HI3842	Hardness HR (as CaCO ₃)	EDTA titration	HI3842	50 avg
HI3843	Hypochlorite (bleach)	iodometric	HI3843-100	100 avg
HI3844	Hydrogen Peroxide	iodometric	HI3844-100	100 avg
HI3846	Chromium VI	diphenylcarbohydrazide	HI3846-100	100 avg
HI3847	Copper	bicinchoninate	HI3847-100	100
HI3859	Glycol	oxidation	HI3859-025	25
HI3873	Nitrite (as NO ₂ ⁻ -N)	chromotropic acid	HI3873-100	100
HI3874	Nitrate (as NO ₃ ⁻ -N)	cadmium reduction	HI3874-100	100
HI3875	Chlorine, free	DPD colorimetric	HI3875-100	100
HI3887	Chlorine, free	DPD colorimetric	HI3831F-050	50 avg
HI3895	Nitrogen	Ned	HI3895-010	10
	Phosphorus	ascorbic acid	HI3895-010	10
	Potassium	tetraphenylborate	HI3895-010	10
	pH	pH indicators	HI3895-010	10
HI3896	Nitrogen	Ned	HI3896-025	25
	Phosphorus	ascorbic acid	HI3896-025	25
	Potassium	tetraphenylborate	HI3896-025	25
	pH	pH indicators	HI3896-025	25
HI3896BP	Nitrogen	Ned	HI3896-025	25
	Phosphorus	ascorbic acid	HI3896-025	25
	Potassium	tetraphenylborate	HI3896-025	25
	pH	pH indicators	HI3896-025	25
	Buffer solution	-	HI70004P	25
HI3897	Buffer solution	-	HI70007P	25
	Buffer solution	-	HI70010P	25
	EC Calibration Standard	-	HI70031P	25
	TDS Calibration Standard	-	HI70032P	25
	Acidity, olive oil	titration with hydroxide	HI3897-010	10
HI3827	Alkalinity (as CaCO ₃)	acid titration	HI3811-100	110 avg.
	Hardness, total (as CaCO ₃)	EDTA titration	HI3812-100	100 avg.
	Chloride	mercuric nitrate titration	HI3815-100	110 avg.
	Sulfite (as Na ₂ SO ₃)	titration	HI3822-100	110 avg.
	Phosphate	ascorbic acid	HI3833-050	50
	Buffer solution	-	HI70004P	25
	Buffer solution	-	HI70007P	25
Buffer solution	-	HI70010P	25	

CTK Code	Test Kit Parameter	Chemical Method	Reagent Code	# Tests
HI3899BP	Dissolved Oxygen	Winkler	HI3810-100	110 avg
	Alkalinity (as CaCO ₃)	phenolphthalein/bromphenol blue	HI3811-100	110 avg.
	Carbon Dioxide	phenolphthalein titration	HI3818-100	110 avg
	Acidity (as CaCO ₃)	methyl-orange/phenolphthalein	HI3820-100	110 avg
	Ammonia, Seawater (as NH ₃ -N)	Nessler colorimetric	HI3826-025	25 avg
	Phosphate	ascorbic acid	HI3833-050	50
	Salinity	mercuric nitrate titration	HI3835-100	110 avg
	Nitrite (as NO ₂ ⁻ -N)	chromotropic acid	HI3873-100	100
	Nitrate (as NO ₃ ⁻ -N)	cadmium reduction	HI3874-100	100
	Buffer solution	-	HI70004P	25
	Buffer solution	-	HI70007P	25
	Buffer solution	-	HI70010P	25
	EC Calibration Standard	-	HI70031P	25
	EC Calibration Standard	-	HI7033M	1 bottle (230 mL)
HI38000	Sulfate	barium chloride	HI38000-10	100
HI38001	Sulfate LR/HR	barium chloride	HI38001-10	100
HI38017	Chlorine, free and total	DPD colorimetric	HI38017-200	200
HI38018	Chlorine, free	DPD colorimetric	HI38018-200	200
HI38020	Chlorine, free and total	DPD colorimetric	HI38020-200	200
HI38023	Chlorine, total, extended range	iodometric	HI38023-100	100
HI38033	Hardness, total (as CaCO ₃)	EDTA titration	HI38033-100	100
HI38039	Iron LR	phenanthroline colorimetric	HI38039-100	100
HI38040	Iron MR	phenanthroline colorimetric	HI38040-100	100
HI38041	Iron HR	phenanthroline colorimetric	HI38041-100	100
HI38050	Nitrate (soil + irrigation) (as NO ₃ ⁻ -N)	cadmium reduction	HI38050-200	200
HI38054	Ozone	DPD	HI38054-100	100
HI38061	Phosphate	ascorbic acid	HI38061-100	100
HI38067	Silica HR (as SiO ₂)	heteropoly blue	HI38067-100	100
HI38074	Boron	boric acid	HI38074-100	100



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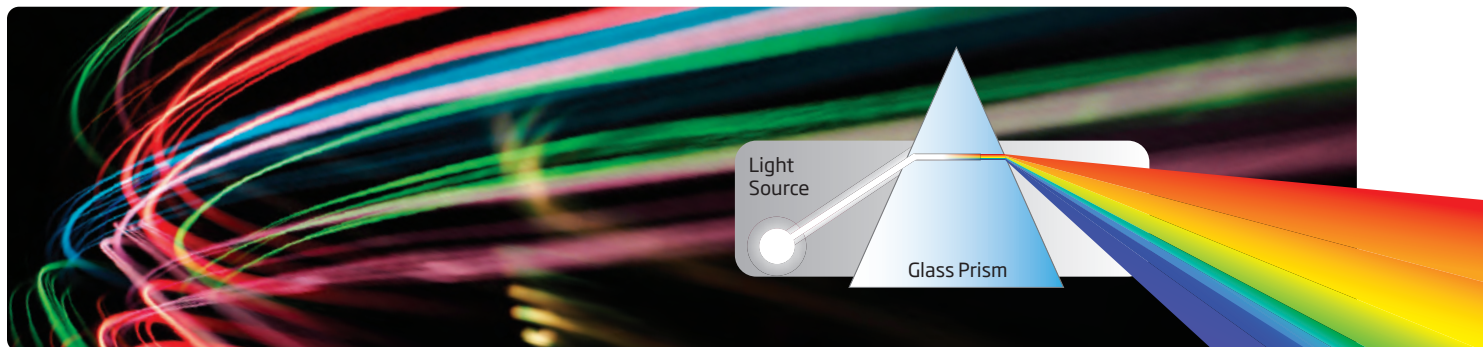
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Light and Color

Before entering into colorimetry, it is important to understand the relationship between light and color.

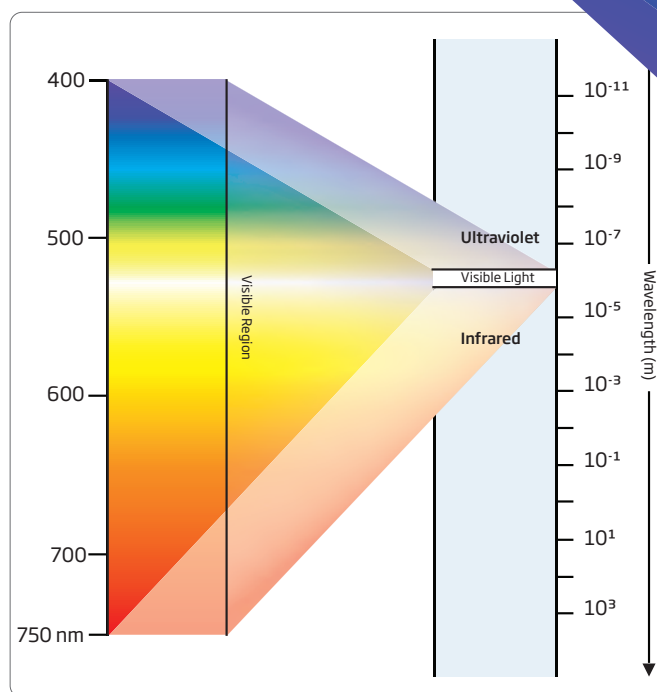
In simple terms, colors are dependent on light. We do not actually see colors rather, what we see as color is the effect of light shining on an object. When white light shines on an object, it may be reflected, absorbed, or transmitted. Glass transmits most of the light that comes into contact with it, thus it appears colorless. Snow reflects all of the light and appears white. A black cloth absorbs all light, and so appears black. A red piece of paper reflects red light better than it reflects other colors. Most objects appear colored because their chemical structure absorbs certain wavelengths of light and reflects others.

When discussing light, we are usually referring to white light. A thin line of light is called a ray; a beam is made up of many rays of light. When white light passes through a prism (a triangular transparent object) the colors that make up white light disperse into seven bands of color. These bands of color are called a spectrum. Seven colors constitute white light: red, orange, yellow, green, blue, indigo, and violet. In any spectrum, the bands of color are always organized in this order from left to right.

Suppose we shine a beam of white light at a substance that absorbs blue light. Since the blue component of the white light gets absorbed by the substance, the light that is transmitted is mostly yellow, the complementary color of blue. This yellow light reaches our eyes, and we "see" the substance as a yellow colored substance.

The color variation of a system that undergoes a change in concentration of some component is the basis of colorimetric analysis.

Wavelength (nm)	Color Absorbed	Color Observed
400	Violet	Yellow-green
435	Blue	Yellow
495	Green	Purple
560	Yellow	Blue
650	Orange	Greenish blue
800	Red	Bluish green



Colorimetry

Colorimetry is simply the measurement of color. Colorimetry is the determination of the concentration of a substance by measurement of the relative absorption of light with respect to a known concentration of the substance. In visual colorimetry, natural or artificial white light is generally used as a light source and determinations are usually made with a simple instrument termed a colorimeter, or color comparator. When the eye is replaced by a photoelectric cell, the instrument is termed a photoelectric colorimeter.

A colorimetric analysis is based on the principle that many substances react with each other and form a color which can indicate the concentration of the substance to be measured. When a substance is exposed to a beam of light of intensity (I_0) a portion of the radiation is absorbed by the substance's molecules and a radiation of intensity (I) is emitted. This difference in intensity is used for the colorimetric determination.

The quantity of radiation absorbed is given by the Beer-Lambert Law: $A = \log \frac{I_0}{I}$

Absorbance is also given by: $A = \epsilon_{\lambda} \cdot C \cdot l$ where:

A is a dimensionless number

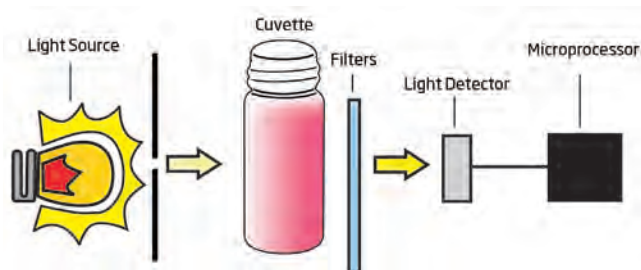
ϵ_{λ} the proportionality constant, is called the molar extinction coefficient or molar absorptivity; it is a constant for a given substance, provided the temperature and wavelength are constant [$L/(\text{mol} \cdot \text{cm})$]

C concentration of the substance (mol/liter)

l optical distance light travels through sample (cm)

Therefore, the concentration (**C**) can be calculated from the absorbance of the substance determined by the emitted radiation (**I**), as the other factors are known.

A typical block diagram of a photometer is shown below:



Sources of light used by Hanna colorimeters:

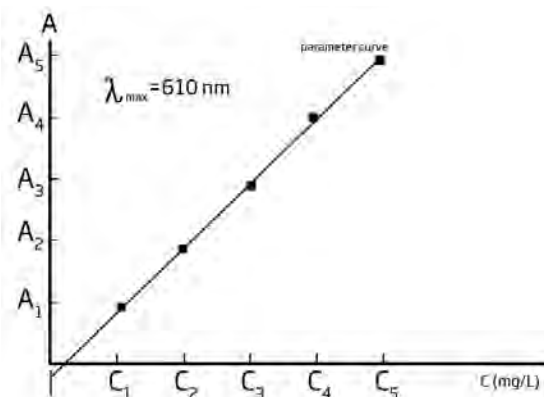
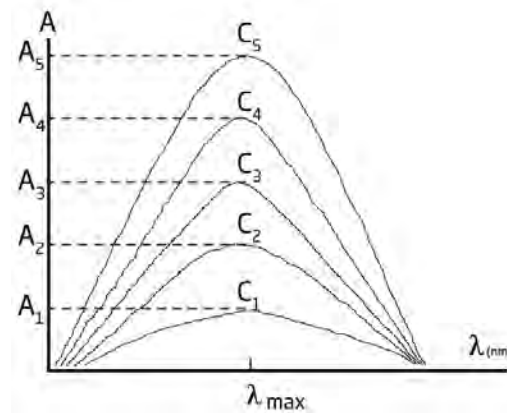
Tungsten lamp an incandescent lamp having a tungsten filament

LED light emitting diode

The optical distance is measured by the dimension of the cuvette containing the sample. The photoelectric cell collects the radiation (**I**) emitted by the sample and converts it into an electric current, producing a potential in the mV range. The microprocessor uses this potential to convert the incoming value into the desired measuring unit and display it on the LCD.

In fact, the preparation of the solution to be measured occurs under known conditions, which are programmed into the meters microprocessor in the form of a calibration curve. This curve is used as a reference for each measurement. It is then possible to determine unknown concentrations of a sample by using a colorimetric reaction and the mV signal separated by a sensor in relation to the emitted intensity (**I**) (the color of the sample). By employing the calibration curve, one can determine the concentration of the sample that corresponds to the mV value.

Supposing that for one chemical substance there is a maximum absorbance at 610 nm. With the following graphs, you have one example of how the colorimeters are working to determine concentration:



One example of an early colorimetric analysis is Nessler's method for ammonia, which was first proposed in 1856. Nessler found that adding an alkaline solution of HgI₂ and KI to a dilute solution of ammonia produced a yellow to reddish brown colloid with the color intensity proportional to the concentration of ammonia present. A comparison of the samples color for a series of standards was used to determine the concentration of ammonia. Equal volumes of the sample and standards were transferred to a set of tubes with flat bottoms. The tubes were placed in a rack equipped at the bottom with a reflecting surface, allowing light to pass through the solution. The colors of the samples and standards were compared by looking down through the solutions. A modified form of this method is used for the analysis of ammonia in water and wastewater.





HI97000 Series

Advanced Waterproof Portable Photometers

These portable photometers are designed with an innovative optical system that offers superior performance in accuracy, repeatability, and the amount of time that it takes to do a measurement.

These waterproof meters are exceptionally user friendly with a tutorial mode that walks the user graphically, step by step, in performing a measurement. The use of a backlit dot matrix LED allows the use of virtual keys making operation of the meter very intuitive.

[See page 10.42](#)



iris

Spectrophotometer

with split beam optical system, customizable methods and rechargeable battery

iris portable spectrophotometer is unlike any of the products we have created in the past. It is different from our photometers as it allows for measurement in the spectrum of all wavelengths of visible light and not just pre-specified wavelengths. Spectrophotometers work by isolating light at specific wavelengths from white light. This compact meter incorporates a number of features that facilitate both fantastic performance and exceptional usability.

[See page 10.9](#)

Multiparameter Benchtop Photometers Comparison Guide

Parameter	HI83300 Laboratory	HI83303 Aquaculture	HI83305 Boilers/Cooling Towers	HI83306 Environmental Analysis	HI83308 Water Conditioning	HI83325 Nutrient Analysis	HI83326 Pools and Spas
Alkalinity	•	•					•
Alkalinity, Marine	•	•					
Aluminum	•		•				
Ammonia Low Range	•	•	•	•	•	•	
Ammonia Medium Range	•	•	•	•	•	•	
Ammonia High Range	•	•	•	•	•	•	
Bromine	•		•				•
Calcium	•	•				•	
Calcium, Marine	•	•					
Chloride	•						
Chlorine Dioxide	•		•				•
Chlorine Dioxide, Rapid Method	•		•				•
Chlorine, Free	•	•	•	•	•		•
Chlorine, Free Ultra Low Range	•						
Chlorine, Total	•	•	•	•	•		•
Chlorine, Total Ultra Low Range	•						
Chlorine, Total Ultra High Range	•						
Chromium(VI) Low Range	•		•	•			
Chromium(VI) High Range	•		•	•			
Color of Water	•			•			
Copper Low Range	•	•	•	•	•		
Copper High Range	•	•	•	•	•		•
Cyanuric Acid	•			•			•
Fluoride Low Range	•				•		
Fluoride High Range	•						
Hardness, Calcium	•						•
Hardness, Magnesium	•						
Hardness, Total Low Range	•						
Hardness, Total Medium Range	•						
Hardness, Total High Range	•						
Hydrazine	•		•				
Iodine	•						
Iron Low Range	•		•		•		
Iron High Range	•		•		•		•
Iron (II) (Ferrous)	•		•				
Iron (II & III) (Ferrous and Ferric)	•					•	
Magnesium	•					•	
Manganese Low Range	•				•		
Manganese High Range	•				•		
Molybdenum	•		•	•	•		
Nickel Low Range	•			•	•		
Nickel High Range	•			•	•		
Nitrate	•	•	•	•	•	•	•
Nitrite Ultra Low Range, Marine	•	•					
Nitrite Low Range	•	•	•				
Nitrite High Range	•	•	•	•			
Oxygen, Dissolved	•	•	•	•	•		
Oxygen Scavengers (as Carbohydrazide)	•		•				

Parameter	HI83300 Laboratory	HI83303 Aquaculture	HI83305 Boilers/Cooling Towers	HI83306 Environmental Analysis	HI83308 Water Conditioning	HI83325 Nutrient Analysis	HI83326 Pools and Spas
Oxygen Scavengers (as DEHA)	•		•				
Oxygen Scavengers (as Hydroquinone)	•		•				
Oxygen Scavengers (as Iso-ascorbic acid)	•		•				
Ozone	•						•
pH	•	•	•	•	•		•
Phosphate Ultra Low Range, Marine	•	•					
Phosphate Low Range	•	•	•	•	•		•
Phosphate High Range	•	•	•	•	•	•	
Potassium	•					•	
Silica Low Range	•		•	•	•		
Silica High Range	•		•				
Silver	•			•	•		
Sulfate	•					•	
Surfactants, Anionic	•						
Zinc	•		•	•	•		
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Single Parameter Portable Photometers Guide

Parameter	Meter	Page	Parameter	Meter	Page	Parameter	Meter	Page
Aluminum	HI97712 HI96712	10.47 10.101	Cyanide	HI97714 HI96714	10.61 10.102	Nickel LR	HI97740 HI96740	10.71 10.103
Ammonia HR	HI97733 HI96733	10.49 10.101	Cyanuric Acid	HI97722 HI96722	10.62 10.102	Nitrate, as Nitrogen	HI97728 HI96728	10.72 10.103
Ammonia MR	HI97715 HI96715	10.48 10.101	Fluoride HR	HI97739 HI96739	10.63 10.102	Nitrate	HI96786	10.103
Ammonia LR	HI97700 HI96700	10.48 10.101	Fluoride LR	HI97729 HI96729	10.63 10.102	Nitrite HR	HI97708 HI96708	10.73 10.103
Anionic Surfactants	HI97769 HI96769	10.50 10.101	Hardness, Ca	HI97720 HI96720	10.64 10.102	Nitrite LR	HI97707 HI96707	10.73 10.103
Bromine	HI97716 HI96716	10.51 10.101	Hardness, Mg	HI97719 HI96719	10.64 10.102	Oxygen, Dissolved	HI97732 HI96732	10.74 10.103
Chloride	HI97753 HI96753	10.52 10.101	Hardness, EPA	HI97735 HI96735	10.65 10.102	Phosphate HR	HI97717 HI96717	10.75 10.103
Chlorine Dioxide	HI97738 HI96738	10.53 10.101	Honey Color	HI96785	10.102	Phosphate LR	HI97713 HI96713	10.75 10.103
Chlorine Dioxide (Rapid)	HI97779	10.54	Hydrazine	HI97704 HI96704	10.66 10.102	Phosphorus	HI97706 HI96706	10.76 10.104
Chlorine, Free ULR	HI97762 HI96762	10.55 10.101	Iodine	HI97718 HI96718	10.67 10.102	Potassium	HI97750 HI96750	10.77 10.104
Chlorine, Free	HI97701 HI96701	10.56 10.101	Iron LR	HI97746 HI96746	10.68 10.102	Silica HR	HI97770 HI96770	10.104
Chlorine, Total ULR	HI97761 HI96761	10.57 10.101	Iron HR	HI97721 HI96721	10.68 10.103	Silica LR	HI97705 HI96705	10.104
Chromium VI HR	HI97723 HI96723	10.58 10.101	Manganese HR	HI97709 HI96709	10.69 10.103	Silver	HI97737 HI96737	10.79 10.104
Chromium VI LR	HI97749 HI96749	10.58 10.101	Manganese LR	HI97748 HI96748	10.69 10.103	Sulfate	HI97751 HI96751	10.80 10.104
Color of Water	HI97727 HI96727	10.59 10.101	Maple Syrup	HI96759	10.103	Zinc	HI97731 HI96731	10.81 10.104
Copper LR	HI97747 HI96747	10.60 10.102	Molybdenum	HI97730 HI96730	10.70 10.103			
Copper HR	HI97702 HI96702	10.60 10.102	Nickel HR	HI97726 HI96726	10.71 10.103			

Multiparameter Portable Photometers Comparison Guides

HI97000 Series	HI97101	HI97104	HI97725	HI97771	HI97736	HI97710	HI97711	HI97734	HI97741	HI97742	HI97752	HI97745
Alkalinity		•										
Bromine	•											
Calcium HR											•	
Chlorine, Free	•	•	•			•	•					•
Chlorine, Free HR								•				
Chlorine, Free UHR				•								
Chlorine, Total	•	•	•			•	•					•
Chlorine, Total HR								•				
Chlorine, Total UHR				•								
Cyanuric Acid	•	•	•									
Hardness, Ca									•			
Hardness, Mg									•			
Hardness, Total					•				•			•
Iodine	•											
Iron LR	•								•	•		•
Magnesium HR											•	
Manganese LR										•		
pH	•	•	•		•	•						•
Page	10.82	10.84	10.86	10.88	10.89	10.90	10.92	10.93	10.94	10.96	10.97	10.98

HI96000 Series	HI96101	HI96104	HI96710	HI96711	HI96724	HI96725	HI96734	HI96736	HI96741	HI96742	HI96745	HI96752	HI96771
Alkalinity													
Bromine	•												
Calcium HR												•	
Chlorine, Free	•	•	•	•	•	•					•		•
Chlorine, Free HR							•						
Chlorine, Free UHR													•
Chlorine, Total	•	•	•	•	•	•					•		
Chlorine, Total HR							•						
Chlorine, Total UHR													
Cyanuric Acid	•	•				•							
Hardness, Ca								•	•		•		
Hardness, Mg								•	•		•		
Hardness, Total								•	•		•		
Iodine	•												
Iron LR	•								•	•	•		
Magnesium HR												•	
Manganese LR										•			
pH	•	•	•			•		•			•		
Page	10.104	10.104	10.105	10.105	10.105	10.105	10.105	10.105	10.106	10.106	10.106	10.106	10.105

Wine and Olive Oil Measurement Photometers

Concentration of Reducing Sugars in Wine	HI83746	10.110
Tartaric Acid in Wine	HI83748	10.112
Peroxide in Olive Oils	HI83730	10.114

The logo for 'iris' is displayed in a multi-colored font, with each letter having a different color: 'i' is red, 'r' is yellow, 'i' is green, 's' is blue, and 's' is purple.

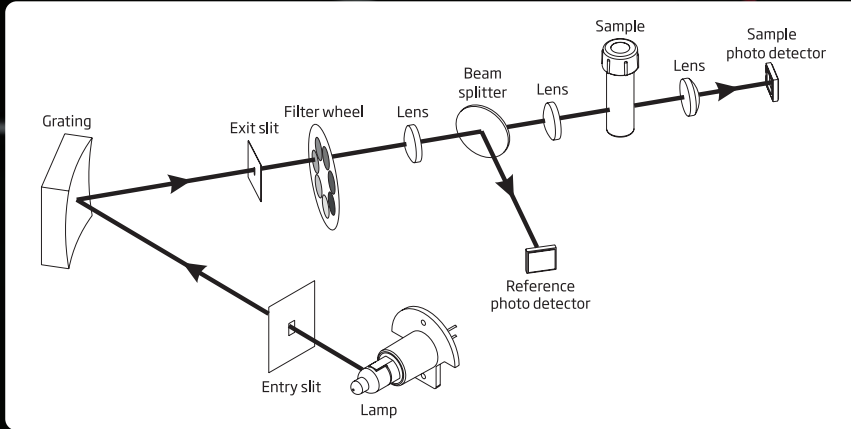
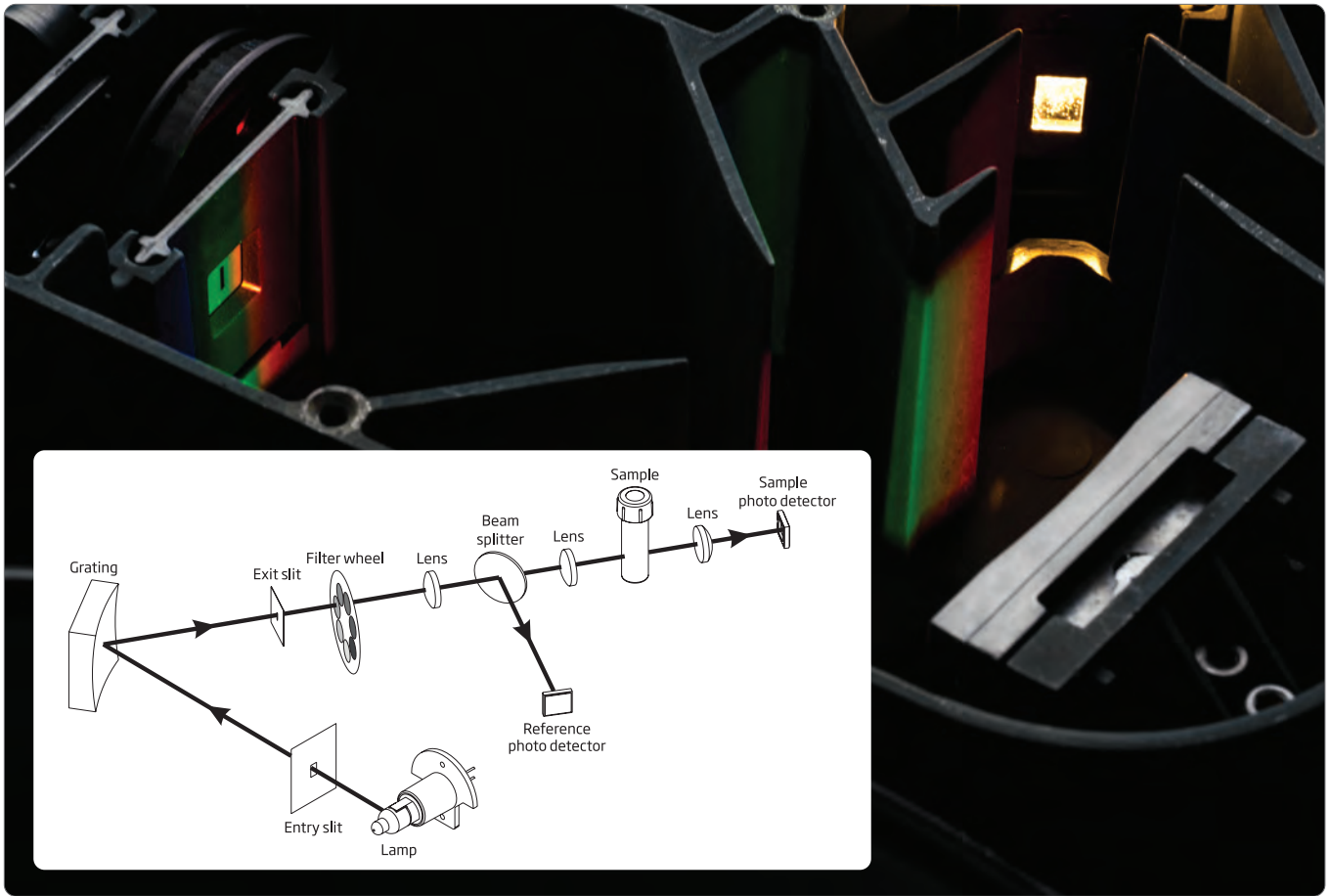
Spectrophotometer

with split beam optical system, customizable methods and rechargeable battery

iris portable spectrophotometer is unlike any of the products we have created in the past. It is different from our photometers as it allows for measurement in the spectrum of all wavelengths of visible light and not just pre-specified wavelengths. Spectrophotometers work by isolating light at specific wavelengths from white light. This compact meter incorporates a number of features that facilitate both fantastic performance and exceptional usability.

- Advanced split beam optical system
- Rechargeable li-ion battery
- User customizable methods





Advanced Split-beam Optical System

In a spectrophotometer the optical system is the heart of the instrument. Ensuring that the optical system is built with the best design and highest quality materials will guarantee accurate readings and a long life for the meter. When developing this meter our research and development team paid special attention to details and combined many small improvements to a typical spectrophotometer design to create a portable meter with unprecedented performance.



Replaceable Tungsten-Halogen Lamp

To be able to measure in a wide variety of wavelengths a broadband light source is necessary. In the iris spectrophotometer this is accomplished by a tungsten-halogen lamp. As these lamps do not last indefinitely, it is necessary to change them throughout the life of the meter. The pre-alignment of the lighting fixture guarantees that the bulb is in the same position every time it is changed. This generates peace of mind as there is no need to worry about realigning the light source.



Beam splitter

The beam splitter is added to the optical system for use with a reference detector to ensure that the measurement compensates for any drift in the light source. It works by splitting the light emitted by the tungsten lamp into two beams and sending one beam of light to the reference detector that measures intensity. If there are any fluctuations in the light source the meter detects this and compensates through a mathematical calculation. The reference detector also saves battery life and leads to improved speed of the meter as the lamp doesn't have to warm up prior to use.





Concave grating

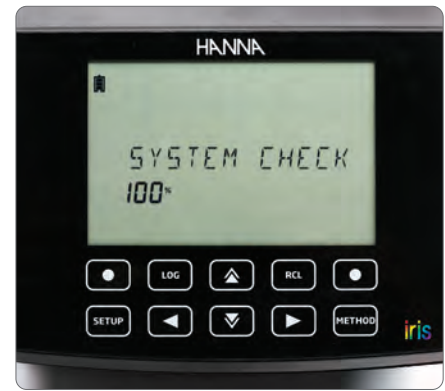
This element of the optical system is what generates the spectrum of light. When the light from the tungsten lamp hits the grating it is met with interference coatings that turn the polychromatic white light into a rainbow. This rainbow contains dispersed light at all wavelengths in the visible spectrum. The rotation of this grating is what allows for a specific wavelength to be selected. This ability is one of the biggest differences between a spectrophotometer and a photometer. The concave grating which accomplishes this is superior to other types of diffraction, such as prisms, as it minimizes stray light generated and has constant bandwidth. It also combines elements of the optical system that would typically be separate, for example if a flat grating was used a concave mirror would need to be added in order to refocus the light. The combination of these two pieces creates greater efficiency and a smaller optical system to yield a more compact portable meter.

Narrow Bandwidth and High Resolution

Having a small bandwidth is necessary to accurately measure narrow peaks. The iris spectrophotometer maintains a narrow bandwidth of 5 nm resulting in good spectral resolution. This leads to accurate measurement of sharp, narrow absorbance peaks. Additionally, the high resolution of 1 nm generates greater sensitivity as the wavelength is closer to where the sample absorbs the most light.

Low stray light

A common problem in spectrophotometers is stray light. Stray light can be light which is outside the wavelength the meter is measuring or also light at the proper wavelength but from outside the meter. This leads to inaccurate readings as this light would not be absorbed by the sample but would still be detected by the meter. This is a problem that is typically hard to control. Due to the design of the optical system we are able to keep this potential issue to a minimum to improve the linearity and accuracy of readings.



System Check

Upon turning on the meter a performance check occurs to confirm that the light source is working properly and to calibrate the position of the grating. The grating calibration works by scanning for the "zero order" light reflecting off the grating. If any mechanical problems are present, the meter will display an alert. This feature establishes confidence in measurements knowing that the meter is always working properly without needing to run any additional tests.



Universal Cuvette Holder and Auto-Recognition

The cuvette holder built into the meter holds both 22 mm round cuvettes and rectangular cuvettes with a 5 cm path length. Adapters for the cuvette holder are available to hold other 13 and 16 mm round cuvettes, and 10 mm square cuvettes. Rectangular cuvettes have longer path lengths which result in higher sensitivity in readings of low absorbance samples. Additionally, the meter permits the selection of the size of the cuvette used in custom user methods from the available sizes. For all methods, the programmed cuvette size is displayed on the screen to ensure the correct cuvette size is used, ensuring that the proper path length is being used by the meter when calculating measurements.



Customized Methods

- Step-By-Step Method Creation
- Up to 10 calibration points
- Flexible calculations for multi wavelength methods

Creating a customized method is easy and intuitive. The HI801 guides you step-by-step through the process of creating your own custom method. The intuitive user interface will guide you through naming your method, setting the measurement wavelengths, creating reaction timers, and calibrating the method. Up to 10 points can be used to calibrate methods.

User Interface

No one likes to work with difficult equipment, which is why we have worked hard to create an interface that makes the meter's operation seamless. The intuitive menu design and large LCD screen all make working with the meter a breeze. Get ready for your new favorite piece of lab equipment.

Favorite Methods

Always have your most frequently used methods readily available with the favorite methods feature. Directly from the home screen is access to user-programmed favorite methods, saving time.

Large High Contrast Custom LCD display

With a 6" display, the screen is large and easy to read. The high contrast makes every character on the display stand out even during outdoor use. The wide viewing angle allows for measurements to be seen from far away, so while working around the lab it is not necessary to hover over the meter to see the measurements.

Capacitive touchpad

Maneuvering the menus and using the meter is effortless with the capacitive touchpad. Featuring dedicated buttons specifically for setup, logging data, recalling data, and methods allows for quick and easy access to these functions. There is a key beep feature that can be enabled or disabled, for audible feedback that the key was pressed. Additionally, the meter also still recognizes key touches even through gloves.



General Features

When choosing a piece of equipment making sure the product has all required features for the intended purposes is critical. When building the iris we included as many features as we could to aid in making this meter exceedingly versatile and convenient. From bare necessities such as long battery life and easy data logging and transfer, we have pushed the limits on seemingly basic features to make your life as easy as possible.



Spectral range

The meter features a spectral range of 340nm to 900nm allowing for a wide selection of analytical methods. The flexibility of this range permits compliance with many methods from regulatory organizations and associations for a variety of applications.



Pre-programmed Methods

Programmed in the meter are more than 80 commonly used methods for chemical analysis. Methods can easily be updated by transferring the file from a computer to the meter or by a flash drive. Up to 150 factory methods can be saved in the meter and some chemical parameters have the option to switch between different chemical forms. Finding the product codes to order additional reagents is easy as the meter provides the appropriate reagent codes for each programmed method.



User methods

The ability to program up to 100 personal methods into the meter creates both versatility and customization. Methods can include up to 10 calibration points, 5 different wavelengths (which can be used simultaneously), and permits the use of 5 reaction timers. These features allow for many variations to be implemented into methods. Compared to a photometer there is no longer a limitation by factory methods. If a certain parameter is not offered or a modification to a pre-programmed method is required, the meter can be customized to suit your needs.



Battery operated

The meter features a rechargeable lithium ion battery that lasts for approximately 3,000 measurements. Lasting well over a day of use in the field there is no need to worry about the battery life while out working without a power supply. The meter can be quickly recharged with a dedicated fast charging adapter.



Data Logging and Transfer

Transferring data from a meter should always be simple and straightforward. Impressively the meter can store up to 9999 measurements in the memory. At any time data can be transferred to a PC or Mac as either a CSV or PDF file. No software is required, simply plug in a flash drive or plug it into a computer and export the data. The ability to save data as a PDF ensures higher integrity of the data as it cannot be easily changed. Additionally, a meter ID and a sample ID can be programmed to be saved along with logged measurements. With technical equipment wide-spread connection compatibility can often be an issue, which is why the iris features USB ports for both flash drive and a direct computer connection. Connectivity with a USB-A port to a flash drive can be used to transfer logged measurements from the meter and also to transfer method updates onto the meter. The USB-B port is used for a direct connection to a computer specifically for transferring logged data.



Cuvette Adapters



General Specifications

HI801 iris

Wavelength Range	340-900 nm
Wavelength Resolution	1 nm
Wavelength Accuracy	±1.5 nm
Photometric Range	0.000-3.000 Abs
Photometric Accuracy	5 mAbs at 0.000-0.500 Abs; 1% at 0.500-3.000 Abs
Measurement Mode	transmittance (%), absorbance and concentration
Sample Cell	10 mm square, 50 mm rectangular, 16 mm round, 22 mm round, 13 mm round (vial)
Wavelength Selection	automatic, based on the selected method (editable for user methods only)
Light Source	tungsten halogen lamp
Optical System	split beam
Wavelength Calibration	internal, automatic at power-on with visual feedback
Stray Light	<0.1 % T at 340 nm with NaNO ₂
Spectral Bandwidth	5 nm
Number of Methods	150 Factory / 100 User
Data Points Stored	9999 measured values
Export Capability	csv file format, pdf file format
Connectivity	1x USB A (mass storage host); 1x USB B (mass storage device)
Battery Life	3000 measurements or 8 hours
Power Supply	15 VDC power adapter; 10.8 VDC Li-Ion rechargeable battery
Environment	0 to 50 °C (32 to 122 °F); 0 to 95% RH
Dimensions	155 x 205 x 322 mm (6.1 x 8.0 x 12.6")
Weight	3 kg (6.6 lbs.)
Ordering Information	HI801-01 (115V) and HI801-02 (230V) is supplied with sample cuvettes and caps (22 mm, 4 pcs.), cuvette adapters (3), cloth for wiping cuvettes, scissors, USB cable, USB flash drive, 15 VDC power adapter, instruction manual and instrument quality certificate.
Accessories	HI7408011 replacement 16mm vial adapter
	HI7408012 replacement 10mm vial adapter
	HI7408013 replacement 13mm vial adapter
	HI7408014 replacement Tungsten-Halogen lamp
	HI7408015 replacement battery

HI801 iris Parameter Specifications

Parameter	Range	Accuracy (@25°C)	Method	λ (nm)	Reagent Code	Cuvette
Alkalinity	0-500 mg/L CaCO ₃	±5 mg/L ±5% of reading	Bromocresol green	610	HI775-26	R-22
Alkalinity, Marine	0-300 mg/L CaCO ₃	±5 mg/L ±5% of reading	Bromocresol green	610	HI755-26	R-22
Aluminum	0.00-1.00 mg/L Al ³⁺	±0.04 mg/L ±4% of reading	Aluminon	530	HI93712-01	R-22
Ammonia LR	0.00-3.00 mg/L NH ₃ -N	±0.04 mg/L ±4% of reading	Nessler	425	HI93700-01	R-16
Ammonia LR	0.00-3.00 mg/L NH ₃ -N	±0.10 mg/L or 5% of reading	Nessler	425	HI93764A-25	R-13
Ammonia MR	0.00-10.00 mg/L NH ₃ -N	±0.05 mg/L ±5% of reading	Nessler	425	HI93715-01	R-16
Ammonia HR	0.0-100 mg/L NH ₄ ⁺	±0.5 mg/L ±5% of reading	Nessler	425	HI93733-01	R-16
Ammonia HR	0.0-100 mg/L NH ₃ -N	±1 mg/L or 5% of reading	Nessler	430	HI93764B-25	R-13
Bromine	0.00-10.00 mg/L (mg/L)	±0.08 mg/L ±3% of reading	DPD	525	HI93716-01	R-22
Calcium	0-400 mg/L Ca ²⁺	±10 mg/L ±5% of reading	Oxalate	466	HI937521-01	R-22
Calcium, Marine	200-600 mg/L Ca ²⁺	±5% of reading	Zincon	610	HI758-26	R-16
Chloride	0.0-20.0 mg/L Cl ⁻	±0.5 mg/L ±5% of reading	Mercury thiocyanate	455	HI93753-01	R-22
Chlorine Dioxide	0.00-2.00 mg/L ClO ₂	±0.10 mg/L ±5% of reading	Chlorophenol Red	575	HI93738-01	R-22
Chlorine Dioxide, Rapid	0.00-2.00 mg/L ClO ₂	±0.10 mg/L ±5% of reading	DPD-Glycine	525	HI96779-01	R-22
Chlorine Free ULR	0.000-0.500 mg/L Cl ₂	±0.020 mg/L ±3% of reading	DPD	525	HI95762-01	R-22
Chlorine, Free LR (powder reagent)	0.00-5.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93701-01	R-22
Chlorine, Free LR (liquid reagent)	0.00-5.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93701-F	R-22
Chlorine, Free HR	0.00-10.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93734-01	R-22
Chlorine, Total ULR	0.000-0.500 mg/L Cl ₂	±0.020 mg/L ±3% of reading	DPD	525	HI95761-01	R-22
Chlorine, Total LR (powder reagent)	0.00-5.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93711-01	R-22
Chlorine, Total LR (liquid reagent)	0.00-5.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93701-T	R-22
Chlorine, Total HR	0.00-10.00 mg/L Cl ₂	±0.03 mg/L ±3% of reading	DPD	525	HI93734-01	R-22
Chlorine UHR	0-500 mg/L Cl ₂	±3 mg/L ±3% of reading	DPD	525	HI95771-01	R-22
Chromium(VI) LR	0-300 µg/L Cr ⁶⁺	±10 µg/L ±4% of reading	Diphenylcarbohydrazide	535	HI93749-01	R-22
Chromium(VI) HR	0-1000 µg/L Cr ⁶⁺	±5 µg/L ±4% of reading	Diphenylcarbohydrazide	535	HI93723-01	R-22
Chromium, Total and VI (16 mm vial)	0 - 1000 µg/L (as Cr)	±10 µg/L ±3% of reading	Diphenylcarbohydrazide	525	HI96781-25	R-13
COD LR EPA	0-150 mg/L O ₂	±5 mg/L or 4% of reading	Dichromate EPA	420	HI93754A-25	R-13
COD LR Hg free	0-150 mg/L O ₂	±5 mg/L or 4% of reading	Dichromate Mercury Free	420	HI93754D-25	R-13
COD LR ISO	0-150 mg/L O ₂	±5 mg/L or 4% of reading	Dichromate ISO	420	HI93754F-25	R-13
COD MR EPA	0-1500 mg/L O ₂	±15 mg/L or 3% of reading	Dichromate EPA	610	HI93754B-25	R-13
COD MR Hg free	0-1500 mg/L O ₂	±15 mg/L or 3% of reading	Dichromate Mercury Free	610	HI93754E-25	R-13
COD MR ISO	0-1500 mg/L O ₂	±15 mg/L or 3% of reading	Dichromate ISO	610	HI93754G-25	R-13
COD HR EPA	0-15000 mg/L O ₂	±150 mg/L or 2% of reading	Dichromate EPA	610	HI93754C-25	R-13
COD UHR	0.0 to 60.0 g/L (as O ₂)	±0.5 mg/L ±3% of reading	Dichromate	610	HI93754I-25	R-13
Color of Water	0-500 PCU	±10 PCU ±5% of reading	Platinum Cobalt	460		R-22
Copper LR	0-1500 µg/L Cu ²⁺	±10 µg/L ±5% of reading	Bicinchoninate	575	HI95747-01	R-22
Copper HR	0.00-5.00 mg/L Cu ²⁺	±0.02 mg/L or 4% of reading	Bicinchoninate	560	HI93702-01	R-22
Cyanide	0.000-0.200 mg/L CN ⁻	±0.005 mg/L ±3% of reading	Pyridine-Pyrazalone	610	HI93714-01	R-22
Cyanuric Acid	0-100 mg/L CYA	±1 mg/L ±15% of reading	Turbidimetric	525	HI93722-01	R-22
Fluoride LR	0.00-2.00 mg/L F ⁻	±0.03 mg/L ±3% of reading	SPADNS	575	HI93729-01	R-22
Fluoride HR	0.0-20.0 mg/L F ⁻	±0.5 mg/L ±3% of reading	SPADNS	575	HI93739-01	R-22
Hardness Calcium	0.00-2.70 mg/L CaCO ₃	±0.08 mg/L ±4% of reading	Calmagite	523	HI93720-01	R-22
Hardness Magnesium	0.00-2.00 mg/L CaCO ₃	±0.11 mg/L ±5% of reading	EDTA	523	HI93719-01	R-22
Hardness Total LR	0-250 mg/L CaCO ₃	±5 mg/L ±4% of reading	Calmagite	466	HI93735-00	R-22
Hardness Total MR	200-500 mg/L CaCO ₃	±7 mg/L ±3% of reading	Calmagite	466	HI93735-01	R-22
Hardness Total HR	400-750 mg/L CaCO ₃	±10 mg/L ±2% of reading	Calmagite	466	HI93735-02	R-22
Hydrazine	0-400 µg/L N ₂ H ₄	±3 µg/L ±3% of reading	Dimethyl-aminobenzaldehyde	466	HI93704-01	R-22
Iodine	0.0-12.5 mg/L I ₂	±0.1 mg/L ±5% of reading	DPD	525	HI93718-01	R-22

Parameter	Range	Accuracy (@25°C)	Method	λ (nm)	Reagent Code	Cuvette
Iron LR	0.00-1.60 mg/L Fe	±0.01 mg/L ±8% of reading	TPTZ	575	HI93746-01	R-22
Iron HR	0.00-5.00 mg/L Fe	±0.04 mg/L ±2% of reading	Phenanthroline	525	HI93721-01	R-22
Iron (II) (ferrous)	0.00 - 6.00 mg/L Fe ²⁺	±0.10 mg/L ±2% of reading	Phenanthroline	525	HI96776-01	R-22
Iron, Total	0.00 - 7.00 mg/L Fe	±0.20 mg/L ±3% of reading	Phenanthroline	525	HI96778-25	R-13
Magnesium	0-150 mg/L Mg ²⁺	±5 mg/L ±3% of reading	Calmagite	466	HI937520-01	R-22
Manganese LR	0-300 µg/L Mn	±7 µg/L ±3% of reading	PAN	560	HI93748-01	R-22
Manganese HR	0.0-20.0 mg/L Mn	±0.2 mg/L ±3% of reading	Periodate	525	HI93709-01	R-22
Maple Syrup	0.0-100.0%T	±3% @75 %T	Direct measure	560	HI93703-57	S-10
Molybdenum	0.0-40.0 mg/L Mo ⁶⁺	±0.3 mg/L ±5% of reading	Mercaptoacetic acid	420	HI93730-01	R-22
Nickel LR	0.000-1.000 mg/L Ni	±0.010 mg/L ±7% of reading	PAN	565	HI93740-01	R-16
Nickel HR	0.00-7.00 ppt Ni	±0.07 ppt ±4% of reading	Photometric	575	HI93726-01	R-22
Nitrate	0.0-30.0 mg/L N-NO ₃	±0.5 mg/L ±10% of reading	Cadmium reduction	525	HI93728-01	R-22
Nitrate (Chromotropic acid)	0.0-30.0 mg/L N-NO ₃	±1.0 mg/L ±3% of reading	Chromotropic acid	410	HI93766-50	R-13
Nitrite Marine ULR	0-200 µg/L N-NO ₂	±8 µg/L ±4% of reading	Diazotization	480	HI764-25	R-22
Nitrite LR	0-600 µg/L N-NO ₂	±20 µg/L ±4% of reading	Diazotization	480	HI93707-01	R-22
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ -N)	±10 µg/L ±3% of reading	Diazotization	525	HI96783-25	R-13
Nitrite MR	0.00 to 6.00 mg/L (as NO ₂ ⁻ -N)	±0.10 mg/L ±3% of reading	Diazotization	525	HI96784-25	R-13
Nitrite HR	0-150 mg/L N-NO ₂	±4 mg/L ±4% of reading	Ferrous sulfate	575	HI93708-01	R-22
Nitrogen Total LR	0.0-25.0 mg/L N	±1 mg/L or 5% of reading	Chromotropic acid	420	HI93767A-50	R-13
Nitrogen Total HR	10-150 mg/L N	±3 mg/L or 4% of reading	Chromotropic acid	420	HI93767B-50	R-13
Oxygen Dissolved	0.0-10.0 mg/L O ₂	±0.4 mg/L ±3% of reading	Winkler	466	HI93732-01	R-22
Oxygen Scavengers (Carbohydrazide)	0.00-1.50 mg/L	±0.02 mg/L ±3% of reading	Iron reduction	575	HI96773-01	R-22
Oxygen Scavengers (DEHA)	0-1000 µg/L	±5 µg/L ±5% of reading	Iron reduction	575	HI96773-01	R-22
Oxygen Scavengers (ISO-Ascorbic Acid)	0.00-4.50 mg/L	±0.03 mg/L ±3% of reading	Iron reduction	575	HI96773-01	R-22
Oxygen Scavengers (Hydroquinone)	0.00-2.50 mg/L	±0.04 mg/L ±3% of reading	Iron reduction	575	HI96773-01	R-22
Ozone	0.00-2.00 mg/L O ₃	±0.02 mg/L ±3% of reading	DPD	525	HI93757-01	R-22
pH	6.5-8.5 pH	±0.1 pH	Phenol red	525	HI93710-01	R-22
Phosphorus Marine ULR	0-200 µg/L P	±5 µg/L ±5% of reading	Ascorbic acid	610	HI736-25	R-22
Phosphate LR	0.00-2.50 mg/L PO ₄ ³⁻	±0.04 mg/L ±4% of reading	Ascorbic Acid	610	HI93713-01	R-22
Phosphate HR	0.0-30.0 mg/L PO ₄ ³⁻	±1 mg/L ±4% of reading	Amino Acid	525	HI93717-01	R-22
Phosphorus Acid Hydrolyzable	0.00-1.60 mg/L P	±0.05 mg/L or 5% of reading	Ascorbic acid	610	HI93758B-50	R-13
Phosphorus, Reactive LR	0.00-1.60 mg/L P	±0.05 mg/L or 4% of reading	Ascorbic acid	610	HI93758A-50	R-13
Phosphorus, Reactive HR	0.0-32.6 mg/L P	±0.5 mg/L or 4% of reading	Vanadomolybdo-phosphoric acid	420	HI93763A-50	R-13
Phosphorus, Total LR	0.00-1.60 mg/L P	±0.05 mg/L or 5% of reading	Adenosine 5'-monophosphate monohidrat	610	HI93758C-50	R-13
Phosphorus, Total HR	0.0-32.6 mg/L P	±0.5 mg/L or 5% of reading	Adenosine 5'-monophosphate monohidrat	420	HI93763B-50	R-13
Potassium LR	0.0-20.0 mg/L K	2 mg/L ±7% of reading	Turbidimetric tetraphenylborate	466	HI93750-01	R-22
Potassium MR	10-100 mg/L K	±10 mg/L ±7% of reading	Turbidimetric tetraphenylborate	466	HI93750-01	R-22
Potassium HR	20-200 mg/L K	±20 mg/L ±7% of reading	Turbidimetric tetraphenylborate	466	HI93750-01	R-22
Silica LR	0.00-2.00 mg/L SiO ₂	±0.03 mg/L ±5% of reading	Heteropoly Blue	610	HI93705-01	R-22
Silica HR	0-200 mg/L SiO ₂	±1 mg/L ±5% of reading	Molybdosilicate	466	HI96770-01	R-22
Silver	0.000-1.000 mg/L Ag	±0.02 mg/L ±5% of reading	PAN	570	HI93737-01	R-22
Sulfate	0-150 mg/L SO ₄ ²⁻	±5 mg/L ±3% of reading	Turbidimetric	466	HI93751-01	R-22
Surfactants Anionic	0.0-3.50 mg/L SDBS	±0.04 mg/L ±3% of reading	Methylene blue	610	HI95769-01	R-22
Surfactants Anionic	0.0-3.50 mg/L SDBS	±0.10 mg/L ±5% of reading	Methylene blue	610	HI96782-25	R-13
Surfactants Nonionic	0.0-6.00 mg/L TRITON X-100	±0.10 mg/L ±5% of reading	TBPE	610	HI96780-25	R-13
Zinc	0.00-3.00 mg/L Zn	±0.03 mg/L ±3% of reading	Zincon	620	HI93731-01	R-22

HI83300 Family

Multiparameter Photometers

with Digital pH Electrode Input

The HI83300 family of multiparameter photometers features seven models to cover a wide variety of applications. These meters are compact and versatile making them ideal for both benchtop or portable operation.

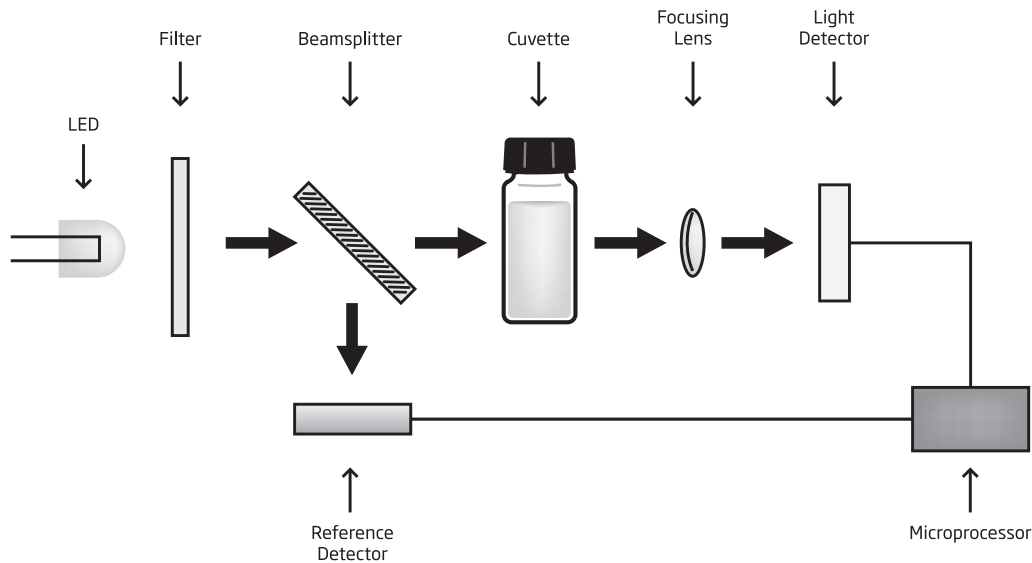
- **Advanced optical system**
 - Innovative optical design that utilizes a reference detector and focusing lens to eliminate errors from changes in the light source and from imperfections in the glass cuvette.
- **Up to 73 different programmed methods measuring 40 key water and wastewater quality parameters.**
- **Absorbance mode**
 - Absorbance measurement mode for performance verification and can also be used to plot a custom concentration versus absorbance curve useful for user-supplied chemistry and for teaching students about photometry.
- **High performance pH meter** that uses advanced digital pH/temperature electrodes.



Since 1978, Hanna has introduced instruments that tailor to the needs of a specific application or industry. From this philosophy we have created Application Designed Photometers to satisfy the needs of your specific application or industry.

Aquaculture	HI83303
Boilers & Cooling Towers	HI83305
Environmental Analysis	HI83306
Laboratory Analyses	HI83300
Nutrient Analyses	HI83225
Pool and Spa Applications	HI83326
Water Conditioning	HI83308





Improved Optical System

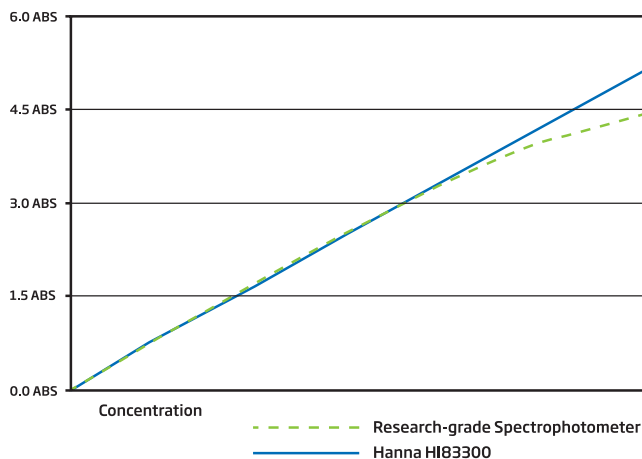
HI83300 family is designed with an innovative optical system that incorporates a beam splitter so that light can be used for absorbance readings and by the reference detector. The reference detector monitors the intensity of light and modulates when there is drift due to power fluctuation or the heating 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

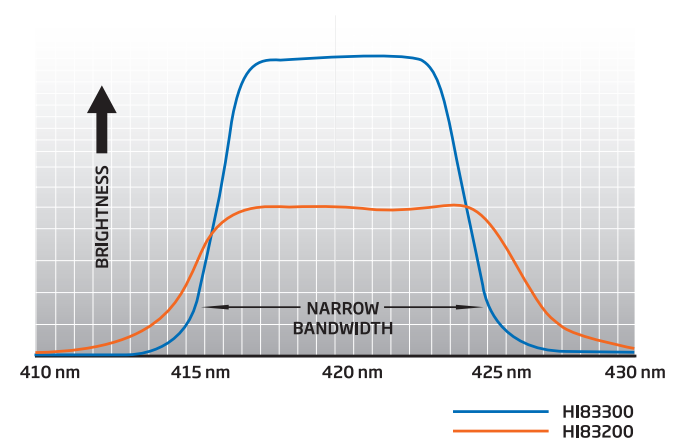
A beam splitter is used as part of the internal reference system of the HI83300 photometer. The reference detector compensates for any drift due to power fluctuations or ambient temperature changes. Now you can rely on a stable source of light.

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



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

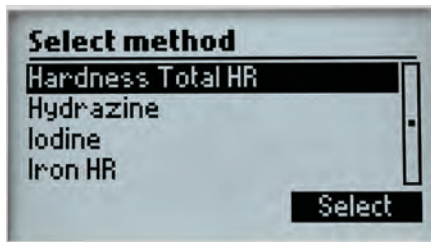
What makes the HI83300 family such versatile meters is their ability to be used as a portable or benchtop meter. Equipped with a rechargeable lithium ion battery, these meters can easily be brought on the production room floor or taken for measurements on the move. This long-

lasting battery lasts up to 500 photometer measurements or 50 hours of continuous pH measurements. To further preserve battery life, the auto-off feature automatically shuts off the meter after 15 minutes of inactivity. If being used on a benchtop, a power supply can 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 meters. 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

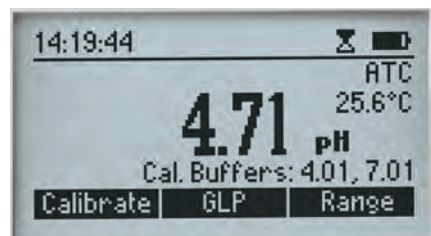
Users can access the menu of measurement methods with the simple press of a button. Low, medium, and high range methods of several parameters are available for users to obtain a high accuracy reading. Each method is assigned a concentration unit of measure. Parameters can be expressed in different chemical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



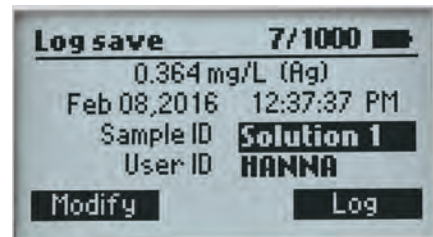
Absorbance Measurement Mode

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 HI83300 family 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

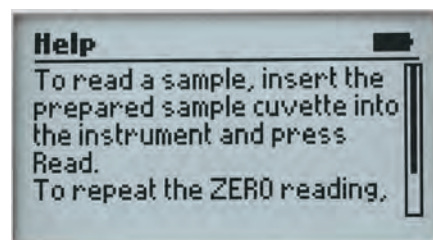
Two USB ports are provided for transferring data. One port allows the data to be transferred to a flash drive while the other USB is used for direct connection to a computer. All data is transferred as a .CSV file that can be used with many spreadsheet programs for documentation.

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.



General Specifications for all Models

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
	Number of Methods	128 max
pH	Range	-2.00 to 16.00 pH (±1000 mV)*
	Resolution	0.01 pH (0.1 mV)
	Temperature Compensation	Automatic (-5.0 to 100.0°C; 23.0 to 212.0°F)*
Temperature	Range	-20 to 120°C (-4.0 to 248.0 °F)
	Resolution	0.1 °C (0.1 °F)
Additional Specifications	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	3.7VDC 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.)

* Limits will be reduced to actual sensor limits



HI83300-100 sample preparation kit consisting of activated carbon for 50 tests, demineralizer for preparation of 10 L deionized water (100 g), 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)



HI740225 60 mL graduated syringe



HI740226 5 mL graduated syringe



HI76404A electrode holder for HI83300 family



HI731318 cuvette cleaning cloth (4)



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

HI83300

Multiparameter Photometer

with Digital pH Electrode Input for Laboratories

HI83300 is a compact, multiparameter photometer for use in the lab or in the field. The meter is one of the most advanced photometers available with an 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. This meter has 63 different programmed methods measuring 37 key water quality parameters and also offers an absorbance measurement mode for performance verification and for users that would like to develop their own concentration versus absorbance curves.

To save valuable laboratory benchtop space, the HI83300 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

• 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 the 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



HI83300-11

Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) with Narrow Band Interference Filter	Method	Reagent Code
Alkalinity	0 to 500 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	bromocresol green	HI775-26 25 tests
Alkalinity, Marine	0 to 300 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	bromocresol green	HI755-26 25 tests
Aluminum	0.00 to 1.00 mg/L (as Al ³⁺)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 525 nm	aluminon	HI93712-01 100 tests
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Bromine	0.00 to 8.00 mg/L (as Br ₂)	0.01 mg/L	±0.08 mg/L ±3% of reading	@ 525 nm	DPD	HI93716-01 100 tests
Calcium	0 to 400 mg/L (as Ca ²⁺)	1 mg/L	±10 mg/L ±5% of reading	@ 466 nm	oxalate	HI937521-01 50 tests
Calcium, Marine	200 to 600 mg/L (as Ca ²⁺)	1 mg/L	±6% of reading	@ 610 nm	zincon	HI758-26 25 tests
Chloride	0.0 to 20.0 mg/L (as Cl ⁻)	0.1 mg/L	±0.5 mg/L ±6% of reading	@ 466 nm	mercury (II) thiocyanate	HI93753-01 100 tests
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 575 nm	chlorophenol red	HI93738-01 100 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	@ 525 nm	DPD-Glycine	HI96779-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Free ULR	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading	@ 525 nm	DPD	HI95762-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Chlorine, Total ULR	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading	@ 525 nm	DPD	HI95761-01 100 tests
Chlorine, Total UHR	0 to 500 mg/L (as Cl ₂)	1 mg/L	±3 mg/L ±3% of reading	@ 525 nm	iodometric	HI95771-01 100 tests
Chromium(VI) LR	0 to 300 µg/L (as Cr ⁶⁺)	1 µg/L	±10 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93749-01 100 tests
Chromium(VI) HR	0 to 1000 µg/L (as Cr ⁶⁺)	1 µg/L	±5 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93723-01 100 tests
Color of Water	0 to 500 PCU (Platinum Cobalt Units)	1 PCU	±10 PCU ±5% of reading	@ 420 nm	colorimetric platinum cobalt	
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Cyanuric Acid	0 to 80 mg/L (as CYA)	1 mg/L	±1 mg/L ±15% of reading	@ 525 nm	turbidimetric	HI93722-01 100 tests
Fluoride LR	0.00 to 2.00 mg/L (as F ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	SPADNS	HI93729-01 100 tests
Fluoride HR	0.0 to 20.0 mg/L (as F ⁻)	0.1 mg/L	±0.5 mg/L ±3% of reading	@ 575 nm	SPADNS	HI93739-01 100 tests
Hardness, Calcium	0.00 to 2.70 mg/L (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading	@ 525 nm	calmagite	HI93720-01 100 tests
Hardness, Magnesium	0.00 to 2.00 mg/L (ppm) (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading	@ 525 nm	calmagite	HI93719-01 100 tests
Hardness, Total LR	0 to 250 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±4% of reading	@ 466 nm	calmagite	HI93735-00 100 tests
Hardness, Total MR	200 to 500 mg/L (as CaCO ₃)	1 mg/L	±7 mg/L ±3% of reading	@ 466 nm	calmagite	HI93735-01 100 tests
Hardness, Total HR	400 to 750 mg/L (as CaCO ₃)	1 mg/L	±10 mg/L ±2% of reading	@ 466 nm	calmagite	HI93735-02 100 tests
Hydrazine	0 to 400 µg/L (as N ₂ H ₄)	1 µg/L	±4% of full scale reading	@ 466 nm	p-Dimethylaminobenzaldehyde	HI93704-01 100 tests
Iodine	0.0 to 12.5 mg/L (as I ₂)	0.1 mg/L	±0.1 mg/L ±5% of reading	@ 525 nm	DPD	HI93718-01 100 tests
Iron LR	0.000 to 1.600 mg/L (as Fe)	0.001 mg/L	±0.01 mg/L ±8% of reading	@ 575 nm	TPTZ	HI93746-01 50 tests
Iron HR	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI93721-01 100 tests
Iron (II) (ferrous)	0.00 to 6.00 mg/L Fe ²⁺	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96776-01 100 tests
Iron (II)/(III) (ferrous and ferric)	0.00 to 6.00 mg/L Fe	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96777-01 100 tests
Magnesium	0 to 150 mg/L (as Mg ²⁺)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	calmagite	HI937520-01 50 tests
Manganese LR	0 to 300 µg/L (as Mn)	1 µg/L	±10 µg/L ±3% of reading	@ 575 nm	PAN	HI93748-01 50 tests
Manganese HR	0.0 to 20.0 mg/L (as Mn)	0.1 mg/L	±0.2 mg/L ±3% of reading	@ 525 nm	periodate	HI93709-01 100 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading	@ 420 nm	mercaptoacetic acid	HI93730-01 100 tests
Nickel LR	0.000 to 1.000 mg/L (as Ni)	0.001 mg/L	±0.010 mg/L ±7% of reading	@ 575 nm	PAN	HI93740-01 50 tests
Nickel HR	0.00 to 7.00 g/L (as Ni)	0.01 g/L	±0.07g/L ±4% of reading	@ 575 nm	photometric	HI93726-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Nitrite ULR, Marine	0 to 200 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ±4% of reading	@ 466 nm	diazotization	HI764-25 25 tests
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	HI93707-01 100 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ -N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
Oxygen Scavengers	0.00 to 1.50 mg/L (as Carbohydrazide)	0.01 mg/L	±0.02 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0 to 1000 µg/L (as DEHA)	1 µg/L	±5 µg/L ±5% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 2.50 mg/L (as Hydroquinone)	0.01 mg/L	±0.04 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 4.50 mg/L (as Iso-ascorbic acid)	0.01 mg/L	±0.03 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Ozone	0.00 to 2.00 mg/L (as O ₃)	0.01 mg/L	±0.02 mg/L ±3% of reading	@ 525 nm	DPD	HI93757-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate ULR, Marine	0 to 200 µg/L (as P)	1 µg/L	±5 µg/L ±5% of reading	@ 610 nm	ascorbic acid	HI774-25 25 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Potassium	0.0 to 20.0 mg/L (as K)	0.1 mg/L	±3.0 mg/L ±7% of reading	@ 466 nm	turbidimetric tetraphenylborate	HI93750-01 100 tests
Silica LR	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 610 nm	heteropoly blue	HI93705-01 100 tests
Silica HR	0 to 200 mg/L (as SiO ₂)	1 mg/L	±1 mg/L ±5% of reading	@ 466 nm	molybdosilicate	HI96770-01 100 tests
Silver	0.000 to 1.000 mg/L (as Ag)	0.001 mg/L	±0.020 mg/L ±5% of reading	@ 575 nm	PAN	HI93737-01 50 tests
Sulfate	0 to 150 mg/L (as SO ₄ ²⁻)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	turbidimetric	HI93751-01 100 tests
Surfactants, Anionic	0.00 to 3.50 mg/L (as SDBS)	0.01 mg/L	±0.04 mg/L ±3% of reading	@ 610 nm	methylene blue	HI95769-01 100 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	zincon	HI93731-01 100 tests
Ordering Information	HI83300-01 (115V) and HI83300-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
Standards	HI83300-11 CAL Check Cuvette Kit for HI83300					

HI83303

Multiparameter Photometer

with Digital pH Electrode Input
for Aquaculture

The HI83303 benchtop photometer measures 12 different key water quality parameters using 20 different methods. This photometer uses an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

Made with the aquaculture industry in mind, the HI83303 is a comprehensive solution to maintaining optimal chemical and environmental conditions, preventing disease, and increasing production. The HI83303 measures vital parameters such as alkalinity, calcium, nitrite, and phosphate. Alkalinity plays a part in a dynamic relationship with pH and CO₂ concentrations, high alkalinity water lowers fluctuations in pH. The buffering capacity acts to store extra CO₂ essential for photosynthesis in ponds to produce oxygen. Maintaining calcium at certain levels is vital to proper fish growth and development. Excessive nitrite can be toxic to fish. When nitrite interacts with hemoglobin the iron becomes oxidized and blood cells can no longer carry oxygen. Phosphate is essential to plant growth; too much phosphate in an aquaculture system can contribute to algal blooms decreasing dissolved oxygen vital for a successful ecosystem.

• 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

• 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 the 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



- 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



Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (Å nm) with Narrow Band Interference Filter	Method	Reagent Code
Alkalinity	0 to 500 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	Bromocresol green	HI775-26 25 tests
Alkalinity, Marine	0 to 300 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	Bromocresol green	HI755-26 25 tests
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Calcium	0 to 400 mg/L (as Ca ²⁺)	1 mg/L	±10 mg/L ±5% of reading	@ 466 nm	oxalate	HI937521-01 50 tests
Calcium, Marine	200 to 600 mg/L (as Ca ²⁺)	1 mg/L	±6% of reading	@ 610 nm	zincon	HI758-26 25 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Nitrite ULR, Marine	0 to 200 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ±4% of reading	@ 466 nm	diazotization	HI764-25 25 tests
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	HI93707-01 100 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ -N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate ULR, Marine	0 to 200 µg/L (as P)	1 µg/L	±5 µg/L ±5% of reading	@ 610 nm	ascorbic acid	HI774-25 25 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Ordering Information	HI83303-01 (115V) and HI83303-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
Standards	HI83303-11 CAL Check Cuvette Kit for HI83303					

HI83305

Multiparameter Photometer

with Digital pH Electrode Input
for Boilers and Cooling Towers

The HI83305 benchtop photometer measures 18 different key water quality parameters using 32 different methods. This photometer features an innovative optical system that use an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

Specially designed for use with boilers and cooling towers, the HI83305 is a comprehensive way to maintain precise water conditions within these systems. Problems such as corrosion, deposition, and microbial growth can occur if these key parameters, such as oxygen scavengers and silica, aren't maintained. Oxygen scavengers are added to remove residual dissolved oxygen in boiler feed water that can cause corrosion in a steam generating plant. It is important that levels of oxygen scavengers be routinely checked to prevent corrosion and ensure that equipment is working efficiently. Boiler water maintenance is necessary to prevent or control deposit formation as seen with silica. Silica contamination can reduce system efficiency and increase maintenance of equipment due to scaling.

• 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

• 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 the 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



HI83305-11

- 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



Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) with Narrow Band Interference Filter	Method	Reagent Code
Aluminum	0.00 to 1.00 mg/L (as Al ³⁺)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 525 nm	aluminon	HI93712-01 100 tests
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Bromine	0.00 to 8.00 mg/L (as Br ₂)	0.01 mg/L	±0.08 mg/L ±3% of reading	@ 525 nm	DPD	HI93716-01 100 tests
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 575 nm	chlorophenol red	HI93738-01 100 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	@ 525 nm	DPD-Glycine	HI96779-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Chromium(VI) LR	0 to 300 µg/L (as Cr ⁶⁺)	1 µg/L	±10 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93749-01 100 tests
Chromium(VI) HR	0 to 1000 µg/L (as Cr ⁶⁺)	1 µg/L	±5 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93723-01 100 tests
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Hydrazine	0 to 400 µg/L (as N ₂ H ₄)	1 µg/L	±4% of full scale reading	@ 466 nm	p-Dimethylaminobenzaldehyde	HI93704-01 100 tests
Iron (II) (ferrous)	0.00 to 6.00 mg/L Fe ²⁺	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96776-01 100 tests
Iron LR	0.000 to 1.600 mg/L (as Fe)	0.001 mg/L	±0.01 mg/L ±8% of reading	@ 575 nm	TPTZ	HI93746-01 50 tests
Iron HR	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI93721-01 100 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading	@ 420 nm	mercaptoacetic acid	HI93730-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	HI93707-01 100 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ -N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
Oxygen Scavengers	0.00 to 1.50 mg/L (as Carbohydrazide)	0.01 mg/L	±0.02 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0 to 1000 µg/L (as DEHA)	1 µg/L	±5 µg/L ±5% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 2.50 mg/L (as Hydroquinone)	0.01 mg/L	±0.04 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 4.50 mg/L (as Iso-ascorbic acid)	0.01 mg/L	±0.03 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Silica LR	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 610 nm	heteropoly blue	HI93705-01 100 tests
Silica HR	0 to 200 mg/L (as SiO ₂)	1 mg/L	±1 mg/L ±5% of reading	@ 466 nm	molybdosilicate	HI96770-01 100 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	zincon	HI93731-01 100 tests
Ordering Information	HI83305-01 (115V) and HI83305-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
Standards	HI83305-11 CAL Check Cuvette Kit for HI83305					

HI83306

Multiparameter Photometer

with Digital pH Electrode Input
for Environmental Analysis

The HI83306 benchtop photometer measures 16 different key water quality parameters using 23 different methods. This photometer features an innovative optical system that uses an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

The HI83306 was developed to measure the most common parameters in environmental water quality monitoring. Nutrients such as nitrates and phosphates are key indicators of nutrient pollution from agricultural sources and are considered dangerous to environmental waters. Too few nutrients and waters will be unable to sustain healthy ecosystems; too many nutrients and algal blooms can form, which can be detrimental to water quality and aquatic health. Dissolved oxygen is an essential to performing biological processes for many forms of aquatic life, such as fish, plants and microorganisms.

• 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

• 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 the 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



HI83306-11

- 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



Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (▲ nm) with Narrow Band Interference Filter	Method	Reagent Code
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Chromium(VI) LR	0 to 300 µg/L (as Cr ⁶⁺)	1 µg/L	±10 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93749-01 100 tests
Chromium(VI) HR	0 to 1000 µg/L (as Cr ⁶⁺)	1 µg/L	±5 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93723-01 100 tests
Color of Water	0 to 500 PCU (Platinum Cobalt Units)	1 PCU	±10 PCU ±5% of reading	@ 420 nm	colorimetric platinum cobalt	
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Cyanuric Acid	0 to 80 mg/L (as CYA)	1 mg/L	±1 mg/L ±15% of reading	@ 525 nm	turbidimetric	HI93722-01 100 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading	@ 420 nm	mercaptoacetic acid	HI93730-01 100 tests
Nickel LR	0.000 to 1.000 mg/L (as Ni)	0.001 mg/L	±0.010 mg/L ±7% of reading	@ 575 nm	PAN	HI93740-01 50 tests
Nickel HR	0.00 to 7.00 g/L (as Ni)	0.01 g/L	±0.07g/L ±4% of reading	@ 575 nm	photometric	HI93726-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Silica LR	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 610 nm	heteropoly blue	HI93705-01 100 tests
Silver	0.000 to 1.000 mg/L (as Ag)	0.001 mg/L	±0.020 mg/L ±5% of reading	@ 575 nm	PAN	HI93737-01 50 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	zincon	HI93731-01 100 tests

Ordering Information

HI83306-01 (115V) and HI83306-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.

Standards

HI83306-11 CAL Check Cuvette Kit for HI83306

HI83325

Multiparameter Photometer

with Digital pH Electrode Input
for Nutrient Analysis

The HI83325 benchtop photometer measures 8 different key water quality parameters using 10 different methods. This photometer features an innovative optical system that uses an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

Consistent and thorough monitoring of plant nutrients is essential to maintaining healthy growth and reproduction. This is easy with the HI83325, a comprehensive way to monitor vital plant nutrients such as potassium, calcium and magnesium. Required in large quantities, potassium plays a vital role in water uptake and enzyme regulation. Calcium helps to strengthen plant cell walls protecting against heat stress while magnesium helps build a strong immune system.

• 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
- **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 the 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



HI83325-11

- 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



Supplied Complete

HI83225 is supplied with the HI83300-100 in a rugged carrying case.

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 ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Calcium	0 to 400 mg/L (as Ca ²⁺)	1 mg/L	±10 mg/L ±5% of reading	@ 466 nm	oxalate	HI937521-01 50 tests
Iron (II)/(III) (ferrous and ferric)	0.00 to 6.00 mg/L Fe	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96777-01 100 tests
Magnesium	0 to 150 mg/L (as Mg ²⁺)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	calmagite	HI937520-01 50 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Potassium	0.0 to 20.0 mg/L (as K)	0.1 mg/L	±3.0 mg/L ±7% of reading	@ 466 nm	turbidimetric tetraphenylborate	HI93750-01 100 tests
Sulfate	0 to 150 mg/L (as SO ₄ ²⁻)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	turbidimetric	HI93751-01 100 tests
Ordering Information	HI83325-01 (115V) and HI83325-02 (230V) is supplied with sample cuvettes and caps (4 ea.), activated carbon for 50 tests, demineralizer for preparation of 10 L deionized water (100g), 100 mL graduated beaker with caps (10), 3 mL pipette, 60 mL syringe, 5 mL syringe, graduated cylinder, spoon, funnel, paper filters (100), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instruction manual, instrument quality certificate, and carrying case.					
Standards	HI83325-11 CAL Check Cuvette Kit for HI83325					

HI83900

Suction Lysimeter

for Root Level Soil Monitoring

- The perfect companion to the HI83325
- Monitor soil nutrients at the roots

The HI83900 suction lysimeter is built with a porous ceramic cap connected to a transparent tube for soil solution extraction. A rubber capillary is inserted in the tube passing through a rubber cap and reaching the ceramic tip.

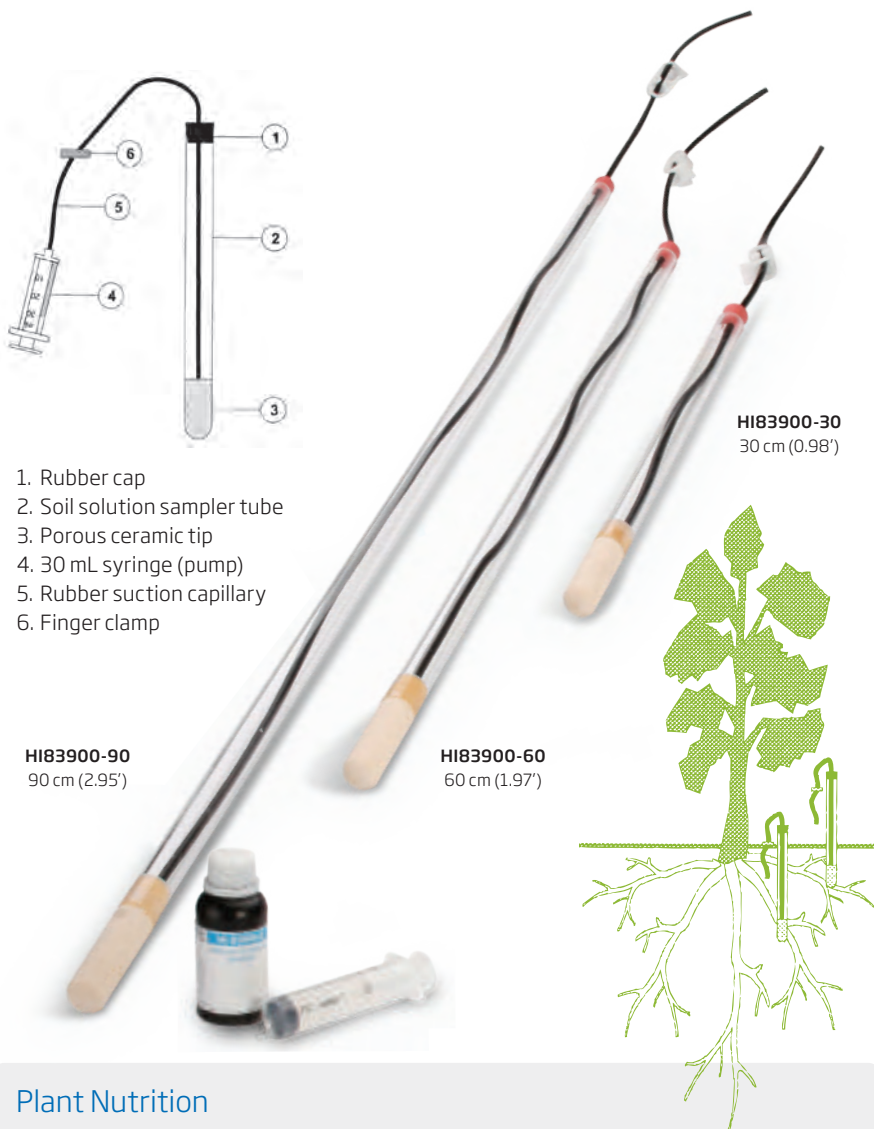
The HI83900 series lysimeter is an ideal tool for collecting soil solution samples and then performing quantitative chemical analysis. In this way, the operator can easily monitor the level of nutrients such as ammonia, nitrate, phosphorous, potassium, sulfate, calcium, and magnesium.

The ceramic tip of the lysimeter can be used in all types of soil. It is made of a sinterized material that does not react with the nutrients in the soil. Therefore, the soil solution collected is not affected by the chemical composition of the ceramic cap resulting in precise and reliable tests.

The HI83900 allows the extraction of a solution from the soil by creating a vacuum inside the sampler tube, that exceeds the soil water tension. This will establish an hydraulic gradient for the solution to flow through the porous ceramic cap and into the lysimeter tube. Typically, a vacuum of about -60 cb (centibar) should be drawn.

For better monitoring of soil solution composition throughout an entire growth period of a crop, at least two lysimeters should be installed in the root zone of a representative plant, one at the upper part and one in the lower part of the root zone.

For better measurement accuracy and repeatability, it is recommended to replicate installations in at least two more locations.



1. Rubber cap
2. Soil solution sampler tube
3. Porous ceramic tip
4. 30 mL syringe (pump)
5. Rubber suction capillary
6. Finger clamp

HI83900-90
90 cm (2.95')

HI83900-60
60 cm (1.97')

HI83900-30
30 cm (0.98')

Plant Nutrition

The three elements that are most needed by plants are nitrogen (N), phosphorous (P), and potassium (K).

Nitrogen is indispensable for the plant's life and is a key factor in fertilization. Nitrogen allows the development of the vegetative growth of the plant; in particular, it contributes to lengthening of trunks and sprouts and increases the production of foliage and fruits. An excess of nitrogen weakens the plants structure creating an unbalanced relationship between the leaves and the stalks. In addition, the plant becomes less resistant to diseases.

Phosphorous is an important element in the composition of DNA and RNA, the regulators of the energetic exchange (ATP and ADP), as well as the reserve substances in seeds and bulbs. It contributes to the formation of buds, roots, blooming, and lignification. A lack of phosphorous results in: stifling of plants, slow growth, a reduction of production, smaller fruits and a lower expansion of the roots.

Even though potassium is not a constituent of important compounds, it plays a remarkable role in many physiological activities in plants like the control of cellular turgor and the accumulation of carbohydrates. It increases the size of fruits, their flavor, as well as yielding a positive effect on the color and fragrance of flowers. Potassium also makes plants more resistant to disease.

Ordering Information

All include capillary rubber tube with rubber cap and finger clamp, cleaning solution starter kit (120 mL), 30 mL syringe and instructions

HI83900-30 is comprised of 30 cm (0.98') sampler tube ending with porous ceramic tip.

HI83900-60 is comprised of 60 cm (1.97') sampler tube ending with porous ceramic tip.

HI83900-90 is comprised of 90 cm (2.95') sampler tube ending with porous ceramic tip.

Accessories

HI83900-25 cleaning solution kit, 500 mL



Residual Disinfection and pH Control

In swimming pool treatment, disinfection or sanitization is essential to rid the pool of bacteria and control nuisance organisms like algae which may occur in the pool, filtration equipment, and piping.

There are a number of available disinfectant compounds available, including chlorine, bromine and ozone dosing systems, of which chlorine is the most common.

Chlorine

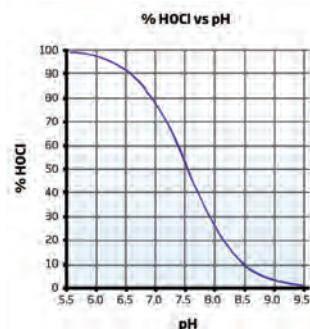
Chlorine is a strong oxidizing agent that destroys organic pollutants and bacteria. Part of the chlorine combines with compounds containing nitrogen forming chloramines, while the rest remains active, continuing its disinfecting action.

Combined chlorine is the quantity of chlorine that has already combined with nitrogen containing compounds. It is much less effective as a disinfectant than free chlorine. The addition of combined chlorine, and free chlorine gives total chlorine. A pool manager needs to aim for the perfect balance where free and total chlorine are proportionally equal, and thus to keep the combined chlorine levels near zero. The presence of chloramines is undesirable because of the distinctive 'swimming pool smell' as well as irritation to the eyes and mucous membranes caused by combined chlorines like dichloramines.

Commercial chlorine for disinfection may be available as a gas (Cl_2), a liquid like sodium hypochlorite or bleach (NaOCl) or in a solid state like calcium hypochlorite, chlorohydrantoin or chlorocyanuric acid compounds. These compounds, once dissolved in water, establish equilibrium between the hypochlorous acid (HOCl) and

the hypochlorite ions (OCl^-). Although both forms are considered free chlorine, it is the hypochlorous acid that provides the strongest disinfecting and oxidizing characteristic of chlorine solutions. The amount of hypochlorous acid in chlorinated water depends upon the pH value of the solution. Changes in pH value will effect the HOCl equilibrium in relation to the hydrogen and hypochlorite ions.

As depicted by the graph, HOCl decreases and OCl^- increases as pH increases. At a low pH, almost all the free chlorine is in the molecular form HOCl , and at a pH of around 7.5, the ratio between HOCl and OCl^- is 50:50. Since the ionic form OCl^- is a slow acting sanitizer while the molecular HOCl is fast acting, it is important to measure pH regularly. As a general rule a pH of about 7.2 is recommended to maintain fast acting disinfection conditions.



Bromine

In many countries bromine sanitizing has been introduced as an alternative for chlorine, although it is not as strong. The advantage of bromine lies in its stability at higher temperatures (advantageous for heated pools and hot tubs), and its maintained disinfection power at a higher pH. Furthermore, there is very little reaction between bromine and nitrogen compounds reducing the unpleasant odor, and eye irritation problems. The main disadvantage of bromine is the slower acting disinfecting power, making it less suitable for larger pools.



Ozone

Ozone is a very strong oxidizing agent that destroys organic compounds that are especially difficult to oxidize. It allows the pool manager to very efficiently remove combined chlorine without frequently refreshing large amounts of pool water. By the time the water passes through the filter units, ozone has already completed sanitizing, and it is not effected by the pH level.

Mainly because of its strong oxidizing power, the return water may contain trace concentrations of ozone. It is imperative to know that ozone is very unstable, so to ensure thorough sanitization of the water, low-level chlorination remains necessary.

The Water Balance and Langelier Index

Pool water characteristics need to be maintained in a balanced state to avoid numerous issues. Measuring certain variables is extremely important to predict if the water is corrosive or will cause scaling.

A saturation index developed by Dr. Wilfred Langelier is widely used to predict the balance of swimming pool waters. It represents the estimation of a solution's ability to dissolve or precipitate calcium carbonate deposits. A certain level of this precipitation (filming) is desired to insulate pipes and boilers from contact with water. When no protective filming is formed, water is considered to be corrosive. On the other hand, too much filming can develop into scaling and incrustation of the pipes.

In the treatment and monitoring of pool water, the pool manager must ensure that related parameters such as alkalinity, hardness, and pH are carefully monitored in addition to sanitizing chemicals.

Calcium

The presence of calcium in the system is desired to ensure filming on those places where the temperature is relatively high, like in boilers and pipes transporting warm water. Scaling must be avoided because it reduces heat transfer and pump capacity, and causes cloudiness in the water.

It is recommended to maintain the calcium hardness value within the range from 200 to 400 ppm as calcium carbonate (CaCO_3).

Alkalinity

Alkalinity is the measure of the total concentration of alkaline substances, mostly bicarbonates, dissolved in the water. The higher the alkalinity, the more resistant the water is to pH change. At the same time, high alkaline water is a major contributor to scaling problems like incrustation in filtration equipment, pumps, and piping.

It is recommended to maintain the alkalinity value within the range from 80 to 125 ppm as calcium carbonate (CaCO_3).

pH

The pH of the water is an important factor since at lower pH levels the corrosion rate increases. If the alkalinity values are sufficiently high, it will not be difficult to control the pH. Most pool managers prefer to keep the pH between 7.2 and 7.4 to best maintain low corrosion rates and a sufficient activity of chlorine.

Langelier Index

The Langelier Index is a powerful tool to calculate the water balance, and to predict corrosion or scaling problems. Theoretically, a LI of zero indicates perfect water condition for swimming pools. If LI>0, scaling and staining of the water is present, and if LI<0 the water is corrosive and highly irritating. A tolerance of ±0.4 is normally acceptable.

The Langelier formula is expressed as: **LI = pH + TF + HF + AF - 12.5**

Where:

LI = Langelier Index (also called Saturation Index)

pH = pH of the water

TF = temperature factor

HF = hardness factor, log (Ca hardness, ppm as CaCO₃)

AF = alkalinity factor, log (alkalinity, ppm as CaCO₃)

To calculate the exact Langelier Index of your water please use the **WATER INDEX** reference tables.

For most pools, water is balanced if:

- The pH value is maintained within the recommended ranges of pH 7.2 - 7.6
- Ideally, the Alkalinity should be maintained within a range of 80 - 125 ppm
- The Calcium Hardness should be maintained within a range of 200 - 400 ppm.

To calculate your water balance, three parameters must be measured; calcium hardness, alkalinity and pH. Find the hardness and alkalinity factor in the reference tables below.

The water temperature is, in general, maintained between 24°C (76°F) and 34°C (94°F). Assuming the temperature is kept within those ranges, an average value of 0.7 may be used.

Water balance = pH+TF+HF+AF

Water Balance	Condition	Recommendation
11.0-12.0	Corrosive	Increase pH and/or alkalinity
12.1-12.3	Acceptable Balance	Retest water frequently
12.4-12.6	Ideal Balance	Maintain
12.7-12.9	Acceptable Balance	Retest water frequently
13.0-14.0	Scale Forming	Reduce pH and/or alkalinity

Water Index Reference Table

Temperature			Calcium Hardness		Alkalinity	
°C	°F	TF	mg/L (as CaCO ₃)	HF	mg/L (as CaCO ₃)	AF
0	32	0	5	0.7	5	0.7
4	39	0.1	25	1.4	25	1.4
8	46	0.2	50	1.7	50	1.7
12	54	0.3	75	1.9	75	1.9
16	60	0.4	100	2.0	100	2.0
20	68	0.5	150	2.2	150	2.2
24	75	0.6	200	2.3	200	2.3
28	82	0.7	250	2.4	250	2.4
32	90	0.7	300	2.5	300	2.5
36	97	0.8	400	2.6	400	2.6
40	104	0.9	500	2.7	500	2.7
50	122	1.0	1000	3.0	1000	3.0



HI83326

Multiparameter Photometer

with Digital pH Electrode Input
for Pool and Spa Applications

The HI83326 benchtop photometer measures 12 different key water quality parameters using 14 different methods. This photometer features an innovative optical system that uses an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

Made with the pool and spa industry in mind, a basic necessity of pool water treatment is to maintain the water in a safe and pleasant condition for the swimmers. In pool and spa water treatment, disinfection is essential to rid the pool of bacteria and control nuisance organisms like algae which may occur in the pool, spa, filtration equipment, or piping. There are a number of available disinfectant compounds including chlorine, bromine, and ozone. In order to achieve ideal water conditions, water requires testing on a daily and sometimes hourly basis to ensure there is enough residual disinfectant and to maintain pH levels. Equally important is calcium hardness and alkalinity; these levels should be monitored weekly to ensure the pool or spa water is well balanced to avoid corrosion and scale formation.

- **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



Application Designed Photometers



- **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
- **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 the 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



HI83326-11

- 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



Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) with Narrow Band Interference Filter	Method	Reagent Code
Alkalinity	0 to 500 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	Bromocresol green	HI775-26 25 tests
Bromine	0.00 to 8.00 mg/L (as Br ₂)	0.01 mg/L	±0.08 mg/L ±3% of reading	@ 525 nm	DPD	HI93716-01 100 tests
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 575 nm	chlorophenol red	HI93738-01 100 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	@ 525 nm	DPD	HI96779-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Cyanuric Acid	0 to 80 mg/L (as CYA)	1 mg/L	±1 mg/L ±15% of reading	@ 525 nm	turbidimetric	HI93722-01 100 tests
Hardness, Calcium	0.00 to 2.70 mg/L (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading	@ 525 nm	calmagite	HI93720-01 100 tests
Iron HR	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI93721-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Ozone	0.00 to 2.00 mg/L (as O ₃)	0.01 mg/L	±0.02 mg/L ±3% of reading	@ 525 nm	DPD	HI93757-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Ordering Information	HI83326-01 (115V) and HI83326-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
Standards	HI83326-11 CAL Check Cuvette Kit for HI83326					

HI83308

Multiparameter Photometer

with Digital pH Electrode Input
for Water Conditioning

The HI83308 benchtop photometer measures 15 different key water quality parameters using 23 different methods. This photometer features an innovative optical system that uses an LED, a narrow band interference filter, a focusing lens, and both a silicon photodetector for absorbance measurement and a reference detector to maintain a consistent light source to ensure accurate and repeatable photometric readings every time.

The HI83308 was developed to measure the most common parameters in water quality monitoring. One important parameter to test water quality is iron since it can affect color, odor, and turbidity and can also be the most troublesome factor for appliances and surfaces in contact with water. High levels of iron in water can result in clogged water pipes or heat exchangers. Also, ammonia detection in water treatment systems is particularly important for aquarium owners and fish farm operators since ammonia is highly soluble in water and extremely toxic to fish. One other important parameter in water quality monitoring is fluoride. Fluoride is best known for preventing tooth decay. While it does help prevent tooth decay, too little fluoride can be ineffective while too much can cause staining of teeth.

- **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**
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 - 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



HI83308-11

- 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



Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (▲ nm) with Narrow Band Interference Filter	Method	Reagent Code
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Fluoride LR	0.00 to 2.00 mg/L (as F ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	SPADNS	HI93729-01 100 tests
Iron LR	0.000 to 1.600 mg/L (as Fe)	0.001 mg/L	±0.01 mg/L ±8% of reading	@ 575 nm	TPTZ	HI93746-01 50 tests
Iron HR	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI93721-01 100 tests
Manganese LR	0 to 300 µg/L (as Mn)	1 µg/L	±10 µg/L ±3% of reading	@ 575 nm	PAN	HI93748-01 50 tests
Manganese HR	0.0 to 20.0 mg/L (as Mn)	0.1 mg/L	±0.2 mg/L ±3% of reading	@ 525 nm	periodate	HI93709-01 100 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading	@ 420 nm	mercaptoacetic acid	HI93730-01 100 tests
Nickel LR	0.000 to 1.000 mg/L (as Ni)	0.001 mg/L	±0.010 mg/L ±7% of reading	@ 575 nm	PAN	HI93740-01 50 tests
Nickel HR	0.00 to 7.00 g/L (as Ni)	0.01 g/L	±0.07g/L ±4% of reading	@ 575 nm	photometric	HI93726-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 tests
Silica LR	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 610 nm	heteropoly blue	HI93705-01 100 tests
Silver	0.000 to 1.000 mg/L (as Ag)	0.001 mg/L	±0.020 mg/L ±5% of reading	@ 575 nm	PAN	HI93737-01 50 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	zincon	HI93731-01 100 tests
Ordering Information	HI83308-01 (115V) and HI83308-02 (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter, instrument quality certificate, and instruction manual.					
Standards	HI83308-11 CAL Check Cuvette Kit for HI83308					

Advanced Waterproof Portable Photometers

These portable photometers are designed with an innovative optical system that offers superior performance in accuracy, repeatability, and the amount of time that it takes to do a measurement.

These waterproof meters are extremely user friendly with a tutorial mode that walks the user graphically, step by step, in performing a measurement. The use of a backlit dot matrix LED allows the use of virtual keys making operation of the meter very intuitive.



General Features

Waterproof casing

The casing offers IP67 waterproof protection and floats.

Advanced LED optical system

LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.

CAL Check™ functionality

Hanna's exclusive CAL Check feature allows for performance verification and calibration of the meter using NIST traceable standards. Our CAL Check standard vials are developed to simulate a specific absorbance value at each wavelength to verify the accuracy of subsequent readings. The CAL Check screen guides the user step-by-step through the validation process and user calibration.

Multiple measurement methods

Users can select the use of powder reagents supplied in packets or the use of liquid reagents supplied in a dropper bottle.

Built-in reaction timer

Waiting the proper reaction time is of key importance when performing colorimetric measurements. The countdown timer displays the time remaining until a measurement will be taken, ensuring consistent results between sample measurements and users.

Large cuvette size

The sample cell of these photometers 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. The cuvette holder features ridges to protect scratching of the optical path by the cuvette.

Intuitive dot matrix display

These photometers are designed with a backlit, graphic LCD. With virtual keys, a battery status indicator, and error messages. Users will find the interface intuitive and easy to read.

GLP data

Good Laboratory Practice (GLP) shows the date and time of the last user calibration.



Auto logging

Log and recall the last 50 measurements.

Dedicated help

A dedicated help key provides information relating to the current meter operation, and can be used at any stage in the setup or measurement process to show contextual help.

On-screen tutorial mode with animations

The built in Tutorial mode guides users step-by-step through the measurement process.

Error messages

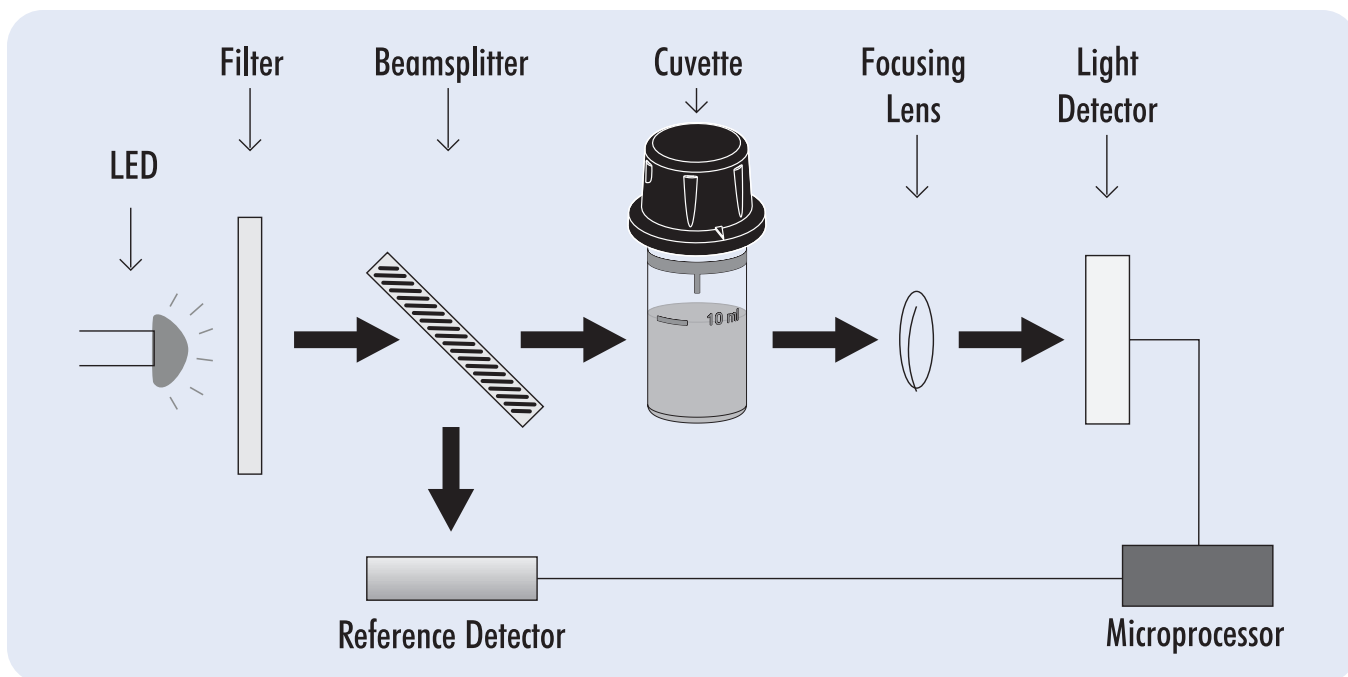
Messages appear on the display alerting to problems such as out of range, light low, light high, ambient temperature out of limits, and battery low.

Auto-off protection

These meters use three AA batteries that allow for about 800 measurements to be taken. The auto-off feature automatically shuts off the meter after 15 minutes of inactivity in order conserve battery life.

Battery status indicator

Indicates the amount of battery life left.



Advanced Optical System

- LED that generates little heat
- 8 nm narrow band interference filter that is accurate to ± 1 nm and offers 25% increase in light efficiency.
- Reference detector that modulates the voltage to LED for consistent light output.
- A concave focusing lens that reduces errors from imperfections in the cuvette

High Efficiency Light Source

LED light sources offer superior performance compared to tungsten lamps. LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability. LEDs are available in a wide array of wavelengths, whereas tungsten lamps have poor blue/violet light output.

High Quality Filters

Improved optical filters ensure greater wavelength accuracy and allow a brighter, stronger signal to be received. The end result is higher measurement stability and less wavelength error.

Stable Light Source

The internal reference system of these photometers compensates for any drifts due to power fluctuations or ambient temperature changes. With a stable source of light the readings are fast and reliable between your blank (zero) measurement and sample measurement.

Greater Light Yield

A focusing lens collects all of the light that exits the cuvette, reducing errors from imperfections and scratches that may be present in the glass. The use of the convex lens reduces the need for indexing cuvettes.



Method and Parameter

Chosen parameter and method used is displayed along with the reading.

Backlit LCD

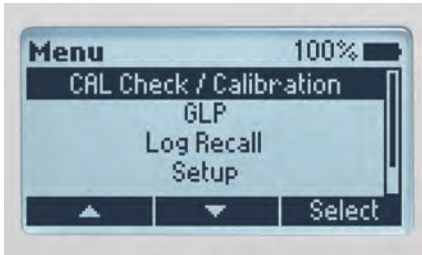
The 128 x 64 Pixel LCD allows for a simplified user interface with virtual keys and on-screen help to guide the user through use of the meter.

Positive locking system

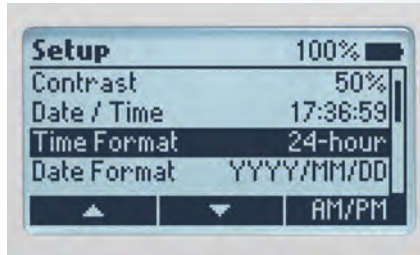
The Hanna positive-locking system ensures cuvettes are placed into the holder in the same position every time.



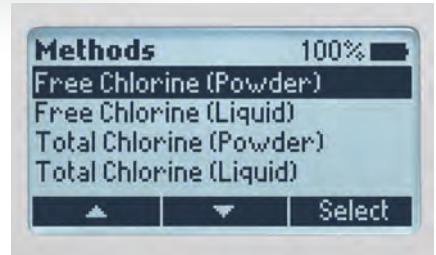
On-Screen Features



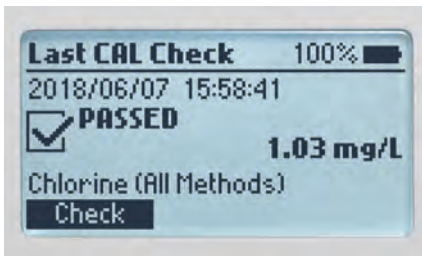
Advanced features such as CAL Check™ to verify performance, GLP for last calibration date, setup and ability to see all accessories used with the meter.



Setup options for meter personalization include date and time format, language, and enabling the tutorial mode.



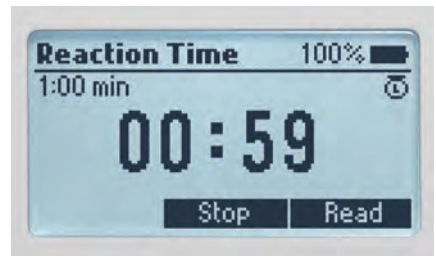
Choice of powder or economical easy to use liquid reagents.



Backlit dot matrix LCD that offers an exceptionally intuitive user interface that is easy to read and understand.



Tutorial mode for step-by-step instructions to guide a first time user to performing a measurement correctly.



Displays time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate intervals for the test being performed.



Virtual keys



Menu available at the touch of a button



Contextual HELP button

A dedicated help key provides informational help relating to the current meter operation, and can be used at any stage in the setup or measurement process.

Solutions and Accessories

HI93703-50	Cuvette cleaning solution, 230 mL	HI7101412	Carrying case for HI977 series with two CAL Check standards
HI731318	Cuvette cleaning cloth (4)	HI7101413	Carrying case for HI977 series with three CAL Check standards
HI731331	Measuring cuvettes (4)	HI7101415	Carrying case for HI977 series with five CAL Check standards
HI731336N	Cuvette caps (4)	HI7101417	Carrying case for HI977 series with seven CAL Check standards



HI97712

Aluminum Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications		HI97712 Aluminum
Measurement	Range	0.00 to 1.00 mg/L (ppm) (as Al ³⁺)
	Resolution	0.01 mg/L (ppm)
	Accuracy @25°C (77°F)	±0.04 mg/L ±4% of reading
	Method	adaptation of the aluminon method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97712 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97712C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Ordering Information

Reagents and Standards	HI97712	
		HI97712-11 CAL Check standard cuvettes for aluminum
		HI93712-01 aluminum reagents for 100 tests
		HI93712-03 aluminum reagents for 300 tests

Significance of Use

Due to its vast occurrence in minerals, rocks and clays, aluminum is present in nearly all natural water as a soluble salt, a colloid, or an insoluble compound. These forms of aluminum may also appear in treated water and wastewater due to its use during coagulation processes. When concentrations are greater than 0.2 mg/L, water will be colored, but cause no significant human health effects.

HI97700 · HI97715

Ammonia LR and MR Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**



Specifications	HI97700 Ammonia LR	HI97715 Ammonia MR	
Measurement	Range	0.00 to 3.00 mg/L (ppm) (as NH ₃ -N)	0.00 to 10.00 mg/L (ppm) (as NH ₃ -N)
	Resolution	0.01 mg/L	0.01 mg/L
	Accuracy @25°C (77°F)	±0.04 mg/L ±4% of reading	±0.05 mg/L ±5% of reading
Measurement System	Method	adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler method	
	Light Source	light emitting diode	
	Bandpass filter	420 nm	
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)		
Ordering Information	HI97700 and HI97715 are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately		
	HI97700C and HI97715C include photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. Reagents sold separately		
Reagents and Standards	HI97700	HI97700-11 CAL Check standard cuvettes for ammonia LR	
		HI93700-01 ammonia LR reagent for 100 tests	
		HI93700-03 ammonia LR reagent for 300 tests	
	HI97715	HI97715-11 CAL Check standard cuvettes for ammonia MR	
		HI93715-01 ammonia MR reagent for 100 tests	
		HI93715-03 ammonia MR reagent for 300 tests	



HI97733

Ammonia HR Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Present naturally in surface and wastewaters, ammonia mainly results from the deamination of organic nitrogen-containing compounds and hydrolysis of urea. Ammonia may also be present from water treatment processes that utilize chloramines for disinfection, where ammonia is added to the water to react with chlorine. Ammonia is less likely to appear in groundwater due to adsorption by soil particles.

Specifications		HI97733 Ammonia HR
Measurement	Range	0.0 to 100.0 mg/L (ppm) (as NH ₄ ⁺)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.5 mg/L ±5% of reading
	Method	adaptation of the ASTM Manual of Water and Environmental Technology, D1426 Nessler method
Measurement System	Light Source	light emitting diode
	Bandpass filter	420 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97733 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97733C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Ordering Information

Reagents and Standards	HI97733	
		HI97733-11 CAL Check standard cuvettes for Ammonia HR
		HI93733-01 ammonia HR reagent for 100 tests
		HI93733-03 ammonia HR reagent for 300 tests

See page 10.107 for standard reagents; see page 10.108 for CAL Check kits; see page 10.46 for general accessories

HI97769

Anionic Surfactants, Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**



Specifications

HI97769 Anionic Surfactants

Measurement	Range	0.00 to 3.50 mg/L (as SDBS)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.04 mg/L ±3% of reading
	Method	adaptation of the US EPA Method 425.1 and Standard Methods for the Examination of Water & Wastewater, 20th Edition, 5540C, Anionic Surfactants as MBAS
Measurement System	Light Source	light emitting diode
	Bandpass filter	610 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
Additional Specifications	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)	

HI97769 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97769C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97769	HI97769-11 CAL Check standard cuvettes for anionic surfactants
		HI95769-01 anionic surfactants reagents for 40 tests

HI97716

Bromine Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

In some areas around the world, bromine is replacing other more common disinfectants, such as chlorine. Due to its stability at higher temperatures and higher pH levels, bromine is most often used in sanitization of pools and spas, and cooling towers.

Specifications	HI97716 Bromine	
Measurement	Range	0.00 to 10.00 mg/L (ppm) (as Br ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.08 mg/L ± 3% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, DPD method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97716 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97716C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97716	
		HI97716-11 CAL Check standard cuvettes for bromine
		HI93716-01 bromine reagents for 100 tests
		HI93716-03 bromine reagents for 300 tests

HI97753

Chloride Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

As one of the major inorganic anions in water and wastewater, chloride is often measured in a variety of industries. Due to its corrosive nature, chloride levels are monitored in boiler systems and cooling towers to prevent metal parts from being damaged. Not known to be toxic to humans, chloride is monitored in drinking water for aesthetic purposes due to its negative affect on taste. However, chloride can be toxic to plant life. Chloride may be monitored in agricultural applications in certain areas of the world where salinity levels are known to be naturally high.



Specifications	HI97753 Chloride	
Measurement	Range	0.0 to 20.0 mg/L (ppm) (as Cl ⁻)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±0.5 mg/L ±6% of reading
Measurement System	Method	adaptation of the mercury (II) thiocyanate method
	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
Weight	380 g (13.4 oz.)	

HI97753 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97753C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97753	HI97753-11 CAL Check standard cuvettes for chloride
		HI93753-01 chloride reagents for 100 tests
		HI93753-03 chloride reagents for 300 tests

HI97738

Chlorine Dioxide Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Used primarily as a disinfectant in drinking water and in various industrial processes, chlorine dioxide is a highly effective, environmentally friendly microbicide. Chlorine dioxide is safe, potent, and does not produce trihalomethanes, the disinfection byproduct characteristic of chlorine use.

Specifications		HI97738 Chlorine Dioxide
Measurement	Range	0.00 to 2.00 mg/L (ppm) (as ClO ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.10 mg/L ±5% of reading
	Method	adaptation of chlorophenol red method
Measurement System	Light Source	light emitting diode
	Bandpass filter	575 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	HI97738 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately	
Reagents and Standards	HI97738	HI97738-11 CAL Check standard cuvettes for chlorine dioxide
		HI93738-01 chlorine dioxide reagents for 100 tests
		HI93738-03 chlorine dioxide reagents for 300 tests

HI97779

Chlorine Dioxide (Rapid) Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**



Specifications	HI97779 Chlorine Dioxide (Rapid)	
Measurement	Range	0.00 to 2.00 mg/L (as ClO ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.10 mg/L, ±5% of reading
Measurement System	Method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 18th ed., 4500 ClO ₂ D
	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
Additional Specifications	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
Additional Specifications	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	HI97779 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately	
Reagents and Standards	HI97779	HI97779-11 CAL Check Standard cuvettes for chlorine dioxide (rapid)
		HI96779-01 chlorine dioxide (rapid) reagents for 100 tests
		HI96779-03 chlorine dioxide (rapid) reagents for 300 tests



HI97762

Free Chlorine, Ultra Low Range Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

As one of the most common forms of disinfectants used, chlorine improves water quality by destroying disease-producing microorganisms, and by reacting with other organic and inorganic substances. Chlorine levels must be actively monitored to ensure sufficient chlorine is present for disinfection, as well as to control adverse effects such as taste, odor, and potential reactions with organic matter to form harmful disinfection byproducts.

Specifications		HI97762 Free Chlorine, ULR
Measurement	Range	0.000 to 0.500 mg/L (as Cl ₂)
	Resolution	0.001 mg/L
	Accuracy @25°C (77°F)	±0.020 mg/L ±3% of reading at 25°C
	Method	Adaptation of Standard Method for the Examination of Water and Wastewater, 18th Edition, 4500-Cl _G , DPD colorimetric method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97762 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97762C includes photometer, CAL Check cuvette A, CAL Check cuvette B for free chlorine ULR, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97762	HI97762-11 CAL Check standard cuvettes for free chlorine ULR
		HI95762-01 free chlorine ULR reagents for (100 tests)
		HI95762-03 free chlorine ULR reagents for (300 tests)

HI97701

Free Chlorine Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**



Specifications	HI97701 Free Chlorine	
Measurement	Range	0.00 to 5.00 mg/L (as Cl ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading at 25 °C
	Method	adaptation of US EPA method 330.5, DPD Colorimetric method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
Additional Specifications	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
Additional Specifications	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97701 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97701C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. Reagents sold separately

Reagents and Standards	HI97701
	HI97701-11 CAL Check standard cuvettes for free and total chlorine
	HI93701-01 free chlorine powder reagent (100 tests)
	HI93701-03 free chlorine powder reagent (300 tests)
	HI93701-F free chlorine liquid reagent (300 tests)

HI97761

Chlorine, Total ULR Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications HI97761 Chlorine, Total Ultra Low Range

Measurement	Range	0.000 to 0.500 mg/L (ppm) (as Cl ₂)
	Resolution	0.001 mg/L
	Accuracy @25°C (77°F)	±0.020 mg/L ±3% of reading
	Method	adaptation of the USEPA method 330.5
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
Weight	380 g (13.4 oz.)	

HI97761 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97761C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97761	HI97761-11 CAL Check Standard cuvettes for chlorine, total ULR
		HI95761-01 chlorine, total ULR reagents for 100 tests
		HI95762-03 chlorine, total ULR reagents for 300 tests

Significance of Use

As one of the oldest and most common forms of disinfection, chlorine improves water quality by destroying disease-producing microorganisms, and by reacting with other organic and inorganic substances. Chlorine levels must be actively monitored to ensure sufficient chlorine is present for disinfection, as well as to control adverse effects such as taste, odor, and potential reactions with organic matter to form harmful disinfection byproducts.

HI97723 • HI97749

Chromium (VI) HR and LR Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Hexavalent chromium salts are used in various industrial applications, such as in the manufacture of paints, dyes, explosives, and ceramics, and extensively in the metal finishing and plating industries. Due to its toxicity to humans, animals, and aquatic life, hexavalent chromium is actively monitored and neutralized in wastewater from the above industries.



Specifications	HI97749 Chromium (VI) LR	HI97723 Chromium (VI) HR	
Measurement	Range	0 to 300 µg/L (as Cr (VI))	0 to 1000 µg/L (ppb) (as Cr(VI))
	Resolution	1 µg/L	1 µg/L
	Accuracy @25°C (77°F)	±10 µg/L ±4% of reading	±5 µg/L ±4% of reading
Measurement System	Method	adaptation of the ASTM Manual of Water and Environmental Technology, D1687 Diphenylcarbohydrazide Method	
	Light Source	light emitting diode	
	Bandpass filter	525 nm	
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable		
Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")		
Weight	380 g (13.4 oz.)		

Ordering Information

HI97723 and **HI97749** is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

HI97749C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. Reagents sold separately

Reagents and Standards

HI97749	HI97749-11 CAL Check standard cuvettes for chromium(VI) LR
	HI93749-01 chromium(VI) LR reagents for 100 tests
	HI93749-03 chromium(VI) LR reagents for 300 tests
HI97723	HI97723-11 CAL Check standard cuvettes for Chromium(VI) HR
	HI93723-01 chromium(VI) HR reagents for 100 tests
	HI93723-03 chromium(VI) HR reagents for 300 tests



HI97727

Color of Water Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Used in natural water based applications, such as drinking water and municipal wastewater treatment, the color of water may dictate the presence of both unwanted inorganic and organic material; removal results in more suitable water for general and industrial applications. "Color" is applied in this context to represent "true color", where turbidity is removed. Where turbidity removal has been omitted, the term "apparent color" is then applied.

Specifications		HI97727 Color of Water
Measurement	Range	0 to 500 PCU (Platinum Cobalt Units)
	Resolution	1 PCU
	Accuracy @25°C (77°F)	±10 PCU ±5% of reading at 25°C
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Colorimetric Platinum Cobalt method
Measurement System	Light Source	light emitting diode
	Bandpass filter	420 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	HI97727 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately	
	HI97727C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. Reagents sold separately	
Reagents and Standards	HI97727	HI97727-11 CAL Check standard cuvettes for color of water

HI97747 · HI97702

Copper, Low and High Range Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Due to its malleability, thermal and electrical conductivity, and corrosion resistance, copper is used in a variety of industrial and technological applications. Copper may also be present in natural water and effluents due to widespread use to control biological growths in reservoirs and distribution pipes.



Specifications	HI97747 Copper, LR	HI97702 Copper, HR	
Measurement	Range	0.000 to 1.500 mg/L (ppm) (as Cu)	0.00 to 5.00 mg/L (ppm) (as Cu)
	Resolution	0.001 mg/L	0.01 mg/L (ppm)
	Accuracy @25°C (77°F)	±0.010 mg/L ±5% of reading	±0.02 mg/L ±4% of reading
	Method	adaptation of the USEPA approved bicinchoninate method	
Measurement System	Light Source	light emitting diode	
	Bandpass filter	575 nm	575 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
Additional Specifications	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
Additional Specifications	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)		

HI97747 and **HI97702** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

Ordering Information

HI97747C and **HI97702C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97747	HI97702
Reagents and Standards		HI97747-11 CAL Check standard cuvettes for copper LR
		HI95747-01 copper LR reagents for 100 tests
		HI95747-03 copper LR reagents for 300 tests
Reagents and Standards		HI97702-11 CAL Check standard cuvettes for copper HR
		HI93702-01 copper HR reagents for 100 tests
		HI93702-03 copper HR reagents for 300 tests

HI97714

Cyanide Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

The term "cyanide" refers to all of the CN groups in cyanide compounds that can be determined as the cyanide ion, CN⁻. Originating in water primarily from metallurgical and galvanic industrial plants, cyanide is highly toxic to the human nervous system.

Specifications	HI97714 Cyanide	
Measurement	Range	0.000 to 0.200 mg/L (ppm) (as CN ⁻)
	Resolution	0.001 mg/L
	Accuracy @25°C (77°F)	±0.005 mg/L ±3% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Pyridine-Pyrazolone method
Measurement System	Light Source	light emitting diode
	Bandpass filter	610 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information

HI97714 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.
CAL Check standards and testing reagents sold separately

Reagents and Standards

HI97714	HI97714-11 CAL Check standard cuvettes for cyanide
	HI93714-01 cyanide reagents for 100 tests
	HI93714-03 cyanide reagents for 300 tests

HI97722

Cyanuric Acid Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Cyanuric acid (CYA) is best known as a stabilizing reagent for chlorine. It is widely applied in swimming pool and spa treatment programs to slow down the decomposition of hypochlorous acid. In outside pool areas, this process is accelerated by the effects of UV rays. When applied properly it can save up to 80% of normal chlorine consumption in pools during peak months.

Cyanuric acid is also used in chlorinated beaches, selective herbicides and whitening agents.



Specifications	HI97722 Cyanuric Acid	
Measurement	Range	0 to 80 mg/L (ppm) (as CYA)
	Resolution	1 mg/L (ppm)
	Accuracy @25°C (77°F)	±1 mg/L ±15% of reading
	Method	adaptation of the turbidimetric method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information

HI97722 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Reagents and Standards

HI97722	HI97722-11 CAL Check standard cuvettes for cyanuric acid
	HI93722-01 cyanuric acid reagents for 100 tests
	HI93722-03 cyanuric acid reagents for 300 tests

HI97729 · HI97739

Fluoride, Low and High range Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications		HI97729 Fluoride LR	HI97739 Fluoride HR
Measurement	Range	0.00 to 2.00 mg/L (ppm) (as F ⁻)	0.0 to 20.0 mg/L (ppm) (as F ⁻)
	Resolution	0.01 mg/L	0.1 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading	±0.5 mg/L ±3% of reading
	Method	adaptation of the EPA method 340.1 and SPADNS method	adaptation of the SPADNS method
Measurement System	Light Source	light emitting diode	
	Bandpass filter	575 nm	575 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
Additional Specifications	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
	Weight	380 g (13.4 oz.)	

HI97729 and **HI97739** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

Ordering Information

HI97729C and **HI97739C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 2000 µL automatic pipette with instruction sheet, 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately

Reagents and Standards

HI97729	HI93703-53 reagent for reducing chlorine concentration
	HI97729-11 CAL Check standard cuvettes for fluoride LR
	HI95729-01 fluoride LR reagents for 100 tests
	HI95729-03 fluoride LR reagents for 300 tests
HI97739	HI97739-11 CAL Check standard cuvettes for fluoride HR
	HI93739-01 fluoride HR reagents for 100 tests
	HI93739-03 fluoride HR reagents for 300 tests

Significance of Use

Fluoride is best known for preventing tooth decay. Water authorities often add fluoride to drinking water to maintain approximately a 1.0 mg/L (ppm) concentration. Fluoride can be found naturally in groundwater, particularly if a reservoir is in close proximity to seawater. While fluoride does help prevent tooth decay, too little can be ineffective while too much can cause staining of teeth.

HI97720 · HI97719

Hardness Standard Method Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Water, with exception to distilled water, contains dissolved salts (magnesium and calcium carbonates). The concentration of these salts determines the water hardness, which can be expressed in calcium carbonate or magnesium carbonate. The sum of these two represents the total hardness level. In addition, water hardness is also related to the phenomenon of pipe rusting in water heating and cooling systems, reverse osmosis, and demineralization plants.



Specifications	HI97720 Ca Hardness	HI97719 Mg Hardness
Measurement	Range	0.00 to 2.70 mg/L (ppm) (as CaCO ₃)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
Measurement System	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. Calmagite method
	Light Source	light emitting diode
	Bandpass filter	525nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)	

Ordering Information

HI97720 and **HI97719** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

HI97720C and **HI97719C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), 1 mL syringe with tip, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards

HI97720	HI97720-11 CAL Check standard cuvettes for calcium hardness
	HI95720-01 calcium hardness reagents for 100 tests
	HI95720-03 calcium hardness reagents for 300 tests
HI97719	HI97719-11 CAL Check standard cuvettes for magnesium hardness
	HI93719-01 magnesium hardness reagents for 100 tests
	HI93719-03 magnesium hardness reagents for 300 tests

HI97735

Total Hardness Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications

HI97735 Total Hardness

Total Hardness LR	Range	0 to 250 mg/L (as CaCO ₃)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±5 mg/L ±4% of reading at 25°C
	Method	Adaptation of the EPA recommended method 130.1
Total Hardness MR	Range	200 to 500 mg/L (as CaCO ₃)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±7 mg/L ±3% of reading at 25°C
	Method	Adaptation of the EPA recommended method 130.1
Total Hardness HR	Range	400 to 750 mg/L (as CaCO ₃)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±10 mg/L ±2% of reading at 25°C
	Method	Adaptation of the EPA recommended method 130.1
Measurement System	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
Weight	380 g (13.4 oz.)	

HI97735 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97735C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101414 rigid carrying case. Reagents sold separately

Ordering Information

Reagents and Standards

HI97735	HI97735-11 CAL Check standard cuvettes for total hardness LR, MR, HR
	HI93735-00 total hardness LR reagent for 100 tests
	HI93735-01 total hardness MR reagent for 100 tests
	HI93735-02 total hardness HR reagent for 100 tests
	HI93735-0 reagents for 300 tests (LR - 100 tests, MR - 100 tests, HR - 100 tests)

See page 10.107 for standard reagents; see page 10.108 for CAL Check kits; see page 10.46 for general accessories

HI97704

Hydrazine Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Hydrazine is a liquid chemical substance normally used in high pressure heating plants because of its properties as an oxygen inhibitor, helping to avoid scaling and corrosion. Hydrazine reacts with dissolved oxygen to yield nitrogen and water; this is an advantage over sulfite treatment because it does not produce any dissolved solids in the boiled water. Hydrazine is also used as an energy source in fuel elements, as a reducing agent for metal recovery, and as an intermediate in the production of insecticides, herbicides, pharmaceuticals, and many other chemical products.



Specifications	HI97704 Hydrazine	
Measurement	Range	0 to 400 µg/L (ppb) (as N ₂ H ₄)
	Resolution	1 µg/L
	Accuracy @25°C (77°F)	±4% of full scale
Measurement System	Method	adaptation of the ASTM Manual of Water and Environmental Technology, method D1385-88 for natural and treated water
	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
Weight	380 g (13.4 oz.)	

HI97704 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97704C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97704
	HI97704-11 CAL Check standard cuvettes for hydrazine
	HI93704-01 hydrazine reagents for 100 tests
	HI93704-03 hydrazine reagents for 300 tests



HI97718

Iodine Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications	HI97718 Iodine	
Measurement	Range	0.0 to 12.5 mg/L (ppm) (as I ₂)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±0.1 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97718 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97718C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Ordering Information

Reagents and Standards

HI97718	HI97718-11 CAL Check standard cuvettes for iodine
	HI93718-01 iodine reagents for 100 tests
	HI93718-03 iodine reagents for 300 tests

Significance of Use

The disinfectant properties of iodine have led to its use as an alternative to chlorine and bromine. Unlike chlorinated pools, water treated with iodine decreases eye irritation among swimmers and provides a level of disinfection more stable to adverse conditions. However, its toxic and corrosive properties, along with the difficulties of dissolving it in water, have limited its widespread acceptance. One of the most common applications of iodine is in poultry industry process water.

HI97746 • HI97721

Iron, Low and High Range Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. The iron concentration in water needs to be monitored because it becomes harmful above certain levels. In domestic water, for instance, iron can unpleasantly alter the taste, stain laundry, damage kitchenware and favor the growth of certain bacteria. Iron is also an indicator of ongoing corrosion in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.



Specifications	HI97746 Iron LR	HI97721 Iron HR	
Measurement	Range	0.00 to 1.60 mg/L (ppm) (as Fe)	0.00 to 5.00 mg/L (ppm) (as Fe)
	Resolution	0.01 mg/L	0.01 mg/L
	Accuracy @25°C (77°F)	±0.01 mg/L ±8% of reading	±0.04 mg/L ±2% of reading
	Method	adaptation of the TPTZ method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 3500-Fe B, Phenanthroline Method
Measurement System	Light Source	light emitting diode	
	Bandpass filter	525 nm	
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
Additional Specifications	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)		

Ordering Information

HI97746 and **HI97721** is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

HI97746C and **HI97721C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately

Reagents and Standards

HI97746	HI97746-11 CAL Check standard cuvette for iron LR
	HI93746-01 iron LR reagents for 50 tests
	HI93746-03 iron LR reagents for 150 tests
HI97721	HI97721-11 CAL Check standard cuvettes for iron HR
	HI93721-01 iron HR reagent for 50 tests
	HI93701-03 iron HR reagent for 150 tests

HI97748 • HI97709

Manganese, Low and High Range Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications	HI97748 Manganese LR	HI97709 Manganese HR	
Measurement	Range	0 to 300 µg/L (as Mn)	0.0 to 20.0 mg/L (as Mn)
	Resolution	1 µg/L	0.1 mg/L
	Accuracy @25°C (77°F)	±10 µg/L ±3% of reading at 25°C	±0.2 mg/L ±3% of reading at 25°C
	Method	Adaptation of the PAN Method	adaptation of Standard Methods for the Examination of Water and Wastewater, 18th Edition, Periodate Method
Measurement System	Light Source	light emitting diode	
	Bandpass filter	575 nm	525 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)		

HI97748 and **HI97709** is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

Ordering Information

HI97748C and **HI97709C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately

Reagents and Standards	HI97748	HI97709
	HI97748-11 CAL Check standard cuvettes for manganese LR	HI97709-11 CAL Check standard cuvettes for manganese HR
	HI93748-01 manganese LR reagents for 50 tests	HI93709-01 manganese HR reagents for 100 tests
	HI93748-03 manganese LR reagents for 150 tests	HI93709-03 manganese HR reagents for 300 tests

HI97730

Molybdenum Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Molybdenum is commonly used in creating many types of high strength steel alloys. It has the ability to withstand extremely high temperatures without significant expansion or softening and displays a high resistance to corrosion. Wastewater from industries that use molybdenum must be treated to remove high amounts before discharge into the public collection system.



Specifications	HI97730 Molybdenum		
Measurement	Range	0.0 to 40.0 mg/L (ppm) (as Mo ⁶⁺)	
	Resolution	0.1 mg/L	
	Accuracy @25°C (77°F)	±0.3 mg/L ±5% of reading	
Measurement System	Method	adaptation of the mercaptoacetic acid method	
	Light Source	light emitting diode	
	Bandpass filter	420 nm	
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
	Weight	380 g (13.4 oz.)	
	Ordering Information	HI97730 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. <small>CAL Check standards and testing reagents sold separately</small>	
		Reagents and Standards	HI97730
	HI93730-01 molybdenum reagents for 100 tests		
	HI93730-03 molybdenum reagents for 300 tests		

HI97740 · HI97726

Nickel, Low and High Range Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications	HI97740 Nickel LR	HI97726 Nickel HR	
Measurement	Range	0.000 to 1.000 mg/L (ppm) (as Ni)	0.00 to 7.00 g/L (as Ni)
	Resolution	0.001 mg/L	0.01 g/L
	Accuracy @25°C (77°F)	±0.010 mg/L ±7% of reading	±0.07 mg/L ±4% of reading
	Method	adaptation of the 1-(2-pyridylazo)-2-naphthol PAN method	adaptation of the photometric method
Measurement System	Light Source	light emitting diode	
	Bandpass filter	575 nm	
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
Additional Specifications	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
	Weight	380 g (13.4 oz.)	

Ordering Information

HI97740 and **HI97726** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

HI97726C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately

Reagents and Standards

HI97740	HI97740-11 CAL Check standard cuvettes for nickel LR
	HI93740-01 nickel LR reagents for 50 tests
	HI93740-03 nickel LR reagents for 150 tests
HI97726	HI97726-11 CAL Check standard cuvettes for nickel HR
	HI93726-01 nickel HR reagents for 100 tests
	HI93726-03 nickel HR reagents for 300 tests

Significance of Use

Nickel is commonly utilized by the electroplating industry in processes utilizing stainless steel, cobalt, or nickel alloys. By using nickel in certain alloys, manufacturers can achieve a product that is highly resistant to chemical stress and exhibits a longer lifespan. Nickel is also an essential trace element that is essential for biological processes in livestock health and production. Nickel is also used in batteries, fuel cells, and hydrogenation of vegetable oils in the food industry.

HI97728

Nitrate Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Nitrogen is abundant in the Earth's atmosphere and is present in water in the form of nitrate, nitrite, and ammonia. Plants use nitrogen as a nutrient to build proteins by tracking it in through their root system. Nitrate is formed in water mainly through rainfall, decomposition of organic matter, and runoff from manmade pollutants such as sewage waste and fertilizers. Almost all surface waters have a measurable level of nitrate, and a moderate amount is considered beneficial. Large amounts of nitrate, however, can lead to eutrophication which may result in decreased levels of dissolved oxygen in the water.



Specifications	HI97728 Nitrate	
Measurement	Range	0.0 to 30.0 mg/L (as NO ₃ -N)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±0.5 mg/L ±10% of reading at 25°C
Measurement System	Method	Adaptation of Cadmium Reduction method
	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photodiode
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
Weight	380 g (13.4 oz.)	

HI97728 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97728C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97728	
		HI97728-11 CAL Check standard cuvettes for nitrate
		HI93728-01 nitrate reagents for 100 tests
		HI93728-03 nitrate reagents for 300 tests

HI97707 · HI97708

Nitrite, Low and High Range Portable Photometers



- Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- CAL Check™
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- On-screen tutorial mode with animations
 - Guides users step-by-step through the measurement process
- Waterproof and floating IP67 case
- Unit of measure is displayed along with reading
- Built-in timer
 - Built-in reaction timer that ensures consistency between tests.
- Error messages on display
 - Alerts to problems including no cap, high zero, and standard too low
- GLP data
 - Displays the last calibration date.
- Auto logging
- Battery status indicator
- Auto-shut off

Specifications		HI97707 Nitrite, LR	HI97708 Nitrite, HR
Measurement	Range	0 to 600 µg/L (as NO ₂ -N)	0 to 150 mg/L (ppm) (as NO ₂ -N)
	Resolution	1 µg/L	1 mg/L
	Accuracy @25°C (77°F)	±20 µg/L ±4% of reading	±4 mg/L ±4% of reading
	Method	adaptation of an EPA approved diazotization method	adaptation of the Ferrous Sulfate method
Measurement System	Light Source	light emitting diode	
	Bandpass filter	466 nm	575 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
Additional Specifications	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
	Weight	380 g (13.4 oz.)	

Ordering Information

HI97707 and **HI97708** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

HI97707C and **HI97708C** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately

Reagents and Standards

HI97707	HI97707-11 CAL Check standard cuvettes for nitrite LR
	HI93707-01 nitrite LR reagents for 100 tests
	HI93707-03 nitrite LR reagents for 300 tests
HI97708	HI97708-11 CAL Check standard cuvettes for nitrite HR
	HI93708-01 nitrite HR reagents for 100 tests
	HI93708-03 nitrite HR reagents for 300 tests

Significance of Use

Nitrites can be harmful to aquatic organisms even in low concentrations and for this reason, they are closely monitored in aquaculture facilities. In cooling towers, however, an adequate amount of nitrites is necessary to prevent corrosion. In high concentrations, they can be harmful to the environment and to humans. They are, therefore, normally monitored to verify the quality of water for domestic use, as well as lakes and ponds.

Nitrites are an intermediate product in the nitrogen cycle and are produced by ammonia oxidation with water, or even originate in industrial waste directly. They must not be present in drinking water.

HI97732

Dissolved Oxygen Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Dissolved oxygen analysis measures the amount of gaseous oxygen (O₂) dissolved in an aqueous solution. Dissolved oxygen is one of the most important parameters in aquatic systems. This gas is required for metabolism by aerobic organisms and also influences inorganic chemical reactions. Therefore, knowledge of the solubility and dynamics of oxygen distribution is essential to interpreting both biological and chemical processes within water bodies. Oxygen gets into water by diffusion from the surrounding air by aeration (rapid movement) and as a product of photosynthesis. The amount of oxygen that can dissolve in pure water is inversely proportional to the temperature of the water; the warmer the water, the less dissolved oxygen is present.



Specifications		HI97732 Oxygen, Dissolved
Measurement	Range	0.0 to 10.0 mg/L (ppm) (as O ₂)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±0.4 mg/L ±3% of reading
	Method	Adaptation of Standard Methods for Examination of Water and Wastewater (18th edition) Azide modified Winkler method reaction causes a yellow tint in sample
Measurement System	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	HI97732 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. <small>CAL Check standards and testing reagents sold separately</small>	
Reagents and Standards	HI97732	HI97732-11 CAL Check standard cuvettes for dissolved oxygen
		HI93732-01 dissolved oxygen reagent for 100 tests
		HI93732-03 dissolved oxygen reagent for 300 tests

HI97713 • HI97717

Phosphate, Low and High Range Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications	HI97713 Phosphate, LR	HI97717 Phosphate, HR	
Measurement	Range	0.00 to 2.50 mg/L (as PO ₄ ³⁻)	0.0 to 30.0 mg/L (ppm) (as PO ₄ ³⁻)
	Resolution	0.01 mg/L	0.1 mg/L
	Accuracy @25°C (77°F)	±0.04 mg/L ±4% of reading at 25°C	±1.0 mg/L ±4% of reading
	Method	Adaptation of the Ascorbic Acid method	Amino Acid Method, adapted from Standard Method for the Examination of Water and Wastewater
Measurement System	Light Source	light emitting diode	
	Bandpass filter	610 nm	525 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
	Light Detector	silicon photocell	
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
	Weight	380 g (13.4 oz.)	

HI97713 and **HI97717** are supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately.

Ordering Information

HI97713C and **HI97717** includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97713	HI97717
	HI97713	HI97713-11 CAL Check standard cuvettes for phosphate LR
		HI93713-01 phosphate LR reagent for 100 tests
		HI93713-03 phosphate LR reagent for 300 tests
	HI97717	HI97717-11 CAL Check standard cuvettes for phosphate HR
		HI93717-01 phosphate HR reagent for 100 tests
		HI93717-03 phosphate HR reagent for 300 tests

Significance of Use

Phosphates are used in a number of everyday products. Such as cola drinks to enhance flavor and tartness, antifreeze as a pH buffer, and french fries to delay darkening of the cut potatoes. They are also extensively used in detergents and cleaning fluids because of their ability to soften water and remove soil deposits.

Phosphate is essential for the growth and development of plant roots, stems, flowers and seeds, hence why it is one of the most commonly added to fertilizers. However, high concentrations of phosphates in agricultural runoff can cause environmental pollution, as they are a primary cause of eutrophication. Local laws govern the use of phosphates and the discharge levels into streams and waterways..

HI97706

Phosphorus Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Common in natural systems, such as lakes, oceans, and soil, phosphorus is an essential element for plant and animal growth. However, when present in large concentrations, phosphorus can cause excessive microorganism and algae growth. For hobbyists with saltwater aquaria, a high amount of phosphorus can be problematic to fish and coral. The main source of phosphorus in reef aquaria is through food that is introduced on a daily basis, but it is also produced through the breakdown of plant material and excretion from fish. Replacement water can also be a source of phosphorus in aquaria, where tap water or reverse osmosis water is used to replace evaporated water and control the salt concentration in tanks. Both forms of water contain phosphorus, albeit in varying concentrations, and will have negative effects if the accumulating levels are not controlled. Phosphorus is also responsible for corrosion of piping systems if present in high enough amounts.



Specifications

HI97706 Phosphorus

Measurement	Range	0.0 to 15.0 mg/L (ppm) (as P)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	± 0.3 mg/L ±4% of reading
Measurement System	Method	Amino Acid Method, adapted from Standard Method for the Examination of Water and Wastewater
	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97706 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately

Ordering Information

HI97706C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards

HI97706

- HI97706-11** CAL Check standard cuvettes for phosphorus
- HI93706-01** phosphorus reagents for 100 tests
- HI93706-03** phosphorus reagents for 300 tests

HI97750

Potassium LR and MR Portable Photometers



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications

HI97750 Potassium LR and MR

Potassium LR	Range	0.0 to 10.0 mg/L (as K)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±3.0 mg/L ±7 % of reading
	Method	adaptation of the Turbidimetric Tetraphenylborate Method
Potassium MR	Range	10 to 100 mg/L (as K)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±10 mg/L ±7 % of reading
	Method	adaptation of the Turbidimetric Tetraphenylborate Method
Measurement System	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97750 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97750C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Ordering Information

Reagents and Standards	HI97750	HI97750-11 CAL Check standard cuvettes for potassium
		HI93750-01 potassium reagents for 100 tests
		HI93750-03 potassium reagents for 300 tests

See page 10.107 for standard reagents; see page 10.108 for CAL Check kits; see page 10.46 for general accessories

HI97705 · HI97770

Silica, Low and High Range Portable Photometers

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

The dissolved mineral forms of silica are found in all natural waters. Although silica is only slightly soluble in water and it can be found as ionic silica, silicates, and colloidal or suspended particles. The solubility of silica is highly dependent on pH, temperature, and pressure. Silica's presence in industrial applications, particularly in high pressure turbines, is undesirable because of scaling caused as silica precipitates out of solution at the elevated temperatures and pressures. Heating systems and reverse osmosis plants also require monitoring of silica to ensure process efficiency.



Specifications	HI97705 Silica LR	HI97770 Silica HR	
Measurement	Range	0.00 to 2.00 mg/L (ppm) (as SiO ₂)	0 to 200 mg/L (ppm) (as SiO ₂)
	Resolution	0.01 mg/L	1 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading	±1 mg/L ±5% of reading
	Method	adaptation of the ASTM D859, heteropoly blue method	adaptation of the USEPA method 370.1 for drinking, surface and saline waters, domestic and industrial wastes and Standard Method 4500-SiO ₂ C
Measurement System	Light Source	light emitting diode	
	Bandpass filter	610 nm	466 nm
	Bandpass filter bandwidth	8 nm	
	Bandpass filter wavelength accuracy	±1.0 nm	
Additional Specifications	Light Detector	silicon photocell	
	Cuvette type	round 24.6 mm diameter (22 mm inside)	
	Auto logging	50 readings	
Ordering Information	Display	128 x 64 pixel B/W LCD with backlight	
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)	
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Reagents and Standards	Weight	380 g (13.4 oz.)	
	HI97705	HI97705 and HI97770 are supplied with sample cuvettes (2), sample stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately	
		HI97705C and HI97770C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case. Reagents sold separately	
		HI97705-11 CAL Check standard cuvettes for silica LR	
	HI97770	HI93705-01 silica LR reagents for 100 tests	
		HI93705-03 silica LR reagents for 300 tests	
HI97770-11 CAL Check standard cuvettes for silica HR			
HI96770-01 silica HR reagents for 100 tests			
HI96770-03 silica HR reagents for 300 tests			



HI97737

Silver Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

At times, silver is used in the disinfection of pools and spas, as well as in water filters. As small quantities of silver acts as a bacteriostatic agent preventing the growth of bacteria. The presence of silver in water is also indicative of pollution, mainly from film manufacturers, film processors, and surface finishers. Silver levels are closely monitored since its presence in drinking water can cause discoloration of the skin, eyes, and mucous membranes.

Specifications	HI97737 Silver	
Measurement	Range	0.000 to 1.000 mg/L (ppm) (as Ag)
	Resolution	0.001 mg/L
	Accuracy @25°C (77°F)	±0.020 mg/L ±5% of reading
	Method	adaptation of the PAN method
Measurement System	Light Source	light emitting diode
	Bandpass filter	575 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	HI97737 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. <small>CAL Check standards and testing reagents sold separately</small>	
Reagents and Standards	HI97737	HI97737-11 CAL Check standard cuvettes for silver
		HI93737-01 silver reagents for 50 tests
		HI93737-03 silver reagents for 150 tests

HI97751

Sulfate Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Sulfate is naturally present within waters at different concentrations. However, sulfate concentrations are kept within strict ranges for drinking water, since this value can become high near mine drainage points. Sulfate is also rigorously tested in the production of beverages such as beer, due to its significant effect upon odor and taste. Sulfate is also rigorously tested in the production of beverages such as beer, due to its significant effect upon odor and taste.



Specifications

HI97751 Sulfate

Measurement	Range	0 to 150 mg/L (ppm) (as SO ₄ ²⁻)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±5 mg/L ±3% of reading
	Method	adaptation of the turbidimetric method; sulfate is precipitated with barium chloride crystals and light absorbance of the suspension is measured
Measurement System	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
Additional Specifications	Light Detector	silicon photodiode
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)	

HI97751 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97751C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), scissors, cuvette wiping cloth, CAL Check standard certificate, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97751	HI97751-11 CAL Check standard cuvettes for sulfate
		HI93751-01 sulfate reagents for 100 tests
		HI93751-03 sulfate reagents for 300 tests



HI97731

Zinc Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Zinc is normally introduced into drinking water through industrial effluents, especially due to dezincification of brass and deterioration of galvanized iron. In addition to drinking water, zinc is measured in surface finishing, boilers and cooling towers, water conditioning, and effluent waters

Specifications		HI97731 Zinc
Measurement	Range	0.00 to 3.00 mg/L (ppm) (as Zn)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, Zincon method causes a brownish-green tint in the sample
Measurement System	Light Source	light emitting diode
	Bandpass filter	575 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information

HI97731 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.
CAL Check standards and testing reagents sold separately

Reagents and Standards	HI97731	
		HI97731-11 CAL Check standard cuvettes for zinc
		HI93731-01 zinc reagents for 100 tests
		HI93731-03 zinc reagents for 300 tests



HI97101

Bromine, Free and Total Chlorine, Cyanuric Acid, Iron LR, Iodine and pH Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications

HI97101 Bromine, Chlorine, Cyanuric Acid, Iodine, Iron LR and pH

pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH
	Method	Phenol Red method
Chlorine, Free and Total	Range	0.00 to 5.00 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading
	Method	adaptation of the USEPA method and Standard Method 4500-Cl G
Cyanuric Acid	Range (all methods)	0 to 80 mg/L (ppm)
	Resolution (all methods)	1 mg/L
	Accuracy @25°C (77°F)	±1 mg/L ±15% of reading
	Method	adaptation of the turbidimetric method
Iodine	Range	0.0 to 12.5 mg/L (ppm)
	Resolution	0.1 mg/L
	Accuracy @25°C (77°F)	±0.1 mg/L ±5% of reading
	Method	adaptation of the EPA, DPD method
Bromine	Range	0.00 to 10.00 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.08 mg/L ±3% of reading
	Method	adaptation of the EPA, DPD method
Iron LR	Range	0.00 to 1.60 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.01 mg/L ±8% or reading
	Method	adaptation of the TPTZ method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97101 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97101C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificates, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Reagents and Standards

HI97101

HI97701-11 CAL Check standard cuvettes for free and total chlorine

HI93701-01 free chlorine reagents for 100 tests

HI97710-11 CAL Check standard cuvettes for pH

HI93710-01 pH reagents for 100 tests

HI93711-01 total chlorine reagents for 100 tests

HI97716-11 CAL Check standard cuvettes for bromine

HI93716-01 bromine reagents for 100 tests

HI97718-11 CAL Check standard cuvettes for iodine

HI93718-01 iodine reagents for 100 tests

HI97722-11 CAL Check standard cuvettes for cyanuric acid

HI93722-01 cyanuric acid reagents for 100 tests

HI97746-11 CAL Check standard cuvettes for iron

HI93746-01 iron LR reagents for 50 tests



HI97104

pH, Alkalinity, Free and Total Chlorine and Cyanuric Acid Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Chlorine is the most commonly used water disinfectant used by homeowners, hotels, and commercial businesses. In swimming pools, spas, and similar applications, cyanuric acid helps to stabilize chlorine and prevent its breakdown, especially in sunlight. Frequent testing of both cyanuric acid and pH helps to minimize chlorine consumption.

Specifications

HI97104 pH, Alkalinity, Free and Total Chlorine, Cyanuric Acid

pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH of reading at 25°C
	Method	adaptation of the Phenol Red method
Alkalinity	Range	0 to 500 mg/L (as CaCO ₃)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±5 mg/L ±5% of reading at 25°C
	Method	Colorimetric method
Chlorine, Free and Total	Range (all methods)	0.00 to 5.00 mg/L (as Cl ₂)
	Resolution (all methods)	0.01 mg/L
	Accuracy @25°C (77°F) (all methods)	±0.03 mg/L ±3% of reading at 25°C
	Method	adaptation of the EPA DPD method 330.5
Cyanuric Acid	Range	0 to 80 mg/L (as CYA)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±1 mg/L ±15% of reading at 25 °C
	Method	adaptation of the turbidimetric method
Measurement System	Light Source	light emitting diode
	Bandpass filters	525 nm and 610 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97104 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97104C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101414 rigid carrying case.

Reagents sold separately

Reagents and Standards	HI97104	HI97775-11 CAL Check standard cuvettes for alkalinity
		HI775-26 alkalinity reagent
		HI97722-11 CAL Check standard cuvettes for cyanuric acid
		HI93722-01 cyanuric acid reagent for 100 tests
		HI93722-03 cyanuric acid reagent for 300 tests
		HI97701-11 CAL Check standard cuvettes for free and total chlorine
		HI93701-01 free chlorine powder reagent 100 tests
		HI93701-03 free chlorine powder reagent for 300 tests
		HI93701-F free chlorine liquid reagent for 300 tests
		HI93711-01 total chlorine powder reagent 100 tests
		HI93711-03 total chlorine powder reagent for 300 tests
		HI93701-T total chlorine liquid reagent for 300 tests
		HI93755-53 chlorine removal reagent
		HI97710-11 CAL Check standard cuvettes for pH
		HI93710-01 pH reagent for 100 tests
HI93710-03 pH reagent for 300 tests		



HI97725

Free and Total Chlorine, Cyanuric Acid and pH Portable Photometer

for Legionella Protection

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low

- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Legionella

Legionella species is the agent that causes human Legionnaires' disease as well as the lesser form, Pontiac Fever. Transmission is facilitated by the inhalation of mist droplets containing the Legionella bacteria.

Common sources of Legionella include cooling towers used in industrial cooling water systems as well as in large central air conditioning systems, domestic hot water systems, fountains, and similar disseminators that draw from a public water supply. Natural sources include freshwater ponds and creeks.

Since Legionella is especially harmful to people with weakened immune systems, it should be actively checked for in the water systems of hospitals and nursing homes.

Specifications		HI97725 Chlorine, Cyanuric Acid and pH
Chlorine, Free	Range	0.00 to 5.00 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading
	Method	adaptation of the EPA recommended DPD method 330.5 and standard method 4500-CL G
Chlorine, Total	Range	0.00 to 5.00 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading
	Method	adaptation of the EPA recommended DPD method 330.5 and standard method 4500-CL G
Cyanuric Acid	Range	0 to 80 mg/L (ppm)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±1 mg/L ±15% of reading
	Method	adaptation of the Turbidimetric method
pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH
	Method	Phenol Red method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97725 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

HI97725C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, CAL Check standard certificates, instrument quality certificate, instruction manual, and rigid carrying case.

Reagents sold separately

Ordering Information

Reagents and Standards

HI97725

HI97701-11 CAL Check standard cuvettes for free and total chlorine

HI93701-01 free chlorine reagents for 100 tests

HI93701-03 free chlorine reagents for 300 tests

HI97710-11 CAL Check standard cuvettes for pH

HI93710-01 pH reagents for 100 tests

HI93710-03 pH reagents for 300 tests

HI93711-01 total chlorine reagents for 100 tests

HI93711-03 total chlorine reagents for 300 tests

HI97722-11 CAL Check standard cuvettes for cyanuric acid

HI93722-01 cyanuric acid reagents for 100 tests

HI93722-03 cyanuric acid reagents for 300 tests

HI97771

Free Chlorine and Total Chlorine UHR Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

As one of the most common forms of disinfectants used, chlorine improves water quality by destroying disease-producing microorganisms and by reacting with other organic and inorganic substances. Chlorine levels must be actively monitored to ensure sufficient chlorine is present for disinfection, as well as to control adverse effects such as taste, odor, and potential reactions with organic matter to form harmful disinfection byproducts.



Specifications

		HI97771 Free Chlorine and Total Chlorine UHR
Free Chlorine (powder and liquid)	Range	0.00 to 5.00 mg/L (as Cl ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading at 25°C
	Method	Adaptation of the EPA DPD method 330.5
Total Chlorine Ultra High Range	Range	0 to 500 mg/L (as Cl ₂)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±3 mg/L ±3% of reading at 25 °C
Measurement System	Method	adaptation of the Standard Methods for Examination of Water and Wastewater, 20th edition, 4500-Cl.
	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Additional Specifications	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)	
Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable	
Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")	
Weight	380 g (13.4 oz.)	

HI97771 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97771C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. Reagents sold separately

Reagents and Standards

HI97771

HI97701-11 CAL Check standard cuvettes for free and total chlorine
HI93701-01 free chlorine powder reagent for 100 tests
HI93701-03 free chlorine powder reagent for 300 tests
HI93701-F free chlorine liquid reagent for 300 tests
HI97771-11 CAL Check standard cuvettes for total chlorine UHR
HI95711-01 total chlorine UHR reagent for 100 tests
HI95711-03 total chlorine UHR reagent for 300 tests

HI97736

Total Hardness and pH Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications HI97736 Total Hardness and pH

Mg Hardness	Range	0.00 to 2.00 mg/L
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
Ca Hardness	Range	0.00 to 2.70 mg/L
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
Total Hardness	Range	0.00 to 4.70 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH
	Method	adaptation of phenol red method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information

HI97736 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Reagents and Standards HI97736

HI97710-11 CAL Check standard cuvettes for pH

HI93710-01 pH reagents for 100 tests

HI93710-03 pH reagents for 300 tests

HI97719-11 CAL Check standard cuvettes for hardness

HI93719-01 hardness reagents for 100 tests

HI93719-03 hardness reagents for 300 tests



HI97710

pH, Free and Total Chlorine Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications		HI97710 pH and Free and Total Chlorine
pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH of reading at 25°C
	Method	adaptation of the Phenol Red method.
Chlorine Dioxide, Rapid Method	Range	0.00 to 2.00 mg/L (as ClO ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.10 mg/L, ±5% of reading
	Method	DPD-Glycine
Chlorine, Free and Total	Range (all methods)	0.00 to 5.00 mg/L (as Cl ₂)
	Resolution (all methods)	0.01 mg/L
	Accuracy @25°C (77°F) (all methods)	±0.03 mg/L ±3% of reading at 25°C
	Method	adaptation of the EPA DPD method 330.5
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

HI97710 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Ordering Information

HI97710C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.

Reagents sold separately

Reagents and Standards		HI97710
		HI97701-11 CAL Check standard cuvettes for free and total chlorine
		HI93701-01 free chlorine powder reagent for 100 tests
		HI93701-03 free chlorine powder reagent for 300 tests
		HI93701-F free chlorine liquid reagent for 300 tests
		HI93711-01 total chlorine powder reagent for 100 tests
		HI93711-03 total chlorine powder reagent for 300 tests
		HI93701-T total chlorine liquid reagent for 300 tests
		HI97710-11 CAL Check standard cuvettes for pH
		HI93710-01 pH reagent for 100 tests
		HI93710-03 pH reagent for 300 tests

HI97711

Free and Total Chlorine Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

As one of the most common forms of disinfectants used, chlorine improves water quality by destroying disease-producing microorganisms and by reacting with other organic and inorganic substances. Chlorine levels must be actively monitored to ensure sufficient chlorine is present for disinfection, as well as to control adverse effects such as taste, odor, and potential reactions with organic matter to form harmful disinfection byproducts.



Specifications		HI97711 Free and Total Chlorine
Measurement	Range (all methods)	0.00 to 5.00 mg/L (as Cl ₂)
	Resolution (all methods)	0.01 mg/L
	Accuracy @25°C (77°F) (all methods)	±0.03 mg/L ±3% of reading at 25 °C
	Method	adaptation of US EPA method 330.5, DPD Colorimetric method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
Additional Specifications	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
Reagents and Standards	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
	Ordering Information	<p>HI97711 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.</p> <p>CAL Check standards and testing reagents sold separately</p> <p>HI97711C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificate, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case.</p> <p>Reagents sold separately</p>
Reagents and Standards	HI97711	<p>HI97701-11 CAL Check standard cuvettes for free and total chlorine</p> <p>HI93701-01 free chlorine powder reagent for 100 tests</p> <p>HI93701-03 free chlorine powder reagent for 300 tests</p> <p>HI93701-F free chlorine liquid reagent for 300 tests</p> <p>HI93711-01 total chlorine powder reagent for 100 tests</p> <p>HI93711-03 total chlorine powder reagent for 300 tests</p> <p>HI93701-T total chlorine liquid reagent for 300 tests</p>

HI97734

Free and Total Chlorine HR Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Chlorine is one of the most cost-effective disinfectants used in a variety of different applications. Its use varies from light application in surface sanitation, to heavy duty disinfection of medical devices, to removal of microorganism infections in piping systems. The advantage of using chlorine over peroxide-type disinfectants is that chlorine is not only a strong oxidant, it also is capable of breaking tough chemical bonds found in cell walls or biofilms. Correct and effective use of chlorine helps to destroy disease-causing pathogens, reduce odors, and eliminate bacteria.

Specifications		HI97734 Free and Total Chlorine HR
Chlorine	Range (all methods)	0.00 to 10.00 mg/L (as Cl ₂)
	Resolution (all methods)	0.01 mg/L
	Accuracy @25°C (77°F) (all methods)	±0.03 mg/L ±3% of reading at 25 °C
	Method	Adaptation of EPA DPD method 330.5
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Ordering Information	<p>HI97734 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. <small>CAL Check standards and testing reagents sold separately</small></p> <p>HI97734C includes photometer, CAL Check standards, sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), cuvette wiping cloth, scissors, CAL Check standard certificates, instrument quality certificate, instruction manual, and HI7101412 rigid carrying case. <small>Reagents sold separately</small></p>	
	Reagents and Standards	<p>HI97734</p> <ul style="list-style-type: none"> • HI97779-11 CAL Check standard cuvettes for chlorine dioxide (rapid) • HI96779-01 chlorine dioxide (rapid) reagents for 100 tests • HI96779-03 chlorine dioxide (rapid) reagents for 300 tests • HI97734-11 CAL Check standard cuvettes for free and total chlorine HR • HI93734-01 free and total chlorine HR reagent for 100 tests • HI93734-03 free and total chlorine HR reagent for 300 tests



HI97741

Total Hardness and Iron, Low Range Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low

- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

In domestic water, iron can alter taste, making it unpleasant to drink. It can also stain laundry, damage kitchenware and favor the growth of certain bacteria. However, low levels of iron are critical in beverage production. The iron concentration in water needs to be monitored since it can become harmful above certain levels.

Hardness, on the other hand, is indicative of the presence of calcium and magnesium in water. By passing through various layers of soil and rocks, rain water dissolves some of the mineral substances.

Hardness can cause pipe rusting in water heating and cooling systems, reverse osmosis and demineralization plants. It can also increase the consumption of soaps and detergents in industrial washing machines or laundries.

Specifications		HI97741 Total Hardness and Iron, LR
Mg Hardness	Range	0.00 to 2.00 mg/L (as CaCO ₃)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
Ca Hardness	Range	0.00 to 2.70 mg/L (as CaCO ₃)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
Total Hardness	Range	0.00 to 4.70 mg/L (as CaCO ₃)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. colorimetric method
Iron, LR	Range	0 to 1.60 mg/L (as Fe)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.01 mg/L ±8% of reading
	Method	Adaptation of the TPTZ method.
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information **HI97741** is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Reagents and Standards		HI97741
		HI97719-11 CAL Check standard cuvettes for hardness
		HI93719-01 hardness reagents for 100 tests
		HI93719-03 hardness reagents for 300 tests
		HI97746-11 CAL Check standard cuvettes for iron
		HI93746-01 iron reagents for 50 tests
		HI93746-03 iron reagents for 150 tests

HI97742

Iron Low Range and Manganese Low Range Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**



Specifications	HI97742	
Iron LR	Range	0.00 to 1.60 mg/L (ppm)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.01 mg/L ±8% or reading
	Method	adaptation of the TPTZ method
Manganese LR	Range	0 to 300 µg/L (as Mn)
	Resolution	0.01 µg/L
	Accuracy @25°C (77°F)	±10 µg/L ±3% of reading at 25°C
Measurement System	Method	adaptation of the 1-(2-pyridylazo)-2-nphtol PAN method
	Light Source	light emitting diode
	Bandpass filter	575 nm
	Bandpass filter bandwidth	8 nm
Additional Specifications	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
Ordering Information	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
Reagents and Standards	HI97742 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. CAL Check standards and testing reagents sold separately	
	HI97742	HI97742-11 CAL Check standard cuvettes for iron LR
		HI93746-01 iron LR reagents for 50 tests
		HI93746-03 iron LR reagents for 150 tests
		HI97748-11 CAL Check standard cuvettes for manganese LR
		HI93748-01 manganese LR reagents for 50 tests
HI93748-03 manganese LR reagents for 150 tests		

HI97752

Calcium and Magnesium Portable Photometer



- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Specifications HI97752 Calcium and Magnesium

Calcium	Range	0 to 400 mg/L (ppm) (as Ca ²⁺)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±10 mg/L ±5% of reading
	Method	adaptation of oxalate method
Magnesium	Range	0 to 150 mg/L (ppm) (as Mg ²⁺)
	Resolution	1 mg/L
	Accuracy @25°C (77°F)	±5 mg/L ±3% of reading
	Method	adaptation of the calmagite method
Measurement System	Light Source	light emitting diode
	Bandpass filter	466 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
	Auto logging	50 readings
Additional Specifications	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)
	Ordering Information	HI97752 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual. <small>CAL Check standards and testing reagents sold separately</small>

Reagents and Standards

HI97752

- HI93752-01** calcium and magnesium reagents for 100 Tests (50 each)
- HI93752-03** calcium and magnesium reagents for 300 Tests (150 each)
- HI97754-11** CAL Check standard cuvettes for magnesium
- HI937520-01** magnesium reagents for 50 tests
- HI937520-03** magnesium reagents for 150 tests
- HI97752-11** CAL Check standard cuvettes for calcium
- HI937521-01** calcium reagents for 50 tests
- HI937521-03** calcium reagents for 150 tests

Significance of Use

Calcium and magnesium both play important roles in the growth of plants. Calcium helps plant roots develop and increases the resistance and strength of plant tissues and stems. Magnesium is an indispensable mineral that helps in the production of chlorophyll, the light-absorbing green pigment that serves as an energy source for plants. It also increases vitamin concentrations and aids in uptake of phosphorus within the plant body.



HI97745

Free and Total Chlorine, Hardness, Iron Low Range, and pH Portable Photometer

- **Advanced LED 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.
 - LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability.
- **CAL Check™**
 - Validate instrument performance at any time using CAL Check cuvettes made with NIST traceable standards. The CAL Check screen guides the user step-by-step through the validation process and user calibration.
- **On-screen tutorial mode with animations**
 - Guides users step-by-step through the measurement process
- **Waterproof and floating IP67 case**
- **Unit of measure is displayed along with reading**
- **Built-in timer**
 - Built-in reaction timer that ensures consistency between tests.
- **Error messages on display**
 - Alerts to problems including no cap, high zero, and standard too low
- **GLP data**
 - Displays the last calibration date.
- **Auto logging**
- **Battery status indicator**
- **Auto-shut off**

Significance of Use

Chlorine and pH are two of the most closely monitored parameters in water quality tests. Hardness is also an important parameter, attentively regulated to reduce waste or ensure proper functioning of equipment. Iron can cause an unpleasant taste or stain kitchenware or laundry.

HI97745 Free and Total chlorine, Total Hardness, Iron Low Range and pH

Specifications

pH	Range	6.5 to 8.5 pH
	Resolution	0.1 pH
	Accuracy @25°C (77°F)	±0.1 pH
	Method	adaptation of the phenol red method
Chlorine, Free Chlorine, Total	Range	0.00 to 5.00 mg/L (ppm) (as Cl ₂)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.03 mg/L ±3% of reading
	Method	adaptation of the USEPA method and Standard Method 4500-Cl ₂ method
Total Hardness	Range	0.00 to 4.70 mg/L (ppm) (as CaCO ₃)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.11 mg/L ±5% of reading
	Method	adaptation of the Standard Methods for the examination of Water and Wastewater, 18th ed., calmagite colorimetric method
Iron, Low Range	Range	0 to 1.60 mg/L (ppm) (as Fe)
	Resolution	0.01 mg/L
	Accuracy @25°C (77°F)	±0.01 mg/L ±8% of reading
	Method	adaptation of the TPTZ method method
Measurement System	Light Source	light emitting diode
	Bandpass filter	525 nm
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	±1.0 nm
	Light Detector	silicon photocell
	Cuvette type	round 24.6 mm diameter (22 mm inside)
Additional Specifications	Auto logging	50 readings
	Display	128 x 64 pixel B/W LCD with backlight
	Auto-off	after 15 minutes of inactivity (30 minutes before a READ measurement)
	Battery type / Life	alkaline 1.5 V AA (3) / > 800 measurements (without backlight)
	Environment	0 to 50°C (32 to 122°F); 0 to 100% RH, non-serviceable
	Dimensions	142.5 x 102.5 x 50.5 mm (5.6 x 4.0 x 2.0")
	Weight	380 g (13.4 oz.)

Ordering Information

HI97745 is supplied with sample cuvettes (2), sample caps (2), plastic stoppers (2), 1.5V AA batteries (3), instrument quality certificate, and instruction manual.

CAL Check standards and testing reagents sold separately

Reagents and Standards

HI97745

HI97701-11 CAL Check standard cuvettes for free and total chlorine

HI93701-01 free chlorine reagents for 100 tests

HI93701-03 free chlorine reagents for 300 tests

HI97710-11 CAL Check standard cuvettes for pH

HI93710-01 pH reagents for 100 tests

HI93710-03 pH reagents for 300 tests

HI93711-01 total chlorine reagents for 100 tests

HI93711-03 total chlorine reagents for 300 tests

HI97719-11 CAL Check standard cuvettes for hardness

HI93719-01 total hardness reagents for 100 tests

HI93719-03 total hardness reagents for 300 tests

HI97746-11 CAL Check standard cuvettes for iron

HI93746-01 iron reagents for 50 tests

HI93746-03 iron reagents for 150 tests



*"C" versions include
CAL Check standards and
a rigid carrying case*

HI96000 Series

Portable Photometers

- **CAL Check™**
 - Allows for performance verification and calibration of the meter using NIST traceable standards.
- **GLP**
 - Review of the last calibration date.
- **Auto-shut off**
 - Automatic shut off after 10 minutes of non-use when the meter is in measurement mode. Prevents wastage of batteries in the event the meter is accidentally left on.
- **Battery status indicator**
 - Indicates the amount of battery life left.
- **Built-in timer**
 - Display of time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate reaction intervals for the test being performed.
- **Error messages**
 - Messages on display alerting to problems including no cap, high zero, and standard too low.

- **Cooling lamp indicator**
 - To maintain the desirable wavelength to be used for absorbance, it is necessary to ensure components are not overheated from the heat generated by the light source. Each photometer is designed to allow a minimal amount of time for components to cool. The cooling lamp indicator is displayed prior to a reading being taken.
- **Units of measure**
 - Appropriate unit of measure is displayed along with reading.

Hanna's portable photometers feature an advanced optical system; the combination of a special tungsten lamp, a narrow band interference filter, and silicon photodetector ensure accurate photometric readings every time. The Hanna exclusive CAL Check feature utilizes ready-made, NIST traceable standards to verify both meter validation and calibration. The exclusive cuvette locking system ensures that the cuvette is inserted into the measurement cell in the same position every time to maintain a consistent path length.

HI96000 Series Portable Photometers

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96712 Aluminum	0.00 to 1.00 mg/L (ppm)	0.01 mg/L	±0.02 mg/L ±4% of reading	525 nm	HI96712 Photometer	HI96712-11 CAL Check HI93712-01 100 tests HI93712-03 300 tests
HI96700 Ammonia LR	0.00 to 3.00 mg/L (ppm) (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	420 nm	HI96700 Photometer HI96700C Photometer, CAL Check standards, and rigid carrying case	HI96700-11 CAL Check HI93700-01 100 tests HI93700-03 300 tests
HI96715 Ammonia MR	0.00 to 9.99 mg/L (ppm) (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	466 nm	HI96715 Photometer HI96715C Photometer, CAL Check standards, and rigid carrying case	HI96715-11 CAL Check HI93715-01 100 tests HI93715-03 300 tests
HI96733 Ammonia HR	0.0 to 50.0 mg/L (ppm) (as NH ₄ ⁺)	0.01 mg/L	±0.5 mg/L ±5% of reading	420 nm	HI96733 Photometer HI96733C Photometer, CAL Check standards, and rigid carrying case	HI96733-11 CAL Check HI93733-01 100 tests HI93733-03 300 tests
HI96769 Anionic Surfactants	0.00 to 3.50 mg/L (ppm) as SDBS	0.01 mg/L	±0.04 mg/L ±3% of reading	610 nm	HI96769 Photometer HI96769C Photometer, CAL Check standards, and rigid carrying case	HI96769-11 CAL Check HI95769-01 40 tests
HI96716 Bromine	0.00 to 10.00 mg/L (ppm)	0.01 mg/L	±0.08 mg/L ±3% of reading	525 nm	HI96716 Photometer HI96716C Photometer, CAL Check standards, and rigid carrying case	HI96716-11 CAL Check HI93716-01 100 tests HI93716-03 300 tests
HI96753 Chloride	0.0 to 20.0 mg/L (ppm)	0.1 mg/L	±0.5 mg/L ±6% of reading	466 nm	HI96753 Photometer HI96753C Photometer, CAL Check standards, and rigid carrying case	HI96753-11 CAL Check HI93753-01 100 tests HI93753-03 300 tests
HI96738 Chlorine Dioxide	0.00 to 2.00 mg/L (ppm)	0.01 mg/L	±0.10 mg/L ±5% of reading	575 nm	HI96738 Photometer	HI96738-11 CAL Check HI93738-01 100 tests HI93738-03 300 tests
HI96701 Free Chlorine	0.00 to 5.00 mg/L (ppm)	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L	±0.03 mg/L ±3% of reading	525 nm	HI96701 Photometer HI96701C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check HI93701-01 100 tests HI93701-03 300 tests
HI96762 Free Chlorine ULR	0.000 to 0.500 mg/L (ppm)	0.001 mg/L	±0.020 mg/L ±3% of reading	525 nm	HI96762 Photometer HI96762C Photometer, CAL Check standards, and rigid carrying case	HI96762-11 CAL Check HI95762-01 100 tests HI95762-03 300 tests
HI96761 Chlorine, Total Low Range	0.000 to 0.500 mg/L (ppm)	0.001 mg/L	±0.020 mg/L ±3% of reading	525 nm	HI96761 Photometer HI96761C Photometer, CAL Check standards, and rigid carrying case	HI96761-11 CAL Check HI95761-01 100 tests HI95761-03 300 tests
HI96723 Chromium VI HR	0 to 1000 µg/L (ppb)	1 µg/L	±5 µg/L ±4% of reading	525 nm	HI96723 Photometer	HI96723-11 CAL Check HI93723-01 100 tests HI93723-03 300 tests
HI96749 Chromium VILR	0 to 300 µg/L (ppb)	1 µg/L	±1 µg/L ±4% of reading	525 nm	HI96749 Photometer	HI96749-11 CAL Check HI93749-01 100 tests HI93749-03 300 tests
HI96727 Color of Water	0 to 500 PCU (Platinum Cobalt Units)	10 PCU	±10 PCU ±5% of reading	420 nm	HI96727 Photometer HI96727C Photometer, CAL Check standards, and rigid carrying case	HI96727-11 CAL Check HI740227 filter assembly HI740228 filter disc

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96747 Copper, LR	0.000 to 1.500 mg/L (ppm)	0.001 mg/L	±0.010 mg/L ±5% of reading	560 nm	HI96747 Photometer HI96747C Photometer, CAL Check standards, and rigid carrying case	HI96747-11 CAL Check HI95747-01 100 tests HI95747-03 300 tests
HI96702 Copper, HR	0.00 to 5.00 mg/L (ppm)	0.01 mg/L (ppm)	±0.02 mg/L ±4% of reading	575 nm	HI96702 Photometer HI96702C Photometer, CAL Check standards, and rigid carrying case	HI96702-11 CAL Check HI93702-01 100 tests HI93702-03 300 tests
HI96714 Cyanide	0.000 to 0.200 mg/L (ppm)	0.001 mg/L	±0.005 mg/L ±3% of reading	610 nm	HI96714 Photometer	HI96714-11 CAL Check HI93714-01 100 tests HI93714-03 300 tests
HI96722 Cyanuric Acid	0 to 80 mg/L (ppm)	1 mg/L (ppm)	±1 mg/L ±15% of reading	525 nm	HI96722 Photometer	HI96722-11 CAL Check HI93722-01 100 tests HI93722-03 300 tests
HI96729 Fluoride LR	0.00 to 2.00 mg/L (ppm)	0.01 mg/L	±0.03 mg/L ±3% of reading	575 nm	HI96729 Photometer HI96729C Photometer, CAL Check standards, and rigid carrying case	HI93703-53 reagent for reducing chlorine concentration HI96729-11 CAL Check HI93729-01 100 tests HI93729-03 300 tests
HI96739 Fluoride HR	0.0 to 20.0 mg/L (ppm)	0.1 mg/L	±0.5 mg/L ±3% of reading	575 nm	HI96739 Photometer HI96739C Photometer, CAL Check standards, and rigid carrying case	HI96739-11 CAL Check HI93739-01 100 tests HI93739-03 300 tests
HI96720 Ca Hardness	0.00 to 2.70 mg/L (ppm)	0.01 mg/L	±0.11 mg/L ±5% of reading	525 nm	HI96720 Photometer HI96720C Photometer, CAL Check standards, and rigid carrying case	HI96720-11 CAL Check HI93720-01 100 tests HI93720-03 300 tests
HI96719 Mg Hardness	0.00 to 2.00 mg/L (ppm)	0.01 mg/L	±0.11 mg/L ±5% of reading	525 nm	HI96719 Photometer HI96719C Photometer, CAL Check standards, and rigid carrying case	HI96719-11 CAL Check HI93719-01 100 tests HI93719-03 300 tests
HI96735 Hardness, Total	Hardness LR (P1): 0 to 250 mg/L (ppm) Hardness MR (P2): 200 to 500 mg/L (ppm) Hardness HR (P3): 400 to 750 mg/L (ppm)	1 mg/L from 0 to 100 mg/L ; 5 mg/L from 100 to 750 mg/L	LR: ±5 mg/L ±4% of reading MR: ±7 mg/L ±3% of reading HR: ±10 mg/L ±2% of reading	466 nm	HI96735 Photometer HI96735C Photometer, CAL Check standards, and rigid carrying case	HI96735-11 CAL Check HI93735-00 100 tests (0-250 mg/L) HI93735-01 100 tests (200-500 mg/L) HI93735-02 100 tests (400-750 mg/L) HI93735-0 100 tests (0-750 mg/L)
HI96785 Honey Color	0 to 150 Pfund	1 mm Pfund	±2 mm Pfund @ 80 mm Pfund	420 nm, 525 nm	HI96785 Photometer, and rigid carrying case	HI93703-57 30 mL glycerol (4) HI93703-56 82 matched square cuvettes, 30 mL glycerol (4), 5 mL syringes (2), 75 tests avg.
HI96704 Hydrazine	0 to 400 µg/L (ppb)	1 µg/L	±3% of full scale	466 nm	HI96704 Photometer HI96704C Photometer, CAL Check standards, and rigid carrying case	HI96704-11 CAL Check HI93704-01 100 tests HI93704-03 300 tests
HI96718 Iodine	0.0 to 12.5 mg/L (ppm)	0.1 mg/L	±0.1 mg/L ±5% of reading	525 nm	HI96718 Photometer HI96718C Photometer, CAL Check standards, and rigid carrying case	HI96718-11 CAL Check HI93718-01 100 tests HI93718-03 300 tests
HI96746 Iron LR	0.00 to 1.60 mg/L (ppm)	0.01 mg/L	±0.01 mg/L ±8% of reading	525 nm	HI96746 Photometer HI96746C Photometer, CAL Check standards, and rigid carrying case	HI96746-11 CAL Check HI93746-01 50 tests HI93746-03 150 tests

HI96000 Series Portable Photometers continued...

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96721 Iron HR	0.00 to 5.00 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±2% of reading	525 nm	HI96721 Photometer HI96721C Photometer, CAL Check standards, and rigid carrying case	HI96721-11 CAL Check HI93721-01 100 tests HI93721-03 300 tests
HI96748 Manganese, LR	0 to 300 µg/L (ppb)	1 µg/L	±10 µg/L ±3% of reading	525 nm	HI96748 Photometer	HI96748-11 CAL Check HI93748-01 50 tests HI93748-03 150 tests
HI96709 Manganese, HR	0.0 to 20.0 mg/L (ppm)	0.1 mg/L	±0.2 mg/L ±3% of reading	525 nm	HI96709 Photometer HI96709C Photometer, CAL Check standards, and rigid carrying case	HI96709-11 CAL Check HI93709-01 100 tests HI93709-03 300 tests
HI96759 Maple Syrup	0.0 to 100.0% transmittance	0.1% transmittance	±3% @ 75.0% transmittance	560 nm	HI96759 Photometer	HI93703-57 30 mL glycerol (4) HI93703-56 82 matched square cuvettes, 30 mL glycerol (4), 5 mL syringes (2), 75 tests avg.
HI96730 Molybdenum	0.0 to 40.0 mg/L (ppm)	0.1 mg/L	±0.3 mg/L ±5% of reading	420 nm	HI96730 Photometer	HI96730-11 CAL Check HI93730-01 100 tests HI93730-03 300 tests
HI96740 Nickel LR	0.000 to 1.000 mg/L (ppm)	0.001 mg/L	±0.010 mg/L ±7% of reading	575 nm	HI96740 Photometer	HI96740-11 CAL Check HI93740-01 50 tests HI93740-03 150 tests
HI96726 Nickel HR	0.00 to 7.00 g/L	0.01 g/L	±0.07 mg/L ±4% of reading	575 nm	HI96726 Photometer HI96726C Photometer, CAL Check standards, and rigid carrying case	HI96726-11 CAL Check HI93726-01 100 tests HI93726-03 300 tests
HI96728 Nitrate-Nitrogen	0.0 to 30.0 mg/L (ppm)	0.1 mg/L	±0.5 mg/L ±10% of reading	525 nm	HI96728 Photometer HI96728C Photometer, CAL Check standards, and rigid carrying case	HI96728-11 CAL Check HI93728-01 100 tests HI93728-03 300 tests
HI96786 Nitrate	0 to 100 mg/L (ppm)	1 mg/L	±5 mg/L ±5% of reading	525 nm	HI96786 Photometer HI96786C Photometer, CAL Check standards, and rigid carrying case	HI96786-11 CAL Check HI93728-01 100 tests HI93728-03 300 tests
HI96707 Nitrite, LR	0.000 to 0.600 mg/L (ppm)	0.001 mg/L	±0.020 mg/L ±4% of reading	525 nm	HI96707 Photometer HI96707C Photometer, CAL Check standards, and rigid carrying case	HI96707-11 CAL Check HI93707-01 100 tests HI93707-03 300 tests
HI96708 Nitrite, HR	0 to 150 mg/L (ppm)	1 mg/L	±4 mg/L ±4% of reading	575 nm	HI96708 Photometer HI96708C Photometer, CAL Check standards, and rigid carrying case	HI96708-11 CAL Check HI93708-01 100 tests HI93708-03 300 tests
HI96732 Oxygen, Dissolved	0.0 to 10.0 mg/L (ppm)	0.1 mg/L	±0.4 mg/L ±3% of reading	466 nm	HI96732 Photometer	HI96732-11 CAL Check HI93732-01 100 tests HI93732-03 300 tests
HI96713 Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	610 nm	HI96713 Photometer HI96713C Photometer, CAL Check standards, and rigid carrying case	HI96713-11 CAL Check HI93713-01 100 tests HI93713-03 300 tests
HI96717 Phosphate HR	0.0 to 30.0 mg/L (ppm)	0.1 mg/L	±1.0 mg/L ±4% of reading	525 nm	HI96717 Photometer HI96717C Photometer, CAL Check standards, and rigid carrying case	HI96717-11 CAL Check HI93717-01 100 tests HI93717-03 300 tests

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96706 Phosphorus	0.0 to 15.0 mg/L (ppm)	0.1 mg/L	± 0.3 mg/L ±4% of reading	525 nm	HI96706 Photometer HI96706C Photometer, CAL Check standards, and rigid carrying case	HI96706-11 CAL Check HI93706-01 100 tests HI93706-03 300 tests
HI96750 Potassium	Potassium LR (P1): 0.0 to 10.0 mg/L (ppm) Potassium MR (P2): 10 to 100 mg/L (ppm)	LR: 0.1 mg/L MR: 1 mg/L	LR: ±1.5 mg/L ±7% of reading MR: ±15 mg/L ±7% of reading	466 nm	HI96750 Photometer HI96750C Photometer, CAL Check standards, and rigid carrying case	HI96750-11 CAL Check HI93750-01 100 tests HI93750-03 300 tests
HI96705 Silica LR	0.00 to 2.00 mg/L (ppm)	0.01 mg/L	±0.03 mg/L ±3% of reading	610 nm	HI96705 Photometer HI96705C Photometer, CAL Check standards, and rigid carrying case	HI96705-11 CAL Check HI93705-01 100 tests HI93705-03 300 tests
HI96770 Silica HR	0 to 200 mg/L (ppm)	1 mg/L	±1 mg/L ±5% of reading	466 nm	HI96770 Photometer HI96770C Photometer, CAL Check standards, and rigid carrying case	HI96770-11 CAL Check HI96770-01 100 tests HI96770-03 300 tests
HI96737 Silver	0.000 to 1.000 mg/L (ppm)	0.001 mg/L	±0.005 mg/L ±10% of reading	575 nm	HI96737 Photometer	HI96737-11 CAL Check HI93737-01 50 tests HI93737-03 150 tests
HI96751 Sulfate	0 to 150 mg/L (ppm)	1 mg/L	±1 mg/L ±5% of reading	466 nm	HI96751 Photometer HI96751C Photometer, CAL Check standards, and rigid carrying case	HI96751-11 CAL Check HI93751-01 100 tests HI93751-03 300 tests
HI96731 Zinc	0.00 to 3.00 mg/L (ppm)	0.01 mg/L	±0.03 mg/L ±3% of reading	575 nm	HI96731 Photometer	HI96731-11 CAL Check HI93731-01 100 tests HI93731-03 300 tests
HI96101 Bromine, Chlorine, Cyanuric Acid, Iodine, Iron LR and pH	pH (P1): 6.5 to 8.5 pH Chlorine [Free (P2) & Total (P3)]: 0.00 to 5.00 mg/L (ppm) Cyanuric Acid (P4): 0 to 80 mg/L (ppm) Iodine (P5): 0.0 to 12.5 mg/L (ppm) Bromine (P6): 0.00 to 10.00 mg/L (ppm) Iron LR (P7): 0.00 to 1.60 mg/L (ppm)	pH (P1): 0.1 pH Chlorine [Free (P2) & Total (P3)]: 0.01 mg/L under 3.50 mg/L; 0.10 mg/L over 3.50 mg/L Cyanuric Acid (P4): 1 mg/L Iodine (P5): 0.1 mg/L Bromine (P6): 0.01 to 10.00 mg/L (ppm) Iron LR (P7): 0.01 to 1.60 mg/L (ppm)	pH (P1): ±0.1 pH Chlorine [Free (P2) & Total (P3)]: ±0.03 mg/L ±3% of reading Cyanuric Acid (P4): ±1 mg/L ±15% of reading Iodine (P5): ±0.1 mg/L ±5% of reading Bromine (P6): ±0.08 mg/L ±3% of reading Iron LR (P7): ±0.01 mg/L ±8% of reading	525 nm	HI96101 Photometer HI96101C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check (free Cl) HI93701-01 100 tests (free Cl) HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI96716-11 CAL Check (bromine) HI93716-01 100 tests (bromine) HI96718-11 CAL Check (iodine) HI93718-01 100 tests (iodine) HI96722-11 CAL Check (cyanuric acid) HI93722-01 100 tests (cyanuric acid) HI96746-11 CAL Check (iron) HI93746-01 50 tests (iron)
HI96104 pH, Chlorine and Cyanuric Acid	pH (P1): 6.5 to 8.5 pH Chlorine [Free (P2) & Total (P3)]: 0.00 to 5.00 mg/L (ppm) Cyanuric Acid (P4): 0 to 80 mg/L (ppm)	pH (P1): 0.1 pH Chlorine [Free (P2) & Total (P3)]: 0.01 mg/L under 3.50 mg/L; 0.10 mg/L over 3.50 mg/L Cyanuric Acid (P4): 1 mg/L	pH (P1): ±0.1 pH Chlorine [Free (P2) & Total (P3)]: ±0.03 mg/L ±3% of reading Cyanuric Acid (P4): ±1 mg/L ±15% of reading	525 nm	HI96104 Photometer HI96104C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check (free Cl) HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI93710-03 300 tests (pH) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI93711-03 300 tests (total Cl) HI96722-11 CAL Check (cyanuric acid) HI93722-01 100 tests (cyanuric acid) HI93722-03 300 tests (cyanuric acid)

HI96000 Series Portable Photometers continued...

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96725 Chlorine, Cyanuric Acid and pH	Chlorine, Free (P1): 0.00 to 5.00 mg/L (ppm) Chlorine, Total (P2): 0.00 to 5.00 mg/L (ppm) Cyanuric Acid (P3): 0 to 80 mg/L (ppm) pH (P4): 6.5 to 8.5 pH	Chlorine, Free (P1): 0.01 mg/L under 3.50 mg/L; 0.10 mg/L above 3.50 mg/L Chlorine, Total (P2): 0.01 mg/L under 3.50 mg/L; 0.10 mg/L above 3.50 mg/L Cyanuric Acid (P3): 1 mg/L pH (P4): 0.1 pH	Chlorine, Free (P1): ±0.03 mg/L ±3% of reading Chlorine, Total (P2): ±0.03 mg/L ±3% of reading Cyanuric Acid (P3): ±1 mg/L ±15% of reading pH (P4): ±0.1 pH	525 nm	HI96725 Photometer HI96725C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check free Cl) HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI93710-03 300 tests (pH) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI93711-03 300 tests (total Cl) HI96722-11 CAL Check (cyanuric acid) HI93722-01 100 tests (cyanuric acid) HI93722-03 300 tests (cyanuric acid)
HI96710 Free and Total Chlorine and pH	pH (P1): 6.5 to 8.5 pH Chlorine [Free (P2) & Total (P3)]: 0.00 to 5.00 mg/L (ppm)	pH (P1): 0.1 pH Chlorine [Free (P2) & Total (P3)]: 0.01 mg/L under 3.50 mg/L; 0.10 mg/L over 3.50 mg/L	pH (P1): ±0.1 pH Chlorine [Free (P2) & Total (P3)]: ±0.03 mg/L ±3% of reading	525 nm	HI96710 Photometer HI96710C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check free Cl) HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI93710-03 300 tests (pH) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI93711-03 300 tests (total Cl)
HI96711 Free and Total Chlorine	Chlorine, Free (P1): 0.00 to 5.00 mg/L (ppm) Chlorine, Total (P2): 0.00 to 5.00 mg/L (ppm)	Chlorine, Free (P1): 0.01 mg/L under 3.50 mg/L; 0.10 mg/L above 3.50 mg/L Chlorine, Total (P2): 0.01 mg/L under 3.50 mg/L; 0.10 mg/L above 3.50 mg/L	Chlorine, Free (P1): ±0.03 mg/L ±3% of reading Chlorine, Total (P2): ±0.03 mg/L ±3% of reading	525 nm	HI96711 Photometer HI96711C Photometer, CAL Check standards, and rigid carrying case	HI96701-11 CAL Check free Cl) HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI93711-03 300 tests (total Cl)
HI96724 Free and Total Chlorine	0.00 to 5.00 mg/L (ppm)	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L	±0.03 mg/L ±3% of reading	525 nm	HI96724 Photometer HI96724C Photometer, CAL Check standards, and rigid carrying case	HI93701-F 300 tests (free Cl) HI93701-T 300 tests (total Cl) HI93711-D3 DPD ³ reagent for 200 tests HI96724-11 CAL Check
HI96734 Free and Total Chlorine, HR	Chlorine, Free HR (P1) & Chlorine, Total HR (P2) 0.00 to 10.00 mg/L	Chlorine, Free HR (P1) & Chlorine, Total HR (P2) 0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L	Chlorine, Free HR (P1) & Chlorine, Total HR (P2) ±0.03 mg/L ±3% of reading	525 nm	HI96734 Photometer HI96734C Photometer, CAL Check standards, and rigid carrying case	HI96734-11 CAL Check HI93734-01 100 tests HI93734-03 300 tests
HI96771 Free Chlorine and Ultra High Range	Free Cl (P1): 0.00 to 5.00 mg/L (ppm) Cl, UHR (P2): 0 to 500 mg/L (ppm)	Free Cl (P1): 0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L Cl, UHR (P2): 1 mg/L from 0 to 200 mg/L; 10 mg/L above 200 mg/L	Free Cl (P1): ±0.03 mg/L ±3% of reading Cl, UHR (P2): ±3 mg/L ±3% of reading	525 nm	HI96771 Photometer HI96771C Photometer, CAL Check standards, and rigid carrying case	HI96771-11 CAL Check HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI95771-01 100 tests (UHR) HI95771-03 300 tests (UHR)
HI96736 Total Hardness and pH	Total Hardness (P1): 0.00 to 4.70 mg/L (ppm) pH (P2): 6.5 to 8.5 pH	Total Hardness (P1): 0.01 mg/L pH (P2): 0.1 pH	Total Hardness (P1): ±0.11 mg/L ±5% of reading pH (P2): ±0.1 pH	525 nm	HI96736 Photometer	HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI93710-03 300 tests (pH) HI96719-11 CAL Check (hardness) HI93719-01 100 tests (hardness) HI93719-03 300 tests (hardness)

Code / Parameter	Range	Resolution	Accuracy	Filter	Ordering Information (reagents sold separately)	Reagents and CAL Check Standards
HI96741 Total Hardness and Iron, LR	Mg Hardness: 0.00 to 2.00 mg/L Ca Hardness: 0.00 to 2.70 mg/L Total Hardness (P1): 0.00 to 4.70 mg/L Iron, LR (P2): 0 to 1.60 mg/L	Mg Hardness: 0.01 mg/L Ca Hardness: 0.01 mg/L Total Hardness (P1): 0.01 mg/L Iron, LR (P2): 0.01 mg/L	Mg Hardness: ±0.11 mg/L ±5% of reading Ca Hardness: ±0.11 mg/L ±5% of reading Total Hardness (P1): ±0.11 mg/L ±5% of reading Iron, LR (P2): ±0.01 mg/L ±8% of reading	525 nm	HI96741 Photometer	HI96719-11 CAL Check (hardness) HI93719-01 100 tests (hardness) HI93719-03 300 tests (hardness) HI96746-11 CAL Check (iron) HI93746-01 50 tests (iron) HI93746-03 150 tests (iron)
HI96742 Iron, LR and Manganese	Iron, LR (P1): 0 to 1.60 mg/L (ppm) Manganese, LR (P2): 0 to 300 µg/L (ppb)	Iron, LR (P1): 0.01 mg/L Manganese, LR (P2): 1 µg/L	Iron, LR (P1): ±0.01 mg/L ±8% of reading Manganese, LR (P2): ±2 µg/L ±3% of reading	525 nm	HI96742 Photometer	HI96746-11 CAL Check (iron) HI93746-01 50 Tests (iron) HI93746-03 150 Tests (iron) HI96748-11 CAL Check (manganese) HI93748-01 100 Tests (manganese) HI93748-03 300 Tests (manganese)
HI96745 Chlorine, Total Hardness, Iron Low Range and pH	pH (P1): 6.5 to 8.5 pH Chlorine [Free (P2) & Total (P3)]: 0.00 to 5.00 mg/L (ppm) Total Hardness (P4): 0.00 to 4.70 mg/L (ppm) Iron, Low Range (P5): 0 to 1.60 mg/L (ppm)	pH (P1): 0.1 pH Chlorine [Free (P2) & Total (P3)]: 0.01 mg/L under 3.50 mg/L; 0.10 mg/L above 3.50 mg/L Total Hardness (P4): 0.01 mg/L Iron, Low Range (P5): 0.01 mg/L	pH (P1): ±0.1 pH Chlorine [Free (P2) & Total (P3)]: ±0.03 mg/L ±3% of reading Total Hardness (P4): ±0.11 mg/L ±5% of reading Iron, Low Range (P5): ±0.01 mg/L ±8% of reading	525 nm	HI96745 Photometer	HI96701-11 CAL Check (free Cl) HI93701-01 100 tests (free Cl) HI93701-03 300 tests (free Cl) HI96710-11 CAL Check (pH) HI93710-01 100 tests (pH) HI93710-03 300 tests (pH) HI96711-11 CAL Check (total Cl) HI93711-01 100 tests (total Cl) HI93711-03 300 tests (total Cl) HI96719-11 CAL Check (hardness) HI93719-01 100 tests (hardness) HI93719-03 300 tests (hardness) HI96746-11 CAL Check (iron) HI93746-01 50 tests (iron) HI93746-03 150 tests (iron)
HI96752 Calcium and Magnesium	Calcium (P1): 0 to 400 mg/L (ppm) Magnesium (P2): 0 to 150 mg/L (ppm)	Calcium (P1): 1 mg/L Magnesium (P2): 1 mg/L	Calcium (P1): ±10 mg/L ±5% of reading Magnesium (P2): ±3 mg/L ±3% of reading	466 nm	HI96752 Photometer	HI93752-01 100 Tests (50 each) HI93752-03 300 Tests (150 each) HI96752-11 CAL Check (calcium) HI937521-01 50 tests (calcium) HI937521-03 150 tests (calcium) HI96754-11 CAL Check (magnesium) HI937520-01 50 tests (magnesium) HI937520-03 150 tests (magnesium)

Solutions and Accessories

HI93703-50	Cuvette cleaning solution, 230 mL
HI731318	Cuvette cleaning cloth (4)
HI731331	Measuring cuvettes (4)
HI731335	Cuvette caps (4)
HI740318	Carrying case for HI96 series

*Each CAL Check cuvette is clearly labeled with its respective measurement. Please read the full instruction manual before validation/calibration.



HI731318

Test	Reagent Kit	No. of Tests
Alkalinity	HI93755-01	100
	HI93755-03	300
Aluminum	HI93712-01	100
	HI93712-03	300
Ammonia HR	HI93733-01	100
	HI93733-03	300
Ammonia MR	HI93715-01	100
	HI93715-03	300
Ammonia LR	HI93700-01	100
	HI93700-03	300
Bromine	HI93716-01	100
	HI93716-03	300
Calcium	HI937521-01	50
	HI937521-03	150
Calcium and Magnesium	HI93752-01	100 (50 each)
	HI93752-03	300 (150 each)
Chloride	HI93753-01	100
	HI93753-03	300
Chlorine Dioxide	HI93738-01	100
	HI93738-03	300
Chlorine Dioxide, Rapid Method	HI96779-01	100
	HI96779-03	300
Chlorine UHR	HI95771-01	100
	HI95771-03	300
Chlorine, Free	HI93701-01	100
	HI93701-03	300
	HI93701-F (liquid)	300
Chlorine, Free and Total HR	HI93734-01	100
	HI93734-03	300
Chlorine, Free ULR	HI95762-01	100
	HI95762-03	300
Chlorine, Total	HI93711-01	100
	HI93711-03	300
	HI93701-T (liquid)	300
Chlorine, Total ULR	HI95761-01	100
	HI95761-03	300
Chromium VI HR	HI93723-01	100
	HI93723-03	300
Chromium VI LR	HI93749-01	100
	HI93749-03	300
Chromium, Total and VI (16 mm vial)	HI96781-25	25
COD UHR (16 mm vial)	HI93702-01	100
	HI93702-03	300
	HI93702T-01 (total)	100
	HI93702T-03 (total)	300
Copper LR	HI95747-01	100
	HI95747-03	300
Cyanide	HI93714-01	100
	HI93714-03	300
Cyanuric Acid	HI93722-01	100
	HI93722-03	300
Detergents, Anionic	HI95769-01	40
Dispersing Reagent (to remove turbidity interference when testing for Manganese, Nickel, or Silver,	HI93703-51	20 mL bottle
Fluoride HR	HI93739-01	100
	HI93739-03	300
Fluoride LR	HI93729-01	100
	HI93729-03	300
Glycine Powder (for removing chlorine interference when testing for ozone)	HI93703-52	100
Hardness, Calcium	HI93720-01	100
	HI93720-03	300
Hardness (Magnesium) and Total Hardness	HI93719-01	100
	HI93719-03	300

Test	Reagent Kit	No. of Tests
Hardness, Total HR	HI93735-02	100
	HI93735-01	100
	HI93735-00	100
	HI93735-0	100 ea. (300)
Hydrazine	HI93704-01	100
	HI93704-03	300
Iodine	HI93718-01	100
	HI93718-03	300
Iron (II) (ferrous)	HI96776-01	100
	HI96776-03	300
Iron (II)/(III) (ferrous and ferric)	HI96777-01	100
	HI96777-03	300
Iron HR	HI93721-01	100
	HI93721-03	300
Iron LR	HI93746-01	50
	HI93746-03	150
Iron, Total (16 mm vial)	HI96778-25	25
Manganese HR	HI93709-01	100
	HI93709-03	300
Manganese LR	HI93748-01	50
	HI93748-03	150
Magnesium	HI937520-01	50
	HI937520-03	150
Molybdenum	HI93730-01	100
	HI93730-03	300
Nickel HR	HI93726-01	100
	HI93726-03	300
Nickel LR	HI93740-01	50
	HI93740-03	150
Nitrate	HI93728-01	100
	HI93728-03	300
Nitrite HR	HI93708-01	100
	HI93708-03	300
Nitrite LR	HI93707-01	100
	HI93707-03	300
Nitrite LR (16 mm vial)	HI96783-25	25
Nitrite MR (16 mm vial)	HI96784-25	25
Oxygen, Dissolved (DO)	HI93732-01	100
	HI93732-03	300
Ozone	HI93757-01	100
	HI93757-03	300
pH	HI93710-01	100
	HI93710-03	300
Phosphate HR	HI93717-01	100
	HI93717-03	300
Phosphate LR	HI93713-01	100
	HI93713-03	300
Phosphorus	HI93706-01	100
	HI93706-03	300
Potassium	HI93750-01	100
	HI93750-03	300
Silica HR	HI96770-01	100
	HI96770-03	300
Silica LR	HI93705-01	100
	HI93705-03	300
Silver	HI93737-01	50
	HI93737-03	150
Sulfate	HI93751-01	100
	HI93751-03	300
Surfactants, Anionic (16 mm vial)	HI96782-25	25
	HI95769-01	40
Surfactants, Non Anionic (16 mm vial)	HI96780-25	24
Zinc	HI93731-01	100
	HI93731-03	300

Single Parameter

Instrument	CAL Check Standards Set	Parameter
HI97700	HI97700-11	Ammonia LR
HI97701	HI97701-11	Free/Total Chlorine
HI97702	HI97702-11	Copper HR
HI97704	HI97704-11	Hydrazine
HI97705	HI97705-11	Silica LR
HI97706	HI97706-11	Phosphorus
HI97707	HI97707-11	Nitrite LR
HI97708	HI97708-11	Nitrite HR
HI97709	HI97709-11	Manganese HR
HI97712	HI97712-11	Aluminum
HI97713	HI97713-11	Phosphate, Low Range
HI97714	HI97714-11	Cyanide
HI97715	HI97715-11	Ammonia MR
HI97716	HI97716-11	Bromine
HI97717	HI97717-11	Phosphate, High Range
HI97718	HI97718-11	Iodine
HI97719	HI97719-11	Mg Hardness
HI97720	HI97720-11	Ca Hardness
HI97721	HI97721-11	Iron HR
HI97722	HI97722-11	Cyanuric Acid
HI97723	HI97723-11	Chromium VI HR
HI97726	HI97726-11	Nickel HR
HI97727	HI97727-11	Color of Water
HI97728	HI97728-11	Nitrate
HI97729	HI97729-11	Fluoride LR
HI97730	HI97730-11	Molybdenum
HI97731	HI97731-11	Zinc
HI97732	HI97732-11	Oxygen, Dissolved
HI97733	HI97733-11	Ammonia HR
HI97735	HI97735-11	Total Hardness
HI97737	HI97737-11	Silver
HI97738	HI97738-11	Chlorine Dioxide
HI97739	HI97739-11	Fluoride HR
HI97740	HI97740-11	Nickel LR
HI97742	HI97742-11	Iron LR
HI97746	HI97746-11	Iron LR
HI97747	HI97747-11	Copper LR
HI97748	HI97748-11	Manganese LR
HI97749	HI97749-11	Chromium VI LR
HI97750	HI97750-11	Potassium
HI97751	HI97751-11	Sulfate
HI97753	HI97753-11	Chloride
HI97761	HI97761-11	Total Chlorine ULR
HI97762	HI97762-11	Free Chlorine, ULR
HI97769	HI97769-11	Anionic Surfactants
HI97770	HI97770-11	Silica HR
HI97779	HI97779-11	Chlorine Dioxide (Rapid)

Instrument	CAL Check Standards Set	Parameter
HI96700	HI96700-11	Ammonia
HI96701	HI96701-11	Free Chlorine
HI96702	HI96702-11	Copper
HI96704	HI96704-11	Hydrazine
HI96705	HI96705-11	Silica
HI96706	HI96706-11	Phosphorus
HI96707	HI96707-11	Nitrite
HI96708	HI96708-11	Nitrite
HI96709	HI96709-11	Manganese
HI96712	HI96712-11	Aluminum
HI96713	HI96713-11	Phosphate
HI96714	HI96714-11	Cyanide
HI96715	HI96715-11	Ammonia
HI96716	HI96716-11	Bromine
HI96717	HI96717-11	Phosphate
HI96718	HI96718-11	Iodine
HI96719	HI96719-11	Hardness, Magnesium
HI96720	HI96720-11	Hardness, Calcium
HI96721	HI96721-11	Iron
HI96722	HI96722-11	Cyanuric Acid
HI96723	HI96723-11	Chromium (VI)
HI96724	HI96724-11	Free/Total Chlorine
HI96726	HI96726-11	Nickel
HI96727	HI96727-11	Color of Water
HI96728	HI96728-11	Nitrate
HI96729	HI96729-11	Fluoride
HI96730	HI96730-11	Molybdenum
HI96731	HI96731-11	Zinc
HI96732	HI96732-11	Dissolved Oxygen
HI96733	HI96733-11	Ammonia
HI96735	HI96735-11	Total Hardness
HI96737	HI96737-11	Silver
HI96738	HI96738-11	Chlorine Dioxide
HI96739	HI96739-11	Fluoride
HI96740	HI96740-11	Nickel
HI96746	HI96746-11	Iron
HI96747	HI96747-11	Copper
HI96748	HI96748-11	Manganese
HI96749	HI96749-11	Chromium (VI)
HI96750	HI96750-11	Potassium LR and MR
HI96751	HI96751-11	Sulfate
HI96753	HI96753-11	Chloride
HI96761	HI96761-11	Total Chlorine
HI96762	HI96762-11	Trace Free Chlorine
HI96769	HI96769-11	Anionic Detergents
HI96770	HI96770-11	Silica
HI96771	HI96771-11	UHR Free Chlorine
HI96786	HI96786-11	Nitrate

Multiparameter

Instrument	CAL Check Standards Set	Parameter
HI97101	HI97701-11 HI97710-11 HI97716-11 HI97718-11 HI97722-11 HI97746-11	Free and total Chlorine pH Bromine Iodine Cyanuric Acid Iron LR
HI97104	HI97775-11 HI97722-11 HI97701-11 HI97710-11	Alkalinity Cyanuric Acid Free/Total Chlorine pH
HI97710	HI97701-11 HI97710-11	Free/Total Chlorine pH
HI97725	HI97701-11 HI97722-11 HI97710-11	Free and Total Chlorine Cyanuric Acid pH
HI97711	HI97701-11	Free/Total Chlorine
HI97734	HI97734-11	Free/Total Chlorine, HR
HI97736	HI97710-11 HI97719-11	pH hardness
HI97741	HI97719-11 HI97746-11	Total Hardness Iron LR
HI97742	HI97742-11 HI97748-11	Iron LR Manganese LR
HI97745	HI97701-11 HI97710-11 HI97719-11 HI97746-11	Free and Total Chlorine pH Total Hardness Iron LR
HI97752	HI97752-11 HI97754-11	Calcium Magnesium
HI97771	HI97701-11	Free/Total Chlorine, UHR
HI96101	HI96716-11 HI96701-11 HI96711-11 HI96722-11 HI96718-11 HI96746-11 HI96710-11	Bromine Free Chlorine Total Chlorine Cyanuric Acid Iodine Iron pH
HI96104	HI96710-11 HI96701-11 HI96711-11 HI96722-11	pH Free Chlorine Total Chlorine Cyanuric Acid
HI96710	HI96701-11 HI96711-11 HI96710-11	Free Chlorine Total Chlorine pH
HI96711	HI96701-11 HI96711-11	Free Chlorine Total Chlorine
HI96725	HI96701-11 HI96711-11 HI96722-11 HI96710-11	Free Chlorine Total Chlorine Cyanuric Acid pH
HI96734	HI96734-11	Free Chlorine HR Total Chlorine HR
HI96735	HI96735-11	Total Hardness LR, MR, HR
HI96736	HI96719-11 HI96710-11	Total Hardness pH

Instrument	CAL Check Standards Set	Parameter
HI96741	HI96719-11 HI96746-11	Total Hardness Iron
HI96742	HI96746-11 HI96748-11	Iron Manganese
HI96743	HI96746-11 HI96710-11	Iron pH
HI96745	HI96701-11 HI96711-11 HI96719-11 HI96746-11 HI96710-11	Free Chlorine Total Chlorine Hardness, Magnesium Iron pH
HI96752	HI96752-11 HI96754-11	Calcium Magnesium



HI83746

Photometer for the Determination of Concentration of Reducing Sugars

- **Built-in timer**
 - Display of time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate reaction intervals for the test being performed.
- **Zero key**
 - A simple press of the zero key on the face of the meter will account for the color and imperfections in the oil sample before reagent addition.
- **GLP**
 - Review of the last calibration date.
- **Auto shut-off**
 - Automatic shut-off after 15 minutes of non-use when the meter is in measurement mode. Prevents wastage of batteries in the event the meter is accidentally left on.
- **Battery status indicator**
 - Indicates the amount of battery life left.
- **Error messages**
 - Messages on display alerting to problems including no cap, high zero, and standard too low.
- **Units of measure**
 - Appropriate unit of measure is displayed along with reading.

The HI83746 photometer is for the determination of reducing sugars in wine. Hanna's photometers feature an advanced optical system; the combination of a special tungsten lamp, a narrow band interference filter, and silicon photodetector ensure accurate photometric readings every time. The exclusive cuvette locking system ensures that the cuvette is inserted into the measurement cell in the same position every time to maintain a consistent path length.

Typical content of reducing sugars in must and wine

Must	sweet must	20-25 %	200-250 g/L
	normal	10-20 %	100-200 g/L
	in fermentation	4-12.5 %	40-125 g/L
Wine	sweet	2.5-12.5 %	25-125 g/L
	semi sweet	0.8-2.5 %	8-25 g/L
	almost dry	0.2-0.8 %	2-8 g/L
	dry	0-0.2 %	0-2 g/L





Supplied in a rigid carrying case

Significance of Use

Sugar is an essential component in the production of wine. During alcoholic fermentation, yeast consume sugars found in the grape juice, or must, and converts it to ethyl alcohol and carbon dioxide. In the case of certain styles of wine such as semi-sweet or dessert wines, some sugar is allowed to remain post-fermentation. This residual sugar can serve to provide a sweeter character to the final blend or play a role in microbial stability.

The primary fermentable sugars found in grapes are glucose and fructose. These two simple sugars are also known as reducing sugars because they contain functional groups capable of being oxidized under certain conditions. After reaction with excess alkaline cupric tartrate (Fehling reagents), the content of reducing sugars can be determined colorimetrically. The Fehling method is not an exact determination but an index of the reducing sugar concentration, because the reaction depends upon the amount and type of reducing sugars present. When the reducing sugar content is known at the beginning of fermentation, the potential alcohol degree can be estimated by multiplying the sugar concentration (in g/L) by 0.06.

Specifications	HI83746						
Range	0.00 to 50.00 g/L (ppt)						
Resolution	0.25 g/L						
Accuracy @25°C (77°F)	± 0.50 g/L ±5% of reading						
Precision	±0.015 @ 0.350 g/L						
Light Source	tungsten lamp						
Light Detector	silicon photocell with narrow band interference filter @ 610 nm						
Method	Fehling						
Environment	0 to 50°C; RH max 95% non-condensing						
Battery Type	1.5V AA batteries (4)/ 12 VDC adapter						
Auto Shut-off	after 15 minutes of non-use						
Dimensions	224 x 87 x 77 mm (8.7 x 3.3 x 3.1")						
Weight	512 g (17.6 oz.)						
Ordering Information	HI83746-01 (115V) and HI83746-02 (230V) is supplied with glass cuvettes and caps (4), reagents for about 20 tests (HI83746-20), HI93703-59 Charcoal, 200 µL automatic pipette with two plastic tips, 1000 µL automatic pipette with plastic tips (2), instruction sheet for automatic pipette, spoon, funnel, filter paper (25), cuvette wiping cloth, 12 VDC adapter, batteries, instructions and Instrument quality certificate, rigid carrying case.						
Optional Reagents	<table border="1"> <tbody> <tr> <td>HI83746-20</td> <td>reducing sugar reagent set (20 tests)</td> </tr> <tr> <td>HI93703-59</td> <td>charcoal for decoloration of red wine (about 100 tests)</td> </tr> <tr> <td>HI839800</td> <td>COD test tube heater (required)</td> </tr> </tbody> </table>	HI83746-20	reducing sugar reagent set (20 tests)	HI93703-59	charcoal for decoloration of red wine (about 100 tests)	HI839800	COD test tube heater (required)
HI83746-20	reducing sugar reagent set (20 tests)						
HI93703-59	charcoal for decoloration of red wine (about 100 tests)						
HI839800	COD test tube heater (required)						



The HI83746 requires the HI839800 Test Tube Heater



HI83746-20

HI83748

Photometer for the Determination of Tartaric Acid in Wine

- **Built-in timer**
 - Display of time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate reaction intervals for the test being performed.
- **Zero key**
 - A simple press of the zero key on the face of the meter will account for the color and imperfections in the oil sample before reagent addition.
- **GLP**
 - Review of the last calibration date.
- **Auto shut-off**
 - Automatic shut-off after 15 minutes of non-use when the meter is in measurement mode. Prevents wastage of batteries in the event the meter is accidentally left on.
- **Battery status indicator**
 - Indicates the amount of battery life left.
- **Error messages**
 - Messages on display alerting to problems including no cap, high zero, and standard too low.
- **Units of measure**
 - Appropriate unit of measure is displayed along with reading.

The HI83748 photometer is for the determination of tartaric acid in wine. Hanna's photometers feature an advanced optical system; the combination of a special tungsten lamp, a narrow band interference filter, and silicon photodetector ensure accurate photometric readings every time. The exclusive cuvette locking system ensures that the cuvette is inserted into the measurement cell in the same position every time to maintain a consistent path length.





Supplied in a rigid carrying case

Significance of Use

Tartaric acid and tartrate play an important role in the stability of wines. They can be present in wine and juice in various forms, like tartaric acid (H₂T), potassium bitartrate (KHT) or calcium tartrate (CaT). The ratio of these depends mainly on the pH of the wine. The percentage of tartrate present as bitartrate (HT-) is maximum at pH 3.7.

The formation of crystalline deposits (tartrate casse) is a phenomenon of wine aging that does not meet customer acceptance. It is therefore important to test for and reduce the potential for bottle precipitation. For example, by adjusting the pH of the wine, winemakers can significantly influence the potential of casse formation.

Tartaric acid concentrations in wine range normally from 1.5 to 4.0 g/L. This acid concentration should not be confused with total or titratable acidity of wines, which are often expressed as tartaric acid content as well. Although it is the tartaric acid that is the predominant acid present (up to 60% of the total acidity), others like malic, citric, and several volatile acids contribute significantly to total acidity.

Specifications	HI83748
Range	0.0 to 5.0 g/L (ppt)
Resolution	0.1 g/L
Accuracy @25°C (77°F)	±0.1 g/L ±5% of reading
Light Source	tungsten lamp
Manual Precision	SD ±0.1 g/L @ 2.0 g/L
Light Detector	silicon photocell with narrow band interference filter @ 525 nm
Method	the reaction between tartaric acid and the reagents causes a yellow/orange red tint in the sample.
Environment	0 to 50°C; RH max 95% non-condensing
Battery Type	1.5V AA batteries (4) / 12 VDC adapter
Auto Shut-off	after 15 minutes of non-use
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17.6 oz.)
Ordering Information	HI83748-01 (115V) and HI83748-02 (230V) are supplied with sample cuvettes and caps (2), reagents for 5 manual tests (HI83748A-0, HI83748B-0), 200 µL automatic pipette, plastic tips for 200 µL automatic pipette (2), 5 mL syringe with tip, cuvette wiping cloth, 12 VDC adapter, batteries, instructions, instrument quality certificate and rigid carrying case.
Reagent Sets	HI83748-20 tartaric acid reagents set for wine (20 tests)



HI83748-20

HI83730

Photometer for the Determination of Peroxide Value in Olive Oils

- **Built-in timer**
 - Display of time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate reaction intervals for the test being performed.
- **Zero key**
 - A simple press of the zero key on the face of the meter will account for the color and imperfections in the oil sample before reagent addition.
- **GLP**
 - Review of the last calibration date.
- **Auto shut-off**
 - Automatic shut-off after 15 minutes of non-use when the meter is in measurement mode. Prevents wastage of batteries in the event the meter is accidentally left on.
- **Battery status indicator**
 - Indicates the amount of battery life left.
- **Error messages**
 - Messages on display alerting to problems including no cap, high zero, and standard too low.
- **Units of measure**
 - Appropriate unit of measure is displayed along with reading.

The HI83730 portable photometer is for the determination of peroxide value in edible oils. Hanna's portable photometers feature an advanced optical system; the combination of a special tungsten lamp, a narrow band interference filter, and silicon photodetector ensure accurate photometric readings every time. The exclusive cuvette locking system ensures that the cuvette is inserted into the measurement cell in the same position every time to maintain a consistent path length.

Oil Peroxides Content

<10 meq O ₂ /kg	excellent conservation
10-15 meq O ₂ /kg	good conservation
<10 meqO ₂ /kg	refined oil
>20 meqO ₂ /kg	rancid oil





Supplied in a rigid carrying case

Significance of Use

Over time, edible oils may degrade and spoil. The primary cause of edible oil degradation is oxidation; as oil oxidation occurs, flavors and odors can change, resulting in a product that is undesirable to consumers. The unsaturated fatty acids found in oils react with oxygen, creating peroxide as an unwanted byproduct. This oxidation reaction is more likely to occur under certain conditions, including exposure to light, the presence of metal ions, the introduction of oxygen, or when storage temperatures are not maintained. In order to determine oil quality and the onset of oxidation, peroxide value is determined. Peroxide value is defined as the amount of peroxide oxygen per kilogram of oil, which is reported in units of milliequivalents or meq. A lower peroxide value indicates higher quality edible oil.

Specifications	HI83730
Range	0.0 to 25.0 meq O ₂ /kg
Resolution	0.5 meq O ₂ /kg
Accuracy @25°C (77°F)	±0.5 meq O ₂ /kg
Light Source	tungsten lamp
Light Detector	silicon photocell with narrow band interference filter @ 466 nm
Method	adaptation of EC 2568/91 method and following amendments
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	1.5V AA batteries (4) / 12 VDC adapter
Auto Shut-off	after 15 minutes of non-use
Dimensions	224 x 87 x 77 mm (8.8 x 3.4 x 3")
Weight	512 g (18 oz.)
Ordering Information	HI83730-01 (115V) and HI83730-02 (230V) are supplied with reagents for 10 tests, 1 mL syringes (4), scissors, vial wiping cloth, batteries, AC adapter, instructions and a rigid carrying case.
Reagent Sets	HI83730-20 peroxide in olive oil reagents kit (21 manual tests)



HI83730-20

Checker^{hc}
handheld colorimeter

Hanna Checker[®] HC Series

Handheld Colorimeters

The Hanna Checker HC bridges the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give 5 to 10 points of resolution while professional instrumentation can cost hundreds of dollars and can be time consuming to calibrate and maintain. The Checker HC is both accurate and affordable.

The contoured style of the Checker HC fits in your palm or pocket perfectly, while the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.

- **Easier to use and more accurate than chemical test kits**
 - High accuracy
 - Large, easy-to-read digits
 - Auto shut-off
- **Dedicated to a single parameter**
 - Designed to work with Hanna's reagents
 - Uses 10 mL glass cuvettes
- **Small size, big convenience**
 - Weighing a mere 64 g (2.25 oz.), the Checker[®]HC easily fits in your palm or pocket
- **Use for quick and accurate on-the-spot analysis**
- **Single-button operation: zero and measure**
- **Operated by a single AAA battery**



Actual Size

Checker HC's are supplied in a case with custom insert



Calibration Checking Sets

Our optional Checker HC Calibration Sets provide a simple solution to validating your Checker HC. Each high quality set of standards is manufactured in our state-of-the-art facility and comes supplied with a Certificate of Analysis. The Certificate of Analysis provides the lot number, reference values, and expiration date to provide traceability when certifying the Checker HC.

General Specifications for All Models

Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.25 oz.)

Seawater and Fresh Water Alkalinity

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
 - Operated by a single AAA battery
- Use for quick and accurate on-the-spot analysis
- Ideal for:
 - Saltwater aquariums (HI755, HI772)
 - Fresh water aquariums (HI775)



Alkalinity is one of the most important parameters to measure in aquariums. It helps to maintain a stable pH, an important factor for most aquatic life. In seawater, bicarbonate is the largest contributor to alkalinity and is a critical element needed for healthy corals. Corals need bicarbonate and carbonate available to form their skeletons. Without an adequate level, healthy coral growth is not possible. Since bicarbonate levels can be difficult to determine, total alkalinity is measured instead. The alkalinity of natural seawater is typically 125 ppm CaCO₃ (equivalent to 7 degrees of carbonate hardness, or dKH). In saltwater aquariums, typical alkalinity values can range from 125 to 200 ppm CaCO₃ (7 to 11.2 dKH).

The HI755, HI775 and HI772 Checker®HC's are simple, accurate, and cost effective ways to measure alkalinity in seawater and fresh water. Designed as a more accurate alternative to chemical test kits, these handheld colorimeters provide quick, accurate alkalinity testing results in four easy steps.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert sample into the Checker HC and press the button to zero.

Step Three - Remove sample and add reagent as stated in the manual.

Step Four - Reinsert sample and press the button to measure your results.

Specifications	HI755 (Seawater)	HI775 (Fresh water)	HI772 (Seawater)
Range	0 to 300 ppm CaCO ₃	0 to 500 ppm CaCO ₃	0.0 to 20.0 dKH
Resolution	1 ppm	1 ppm	0.1 dKH
Accuracy @25°C (77°F)	±5 ppm ±5% of reading		±0.3 dKH ±5% of reading
Light Source	LED @ 610 nm		
Light Detector	silicon photocell		
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing		
Battery Type	1.5V AAA (1)		
Auto-off	after ten minutes of non-use	After ten minutes of non-use and two minutes after reading	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")		
Weight	64 g (2.3 oz)		
Method	colorimetric method. The reaction causes a distinctive range of colors from yellow to greenish blue to develop.		
Ordering Information	HI755 Checker®HC is supplied with sample cuvettes with caps (2), seawater alkalinity reagent starter kit (reagents for 25 tests), syringe with tip, battery, instructions, and quick start guide.		
	HI775 Checker®HC is supplied with sample cuvettes with caps (2), alkalinity reagent starter kit (reagents for 25 tests), syringe with tip, battery, instructions, and quick start guide.		
	HI772 Checker®HC is supplied with sample cuvettes with caps (2), seawater alkalinity reagent starter kit (reagents for 25 tests), syringe with tip, battery, instructions, and quick start guide.		
Reagent Set	HI755-26 (25 tests)	HI775-26 (25 tests)	HI772-26 (25 tests)
Calibration Set	HI755-11	HI775-11	HI772-11

HI700 · HI715 · HI733

Ammonia Low, Medium, and High Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
 - Operated by a single AAA battery
- Use for quick and accurate on-the-spot analysis
- Ideal for:
 - Water quality
 - Aquariums
 - Environmental



The HI700, HI715, and HI733 Checker®HC's are simple, accurate, and cost effective ways to measure ranges of ammonia in fresh water. The all new HI700 Checker HC Ammonia LR for fresh water can be used to replace the usage of HI3824 or HI38049 fresh water test kits.

Designed as a more accurate alternative to chemical test kits, the HI700, HI715, and the HI733* provides quick, accurate results.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert sample into the Checker HC and press the button to zero.

Step Three - Remove sample and add reagents as the manual states.

Step Four - Reinsert sample, press and hold the button for 3 seconds to start reaction timer. reading will be taken automatically and the results displayed.

* HI733 uses a different procedure

All three models use an adaptation of the ASTM Manual of Water and Environmental Technology, D1426-92, Nessler method. The reaction between ammonia and reagents causes a yellow tint in the sample.

Specifications	HI700 (LR)	HI715 (MR)	HI733 (HR)
Range	0.00 to 3.00 ppm NH ₃ -N	0.00 to 9.99 ppm NH ₃ -N	0.0 to 99.9 ppm as NH ₄ ⁺
Resolution	0.01 ppm	0.01 ppm	0.1 ppm
Accuracy @25°C (77°F)	±0.05 ppm ±5% of reading	±0.05 ppm ±5% of reading	±1.0 ppm ±5% of reading
Light Source	LED @ 470 nm		
Light Detector	silicon photocell		
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing		
Battery Type	1.5V AAA (1)		
Auto-off	after ten minutes of non-use		
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")		
Weight	64 g (2.3 oz)		
Method	adaptation of the ASTM Manual of Water and Environmental Technology D1426-92, Nessler Method. The reaction between ammonia and reagents causes a yellow tint in the sample		
Ordering Information	<p>HI700 Checker®HC is supplied with sample cuvettes with caps (2), ammonia LR reagent starter kit (reagents for 25 tests), battery, instructions, and quick start guide.</p> <p>HI715 Checker®HC is supplied with sample cuvettes with caps (2), ammonia MR reagent starter kit (reagents for 25 tests), battery, instructions, and quick start guide.</p> <p>HI733 Checker®HC is supplied with sample cuvettes with caps (2), ammonia HR reagent starter kit (reagents for 10 tests), syringe with tip, plastic pipette, battery, instructions, and quick start guide.</p>		
Reagent Set	HI700-25 (25 tests)	HI715-26 (25 tests)	HI733-25 (20 tests)
Calibration Set	HI700-11	HI715-11	HI733-11

HI716

Bromine

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
 - DPD method
 - Accuracy ± 0.08 ppm $\pm 5\%$ of reading
 - 0.01 ppm resolution
 - Large, easy-to-read digits
 - Auto shut-off
- Dedicated to a single parameter
 - Designed to work with Hanna's powder reagents
 - Uses 10 mL glass cuvettes
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Built-in reaction timer
 - Operated by a single AAA battery
- Ideal for:
 - Water quality
 - Education
 - Swimming pools/hot tub sanitization
 - Environmental

The HI716 Checker HC is a simple, accurate, and cost effective way to measure bromine. Designed as a more accurate alternative to chemical test kits, the HI716 provides quick, accurate results in four easy steps.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert sample into the Checker HC and press button to zero.

Step Three - Remove sample and add reagent packet.

Step Four - Reinsert sample, press and hold the button for 3 seconds to start reaction timer. reading will be taken automatically and the results displayed.

The HI716 uses an adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method. The reaction between bromine and the reagent causes a pink tint in the sample.



Specifications	HI716
Range	0.00 to 8.00 ppm
Resolution	0.01 ppm
Accuracy @25°C (77°F)	± 0.08 ppm $\pm 5\%$ of reading
Light Source	LED @ 525 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method. The reaction between bromine and the reagent causes a pink tint in the sample
Ordering Information	HI716 Checker®HC is supplied with sample cuvettes with caps (2), bromine reagent starter kit (reagents for 6 tests), battery, instructions and quick start guide.
Reagent Set	HI716-25 (25 tests)
Calibration Set	HI716-11

HI758

Marine Calcium

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
 - Zincon method adaptation
 - $\pm 6\%$ of reading
 - 1 ppm resolution
 - Large, easy-to-read digits
 - Auto shut-off
- Dedicated to a single parameter
 - Uses 10 mL glass cuvettes
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
 - Operated by a single AAA battery
- Ideal for:
 - Aquaculture
 - Aquariums



HI758 includes HI731339P 100µL pipette and 1 mL syringe

Calcium present in water supplies results from passage over deposits of limestone, dolomite, gypsum, and gypsiferous shale. The concentration may extend from 0 to several hundred milligrams per liter, depending on its source and treatment. Calcium is necessary in plant and animal nutrition since it is an essential constituent of bones, shells and plant structures. Calcium in water as carbonate is one of the primary components of water hardness which can cause pipe or tube scaling.

The HI758 Calcium Checker HC is extremely simple to use. First, zero with Reagent A and deionized water. Next, remove the vial and add sample and Reagent B and shake to dissolve. Reinsert into the Checker HC and press the button to read the calcium concentration in ppm on the display.

Weighing a mere 64 g (2.25 oz.), the Checker HC easily fits into your hand or pocket.

The HI731339P is a volumetric pipette designed to measure and transfer exactly 100 µL of solution to a cuvette. To obtain the highest accuracy and precision from the HI758 marine calcium Checker it is necessary to add exactly 100 µL of aquarium saltwater to the cuvette. Any variation will result in an inaccurate reading.

Specifications

HI758

Range	200 to 600 ppm
Resolution	1 ppm
Accuracy @25°C (77°F)	± 6 ppm $\pm 5\%$ of reading
Light Source	LED @ 610 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the Zincon method
Ordering Information	HI758 Checker®HC is supplied with sample cuvettes with caps (2), marine calcium reagent starter kit (reagents for 25 tests), HI731339P 100 µL pipette, syringe with HI731349 tip, plastic pipette, battery, instructions, and quick start guide.
Reagent Set	HI758-26 (25 tests)
Calibration Set	HI758-11
Accessories	HI731339P 0.1 mL minipipette HI731349P tips for 0.1 mL minipipette (10)

HI753

Chloride

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
 - Operated by a single AAA battery
- Ideal for:
 - Drinking water
 - Waste water
 - Boiler and cooling towers

The HI753 Checker®HC is a simple, accurate, and cost effective way to measure chloride. Designed as a more accurate alternative to chemical test kits, the HI753 provides quick, accurate results in three easy steps.

Step One - Prepare samples according to the manual.

Step Two - Insert zero cuvette into the Checker HC, press and hold the button for 3 seconds to start reaction timer. Meter will zero automatically.

Step Three - Remove zero cuvette and insert sample. Press the button to measure your results.

The HI753 uses an adaptation of the mercury(II) thiocyanate method.



Specifications	HI753
Range	0.0 to 20.0 ppm
Resolution	0.1 ppm
Accuracy @25°C (77°F)	± 0.5 ppm ± 6% of reading
Light Source	LED @ 470 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the mercury(II) thiocyanate method. The chloride ion displace thiocyanate ion from mercury(II). The iron(III) present forms with thiocyanate an orange colored complex. The intensity of color is proportional to the chloride ion concentration.
Ordering Information	HI753 Checker®HC is supplied with sample cuvettes with caps (2), chloride reagent starter kit (reagents for 25 tests), syringes with tips (2), battery, instructions, and quick start guide.
Reagent Set	HI753-25 (25 tests)
Calibration Set	HI753-11

HI701 · HI762

Free Chlorine and Ultra Low Range Free Chlorine

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
 - EPA approved DPD method
 - Large, easy-to-read digits
 - Auto shut off
- Dedicated to a single parameter
- Small size, big convenience
 - The Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
- Ideal for:
 - Swimming pools and spas
 - Fruit and vegetable sanitation
 - Disinfection
 - Drinking water and quality control checks



The HI701 and HI762 Checker®HC bridge the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give 5 to 10 points of resolution, while professional instrumentation can cost hundreds of dollars and can be time consuming to calibrate and maintain. These meters are accurate and affordable.

The HI701 features a resolution of 0.01 ppm and ± 0.03 ppm $\pm 3\%$ of reading accuracy while the HI762 features a resolution of 1 ppb and ± 20 ppb $\pm 4\%$ of reading accuracy. Both meters use an EPA approved DPD method.

The contoured style of the Checker HC fits in your palm or pocket perfectly and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.

These meters are extremely simple to use. First, zero the instrument with your water sample. Next, add the reagent. Lastly, place the vial into the Checker HC, press the button and read the results. It's that easy.

Specifications	HI701	HI762 (ULR)
Range	0.00 to 2.50 ppm	0 to 500 ppb
Resolution	0.01 ppm	1 ppb
Accuracy @25°C (77°F)	± 0.03 ppm $\pm 3\%$ of reading	± 20 ppb $\pm 4\%$ of reading
Light Source	LED @ 525 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after two minutes of non-use	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	Adaptation of USEPA method 330.5. The reaction between free chlorine and the DPD reagent causes a pink tint in the sample.	
Ordering Information	<p>HI701 Checker®HC is supplied with sample cuvettes with caps (2), free chlorine reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI762 Checker®HC is supplied with sample cuvettes with caps (2), free chlorine reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p>	
Reagent Set	HI701-25 (25 tests)	HI762-25 (25 tests)
Calibration Set	HI701-11	HI762-11

HI711 · HI761 · HI771

Total, Total Ultra Low Range, and Ultra High Range Chlorine

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Swimming pools and spas
 - Fruit and vegetable sanitation/disinfection
 - Drinking water
 - Quality control checks
 - Environmental
 - Hospitality
 - Food processing

Chlorine is the most commonly used water disinfectant. The monitoring of chlorine is crucial in applications such as swimming pools and spas, fruit and vegetable sanitation, disinfection, and drinking water. By monitoring this crucial parameter, serious health and safety risks can be avoided.

The HI711, HI761, and HI771 Checker®HC Handheld Colorimeters bridge the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give 5 to 10 points of resolution, while professional instrumentation can cost hundreds of dollars and can be time consuming to calibrate and maintain. Hanna's Checker HC's are an accurate and affordable alternative.

The contoured style of these Checkers fit easily in the palm of your hand or pocket and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.

These Checker HC's are designed to be portable and easy to use, providing quick, accurate results in four easy steps.



Specifications	HI711 (Total)	HI761 (Total ULR)	HI771 (UHR)
Range	0.00 to 3.50 ppm	0 to 500 ppb	0 to 500 ppm
Resolution	0.01 ppm	1 ppb	1 ppm
Accuracy @25°C (77°F)	±0.03 ppm ±3% of reading	±5 ppb ±5% of reading	±3 ppm ±5% of reading
Light Source	LED @ 525 nm		
Light Detector	silicon photocell		
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing		
Battery Type	1.5V AAA (1)		
Auto-off	after two minutes of non-use	after ten minutes of non-use	
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")		
Weight	64 g (2.3 oz)		
Method	adaptation of USEPA method 330.5. The reaction between free chlorine and the DPD reagent causes a pink tint in the sample.		adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, 4500-Cl.
Ordering Information	<p>HI711 Checker®HC is supplied with sample cuvettes with caps (2), total chlorine reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI761 Checker®HC is supplied with sample cuvettes with caps (2), total chlorine ULR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI771 Checker®HC is supplied with sample cuvettes with caps (2), Chlorine UHR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p>		
Reagent Set	HI711-25 (25 tests)	HI761-25 (25 tests)	HI771-25 (25 tests)
Calibration Set	HI711-11	HI761-11	HI771-11

HI749 · HI723

Chromium VI Low Range and High Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Water quality
 - Environmental
 - Plating
 - Education

There are two natural forms of ionic chromium: the hexavalent Cr(VI) and the trivalent Cr(III). Cr(III) is much less toxic than Cr(VI) and seldom found in potable waters. Cr(VI), however, is toxic to humans and is found in water. Even though the toxic effects from Cr(VI) in drinking water are not well documented, it is a suspected carcinogen.

There are many industries that use chromic acid and other forms of Cr(VI) that could be a possible source of Cr(VI) pollution in either water, air, or both. One industry that can introduce Cr(VI) to water sources is the chrome-plating industry. Chromic acid is used in the electroplating process and can be present in industrial waste waters. Cr(VI) can also enter water supplies from industrial cooling towers where chromic acid is added to the water to inhibit metal corrosion.

The maximum permissible level of Cr(VI) allowed to be released into the waterways is 50 ppb. Its level in drinking water is normally much lower, and a level higher than 3 ppb is suggestive of industrial pollution.

The HI723 and HI749 Checker®HC Handheld Colorimeters are a simple, accurate, and cost effective way to measure Cr(VI). Each model is designed for a specific range (low or high) in order to provide high levels of accuracy.

The contoured style of these Checker HC's fit easily in the palm of your hand or pocket and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.



Specifications	HI749 (LR)	HI723 (HR)
Range	0 to 300 ppb	0 to 999 ppb
Resolution	1 ppb	1 ppb
Accuracy @25°C (77°F)	±3 ppb ±5% of reading	±5 ppb ±4% of reading
Light Source	LED @ 525 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use	after ten minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the ASTM Manual of Water and Environmental Technology, D1687-92, Diphenylcarbohydrazide method. The reaction between chromium VI and the reagent causes a purple tint in the sample.	
Ordering Information	HI749 Checker®HC is supplied with sample cuvettes with caps (2), chromium LR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide. HI723 Checker®HC is supplied with sample cuvettes with caps (2), chromium HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.	
Reagent Set	HI749-25 (25 tests)	HI723-25 (25 tests)
Calibration Set	HI749-11	HI723-11

HI727

Color of Water

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for water quality

True color is caused by dissolved compounds in water and can be both natural or artificial. Apparent color is caused by both dissolved and suspended solids. Color is measured in Platinum-Cobalt units (PCU). The AWWA recommends ≤ 15 PCU.

The term "true color" is defined as the color of water from which turbidity has been removed. The term "apparent color" includes not only color due to substances in solution, but also color that is due to suspended matter. Apparent color is determined on the original sample without filtration or centrifugation. In some highly-colored industrial wastewaters, color is contributed principally by colloidal or suspended material. In such cases, both true color and apparent color should be determined.

To determine true color, turbidity must be removed before analysis. Methods for removing turbidity without removing color vary. Filtration yields results that are reproducible from day to day among laboratories, however, some filtration procedures may also remove some true color. Centrifugation avoids interaction of color with filter materials, but results vary with the sample nature, size, and speed of the centrifuge. When sample dilution is necessary, whether it precedes or follows turbidity removal, it can alter the measured color. Acceptable pretreatment procedures are included with each method. The pretreatment method should be stated when reporting the results.

The HI727 Checker®HC is very simple to use. First, zero the instrument with deionized water. Next, prepare the sample according to the Apparent/True color measurement. Place the second vial with prepared sample into the Checker HC, press the operational button and the HI727 Checker® displays the color of water in PCU.



Specifications	HI727
Range	0 to 500 g/L PCU
Resolution	5 PCU
Accuracy @25°C (77°F)	± 10 PCU $\pm 5\%$ of reading
Light Source	LED @ 470 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater 21th edition, Colorimetric Platinum Cobalt method.
Ordering Information	HI727 Checker®HC is supplied with sample cuvettes with caps (2), battery, instructions, and quick start guide.
Calibration Set	HI727-11

Maple Syrup Digital Grader

Handheld Colorimeter

- Easy to use
- Results are displayed % transmittance
- Small size, big convenience

The season of maple syrup production spans several months between winter and spring each year. As the days get longer and warmer and the nights stay below freezing, the sap from maple trees begins to flow and tapping begins. At the beginning of production season, the sap produces a lighter, sweeter syrup comprised of sucrose as the main sugar content. As the season progresses and temperatures rise, microorganisms grow and colonize the sap as it is collected. These bacteria, while not harmful, convert part of the sucrose present into invert sugars, glucose and fructose. The level of invert sugars in the sap, as well as the chemical processes that occur during boiling, are responsible for creating a darker and stronger flavored syrup product.

Maple syrup grading standards for the United States and Canada allow consumers to easily distinguish between the different grades of syrup, regardless of the place of origin.

The HI759 Maple Syrup Digital Grader is a handheld colorimeter designed for quick, accurate determination of the grade of maple syrup. The HI759 is designed as a more accurate alternative to temporary and permanent visual grading kits, providing quick, accurate results in four easy steps.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert the glycerol reference cuvette, close the lid, and press the button to zero.

Step Three - Remove the glycerol reference cuvette and replace with a sample cuvette.

Step Four - Close the lid and press the button. Reading will be taken automatically and the results displayed.

This Maple Syrup Digital Grader measures the percent light transmittance of the syrup and directly displays the percentage results on the large, easy to read LCD display. Located on the back of the meter is a chart referencing the percent light transmittance to the grade. Eliminating the subjectivity of grading by eye and the potential for mislabeling, the HI759 is grading made simple.



State of Vermont Grades and Standards (New IMSI* standards)

Grade A Color Classes	Taste	Light Transmittance
Grade A Golden	Delicate	≥ 75
Grade A Amber	Rich	50 to 74
Grade A Dark	Robust	25 to 49
Grade A Very Dark	Strong	< 25

* International Maple Syrup Institute

Specifications

HI759

Range	0 to 100% transmittance
Resolution	1% transmittance
Accuracy	±4% transmittance
Light Source	light emitting diode @ 560 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)

Ordering Information

HI759 Checker®HC is supplied with sample cuvettes with caps (3), glycerol standard cuvette, plastic beakers (3), battery, instructions, and quick reference guide.

Accessories

HI759-11 glycerol reference cuvettes (2 pcs)
HI731359 round glass cuvettes with plastic inserts (25)

HI747 · HI702

Copper Low Range and High Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Water Quality
 - Education
 - Aquarium
 - Wastewater
 - Environmental



The HI702 and HI747 Checker®HC are a simple, accurate, and cost effective way to measure high and low ranges of copper. Designed as a more accurate alternative to chemical test kits, the HI702 and HI747 provide quick, accurate results in four easy steps.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert sample into the Checker HC and press button to zero.

Step Three - Remove sample and add reagent packet.

Step Four - Reinsert sample, press and hold the button for 3 seconds to start reaction timer. Reading will be taken automatically and the results displayed.

The HI702 and HI747 use an adaptation of the EPA method. The reaction between copper and the bicinchoninate reagent causes a purple tint in the sample.

Specifications	HI747 (LR)	HI702 (HR)
Range	0 to 999 ppb	0.00 to 5.00 ppm
Resolution	1 ppb	0.01 ppm
Accuracy @25°C (77°F)	±10 ppb ± 5% of reading	±0.05 ppm ±5% of reading
Light Source	LED @ 575 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use	
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the EPA method. The reaction between copper and the bicinchoninate reagent causes a purple tint in the sample	
Ordering Information	<p>HI747 Checker®HC is supplied with sample cuvettes with caps (2), copper LR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI702 Checker®HC is supplied with sample cuvettes with caps (2), copper HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p>	
Reagent Set	HI747-25 (25 tests)	HI702-25 (25 tests)
Calibration Set	HI747-11	HI702-11

Fluoride Low Range and High Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for water quality

Fluoride is one of the very few chemicals that have been shown to cause significant effects in people through drinking water. Fluoride has beneficial effects on teeth at low concentrations in drinking water, but excessive exposure to fluoride in drinking water, or in combination with exposure to fluoride from other sources, can give rise to a number of adverse effects.

A 1994 World Health Organization expert committee suggested a level of fluoride from 0.5 to 1.0 ppm, depending on climate. Bottled water typically has unknown fluoride levels, and some domestic water filters remove some or all fluoride.



Specifications	HI729 (LR)	HI739 (HR)
Range	0.00 to 2.00 ppm	0.0 to 20.0 ppm
Resolution	0.01 ppm	0.1 ppm
Accuracy* @25°C (77°F)	±0.10 ppm ±5% of reading	±0.5 ppm ± 5% of reading
Light Source	LED @ 575 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use and two minutes after reading	
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, SPADNS method	
Ordering Information	<p>HI729 Checker®HC is supplied with sample cuvettes with caps (2), fluoride LR reagent starter kit (reagents for 5 tests), syringe with tip, battery, instructions, and quick start guide.</p> <p>HI739 Checker®HC is supplied with sample cuvettes with caps (2), fluoride HR reagent starter kit (reagents for 15 tests), syringe with tip, plastic pipette, battery, instructions, and quick start guide.</p>	
Reagent Set	HI729-26 (20 tests)	HI739-26 (30 tests)
Calibration Set	HI729-11	HI739-11

* Excluding sample volume error

HI719 · HI720

Magnesium and Calcium Hardness

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Water purification systems
 - Heating and cooling systems
 - Drinking water
 - Wastewater

The HI719 and HI720 are a simple, accurate, and cost-effective way to measure magnesium and calcium hardness respectively.

The HI719 uses an adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, EDTA colorimetric method. The reaction between magnesium and reagents causes a reddish-violet tint in the sample.

The HI720 uses an adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Calmagite method. The reaction between calcium and reagents causes a reddish-violet tint in the sample.



Specifications	HI719 (Magnesium Hardness)	HI720 (Calcium Hardness)
Range	0.00 to 2.00 ppm	0.00 to 2.70 ppm
Resolution	0.01 ppm	0.01 ppm
Accuracy @25°C (77°F)	±0.20 ppm ±5% of reading	±0.20 ppm ±5% of reading
Light Source	LED @ 525 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use	
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, EDTA colorimetric method. The reaction between magnesium and reagents causes a reddish-violet tint in the sample	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Calmagite method. The reaction between calcium and reagents causes a reddish-violet tint in the sample
Ordering Information	<p>HI719 Checker®HC is supplied with sample cuvettes with caps (2), magnesium hardness reagent starter kit (reagents for 25 tests), syringes with tips (2), plastic beaker, battery, instructions, and quick start guide.</p> <p>HI720 Checker®HC is supplied with sample cuvettes with caps (2), calcium hardness reagent starter kit (reagents for 25 tests), syringes with tips (2), plastic beaker, battery, instructions, and quick start guide.</p>	
Reagent Set	HI719-25 (25 tests)	HI720-25 (25 tests)
Calibration Set	HI719-11	HI720-11

HI718

Iodine

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
 - DPD method
 - ± 0.1 ppm $\pm 5\%$ of reading accuracy
 - Large, easy-to-read digits
 - Auto shut-off
- Dedicated to a single parameter
 - Designed to work with Hanna's powder reagents
- Small size, big convenience
 - Weighing a mere 64 g (2.25 oz.), the Checker®HC easily fits into the palm of your hand or pocket
 - Use for quick and accurate on-the-spot analysis
 - Single-button operation: zero and measure
- Ideal for:
 - Swimming pools and spas
 - Industrial processes and disinfection



Iodine is sometimes used as a disinfectant for swimming pools, spas and potable water. It has also found use as a disinfectant in the poultry industry. The rapid determination of iodine is required for adequate control of this bactericide.

The Hanna Checker®HC bridges the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give 5 to 10 of points resolution, while professional instrumentation can cost hundreds of dollars and can be time-consuming to calibrate and maintain. The HI718 Checker HC is both accurate and affordable.

The HI718 Checker HC portable handheld colorimeter features a resolution of 0.1 ppm and accuracy of ± 0.1 ppm $\pm 5\%$ of reading. This Checker HC uses a modification of the DPD method used for residual chlorine.

The contoured style of this Checker HC fits in your palm or pocket perfectly and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.

Specifications	HI718
Range	0.0 to 12.5 ppm
Resolution	0.1 ppm
Accuracy @25°C (77°F)	± 0.1 ppm $\pm 5\%$ of reading
Light Source	LED @ 525 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after two minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Periodate method. The reaction between iodine and the reagent causes a pink tint in the sample.
Ordering Information	HI718 Checker®HC is supplied with sample cuvettes with caps (2), iodine reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.
Reagent Set	HI718-25 (25 tests)
Calibration Set	HI718-11

HI746 · HI721

Iron Low Range and High Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Industrial ground and treated waters
 - Mining leachate monitoring
 - Agricultural irrigation water

About 6.3% of the earth's crust is made of iron, of which 43% is in soils. The analysis of iron is often performed to monitor ground water and irrigation waters as a gauge of corrosion from industrial settling, and as an indication of the effectiveness of treatment from mining leachate.

The Hanna HI746 and HI721 Checker®HC bridge the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give 5 to 10 points of resolution, while professional instrumentation can cost hundreds of dollars and can be time-consuming to calibrate and maintain. These meters are accurate, affordable, and produce immediate results.

The HI721 features a resolution of 0.01 ppm and ± 0.04 ppm $\pm 2\%$ of reading accuracy while the HI746 features 1 ppb resolution and ± 20 ppb $\pm 5\%$ of reading accuracy.

The contoured style of these meters fit in your palm or pocket perfectly and the large LCD is easy to read. The auto shut-off feature assures battery life will not be drained if you forget to turn it off.



Specifications	HI746 (LR)	HI721 (HR)
Range	0 to 999 ppb	0.00 to 5.00 ppm
Resolution	1 ppb	0.01 ppm
Accuracy @25°C (77°F)	± 20 ppb $\pm 5\%$ of reading	± 0.04 ppm $\pm 2\%$ of reading
Light Source	LED @ 575 nm	LED @ 525 nm
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use	after three minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the TPTZ method. The reaction between iron and the reagent causes a violet tint in the sample.	adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, 3500-Fe B, Phenanthroline method. The re-action between iron and reagent causes an orange tint in the sample
Ordering Information	<p>HI746 Checker®HC is supplied with sample cuvettes with caps (2), iron LR reagent starter kit (reagents for 25 tests), 25 mL glass cylinders with rubber cap (2), battery, instructions, and quick start guide.</p> <p>HI721 Checker®HC is supplied with sample cuvettes with caps (2), iron HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p>	
Reagent Set	HI746-25 (25 tests)	HI721-25 (25 tests)
Calibration Set	HI746-11	HI721-11

Manganese High Range

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Water Quality
 - Education
 - Aquarium
 - Wastewater
 - Environmental

The HI709 Checker®HC is a simple, accurate, and cost effective way to measure high ranges of manganese. Designed as a more accurate alternative to chemical test kits, the HI709 provides quick, accurate results in four easy steps.

Step One - Add a sample to the included cuvette(s).

Step Two - Insert sample into the Checker HC and press the button to zero.

Step Three - Remove sample and add reagent.

Step Four - Reinsert sample, press and hold the button for 3 seconds to start reaction timer. Reading will be taken automatically and the results displayed.

The HI 709 uses an adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Periodate method. The reaction between manganese and reagents causes a pink tint in the sample.



Specifications	HI709 (HR)
Range	0.0 to 20.0 ppm
Resolution	0.1 ppm
Accuracy @25°C (77°F)	± 0.2 ppm ± 5% of reading
Light Source	LED @ 525 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Periodate method. The reaction between manganese and reagents causes a pink tint in the sample
Ordering Information	HI709 Checker®HC is supplied with sample cuvettes with caps (2), manganese HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.
Reagent Set	HI709-25 (25 tests)
Calibration Set	HI709-11

HI726

Nickel High Range

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Steel manufacturing
 - Electroplating and electronics production

Nickel is extensively used in electroplating, the manufacturing of steel, electronic devices, ceramics and colored glasses. It plays a vital role in many processes of applied sciences and fundamental sciences.

Nickel is seldom found in natural waters, but is often present in industrial wastewater as a direct by-product of metal plating baths, and as a corrosion by-product of stainless steel, nickel or cobalt alloys.

The most serious effects of nickel exposure include lung cancer and other respiratory effects in people who have breathed nickel dust while working in nickel refineries or in nickel processing plants. Other lung effects including chronic bronchitis and reduced lung function have been observed in workers breathing nickel. The levels of nickel in the workplace were much higher than background levels. The International Agency for Research on Cancer (IARC) has determined that some nickel compounds are carcinogenic to humans and that metallic nickel may be carcinogenic to humans. The EPA has determined that nickel refinery dust and nickel subsulfide are human carcinogens.

The HI726 Checker®HC is extremely simple to use. First, zero the instrument with your water sample. Next, add the reagent, shake gently until complete dissolution. Finally, place the vial into the Checker HC, press the button for 3 seconds. The display will show the countdown prior to the measurement. When the timer ends the meter will perform the reading and display concentration in g/L of nickel. It's that easy.



Specifications	HI726 (HR)
Range	0.00 to 7.00 g/L
Resolution	0.01 g/L
Accuracy @25°C (77°F)	±0.10 g/L ±5% of reading
Light Source	LED @ 575 nm
Light Detector	silicon photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type	1.5V AAA (1)
Auto-off	after ten minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)
Method	adaptation of the photometric method. The reaction between nickel and the reagent causes a blue tint in the sample.
Ordering Information	HI726 Checker®HC is supplied with sample cuvettes with caps (2), nickel HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.
Reagent Set	HI726-25 (25 tests)
Calibration Set	HI726-11

HI764 · HI767 · HI707 · HI708

Nitrite Low Range, High Range and Marine Nitrite Ultra Low Range

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Aquaculture
 - Aquariums
 - Education
 - Environmental
 - Water quality
 - Wastewater



Nitrification is the biological oxidation of ammonia (ammonium ion) into nitrite, followed by the oxidation of nitrite to nitrate. The first step of this two-step process is carried out in an aquarium by nitrifying bacteria. During this process, the ammonium levels drop while the nitrite levels increase. Since nitrite is just as harmful as ammonia, nitrite levels should be maintained at immeasurable levels. A mature biological filter should be able to keep nitrite levels low.

The HI707, HI708, HI767, and HI764 Checker®HC Handheld Colorimeters bridge the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate, while professional instrumentation can cost hundreds of dollars and can be time-consuming to calibrate and maintain. Hanna Checker HC's are accurate, affordable, and easy to use.

To begin measurements, first zero the instrument with your water sample. Next, add the reagent. Last, place the vial into the Checker HC, press and hold the button for 3 seconds to start reaction timer. The reading will be taken automatically and the results displayed. It's that easy.

The contoured style of the Checker HC fits in your palm and pocket perfectly and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.

Specifications	HI764 (Marine ULR)	HI767 (Marine LR)	HI707 (LR)	HI708 (HR)
Range	0 to 200 ppb NO ₂ -N	0 to 999 ppb	0 to 600 ppb NO ₂ ⁻	0 to 150 ppm NO ₂ ⁻
Resolution	1 ppb	1 ppb	1 ppb	1 ppm
Accuracy @25°C (77°F)	±10 ppb ±4% of reading	±10 ppb ±4% of reading	±20 ppb ±5% of reading	±3 ppm ±5% of reading
Light Source	LED @ 525 nm	LED @ 470 nm	LED @ 470 nm	LED @ 575 nm
Light Detector	silicon photocell			
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing			
Battery Type	1.5V AAA (1)			
Auto-off	after two minutes of non-use	after ten minutes of non-use and four minutes after reading		after ten minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")			
Weight	64 g (2.3 oz)			
Method	adaptation of the EPA Diazotization method 354.1. The reaction between nitrite and the reagent causes a pink tint in the sample.			Adaptation of the Ferrous Sulfate method. The reaction between nitrite and the reagent causes a greenish-brown tint in the sample.
Ordering Information	<p>HI764 Checker®HC is supplied with sample cuvettes with caps (2), marine nitrite ULR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI767 Checker®HC is supplied with sample cuvettes with caps (2), marine nitrite LR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI707 Checker®HC is supplied with sample cuvettes with caps (2), nitrite LR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI708 Checker®HC is supplied with sample cuvettes with caps (2), nitrite HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p>			
Reagent Set	HI764-25 (25 tests)	HI767-25 (25 tests)	HI707-25 (25 tests)	HI708-25 (25 tests)
Calibration Set	HI764-11	HI767-11	HI707-11	HI708-11

HI774 · HI713 · HI717

Phosphate

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Aquaculture
 - natural, waste, agricultural and drinking waters

Orthophosphates are found in natural waters and wastewaters. They are commonly added to drinking water as a corrosion inhibitor. The instantaneous analysis of orthophosphates by colorimetric determination provides rapid results using a standard analysis technique.

The Hanna HI774, HI713, and HI717 Checker®HC bridges the gap between simple chemical test kits and professional instrumentation. Chemical test kits are not very accurate and only give some points resolution, while professional instrumentation can cost hundreds of dollars and can be time-consuming to calibrate and maintain. These Checker HC's are accurate and affordable.

The HI774 Checker HC is a simple, accurate, and cost effective way to measure ultra low range phosphates in seawater. HI774 features a resolution of 0.01 ppm and ± 0.02 ppm $\pm 5\%$ of reading accuracy. The HI774 Checker HC uses an adaptation of the Ascorbic Acid method.

The HI713 Checker HC portable handheld colorimeter features a resolution of 0.01 ppm and ± 0.04 ppm $\pm 4\%$ of reading accuracy. The HI713 Checker HC uses an adaptation of the Ascorbic Acid method.

The HI717 Checker HC portable handheld colorimeter features a resolution of 0.1 ppm and ± 1.0 ppm $\pm 5\%$ of reading accuracy. The HI717 Checker HC uses an adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Amino Acid method.



Specifications	HI774 (Marine ULR)	HI713 (LR)	HI717 (HR)
Range	0.00 to 0.90 ppm	0.00 to 2.50 ppm	0.0 to 30.0 ppm
Resolution	0.01 ppm	0.01 ppm	0.1 ppm
Accuracy @25°C (77°F)	± 0.02 ppm $\pm 5\%$ of reading	± 0.04 ppm $\pm 4\%$ of reading	± 1.0 ppm $\pm 5\%$ of reading
Light Source	LED @ 525 nm		
Light Detector	silicon photocell		
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing		
Battery Type	1.5V AAA (1)		
Auto-off	after seven minutes of non-use and two minutes after reading	after three minutes of non-use and two minutes after reading	after ten minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")		
Weight	64 g (2.3 oz)		
Method	adaptation of Standard Methods for the Examination of Water and Wastewater, 20th edition, Ascorbic Acid method. The reaction between phosphate and the reagent causes a blue tint in the sample.	adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, Ascorbic Acid method. The reaction between phosphate and the reagent causes a blue tint in the sample.	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Heteropoly-molybdenum Blue method. The reaction between orthophosphate (reactive phosphorus) and the reagent causes a blue tint in the sample
Ordering Information	<p>HI774 Checker®HC is supplied with sample cuvettes with caps (2), marine phosphate ULR reagent starter kit (reagents for 10 tests), battery, instructions, and quick start guide.</p> <p>HI713 Checker®HC is supplied with sample cuvettes with caps (2), phosphate LR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI717 Checker®HC is supplied with sample cuvettes with caps (2), phosphate HR reagent starter kit (reagents for 20 tests), battery, instructions, and quick start guide.</p>		
Reagent Set	HI774-25 (25 tests)	HI713-25 (25 tests)	HI717-25 (40 tests)
Calibration Set	HI774-11	HI713-11	HI717-11

Phosphorus

Handheld Colorimeters

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for aquaculture

Plants, algae and phytoplankton require phosphorus for nourishment and utilize phosphorous as a component of cell tissue. When organic matter such as plant tissue, dead fish, algae, or uneaten food breaks down aerobically (with oxygen), phosphate is produced. This results in rapid oxygen depletion of aquarium water, which in turn suffocates aquatic life and compounds the problem.

Phosphorus concentration in water is monitored because it causes corrosion when present in levels too high.

Both the Hanna HI736 and HI706 Checker®HC's bridge the gap between simple chemical test kits and professional instrumentation. The Hanna HI736 (for marine applications) and HI706 (for fresh water applications) are both accurate and affordable.

The HI736 Checker HC portable handheld colorimeter features a resolution of 1 ppb and ± 5 ppb $\pm 5\%$ of reading accuracy and uses an adaptation of the Ascorbic Acid.



SPECIFICATIONS	HI736 (Marine ULR)	HI706 (HR)
Range	0 to 200 ppb	0.0 to 15.0 ppm
Resolution	1 ppb	0.1 ppm
Accuracy @25°C (77°F)	± 5 ppb $\pm 5\%$ of reading	± 0.3 ppm $\pm 5\%$ of reading
Light Source	LED @ 525 nm	
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after three minutes of non-use and two minutes after reading	after ten minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	daptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, Ascorbic Acid method. The reaction between phosphorus and the reagent causes a blue tint in the sample	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Heteropolymolybdenum Blue method. The reaction between reactive phosphorus and the reagent causes a blue tint in the sample.
ORDERING INFORMATION	<p>HI736 Checker®HC is supplied with sample cuvettes with caps (2), marine phosphorus ULR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI706 Checker®HC is supplied with sample cuvettes with caps (2), phosphorus HR reagent starter kit (reagents for 20 tests), battery, instructions, and quick start guide.</p>	
Reagent Set	HI736-25 (25 tests)	HI706-25 (40 tests)
Calibration Set	HI736-11	HI706-11

HI770 · HI705

Silica High Range and Low Range

Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience
- Ideal for:
 - Aquaculture
 - Water quality
 - Environmental
 - Water treatment

Silica is the name given to silicon dioxide, SiO₂. Silicon (Si), is the most abundant element in the Earth's crust. Silicon is never found in its elemental form in nature. In its crystallized form it is only reactive under conditions of extremely high temperatures. Water and water vapor have little influence upon silicon solubility, because a protective surface layer of silicon dioxide is rapidly formed. Silicon binds with other elements to form various species of silica and silicate. The concentration of the soluble silica molecules are important to aquaculture because they influence (and limit) the growth of diatoms. In most waters, the predominant form of dissolved silica is monosilicic acid, which incorporates two water molecules.

The HI705 and HI770 Checker®HC Handheld Colorimeters are a simple, accurate, and cost effective way to measure silica. Each model is designed for a specific range (low or high) in order to provide high levels of accuracy.

The contoured style of these Checkers HC fit easily in the palm of your hand or pocket and the large LCD is easy to read. The auto shut-off feature assures the battery life will not be drained if you forget to turn it off.



SPECIFICATIONS	HI770 (HR)	HI705 (LR)
Range	0 to 200 ppm	0.00 to 2.00 ppm
Resolution	1 ppm	0.01 ppm
Accuracy @25°C (77°F)	±2 ppm ±5% of reading	±0.03 ppm ±5% of reading
Light Source	LED @ 470 nm	LED @ 610 nm
Light Detector	silicon photocell	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Battery Type	1.5V AAA (1)	
Auto-off	after ten minutes of non-use	after three minutes of non-use and two minutes after reading
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")	
Weight	64 g (2.3 oz)	
Method	adaptation of the USEPA method 370.1 for drinking, surface and saline waters and Standard Method 4500-SiO ₂ C for domestic and industrial waters	adaptation of the ASTM D859, heteropoly blue method
ORDERING INFORMATION	<p>HI770 Checker®HC is supplied with sample cuvettes with caps (2), silica HR reagent starter kit (reagents for 6 tests), battery, instructions, and quick start guide.</p> <p>HI705 Checker®HC is supplied with sample cuvettes with caps (2), silica LR reagent starter kit (reagents for 12 tests), battery, instructions, and quick start guide.</p>	
Reagent Set	HI770-25 (25 tests)	HI705-25 (25 tests)
Calibration Set	HI770-11	HI705-11

Meter Code	Parameter	Chemical Method	Reagent Code	Calibration Checking Set	# of Tests
HI700	Ammonia LR	Nessler*	HI700-25	HI700-11	25
HI701	Chlorine, Free	DPD*	HI701-25	HI701-11	25
HI702	Copper HR	Bicinchoninate*	HI702-25	HI702-11	25
HI705	Silica LR	Heteropoly Blue*	HI705-25	HI705-11	25
HI706	Phosphorus HR	Amino Acid*	HI706-25	HI706-11	40
HI707	Nitrite LR	Diazotization*	HI707-25	HI707-11	25
HI708	Nitrite HR	Ferrous Sulfate*	HI708-25	HI708-11	25
HI709	Manganese HR	Periodate*	HI709-25	HI709-11	25
HI711	Chlorine, Total	DPD*	HI711-25	HI711-11	25
HI713	Phosphate LR	Ascorbic Acid*	HI713-25	HI713-11	25
HI715	Ammonia MR	Nessler*	HI715-25	HI715-11	25
HI716	Bromine	DPD*	HI716-25	HI716-11	25
HI717	Phosphate HR	Amino Acid*	HI717-25	HI717-11	40
HI718	Iodine	DPD*	HI718-25	HI718-11	25
HI719	Magnesium Hardness	EDTA*	HI719-25	HI719-11	25
HI720	Calcium Hardness	Calmagite*	HI720-25	HI720-11	25
HI721	Iron HR	Phenantroline*	HI721-25	HI721-11	25
HI723	Chromium VI HR	Diphenylcarbohydrazide*	HI723-25	HI723-11	25
HI726	Nickel HR	Photometric*	HI726-25	HI726-11	25
HI727	Color of Water	Colorimetric Platinum Cobalt*	-	HI727-11	-
HI729	Fluoride LR	SPADNS*	HI729-26	HI729-11	20
HI733	Ammonia HR	Nessler*	HI733-25	HI733-11	20
HI736	Phosphorus, Marine ULR	Ascorbic Acid*	HI736-25	HI736-11	25
HI739	Fluoride HR	SPADNS*	HI739-26	HI739-11	30
HI746	Iron LR	TPTZ*	HI746-25	HI746-11	25
HI747	Copper LR	Bicinchoninate*	HI747-25	HI747-11	25
HI749	Chromium LR	Diphenylcarbohydrazide*	HI749-25	HI749-11	25
HI753	Chloride	Mercury(II) Thiocyanate	HI753-25	HI753-11	25
HI755	Alkalinity, Marine	Colorimetric	HI755-26	HI755-11	25
HI758	Calcium, Marine	Zincon*	HI758-26	HI758-11	25
HI761	Chlorine, Total ULR	DPD*	HI761-25	HI761-11	25
HI762	Chlorine, Free ULR	DPD*	HI762-25	HI762-11	25
HI764	Nitrite, Marine ULR	Diazotization*	HI764-25	HI764-11	25
HI767	Nitrite, Marine LR	Diazotization*	HI767-25	HI767-11	25
HI770	Silica HR	USEPA 370.1*/Std. Mtd. 4500-SiO ₂ C*	HI770-25	HI770-11	25
HI771	Chlorine, Total UHR	4500-Cl*	HI771-25	HI771-11	25
HI772	Alkalinity, Marine	Colorimetric	HI772-26	HI772-11	25
HI774	Phosphate, Marine ULR	Ascorbic Acid*	HI774-26	HI774-11	25
HI775	Alkalinity	Colorimetric	HI775-26	HI775-11	25

*adaptation

CheckerHC Accessories

Code	Description
HI731318	cuvette cleaning cloth (4)
HI731315	glass cuvettes and caps (2)
HI731321	glass cuvettes (4)
HI731225	cuvette cap for Checker®HC (4)
HI93703-50	cuvette cleaning solution
HI740226	5 mL graduated syringe
HI740157P	plastic refilling pipette (20)
HI740144P	pipette tip (6)
HI740143	1 mL graduated syringe (6)
HI740036P	100 mL plastic beaker (10)
HI70436M	deionized water (230 mL)
HI70436	deionized water (1G)

Tips for an accurate measurement

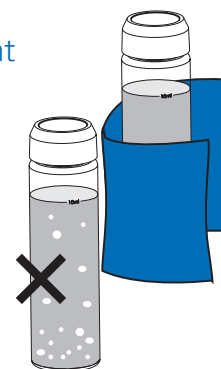
It is important that the sample does not contain any debris.

Whenever the cuvette is placed into the measurement cell, it must be dry outside and completely free of fingerprints, oil or dirt. Wipe it thoroughly with HI731318 or a lint-free cloth prior to insertion.

Shaking the cuvette can generate bubbles, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the cuvette.

Do not let the reacted sample stand for too long after reagent is added, or accuracy will be lost.

After the reading, it is important to discard the sample immediately, otherwise the glass might become permanently stained.





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Wastewater needs to be monitored closely to prevent environmental pollution and human illness.

Oxygen Demand and COD

Chemical Oxygen Demand (COD) is a measure of the biologically available and inert organic matter that is susceptible to oxidation by a strong oxidizing agent.

The Hanna COD method is based on the well established closed dichromate-reflux colorimetric method. The colorimetric measurement of COD is faster and easier to perform than the titrimetric analysis; additional reagents are not required. The sample is added to the reagent vial and digested under closed reflux conditions and allowed to cool before measurement is taken. Reference standards can be made using potassium hydrogen phthalate (KHP), 1 mg of KHP is equal to 1.175 mg COD.

The US Environmental Protection Agency (EPA) specifies that the dichromate reflux method is the only method acceptable for reporting purposes. The advantage in using this method includes certifiable results as well as high accuracy.

COD Testing Applications

COD is used as a measurement of pollutants. It is normally measured in both municipal and industrial wastewater treatment plants and gives an indication of the efficiency of the treatment process. COD is measured on both influent and effluent water. The efficiency of the treatment process is normally expressed as COD removal, measured as a percentage of the organic matter purified during the cycle. COD has further applications in power plant operations, chemical manufacturing, commercial laundries, pulp and paper mills, agriculture and animal waste runoff, environmental studies and general education. Hanna equipment can be used in the laboratory or for on-site testing. The measurement procedure has been designed for ease of use by personnel at any skill level.

Wastewater monitoring examples:

COD Influent	COD Effluent	COD Removal
1214	451	62%
948	328	63%
1341	307	77%

Beyond COD: Nitrogen and Phosphorus

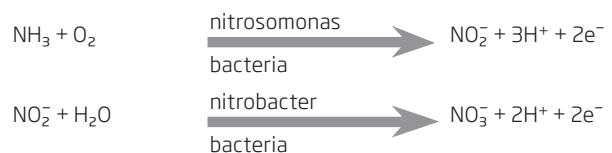
The goal in wastewater treatment is not only COD reduction, but also to control nitrogen and phosphorus, which are responsible for eutrophication phenomena in natural environments. COD, nitrogen, and phosphorus control are performed not only to obey environmental protection laws, but also to optimize plant costs.

Effective monitoring and control of parameters such as ammonia, nitrate, total nitrogen and total reactive phosphorus allow plant managers to profile and improve the health of aquatic ecosystems. By accurately monitoring levels of each specific pollutant, operational parameters can be adjusted to maintain high efficiency of biodegradation treatments while also minimizing costs.

Nitrogen

When a treatment plant uses processes like nitrification and denitrification, it is important to monitor and maintain the equilibrium between ammonia nitrogen, nitrate and total nitrogen during the bio-treatment. The nitrogen level is important because it relates to the quantity of oxygen provided in the nitrification area. Ammonia is also controlled because it can become very toxic for the bacteria responsible for denitrification.

Nitrification



Denitrification



Phosphorus

Phosphorus is measured during both biological and chemical dephosphorization. An excessive amount of phosphate discharged in superficial waters or in bio-treatment tanks causes an increase of algae and system eutrophication.



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.

See page 11.6



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.

See page 11.12



HI93754

COD Certified Standards and Reagents

Each box of 25 vials is supplied with a Hanna certificate of quality. The reagents are traceable to NIST SRM® 930.

- **Compact packaging**
 - Each set of COD vials is stored in fully recyclable, sustainable, compact plastic packaging rather than standard styrofoam. A smaller box allows you to store more on your shelf, and reduce waste when disposing of your packaging.

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HI83224

COD Meter and Multiparameter Photometer

with Barcode Recognition of Sample Vials

From ammonia to phosphorus, the HI83224 benchtop photometer offers 15 measurement methods for different key water quality parameters in addition to chemical oxygen demand (COD) in 3 different ranges. The HI83224 features a barcode reader that can be used for barcoded sample vials. The reader scans each vial and automatically identifies the method and range, eliminating potential errors and simplifying the testing process.

This photometer features an advanced optical system that uses special tungsten lamps, narrow band interference filters, and silicon photodetectors to ensure accurate photometric readings every time. The HI83224 uses a graphic backlit LCD that allows for an intuitive user interface, offering a tutorial mode that gives a step-by-step procedure for performing a measurement. The result obtained can be displayed in various chemical forms based on the user's preference. For tracking of data, results can be logged and then exported to a Windows® compatible PC using the HI92000 software and HI920013 USB cable.

Barcode Recognition

Automatic recognition of bar coded samples is an exciting feature of the HI83224. This advanced meter scans each vial inserted into the vial holder and automatically identifies the sample method and range. The barcode has four digits: the first two digits are for parameter identification and the second two digits are for reagent lot ID. Vials for different methods can be distinguished by a barcode printed on the vial and the cap color - the barcodes for different methods are shown in the table below. For parameters that don't use a barcoded reagent, the vials supplied with the instrument can be used.

Vial Rotation

During the measurement phase of the analysis, the state-of-the-art vial rotator spins the vial to identify the method via the barcode, then rotates while taking a number of absorbance readings. The instrument then converts the readings to concentration units and displays the result on the easy to read screen.



Application Designed Photometers



- **Improved Accuracy**
 - Using the “average” function further improves reading accuracy. When enabled in the setup menu, the instrument takes 180 absorbance readings through the vial as it rotates. Each individual reading represents a measurement through a new optical path. Averaging the absorbance readings minimizes errors due to vial inconsistencies.
- **Method Verification**
 - A dedicated METHOD CHECK button is available to verify the vial barcode, eliminating the potential for vial confusion or incorrect sample readings.
- **Backlit Graphic LCD Display**
 - The HI83224 features an adjustable backlit graphic display with virtual keys and on-screen help to provide for an intuitive user interface.
- **Data Logging**
 - Users can store up to 200 readings by simply pressing the LOG key. Logged readings are just as easily recalled by pressing the dedicated RCL button. Stored data includes parameter, test results, sample number, lot number, instrument ID, date and time.
- **PC Connectivity**
 - Logged readings can be transferred to a PC via USB using HI92000 Windows® compatible software.
- **Result Conversion**
 - Eliminates confusion by automatically converting readings to other chemical forms. Common conversions are available at the touch of a button.
- **On-screen Tutorial**
 - With the tutorial function enabled, short guides relating to the current operation are displayed.
- **Built-in Timer**
 - Display of time remaining before a measurement is taken. Ensures that all readings are taken at the appropriate reaction intervals for the test being performed.
- **Error Messages**
 - Messages on display alerting to problems including barcode error, wrong vial, and different reagent lot.
- **Cooling Lamp Indicator**
 - To maintain the desirable wavelength to be used for absorbance, it is necessary to ensure components are not overheated from the heat generated by the tungsten lamp. Each photometer is designed to allow a minimal amount of time for components to cool.

Specifications	HI83224
Light Source	tungsten lamps with narrow band interference filters
Light Detector	silicon photocell
Data Logging	up to 200 samples
PC Connectivity	USB
Environment	0 to 50°C (32 to 122°F); RH max 90% non-condensing
Power Supply	230 VAC or 115 VAC
Dimensions	235 x 212 x 143 mm (9.2 x 8.34 x 5.62")
Weight	2.3 kg (5.1 lb)
Ordering Information	HI83224-01 (115V) and HI83224-02 (230V) are supplied with sample vials (10), vial cleaning cloths (4), scissors, power cable, and instruction manual.



- Bar code reader detects the method and range automatically

COD Test	Range	Resolution	Accuracy	Method	Reagent Code
COD LR - 150°C, 2 hours	0 to 150 mg/L (as O ₂)	1 mg/L	±5 mg/L or ±5% of reading**	dichromate EPA†	HI94754A-25 (24 tests)
	0 to 150 mg/L	1 mg/L	±5 mg/L or ±5% of reading**	dichromate mercury-free**	HI94754D-25 (24 tests)
	0 to 150 mg/L	1 mg/L	±5 mg/L or ±5% of reading**	dichromate ISO°	HI94754F-25 (24 tests)
COD MR - 150°C, 2 hours	0 to 1500 mg/L (as O ₂)	1 mg/L	±15 mg/L or ±4% of reading**	dichromate EPA†	HI94754B-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±15 mg/L or ±4% of reading**	dichromate mercury-free**	HI94754E-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±15 mg/L or ±4% of reading**	dichromate ISO°	HI94754G-25 (24 tests)
COD HR - 150°C, 2 hours	0 to 15000 mg/L (as O ₂)	1 mg/L	±150 mg/L or ±3% of reading**	dichromate	HI94754C-25 (24 tests)

COD Rapid Method: It is now possible to get results for process control monitoring in a fraction of the time using any of the Hanna COD reagents. The Rapid Method digestion time is reduced from 2 hours to 15 minutes when the digestion temperature is increased from 150°C to 170°C.

COD Test	Range	Resolution	Accuracy	Rapid Method	Reagent Code
COD LR / Rapid Method - 170°C, 15 minutes	0 to 150 mg/L (as O ₂)	1 mg/L	±8 mg/L or 5% of reading**	adaptation of dichromate EPA	HI94754A-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±8 mg/L or 5% of reading**	adaptation of dichromate mercury-free	HI94754D-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±8 mg/L or 5% of reading**	adaptation of dichromate ISO	HI94754F-25 (24 tests)
COD MR / Rapid Method - 170°C, 15 minutes	0 to 150 mg/L (as O ₂)	1 mg/L	±20 mg/L or 4% of reading**	adaptation of dichromate EPA	HI94754B-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±20 mg/L or 4% of reading**	adaptation of dichromate mercury-free	HI94754E-25 (24 tests)
	0 to 1500 mg/L	1 mg/L	±20 mg/L or 4% of reading**	adaptation of dichromate ISO	HI94754G-25 (24 tests)

Test	Range	Resolution	Accuracy*	Method	Reagent Code
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.10 mg/L or ±5% of reading**	Nessler	HI94764A-25 (25 tests)
Ammonia HR	0 to 100 mg/L (as NH ₃ -N)	1 mg/L	±1 mg/L or ±5% of reading**	Nessler	HI94764B-25 (25 tests)
Chlorine, Free**	0.00 to 5.00 mg/L	0.01 mg/L below 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.03 mg/L or ±4% of reading**	DPD	HI93701-01 (100 tests) HI93701-03 (300 tests)
Chlorine, Total**	0.00 to 5.00 mg/L	0.01 mg/L below 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.03 mg/L or ±4% of reading**	DPD	HI93711-01 (100 tests) HI93711-03 (300 tests)
Nitrate	0.0 to 30.0 mg/L (as NO ₃ -N)	0.1 mg/L	±1.0 mg/L or ±5% of reading** @25°C	chromotropic acid	HI94766-50 (50 tests)
Nitrogen, Total LR	0.0 to 25.0 mg/L (as N)	0.1 mg/L	±1.0 mg/L or ±5% of reading** @25°C	chromotropic acid	HI94767A-50 (49 tests)
Nitrogen, Total HR	10 to 150 mg/L (as N)	1 mg/L	±3 mg/L or ±4% of reading**	chromotropic acid	HI94767B-50 (49 tests)
Phosphorus, Acid Hydrolyzable	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±5% of reading**	ascorbic acid	HI94758B-50 (50 tests)
Phosphorus, Reactive LR	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±5% of reading**	ascorbic acid	HI94758A-50 (50 tests)
Phosphorus, Reactive HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±5% of reading**	vanadomolybdophosphoric acid	HI94763A-50 (49 tests)
Phosphorus, Total LR	0.00 to 1.15 mg/L (as P)	0.01 mg/L	±0.05 mg/L or ±6% of reading**	ascorbic acid	HI94758C-50 (50 tests)
Phosphorus, Total HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±0.5 mg/L or ±5% of reading**	vanadomolybdophosphoric acid	HI94763B-50 (49 tests)

Notes:
 † Method with chromium-sulfuric acid is officially recognized by EPA for wastewater analysis.
 ° The HI94754F-25 and HI94754G-25 method follows the official method ISO 15705.
 °° This method is recommended for general purpose analysis with no chloride interference.

* @ 25°C (77°F) unless otherwise stated
 ** Whichever is greater

HI83399

Multiparameter Photometer with COD for Water and Wastewater

with Digital pH Electrode Input

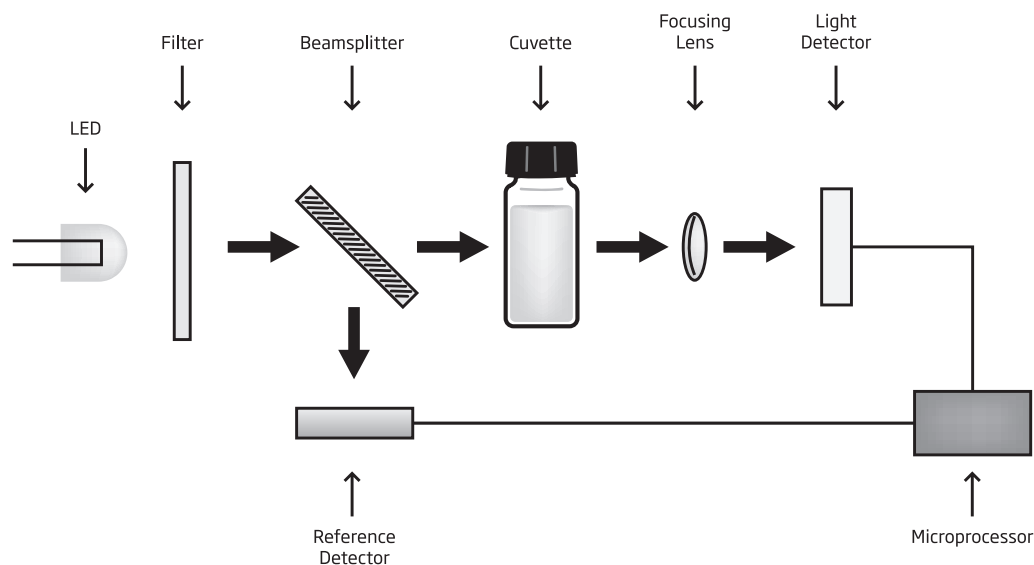
HI83399 benchtop photometer measures 40 different key water and wastewater quality parameters using 77 different methods that allow for multiple ranges and variations in chemistry for specific applications. The Chemical Oxygen Demand (COD) parameter is included for industrial and municipal wastewater 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

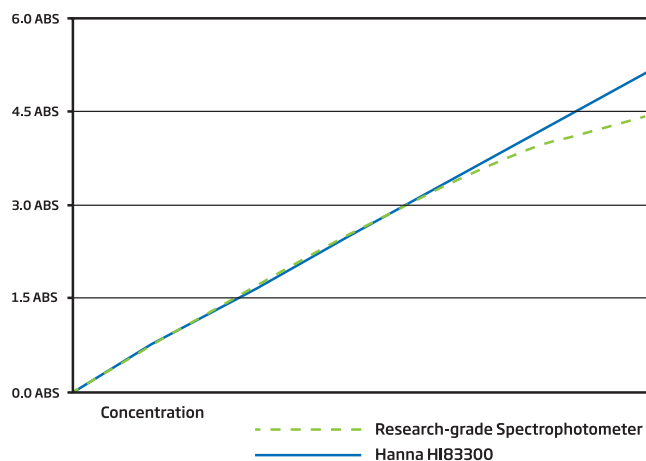
HI83300 family is designed with an innovative optical system that incorporates a beam splitter so that light can be used for absorbance readings and for a reference detector. The reference detector monitors the intensity of light and modulates when there is drift due to power fluctuation or the heating 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

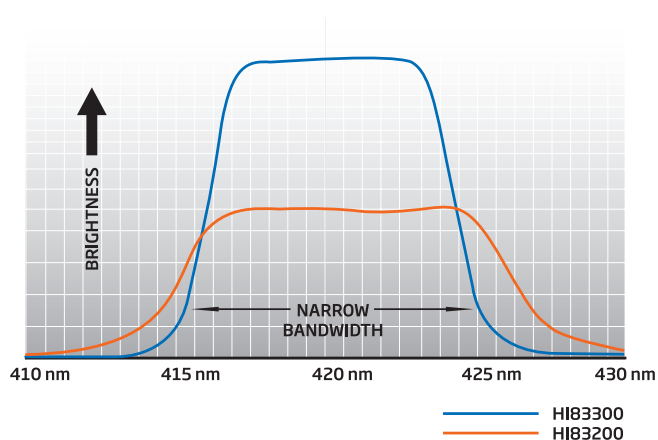
A beam splitter is used as part of the internal reference system of the HI83300 photometer. The reference detector compensates for any drift due to power fluctuations or ambient temperature changes. Now you can rely on a stable source of light.

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 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

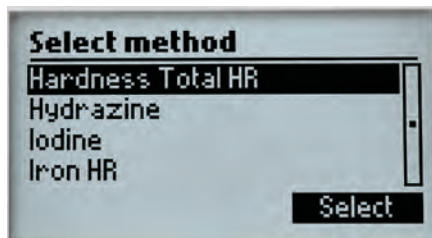
The HI83399 is equipped with a rechargeable lithium ion battery that lasts up to 500

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

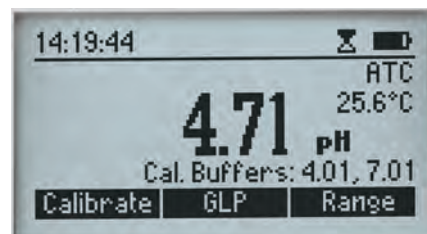
Users can access the menu of measurement methods with the simple press of a button. Low, medium, and high range methods of several parameters are available for users to obtain a high accuracy reading. Each method is assigned a concentration unit of measure. Parameters can be expressed in different chemical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



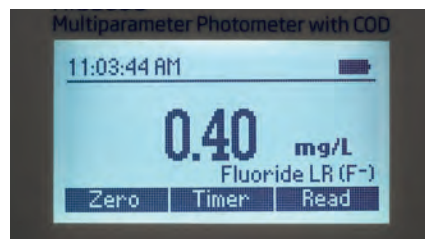
Data Management

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

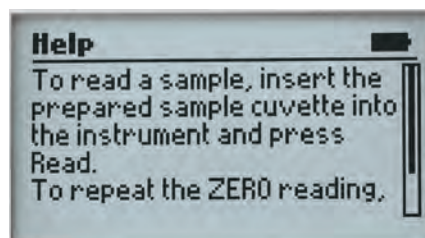
Two USB ports are provided for transferring data. One port allows the data to be transferred to a flash drive while the other USB is used for direct connection to a computer. All data is transferred as a .csv file that can be used with many spreadsheet programs for documentation.

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)	
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	3.7VDC 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.)

Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) with Narrow Band Interference Filter	Method	Reagent Code
Alkalinity	0 to 500 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	Bromocresol green	HI775-26 25 tests
Alkalinity, Marine	0 to 300 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±5% of reading	@ 610 nm	Bromocresol green	HI755-26 25 tests
Aluminum	0.00 to 1.00 mg/L (as Al ³⁺)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 525 nm	aluminon	HI93712-01 100 tests
Ammonia LR	0.00 to 3.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia LR (16 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, whichever is greater	@ 420 nm	Nessler	HI93764A-25 25 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Ammonia HR (16 mm vial)	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	± 1 mg/L or ± 5% of reading, whichever is greater	@ 420 nm	Nessler	HI93764B-25 25 tests
Bromine	0.00 to 8.00 mg/L (as Br ₂)	0.01 mg/L	±0.08 mg/L ±3% of reading	@ 525 nm	DPD	HI93716-01 100 tests
Calcium	0 to 400 mg/L (as Ca ²⁺)	1 mg/L	±10 mg/L ±5% of reading	@ 466 nm	oxalate	HI937521-01 50 tests
Calcium, Marine	200 to 600 mg/L (as Ca ²⁺)	1 mg/L	±6% of reading	@ 610 nm	zincon	HI758-26 25 tests
Chloride	0.0 to 20.0 mg/L (as Cl ⁻)	0.1 mg/L	±0.5 mg/L ±6% of reading	@ 466 nm	mercury (II) thiocyanate	HI93753-01 100 tests
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO ₂)	0.01 mg/L	±0.10 mg/L ±5% of reading	@ 575 nm	chlorophenol red	HI93738-01 100 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	@ 525 nm	DPD	HI96779-01 100 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Free ULR	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading	@ 525 nm	DPD	HI95762-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 tests
Chlorine, Total ULR	0.000 to 0.500 mg/L (as Cl ₂)	0.001 mg/L	±0.020 mg/L ±3% of reading	@ 525 nm	DPD	HI95761-01 100 tests
Chlorine, Total UHR	0 to 500 mg/L (as Cl ₂)	1 mg/L	±3 mg/L ±3% of reading	@ 525 nm	iodometric	HI95771-01 100 tests
Chromium(VI) LR	0 to 300 µg/L (as Cr ⁶⁺)	1 µg/L	±10 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93749-01 100 tests
Chromium(VI) HR	0 to 1000 µg/L (as Cr ⁶⁺)	1 µg/L	±5 µg/L ±4% of reading	@ 525 nm	diphenylcarbohydrazide	HI93723-01 100 tests
Chromium, Total and VI (16 mm vial)	0 - 1000 µg/L (as Cr)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diphenylcarbohydrazide	HI96781-25 25 tests
COD LR (16 mm vial)*	0 to 150 mg/L (as O ₂)	1 mg/L	±5 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 420 nm	dichromate ISO dichromate EPA mercury-free dichromate	HI93754A-25 24 tests HI93754D-25 24 tests HI93754F-25 24 tests
COD MR (16 mm vial)*	0 to 1500 mg/L (as O ₂)	1 mg/L	±15 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate ISO dichromate EPA mercury-free dichromate	HI93754B-25 24 tests HI93754E-25 24 tests HI93754G-25 24 tests
COD HR (16 mm vial)*	0 to 15000 mg/L (as O ₂)	1 mg/L	±150 mg/L or ±2% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate	HI93754C-25 24 tests
COD UHR (16 mm vial)	0.0 to 60.0 g/L (as O ₂)	0.1 g/L	±0.5 mg/L ±3% of reading	@ 610 nm	dichromate	HI93754I-25 24 tests
Color of Water	0 to 500 PCU (Platinum Cobalt Units)	1 PCU	±10 PCU ±5% of reading	@ 420 nm	colorimetric platinum cobalt	
Copper LR	0.000 to 1.500 mg/L (as Cu ²⁺)	0.001 mg/L	±0.010 mg/L ±5% of reading	@ 575 nm	bicinchoninate	HI95747-01 100 tests
Copper HR	0.00 to 5.00 mg/L (as Cu ²⁺)	0.01 mg/L	±0.02 mg/L ±4% of reading	@ 575 nm	bicinchoninate	HI93702-01 100 tests
Cyanuric Acid	0 to 80 mg/L (as CYA)	1 mg/L	±1 mg/L ±15% of reading	@ 525 nm	turbidimetric	HI93722-01 100 tests
Fluoride LR	0.00 to 2.00 mg/L (as F ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	SPADNS	HI93729-01 100 tests
Fluoride HR	0.0 to 20.0 mg/L (as F ⁻)	0.1 mg/L	±0.5 mg/L ±3% of reading	@ 575 nm	SPADNS	HI93739-01 100 tests
Hardness, Calcium	0.00 to 2.70 mg/L (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading	@ 525 nm	calmagite	HI93720-01 100 tests

*COD Rapid Method available.

Parameter	Range	Resolution	Accuracy (@ 25°C)	LED (λ nm) with Narrow Band Interference Filter	Method	Reagent Code
Hardness, Magnesium	0.00 to 2.00 mg/L (ppm) (as CaCO ₃)	0.01 mg/L	±0.11 mg/L ±5% of reading	@ 525 nm	EDTA	HI93719-01 100 tests
Hardness, Total LR	0 to 250 mg/L (as CaCO ₃)	1 mg/L	±5 mg/L ±4% of reading	@ 466 nm	EPA 130.1	HI93735-00 100 tests
Hardness, Total MR	200 to 500 mg/L (as CaCO ₃)	1 mg/L	±7 mg/L ±3% of reading	@ 466 nm	EPA 130.1	HI93735-01 100 tests
Hardness, Total HR	400 to 750 mg/L (as CaCO ₃)	1 mg/L	±10 mg/L ±2% of reading	@ 466 nm	EPA 130.1	HI93735-02 100 tests
Hydrazine	0 to 400 µg/L (as N ₂ H ₄)	1 µg/L	±4% of full scale reading	@ 466 nm	p-Dimethylaminobenzaldehyde	HI93704-01 100 tests
Iodine	0.0 to 12.5 mg/L (as I ₂)	0.1 mg/L	±0.1 mg/L ±5% of reading	@ 525 nm	DPD	HI93718-01 100 tests
Iron (II) (ferrous)	0.00 to 6.00 mg/L Fe ²⁺	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96776-01 100 tests
Iron (II)/(III) (ferrous and ferric)	0.00 to 6.00 mg/L Fe	0.01 mg/L	±0.10 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI96777-01 100 tests
Iron LR	0.000 to 1.600 mg/L (as Fe)	0.001 mg/L	±0.010 mg/L ±8% of reading	@ 575 nm	TPTZ	HI93746-01 50 tests
Iron HR	0.00 to 5.00 mg/L (as Fe)	0.01 mg/L	±0.04 mg/L ±2% of reading	@ 525 nm	phenanthroline	HI93721-01 100 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	HI96778-25 25 tests
Magnesium	0 to 150 mg/L (as Mg ²⁺)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	calmagite	HI937520-01 50 tests
Manganese LR	0 to 300 µg/L (as Mn)	1 µg/L	±10 µg/L ±3% of reading	@ 575 nm	PAN	HI93748-01 50 tests
Manganese HR	0.0 to 20.0 mg/L (as Mn)	0.1 mg/L	±0.2 mg/L ±3% of reading	@ 525 nm	periodate	HI93709-01 100 tests
Molybdenum	0.0 to 40.0 mg/L (as Mo ⁶⁺)	0.1 mg/L	±0.3 mg/L ±5% of reading	@ 420 nm	mercaptoacetic acid	HI93730-01 100 tests
Nickel LR	0.000 to 1.000 mg/L (as Ni)	0.001 mg/L	±0.010 mg/L ±7% of reading	@ 575 nm	PAN	HI93740-01 50 tests
Nickel HR	0.00 to 7.00 g/L (as Ni)	0.01 g/L	±0.07g/L ±4% of reading	@ 575 nm	photometric	HI93726-01 100 tests
Nitrate	0.0 to 30.0 mg/L (as NO ₃ ⁻ N)	0.1 mg/L	±0.5 mg/L ±10% of reading	@ 525 nm	cadmium reduction	HI93728-01 100 tests
Nitrate (16 mm vial)	0.0 to 30.0 mg/L Nitrate (as NO ₃ ⁻ N)	0.1 mg/L	±1.0 mg/L or ±3% of reading, whichever is greater	@ 420 nm	chromotropic acid	HI93766-50 50 tests
Nitrite ULR, Marine	0 to 200 µg/L (as NO ₂ ⁻ N)	1 µg/L	±10 µg/L ±4% of reading	@ 466 nm	diazotization	HI764-25 25 tests
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	HI93707-01 100 tests
Nitrite LR (16 mm vial)	0 to 600 µg/L (as NO ₂ ⁻ N)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diazotization	HI96783-25 49 tests
Nitrite MR (16 mm vial)	0.00 to 6.00 mg/L (as NO ₂ ⁻ N)	0.01 mg/L	±0.10 mg/L ±3% of reading	@ 525 nm	diazotization	HI96784-25 49 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Nitrogen, Total LR (16 mm vial)	0.0 to 25.0 mg/L (as NO ₃ ⁻ N)	0.1 mg/L	±1.0 mg/L or ±5% of reading, whichever is greater	@ 420 nm	chromotropic acid	HI93767A-50 50 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	HI93767B-50 50 tests
Oxygen, Dissolved	0.0 to 10.0 mg/L (as O ₂)	0.1 mg/L	±0.4 mg/L ±3% of reading	@ 420 nm	Winkler	HI93732-01 100 tests
Oxygen Scavengers	0.00 to 1.50 mg/L (as Carbohydrazide)	0.01 mg/L	±0.02 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0 to 1000 µg/L (as DEHA)	1 µg/L	±5 µg/L ±5% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 2.50 mg/L (as Hydroquinone)	0.01 mg/L	±0.04 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Oxygen Scavengers	0.00 to 4.50 mg/L (as Iso-ascorbic acid)	0.01 mg/L	±0.03 µg/L ±3% of reading	@ 575 nm	iron reduction	HI96773-01 100 tests
Ozone	0.00 to 2.00 mg/L (as O ₃)	0.01 mg/L	±0.02 mg/L ±3% of reading	@ 525 nm	DPD	HI93757-01 100 tests
pH	6.5 to 8.5 pH	0.1 pH	±0.1 pH	@ 525 nm	phenol red	HI93710-01 100 tests
Phosphate ULR, Marine	0 to 200 µg/L (as P)	1 µg/L	±5 µg/L ±5% of reading	@ 610 nm	ascorbic acid	HI774-25 25 tests
Phosphate LR	0.00 to 2.50 mg/L (ppm)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 610 nm	ascorbic acid	HI93713-01 100 tests
Phosphate HR	0.0 to 30.0 mg/L (as PO ₄ ³⁻)	0.1 mg/L	±1 mg/L ±4% of reading	@ 525 nm	amino acid	HI93717-01 100 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	HI93758A-50 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	HI93763A-50 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	HI93758B-50 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	HI93758C-50 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	HI93763B-50 49 tests
Potassium	0.0 to 20.0 mg/L (as K)	0.1 mg/L	±3.0 mg/L ±7% of reading	@ 466 nm	turbidimetric tetraphenylborate	HI93750-01 100 tests
Silica LR	0.00 to 2.00 mg/L (as SiO ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 610 nm	heteropoly blue	HI93705-01 100 tests
Silica HR	0 to 200 mg/L (as SiO ₂)	1 mg/L	±1 mg/L ±5% of reading	@ 466 nm	molybdosilicate	HI96770-01 100 tests
Silver	0.000 to 1.000 mg/L (as Ag)	0.001 mg/L	±0.020 mg/L ±5% of reading	@ 575 nm	PAN	HI93737-01 50 tests
Sulfate	0 to 150 mg/L (as SO ₄ ²⁻)	1 mg/L	±5 mg/L ±3% of reading	@ 466 nm	turbidimetric	HI93751-01 100 tests
Surfactants, Anionic	0.00 to 3.50 mg/L (as SDBS)	0.01 mg/L	±0.04 mg/L ±3% of reading	@ 610 nm	methylene blue	HI95769-01 100 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	HI96782-25 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	HI96780-25 24 tests
Zinc	0.00 to 3.00 mg/L (as Zn)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 575 nm	zincon	HI93731-01 100 tests

Ordering Information

HI83399-01 (115V) and **HI83399-02** (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.

Standards

HI83399-11 CAL Check Cuvette Kit for HI83399

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 ₃ -N)	0.01 mg/L	±0.04 mg/L ±4% of reading	@ 420 nm	Nessler	HI93700-01 100 tests
Ammonia LR (16 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, whichever is greater	@ 420 nm	Nessler	HI93764A-25 25 tests
Ammonia MR	0.00 to 10.00 mg/L (as NH ₃ -N)	0.01 mg/L	±0.05 mg/L ±5% of reading	@ 420 nm	Nessler	HI93715-01 100 tests
Ammonia HR	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	±0.5 mg/L ±5% of reading	@ 420 nm	Nessler	HI93733-01 100 tests
Ammonia HR (16 mm vial)	0.0 to 100.0 mg/L (as NH ₃ -N)	0.1 mg/L	± 1 mg/L or ± 5% of reading, whichever is greater	@ 420 nm	Nessler	HI93764B-25 25 tests
Chlorine, Free	0.00 to 5.00 mg/L (as Cl ₂)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93701-01 100 tests
Chlorine, Total	0.00 to 5.00 mg/L (as Cl ⁻)	0.01 mg/L	±0.03 mg/L ±3% of reading	@ 525 nm	DPD	HI93711-01 100 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	HI96781-25 25 tests
COD LR (16 mm vial)*	0 to 150 mg/L (as O ₂)	1 mg/L	±5 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 420 nm	dichromate ISO dichromate EPA mercury-free dichromate	HI93754A-25 24 tests HI93754D-25 24 tests HI93754F-25 24 tests
COD MR (16 mm vial)*	0 to 1500 mg/L (as O ₂)	1 mg/L	±15 mg/L or ±4% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate ISO dichromate EPA mercury-free dichromate	HI93754B-25 24 tests HI93754E-25 24 tests HI93754G-25 24 tests
COD HR (16 mm vial)*	0 to 15000 mg/L (as O ₂)	1 mg/L	±150 mg/L or ±2% of reading @ 25°C, whichever is greater	@ 610 nm	dichromate	HI93754C-25 24 tests
COD UHR (16 mm vial)	0.0 to 60.0 g/L (as O ₂)	0.1 g/L	±0.5 mg/L ±3% of reading	@ 610 nm	dichromate	HI93754I-25 100 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	HI96778-25 25 tests
Nitrate (16 mm vial)	0.0 to 30.0 mg/L Nitrate (as NO ₃ ⁻ -N)	0.1 mg/L	±1.0 mg/L or ±3% of reading, whichever is greater	@ 420 nm	chromotropic acid	HI93766-50 50 tests
Nitrite ULR, Marine	0 to 200 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ±4% of reading	@ 466 nm	diazotization	HI764-25 25 tests
Nitrite LR	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±20 µg/L ±4% of reading	@ 466 nm	diazotization	HI93707-01 100 tests
Nitrite LR (16 mm vial)	0 to 600 µg/L (as NO ₂ ⁻ -N)	1 µg/L	±10 µg/L ±3% of reading	@ 525 nm	diazotization	HI96783-25 25 tests
Nitrite MR (16 mm vial)	0.00 to 6.00 mg/L (as NO ₂ ⁻ -N)	0.01 mg/L	±0.10 mg/L ±3% of reading	@ 525 nm	diazotization	HI96784-25 25 tests
Nitrite HR	0 to 150 mg/L (as NO ₂ ⁻ -N)	1 mg/L	±4 mg/L ±4% of reading	@ 575 nm	ferrous sulfate	HI93708-01 100 tests
Nitrogen, Total LR (16 mm vial)	0.0 to 25.0 mg/L (as NO ₃ ⁻ -N)	0.1 mg/L	±1.0 mg/L or ±5% of reading, whichever is greater	@ 420 nm	chromotropic acid	HI93767A-50 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	HI93767B-50 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	HI93758A-50 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	HI93763A-50 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	HI93758B-50 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	HI93758C-50 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	HI93763B-50 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	HI96782-25 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	HI96780-25 24 tests
Ordering Information	HI83314-01 (115V) and HI83314-02 (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.					
Standards	HI83314-11 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	HI96781-25 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	HI96778-25 25 tests
Nitrogen, Total LR (16 mm vial)	0.0 to 25.0 mg/L (as NO ₃ ⁻ - N)	0.1 mg/L	±1.0 mg/L or ±5% of reading, whichever is greater	@ 420 nm	chromotropic acid	HI93767A-50 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	HI93767B-50 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	HI93758A-50 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	HI93763A-50 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	HI93758B-50 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	HI93758C-50 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	HI93763B-50 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)



HI740225 60 mL graduated syringe



HI76404A electrode holder for HI83300 family



HI731318 cuvette cleaning cloth (4)



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



HI93754

COD Certified Standards and Reagents

Each box of 25 vials is supplied with a Hanna certificate of quality. The reagents are traceable to NIST SRM® 930.

- **Compact packaging**
 - Each set of COD vials is stored in fully recyclable, sustainable, compact plastic packaging rather than standard styrofoam. A smaller box allows you to store more on your shelf, and reduce waste when disposing of your packaging.
- **Three measurement ranges to satisfy every need**
 - As COD levels vary depending on the application and process measuring points, Hanna offers reagents to cover three separate ranges. Simply choose the best range for the application: low range: 0 to 150 mg/L O₂ medium range: 0 to 1500 mg/L O₂ high range: 0 to 15000 mg/L O₂
- **Accurate and repeatable measurements**
 - Hanna COD reagents have been developed in accordance with Standard Methods 5220D, USEPA 410.4 and ISO 15705:2002 methods.
- **Pre-dosed vials**
 - Hanna vials contain approximately 3 mL of pre-dosed reagent. The operator just needs to add a small quantity of the sample.
- **Safe reagents**
 - Hanna COD reagents are safe for operators and the environment. Vials and caps have been designed to avoid accidental reagent spills. Due to the pre-dosed reagents, the amount of chemicals and handling time is minimized.
- **Quick and accurate measurements**
 - With pre-dosed vials, test preparation time is dramatically reduced. There is no time-consuming reagent preparation procedure or glassware cleaning.



HI93754E-25



HI93754A-25



HI93754B-25



HI93754C-25

COD Test	Range	Method	Reagent Code
COD LR - 150°C, 2 hours	0 to 150 mg/L (as O ₂)	dichromate EPA*	HI93754A-25 (25 tests)
	0 to 150 mg/L	dichromate mercury-free**	HI93754D-25 (25 tests)
	0 to 150 mg/L	dichromate ISO***	HI93754F-25 (25 tests)
COD MR - 150°C, 2 hours	0 to 1500 mg/L (as O ₂)	dichromate EPA*	HI93754B-25 (25 tests)
	0 to 1500 mg/L	dichromate mercury-free**	HI93754E-25 (25 tests)
	0 to 1500 mg/L	dichromate ISO***	HI93754G-25 (25 tests)
COD HR - 150°C, 2 hours	0 to 15000 mg/L (as O ₂)	dichromate	HI93754C-25 (25 tests)
COD UHR - 150°C, 2 hours	0.0 to 60.0 g/L	dichromate	HI93754I-25 (24 tests)

COD Rapid Method: It is now possible to get results for process control monitoring in a fraction of the time using any of the Hanna COD reagents. The Rapid Method digestion time is reduced from 2 hours to 15 minutes when the digestion temperature is increased from 150°C to 170°C.

COD Test	Range	Rapid Method	Reagent Code
COD LR / Rapid Method - 170°C, 15 minutes	0 to 150 mg/L (as O ₂)	adaptation of dichromate EPA	HI93754A-25 (25 tests)
	0 to 1500 mg/L	adaptation of dichromate mercury-free	HI93754D-25 (25 tests)
	0 to 1500 mg/L	adaptation of dichromate ISO	HI93754F-25 (25 tests)
COD MR / Rapid Method - 170°C, 15 minutes	0 to 150 mg/L (as O ₂)	adaptation of dichromate EPA	HI93754B-25 (25 tests)
	0 to 1500 mg/L	adaptation of dichromate mercury-free	HI93754E-25 (25 tests)
	0 to 1500 mg/L	adaptation of dichromate ISO	HI93754G-25 (25 tests)

Wastewater Standards

HI93754-11 500 ppm COD standard, 500 mL bottle

HI93754-12 14000 ppm COD standard, 500 mL bottle

HI93717-11 phosphate standard 1000 ppm, 500 mL bottle

Notes:

* Method with chromium-sulfuric acid is officially recognized by EPA for wastewater analysis.

** This method is recommended for general purpose analysis with no chloride interference.

*** Method follows the official method ISO 15705. COD MR ISO method is 0-1000 mg/L. Meter can read higher.

HI839800

COD Test Tube Heater

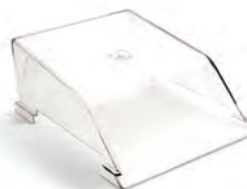
with 25 Vial Capacity

- **Predefined Temperature Settings**
 - The test tube heater features two predefined temperature profiles at 150°C (221°F) and 105°C (301°F) that can be selected at the press of a button.
- **Temperature Alerts**
 - The HI839800 alerts users in the event that the temperature of the heating block is either above or below the set temperature. A timer icon reminds users to wait until the heating block has cooled or warmed up before inserting their samples.
- **Built-in Timer**
 - A built-in countdown timer of up to 180 minutes allows users to easily set the required digestion time by simply pressing the up and down arrows. Once a time has been set and the heating element is stable, a press of the START button begins the digestion procedure.
- **Status Indicator Lights**
 - Three LED lights are featured on the HI839800. A green LED indicates the heater has been turned on; a yellow LED indicates when the heater is actively heating up to a set temperature; a red LED indicates when the heater goes above 50°C, reminding the user that the aluminum element is hot.
- **Overheating Prevention**
 - The HI839800 contains a thermal fuse that prevents overheating. Should overheating occur, the heater automatically shuts down and all LED indicator lights turn off.
- **Reference Temperature Well**
 - In addition to the 25 vial capacity of the aluminum heating block, a small well is available for a temperature probe for users that wish to verify their heating block.
- **Two Operating Modes**
 - The HI839800 features two operating modes: idle and heating. Idle mode is the default mode in which the heater measures and displays the current temperature, target temperature, set reaction time, and an "idle" tag. Heating mode is activated when users press the START button; it starts when actively heating and continues during the countdown timer.
- **Continuous LCD Display**
 - The block temperature is continuously displayed on the easy to read LCD display, even when there is no active temperature program running. All relevant information in addition to temperature are easily visible during idle and heating mode.
- **Error Messages**
 - Messages on display alerting to problems including high or low temperature, hot surface, or heating system malfunction.

The HI839800 COD Test Tube Heater features two predefined temperature profiles: 150°C and 105°C. Digestions for chemical oxygen (COD) and total phosphorus are conducted at 150°C, while total nitrogen digestions are conducted at 105°C. The test tube heater automatically heats up to the set temperature, holding it until the countdown timer has finished. Once the timer has ended, a beep will sound and the heating element will turn off. The outer casing of the HI839800 remains cool to the touch, even during a timed digestion. An optional lab safety shield and test tube cooling rack provide a complete setup for sample digestions.



Outer casing stays cool to the touch!



HI740217
Lab Safety Shield



HI740216
Test Tube Cooling Rack

For safety, the optional HI740217 safety shield and HI740216 test tube cooling rack for the HI839800 are strongly recommended.

Specifications	HI839800
Temperature of Reaction	105°C or 150°C (221°F or 302°F)
Temperature Stability	±0.5°C (±0.9°F)
Temperature Range	-10°C to 160°C (14°F to 320°F)
Accuracy	±2°C (±3.6°F)
Capacity	25 vials (dia 16 x 100 mm), one receptacle for a stainless steel reference thermometer
Warm-up Time	10-15 minutes, depending on selected temperature
Operating Mode	timed (0 to 180 minutes) or infinity mode
Block	aluminum
Environment	5 to 50°C (41 to 122°F)
Power Supply (fuse protected)	HI839800-01: 115 VAC; 60 Hz; 250 W; HI839800-02: 230 VAC; 50 Hz; 250 W
Dimensions	190 x 300 x 95 mm (7.5 x 11.8 x 3.7")
Weight	approximately 4.8 kg (10.6 lb.)
Ordering Information	HI839800-01 (115V) and HI839800-02 (230V) is supplied with power cable and instructions.



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Turbidity of water is an optical property that causes light to be scattered and absorbed, rather than transmitted. The scattering of light that passes through a liquid is primarily caused by suspended solids. The higher the turbidity, the greater the amount of scattered light. Even a very pure fluid will scatter light to a certain degree; no solution will have zero turbidity.

There are different measurement standards used based on applications, and with these standards are applied units. The ISO standard adopted the FNU (Formazin Nephelometric Unit) while the EPA uses the NTU (Nephelometric Turbidity Unit). Other units include the JTU (Jackson Turbidity Unit), FTU (Formazin Turbidity Unit), EBC (European Brewery Convention Turbidity Unit) and diatomaceous earth (mg/L SiO₂).

	JTU	FTU (NTU/FNU)	SiO ₂ (mg/L)
JTU	1	19	2.5
FTU (NTU/FNU)	0.053	1	0.13
SiO ₂ (mg/L)	0.4	7.5	1

Monitoring for Natural Water Supplies

In natural water, turbidity measurements are taken to gauge general water quality and its compatibility in applications where there are aquatic organisms. It has been found that there is a strong correlation between turbidity and BOD (Biochemical Oxygen Demand) value. Moreover, by definition, turbidity obstructs light, thus reducing the growth of marine plants, eggs and larvae, which are usually found in the lower levels of an aquatic ecosystem.



Wastewater Treatment and Turbidity

Historically, turbidity is one of the main parameters monitored in wastewater. In fact, the monitoring and treatment process was once solely based on the control of turbidity. Currently, the measurement of turbidity at the end of the wastewater treatment process is necessary to verify that the values are within regulatory standards. Generally speaking, the turbidity value has to be between 0 and 50 FTU, with an accuracy of ± 3 FTU depending on the phase of the wastewater treatment process. By monitoring the turbidity level, it can be determined if the different stages of the process, particularly in the filtration and purification stages, have been completed correctly.

The Hanna Solution

There are three analytical test methods for turbidity:

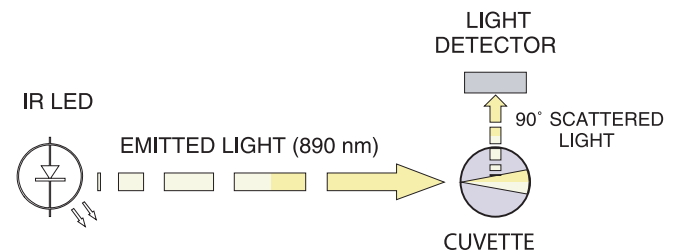
- ISO 7027 "Water Quality: Determination of Turbidity"
- USEPA Method No. 180.1, "Turbidity"
- Seawater and Wastewater No. 2130, "Turbidity"

Specific wavelengths are recommended for each method. For the USEPA and Standard Methods, the wavelength in the visible range of the spectrum is recommended, where the European ISO method requires an infrared light source.

The Infrared Method (ISO 7027)

The ISO 7027 standard specifies the key parameters for the optical system to measure turbidity for drinking and surface water, using the formazin-based metric method. The HI98713 portable turbidimeter meets or exceeds the criteria specified by the ISO 7027 standard.

ISO turbidity meters operate by passing a beam of infrared light through a vial containing the sample to be tested. The light source is a High Emission Infrared LED. A sensor positioned at 90° with respect to the direction of the light detects the amount of light scattered by the undissolved particles present in the sample. A microprocessor converts these readings into FTU (FNU) values.



The US Environmental Protection Agency Approved Method (180.1)

The USEPA Method 180.1 specifies the key parameters for the optical system to measure turbidity for drinking, saline and surface water, in a 0 to 40 NTU range, using the nephelometric method.

Meters compliant with EPA approved methods are designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B.

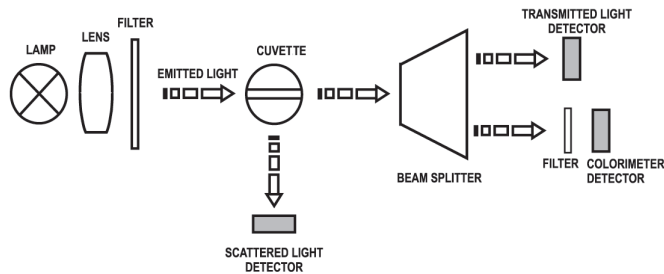
Principle of Operation

The light beam that passes through the sample is scattered in all directions. The intensity and pattern of the scattered light is affected by many variables, such as wavelength of the incident light, particle size and shape, refractive index, and color. The optical system includes a tungsten filament lamp or IR LED, a scattered light detector (90°), and a transmitted light detector (180°).

In the ratio turbidimeter range, the microprocessor of the instrument calculates the turbidity value from the signals that reach the two detectors by using an effective algorithm. This algorithm corrects and compensates for interferences of color, making the turbidimeters color-compensated. The optical system and measuring technique also compensate for the lamp or LED intensity fluctuations; minimizing the need for frequent calibration.

In the non-ratio turbidimeter range, the turbidity value is calculated from the signal on the scattered light detector (90°). This method offers a high linearity on the low range but is more sensitive to lamp or LED intensity fluctuations.

The lower detection limit of a turbidimeter is determined by stray light. Stray light is the light detected by the sensors that is not caused by light scattering from suspended particles. The optical systems of turbidimeters are designed to have very low stray light, providing accurate results for low turbidity samples.



Standardization

The nephelometric turbidity meter is designed to be routinely standardized with a known light scattering standard. As with all analytical standards or reference materials, a turbidity standard should be able to perform the following: provide traceability, demonstrate the accuracy of results, calibrate the equipment and methodology, monitor user performance, validate tests, and facilitate comparability; this ensures that when the correct procedures have been followed, the same analysis of the same materials will produce results that agree with each other whenever they are performed.

Standards and reference materials should be produced and characterized in a technically competent manner and should be homogenous, stable, certified and have available a known uncertainty of measurement. Presently, there are at least two standards recognized and approved by the USEPA, Standard Methods, ASTM and other regulatory agencies; these are formazin and AMCO AEPA-1.

Formazin

Formazin is an aqueous suspension of an insoluble polymer formed by the condensation reaction between hydrazine sulphate and hexamethylenetetramine. Although formazin was suggested as a turbidity standard as early as 1926, it has many limitations, such as its high toxicity, low shelf life, quick rate of settling and easy agglomeration. Also, the diluent for formazin standards must be turbidity-free water. This is often difficult to obtain, particularly in a field situation.

AMCO AEPA-1 Standard

Fortunately, since 1982, there is a standard available which overcomes the shortcomings of formazin. This has been developed by the American company, Advanced Polymer Systems, and is a suspended mixture of styrene divinylbenzene polymer spheres. These standards have the following characteristics:

Stability: AMCO AEPA-1 turbidity standards are a stabilized suspension of cross linked styrene divinylbenzene copolymer microbeads in ultrapure water. These beads are chemically inert and keep their chemical balance in a water medium regardless of concentration.

The size scatter of the beads only ranges from 0.06 to 0.2 microns. This small size accounts for random Brownian movement of these beads in suspension, keeping them in constant motion and totally dispersed within the ultra pure water matrix.

Physical properties: Particle size, uniform shape and refractive index make these spheres ideal to characterize light absorption and scatter for 90° behavior in the UV-VIS range. In addition, the bead's spherical shape and size impedes the agglomeration or precipitation of the standard. For these reasons, the AMCO AEPA-1 standards are very stable.

Reliability: These standards are prepared and bottled in a clean room facility. They are tested for accuracy and stability, fully validated before bottling, and free from any toxic or carcinogenic chemicals or compounds.

Hanna turbidity calibration standards are prepared from NIST traceable primary standard reference materials. All prepared standards are compared to formazin turbidity standard solutions. The values reported on Hanna Certificate of Analysis are the results obtained on the date of analysis. The evaluation of these data is based on Standard Methods.



Purification of Drinking Water

Turbidity is one of the most important parameters used to determine the quality of drinking water. Public water suppliers are required to treat their water to remove turbidity. In the United States, for systems that use conventional or direct filtration methods, turbidity cannot be higher than 1.0 nephelometric turbidity units (NTU) at the plant outlet, and all samples for turbidity must be less than or equal to 0.3 NTU for at least 95% of the samples in any month. Adequately treated surface water does not usually present a turbidity problem. The World Health

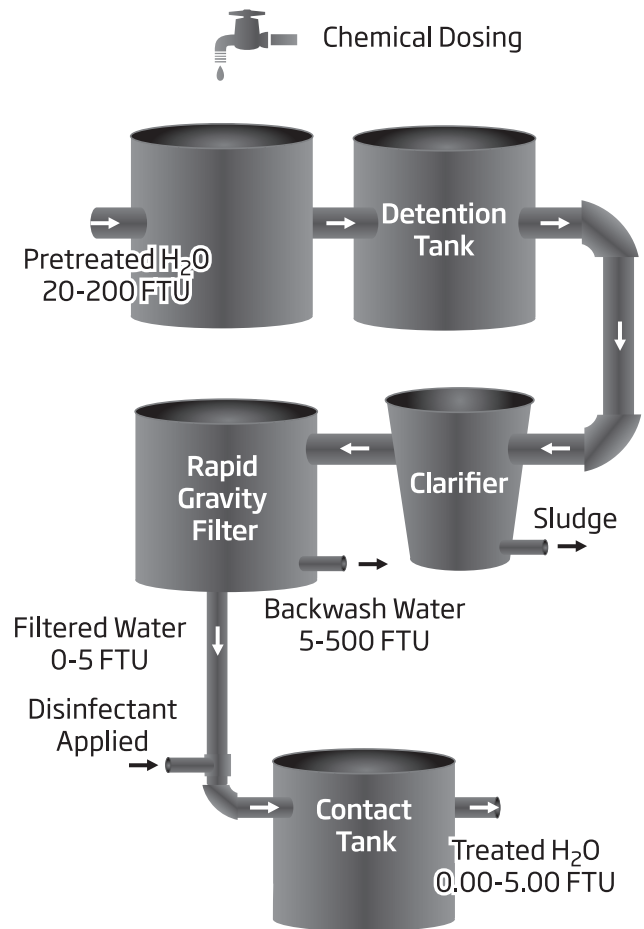
Organization indicates 5 NTU as the reference turbidity value of water for trade. This value has been established based on the aesthetic characteristics of water. From a hygienic point of view, 1 NTU is the recommended value. Many drinking water utilities strive to achieve levels as low as 0.1 NTU.

Turbidity is an indicator and will not give results for a specific pollutant. It will, however, provide information on the degree of overall contamination. The flow chart for the water treatment process of drinking water shows the turbidity reference values for each phase.

Typical sources of turbidity in drinking water include the following:

- Waste discharge
- Run-off from watersheds, especially those that are disturbed or eroding
- Algae or aquatic weeds and products of their breakdown in water reservoirs, rivers, or lakes
- Humic acids and other organic compounds resulting from decay of plants, leaves, etc. in water sources
- High iron concentrations which give water a rust-red coloration (mainly in ground water and ground water under the direct influence of surface water)
- Air bubbles and particles from the treatment process

Treatment Process of Drinking Water





Turbidity	pH	Free Chlorine	Total Chlorine	Bromine (Br)	Iodine (I)	Cyanuric Acid (CYAC)	Iron, LR (Fe, LR)	Ratio Mode	Non-Ratio Mode	FNU Mode	FAU Mode	NTU Ratio Mode	NTU Non-Ratio Mode	Max. Calibration Points	CAL Check™	Logging	EPA Compliant	ISO	GLP	PC Connectivity	Fast Tracker™	Backlit LCD	Auto-off	Page
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EPA Compliant Meters

HI83414	•	•	•					•	•					5	•	•	•			•	•			12.6
HI88703	•							•	•					5		•	•			•	•			12.10
HI93414	•	•	•											4	•	•	•			•	•	•	•	12.12
HI98703	•													4		•	•			•	•	•	•	12.14

ISO Compliant Meters

HI88713	•									•	•	•	•	5	•		•	•	•	•				12.18
HI98713	•													4	•		•	•	•	•	•	•	•	12.17
HI93703	•													3			•	•						12.20

Application Specific Meters

HI93102	•	•	•	•	•	•	•							2	•	•								12.16
HI83749	•							•						4	•	•			•	•	•	•	•	12.21
HI847492	•													4	•				•	•	•	•	•	12.22

Turbidity and Free/ Total Chlorine Meter

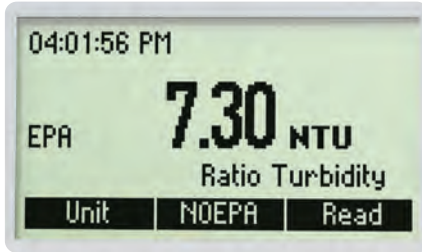
EPA Compliant

Turbidity

EPA meters



The HI83414 is a multiparameter instrument that measures the most important parameters in drinking water: turbidity and chlorine. The instrument is based on a state-of-the-art optical system which provides accurate results by minimizing stray light and color interferences. Periodic calibration with the supplied standards compensates for any variations in intensity of the tungsten lamp. The colorimeter portion of the meter uses a 525 nm narrow band interference filter for maintaining the proper wavelength in the measurement of free and total chlorine. All measurements are performed with 25 mm round cuvettes composed of special optical glass to ensure maximum repeatability of turbidity and chlorine measurements.



EPA Compliant

The HI83414 meets and exceeds the requirements of EPA and Standard Methods both for turbidity and colorimetric chlorine measurements. When in EPA mode all turbidity readings are rounded accordingly to meet reporting requirements.



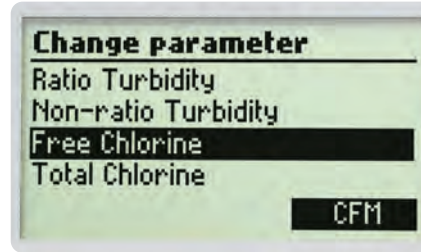
Backlit Graphic LCD Display

A graphic LCD display provides an easy to understand, user-friendly interface. All messages are in plain text making them easy to read.



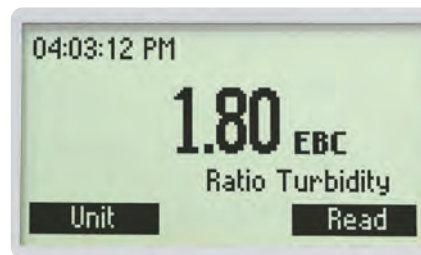
Light blocking cuvette cover

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



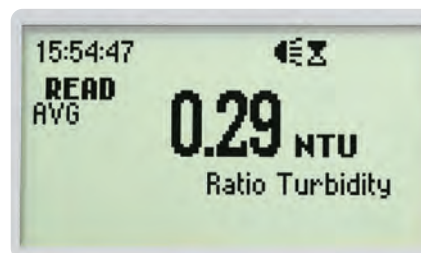
Four Measurement Modes

The HI83414 features four measurement modes including ratio or non-ratio mode for turbidity, free chlorine, and total chlorine. In ratio mode the turbidity is 0.00 to 4000 NTU (Nephelometric Turbidity Units) while in the non-ratio mode the range is 0.00 to 40.0 NTU. The range for free or total chlorine measurements is 0.00 to 5.00 mg/L (ppm) range.



Multiple Turbidity Units of Measure

Turbidity can be displayed as nephelometric turbidity units (NTU), European Brewing Convention units (EBC) or Nephelos units.



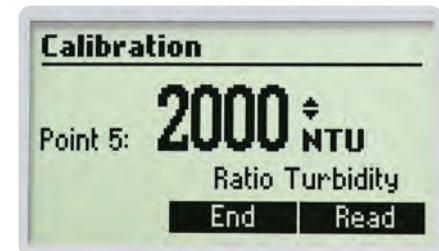
Multiple reading modes

Normal measurement, continuous measurement, or signal averaging measurement are reading modes available



CAL Check™

With the powerful CAL Check function, reliable performance of the chlorine colorimeter can be validated at any moment by using the exclusive HANNA ready-made, NIST traceable standards. All standards are supplied with a Certificate of Analysis (COA) for traceability.



Calibration

A two, three, four, or five-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100, 750, and 2000 NTU) standards. Calibration points can be modified if user-prepared standards are used. For free and total chlorine, the CAL Check standard can be used for calibration to 1.00 mg/L (ppm).



AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres that are uniform in size and density. The standards are stable and reusable with a long shelf life. These standards are used for calibration and performance verification of the HI83414 turbidity meter.



- All measurements are performed with 25 mm round cuvettes composed of special optical glass to ensure maximum repeatability of turbidity and chlorine measurements.

Calibration Error Messages

The calibration is successfully performed if the reading is within certain limits.



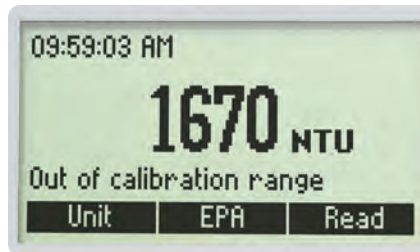
If the CAL Check™ standard value is too high, the display will show a high standard message. If this message appears, check if the correct cuvet was used.



If the CAL Check standard value is too low, the display will show low standard message. If this message appears, check if the correct cuvet was used.

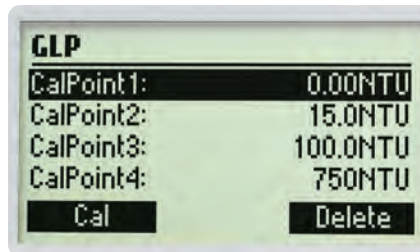


If the calculated calibration coefficients are outside a certain range a calibration error message is displayed.



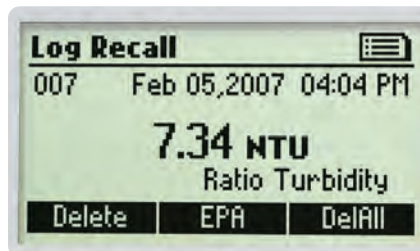
Out of Cal Range Function

The instrument has a mechanism to prevent taking measurements in a range where the calibration does not assure the best results.



GLP Data

The HI83414 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.



Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.

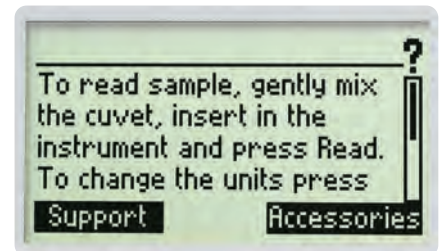


Data Transfer

For further storage or analysis options, logged data can be downloaded to a Windows compatible PC using the USB port and the HI92000 software.

Tutorial Mode

The unique tutorial mode provides additional information to help the user during measurements. When enabled, the instrument displays explanations and a confirmation button when a preparation or other operation has to be performed.



Contextual Help

Contextual help is always available through a dedicated HELP button. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

CAL Check™ standards with certificate

The HI93414-11 free and total chlorine and HI88703-11 turbidity CAL Check standards are used for calibration and performance verification of the HI83414.

- Supplied with Certificate of Analysis
 - Lot number
 - Expiration date
 - Standard value @ 25°C
 - Reference meter NIST traceable
- Provided storage containers
 - Light tight
 - Protects from accidental breakage



HI83414 Turbidity Specifications

Non-Ratio Mode	Range	0.00 to 9.99; 10.0 to 40.0 NTU 0.0 to 99.9; 100 to 268 Nephelos 0.00 to 9.80 EBC
	Resolution	0.01; 0.1 NTU 0.1; 1 Nephelos 0.01 EBC
Ratio Mode	Range	0.00 to 9.99; 10.0 to 99.9; 100 to 4000 NTU 0.0 to 99.9; 100 to 26800 Nephelos 0.00 to 9.99; 10.0 to 99.9; 100 to 980 EBC
	Resolution	0.01; 0.1; 1 NTU 0.1; 1 Nephelos 0.01; 0.1, 1 EBC
Range Selection	automatic	
Accuracy	±2% of reading plus 0.02 NTU (0.15 Nephelos; 0.01 EBC); ±5% of reading above 1000 NTU (6700 Nephelos; 245 EBC)	
Repeatability	±1% of reading or 0.02 NTU (0.15 Nephelos; 0.01 EBC) whichever is greater	
Stray Light	< 0.02 NTU (0.15 Nephelos; 0.01 EBC)	
Light Detector	silicon photocell	
Method	nephelometric method (90°) or ratio nephelometric method (90° & 180°), adaptation of the USEPA method 180.1 and standard method 2130 B	
Measuring Mode	normal, average, continuous	
Turbidity Standards	<0.1, 15, 100, 750 and 2000 NTU	
Calibration	two, three, four or five-point calibration	

HI83414 Free and Total Chlorine Specifications

Range	0.00 to 5.00 mg/L (ppm)
Resolution	0.01 mg/L (ppm) from 0.00 to 3.50 mg/L (ppm); 0.10 above 3.50 mg/L (ppm)
Accuracy @25°C/77°F	±0.02 mg/L @ 1.00 mg/L
Detector	silicon photocell with 525 nm narrow band interference filters
Method	adaptation of the USEPA Method 330.5 and Standard Method 4500-Cl G.
Standards	1.00 mg/L (ppm) free chlorine; 1.00 mg/L (ppm) total chlorine
Calibration	one-point calibration

HI83414 General Specifications

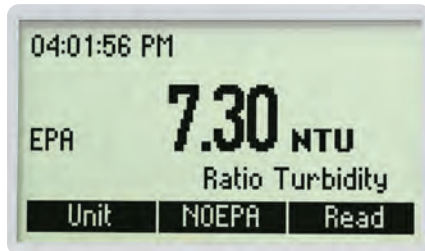
Light Source/ Life	tungsten filament lamp / greater than 100,000 readings
Display	40 x 70 mm graphic LCD (64 x 128 pixels) with backlight
Log Memory	200 records
Connectivity	USB
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	230/115 Vac; 50/60 Hz;
Dimensions	230 x 200 x 145 mm (9.0 x 7.9 x 5.7")
Weight	2.5 kg (88 oz.)
Ordering Information	HI83414-01 (115V) and HI83414-02 (230V) are supplied with sample cuvettes and caps (5), calibration cuvettes for turbidity (HI88703-11) and colorimeter (HI93414-11), silicone oil (HI98703-58), cuvette wiping cloth, scissors, power cord, instrument quality certificate, and instruction manual.

HI88703

Precision Turbidity Benchtop Meter

EPA Compliant

The HI88703 Precision Turbidity Benchtop Meter is specially designed for water quality measurements, providing reliable and accurate readings, especially in the low turbidity range. The instrument is based on a state-of-the-art optical system which guarantees accurate results, assures long term stability, and minimizes stray light and color interferences. Periodic calibration with the supplied standards compensates for any variations in intensity of the tungsten lamp. The 25 mm round cuvettes composed of special optical glass guarantee the repeatability of turbidity measurements.



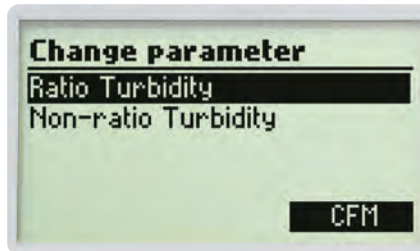
EPA Compliant

The HI88703 meets and exceeds the requirements of EPA and Standard Methods for turbidity measurements. When in EPA mode all turbidity readings are rounded accordingly to meet reporting requirements.



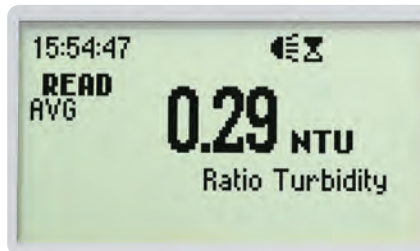
Backlit Graphic LCD Display

A graphic LCD display provides an easy to understand, user-friendly interface. All messages are in plain text making them easy to read.



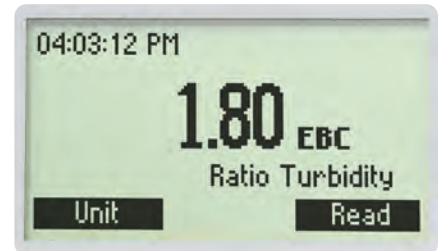
Two Measurement Modes

The HI88703 features two options for turbidity measurement: ratio and non-ratio mode. Turbidity measurements can be made in the 0.00 to 4000 NTU (Nephelometric Turbidity Units) when using the ratio mode and in the 0.00 to 40.0 NTU range when non-ratio mode is used.



Multiple reading modes

Normal, continuous, or signal averaging measurement reading modes available.



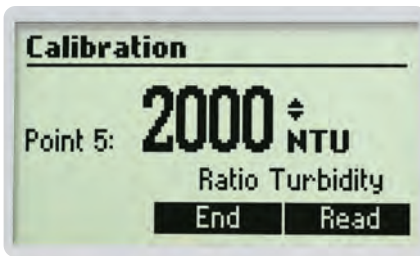
Multiple Turbidity Units of Measure

Turbidity can be read as Nephelometric Turbidity Units (NTU), European Brewing Convention units (EBC), or Nephelos units.



Light blocking cuvette cover

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

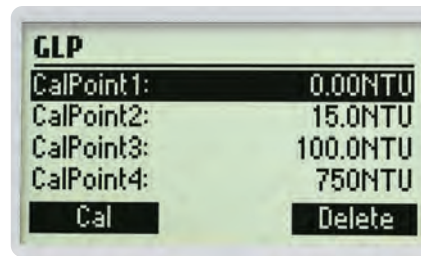


Calibration

The HI88703 has a powerful calibration function that compensates for lamp aging or changing. A two, three, four, or five-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100, 750, and 2000 NTU) standards. Calibration points can be modified if user-prepared standards are used.

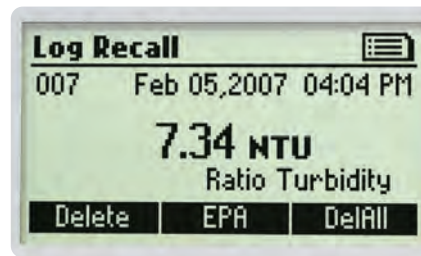
AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres that are uniform in size and density. The standards are reusable and stable with a long shelf life.



GLP Data

The HI88703 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.



Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.



Data Transfer

Logged data can be downloaded to a Windows compatible PC using the USB port and the HI92000 software.

Tutorial Mode

Tutorial mode provides additional information during measurements. When enabled, the instrument displays explanations and a confirmation button when a preparation or other operation has to be performed.

Contextual Help

Contextual help is always available through a dedicated HELP button. Clear tutorial messages and directions are available on-screen to guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

Specifications

HI88703

Non-ratio Mode	Range	0.00 to 9.99; 10.0 to 40.0 NTU 0.0 to 99.9; 100 to 268 Nephelos 0.00 to 9.80 EBC
	Resolution	0.01; 0.1 NTU 0.1; 1 Nephelos 0.01 EBC
Ratio Mode	Range	0.00 to 9.99; 10.0 to 99.9; 100 to 4000 NTU 0.0 to 99.9; 100 to 26800 Nephelos 0.00 to 9.99; 10.0 to 99.9; 100 to 980 EBC
	Resolution	0.01; 0.1; 1 NTU 0.1; 1 Nephelos 0.01; 0.1, 1 EBC
Additional Specifications	Range Selection	automatic
	Accuracy	±2% of reading plus 0.02 NTU (0.15 Nephelos; 0.01 EBC); ±5% of reading above 1000 NTU (6700 Nephelos; 245 EBC)
	Repeatability	±1% of reading or 0.02 NTU (0.15 Nephelos; 0.01 EBC) whichever is greater
	Stray Light	< 0.02 NTU (0.15 Nephelos; 0.01 EBC)
	Light Detector	silicon photocell
	Light Source/ Life	tungsten filament lamp / greater than 100,000 readings
	Display	40 x 70 mm graphic LCD (64 x 128 pixels) with backlight
	Method	nephelometric method (90°) or ratio nephelometric method (90° & 180°), adaptation of the USEPA method 180.1 and standard method 2130 B
	Measuring Mode	normal, average, continuous
	Turbidity Standards	<0.1, 15, 100, 750 and 2000 NTU
	Calibration	two, three, four or five-point calibration
	Log Memory	200 records
	PC Interface	USB
	Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	230/115 Vac; 50/60 Hz	
Dimensions	230 x 200 x 145 mm (9 x 7.9 x 5.7")	
Weight	2.5 kg (88 oz.)	
Ordering Information	HI88703-01 (115V) and HI88703-02 (230V) is supplied with sample cuvettes and caps (5), calibration cuvettes (HI88703-11), silicone oil (HI98703-58), cuvette wiping cloth, power cord, instrument quality certificate, and instruction manual.	

HI93414

Turbidity and Free/Total Chlorine Portable Meter

*Fast Tracker™ Technology,
EPA Compliant*

The HI93414 is a multiparameter instrument that measures the most important parameters in drinking water: turbidity and chlorine. The instrument is based on a state-of-the-art optical system which provides accurate results by minimizing stray light and color interferences. Periodic calibration with the supplied standards compensates for any variations in intensity of the tungsten lamp. The colorimeter portion of the meter uses a 525 nm narrow band interference filter for maintaining the proper wavelength in the measurement of free and total chlorine. All measurements are performed with 25 mm round cuvettes composed of special optical glass to ensure maximum repeatability of turbidity and chlorine measurements.

EPA Compliant

The HI93414 meets and exceeds the requirements of EPA and Standard Methods both for turbidity and colorimetric chlorine measurements. When the meter is in EPA mode all turbidity readings are rounded accordingly to meet reporting requirements.



Backlit Display

A backlit LCD display provides an easy to understand, user-friendly interface. Displayed codes guide the user step-by-step through routine operation and calibration.

Three Measurement Modes

The HI93414 features three options for measurement including ratio mode for turbidity, free chlorine, and total chlorine. Turbidity measurements can be made in the 0.00 to 1000 NTU (Nephelometric Turbidity Units) range, while free or total chlorine measurements can be made in the 0.00 to 5.00 mg/L (ppm) range.



Multiple reading modes

Normal measurement, continuous measurement, or signal averaging measurement are reading modes available.

CAL Check™

With the CAL Check function, reliable performance of the chlorine colorimeter can be validated at any moment by using the exclusive HANNA ready-made, NIST traceable standards. All standards are supplied with a Certificate of Analysis (COA) for traceability.

Calibration

A two, three, or four-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100, and 750 NTU) standards. Calibration points can be modified if user-prepared standards are used. For free and total chlorine, the 1.00 mg/L (ppm) CAL Check standard can be used for calibration and performance verification.

AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres

that are uniform in size and density. The standards are reusable and stable with a long shelf life.

GLP Data

The HI93414 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.



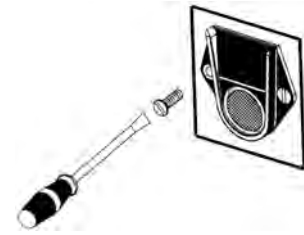
Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.

Data Transfer

For further storage or analysis options, logged data can be downloaded to a Windows compatible PC using the RS232 or USB ports and the HI92000 software.

FastTracker™
location traceability



iButton® Tags are Easy to Install

Install tags near your sampling points for quick and easy iButton® readings. Each tag contains a computer chip with a unique identification code encased in stainless steel. You can install a practically unlimited amount of tags.



HI920005 Tag holders with tags (5)

Fast Tracker™

For advanced, field applications, the HI93414 is equipped with Fast Tracker™ Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever. Fast Tracker™ allows users to record the time and location of a specific measurement or series of measurements using iButton® tags near sampling points for quick and easy readings. Each iButton® tag contains a computer chip with a unique identification code encased in stainless steel.



Power connector

USB

RS232

Fast Tracker™



HI93414 Turbidity

Range	0.00 to 9.99 NTU; 10.0 to 99.9 NTU; 100 to 1000 NTU
Range Selection	automatic
Resolution	0.01; 0.1; 1
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Light Detector	silicon photocell
Method	ratio nephelometric method (90° and 180°), ratio of scattered and transmitted light; adaptation of the USEPA method 180.1 and standard method 2130 B
Measuring Mode	normal, average, continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	two, three or four-point calibration

HI93414 Free and Total Chlorine

Range	0.00 to 5.00 mg/L
Resolution	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)
Accuracy @25°C /77°F	±0.02 mg/L @ 1.00 mg/L
Detector	silicon photocell with 525 nm narrow band interference filter
Method	adaptation of the USEPA method 330.5 and standard method 4500-ClG.
Standards	1 mg/L free chlorine, 1 mg/L total chlorine
Calibration	one-point calibration

HI93414 General Specifications

Light Source	tungsten filament lamp
Lamp Life	greater than 100,000 readings
Log Memory	200 records
Serial Interface	USB or RS 232
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	1.5V AA alkaline batteries (4) or AC adapter; auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)

Ordering Information

HI93414-01 (115V) and **HI93414-02** (230V) is supplied with iButton® tags with tag holders (5), sample cuvettes and caps (5), calibration cuvettes for turbidity (HI98703-11), calibration cuvettes for chlorine (HI93414-11), silicone oil (HI98703-5B), cuvette wiping cloth, scissors, batteries, AC adapter, instrument quality certificate, instruction manual and rugged carrying case.

Turbidity Meter

*Fast Tracker™ Technology,
EPA Compliant*

The HI98703 Precision Turbidity Portable Meter is specially designed for water quality measurements, providing reliable and accurate readings, especially in the low turbidity range. The instrument is based on a state-of-the-art optical system which guarantees accurate results, assures long term stability, and minimizes stray light and color interferences. Periodic calibration with the supplied standards compensates for any variations in intensity of the tungsten lamp. The 25 mm round cuvettes composed of special optical glass guarantee the repeatability of turbidity measurements.



EPA Compliant Measurement

The HI98703 meets and exceeds the requirements of EPA and Standard Methods for turbidity measurements. When the meter is in EPA mode all turbidity readings are rounded accordingly to meet reporting requirements.



Backlit Display

A backlit LCD display provides an easy to understand, user-friendly interface. Displayed codes guide the user step-by-step through routine operation and calibration.

Multiple reading modes

Normal, continuous, or signal averaging measurement are reading modes available.



Calibration

A two, three, or four-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100, and 750 NTU) standards. Calibration points can be modified if user-prepared standards are used.

AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres that are uniform in size and density. The standards are reusable and stable with a long shelf life.

GLP Data

The HI98703 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.



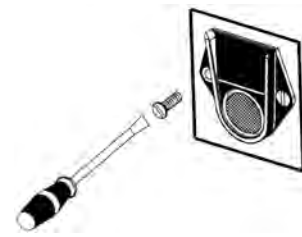
Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.

Data Transfer

For further storage or analysis options, logged data can be downloaded to a Windows compatible PC using the RS232 or USB port and the HI92000 software.

FastTracker™
location traceability



iButton® Tags are Easy to Install

Install tags near your sampling points for quick and easy iButton® readings. Each tag contains a computer chip with a unique identification code encased in stainless steel. You can install a practically unlimited amount of tags.



HI920005 Tag holders with tags (5)



Specifications	HI98703
Range	0.00 to 9.99 NTU; 10.0 to 99.9 NTU; 100 to 1000 NTU
Range Selection	automatic
Resolution	0.01; 0.1; 1
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Light Detector	silicon photocell
Light Source	tungsten filament lamp
Lamp Life	greater than 100,000 readings
Method	ratio nephelometric method (90° and 180°), ratio of scattered and transmitted light; adaptation of the USEPA method 180.1 and standard method 2130 B
Measuring mode	normal, average, continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	two, three or four-point calibration
Log Memory	200 records
Serial Interface	USB or RS232
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	1.5V AA alkaline batteries (4) or AC adapter; auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)
Ordering Information	HI98703-01 (115V) and HI98703-02 (230V) are supplied with iButton® tags with tag holders (5), sample cuvettes and caps (5), calibration cuvettes, silicone oil (HI98703-58), cuvette wiping cloth, batteries, AC adapter, instruction manual, instrument quality certificate, and rugged carrying case.

Fast Tracker™

For advanced field applications, the HI98703 is equipped with Fast Tracker™ Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever. Fast Tracker™ allows users to record the time and location of a specific measurement or series of measurements using iButton® tags near sampling points for quick and easy readings. Each iButton® tag contains a computer chip with a unique identification code encased in stainless steel.



Power connector

USB

RS232

Fast Tracker™

Meter for Water Analysis

Turbidity, Cl₂, pH, Br, Fe, I and CYAC

- **EPA standard**
 - Meets the USEPA standards
- **Custom calibration points**
 - Advanced electronics allow operators to calibrate the meter
- **Logging**
 - Log and recall up to 25 different samples.

The most important parameters needed for water analysis, especially in drinking water, can be measured with Hanna's HI93102 portable meter. This instrument not only measures turbidity, but also pH, total and free chlorine, bromine, iodine, iron, and cyanuric acid (CYAC). Achieve laboratory results in the field quickly and easily.

Measurements are made quickly and repeatedly through a sophisticated, yet easy-to-use microprocessor. In colorimetric mode, users can select between factory pre-programmed calibration or calibrating the meter on their own, and measure either concentration or relative absorbance of the sample. Up to 25 measured samples can be stored in memory, together with time and date. Miniaturization of the electronics has made it possible to offer unsurpassed accuracy and quality in a portable unit weighing just one pound.



Specifications

	HI93102		
Parameter Specifications	Turbidity	Br-Bromine	
	Range	0.00 to 50.0 NTU†	0.00 to 8.00 mg/L (ppm)
	Resolution	0.01 (0.00 to 9.99) and 0.1 NTU (10.0 to 50.0)	0.01 mg/L (ppm)
	Accuracy @25°C	±0.5 NTU or ±5% of reading (whichever is greater)	±0.08 mg/L (ppm) ±3% of reading
		Free and Total Chlorine	CYAC-Cyanuric Acid
	Range	Free: 0.00 to 2.50 mg/L (ppm); Total: 0.00 to 3.50 mg/L (ppm)	0 to 80 mg/L (ppm)
	Resolution	0.01 mg/L (ppm)	1 mg/L (ppm)
	Accuracy @25°C	±0.03 mg/L (ppm) ±3% of reading	±1 mg/L (ppm) ±15% of reading
		I-Iodine	Fe LR-Iron LR
	Range	0.0 to 12.5 mg/L (ppm)	0.00 to 1.00 mg/L (ppm)
Resolution	0.1 mg/L (ppm)	0.01 mg/L (ppm)	
Accuracy @25°C	±0.1 mg/L (ppm) ±5% of reading	±0.02 mg/L (ppm) ±3% of reading	
	pH		
Range	5.9 to 8.5 pH		
Resolution	0.1 pH		
Accuracy @25°C	±0.1 pH		
Additional Specifications	Turbidity Calibration	two-point; selectable between 0.00 - 50.0 FTU (0.00 and 20.0 FTU recommended)	
	Light Source / Detector	pure green LED / silicon photocell (2)	
	Battery Type / Life	1.5V AA (4) / approximately 60 hours of continuous use or 1000 measurements; automatic shut-off selectable after 10, 20, 30, 40, 50 or 60 minutes of non-use	
	Environment	0 to 50°C (32 to 122°F); RH max 95% (non condensing)	
	Dimensions / Weight	220 x 82 x 66 mm (8.7 x 3.2 x 2.6") / 510 g (1.1 lb.)	
Ordering Information	HI93102 is supplied with measurement cuvette cap, batteries and instruction manual.		

† 1 NTU (Nephelometric Turbidity Unit) = FTU (Formazine Turbidity Unit)
 * set of 300 tests available, -03
 ** set of 150 tests available, -03



FastTracker™
location traceability

Fast Tracker™

For advanced field applications, the HI98713 is equipped with Fast Tracker™ Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever. Fast Tracker™ allows users to record the time and location of a specific measurement or series of measurements using iButton® tags near sampling points for quick and

easy readings. Each iButton® tag contains a computer chip with a unique identification code encased in stainless steel.

Backlit Graphic LCD Display

A graphic LCD display provides an easy to understand, user-friendly interface. All messages are in plain text making them easy to read.

Specifications	HI98713
Range	0.00 to 1000 FNU
Resolution	0.01 (0.00 to 9.99 FNU); 0.1 (10.0 to 99.9 FNU); 1 (100 to 1000 FNU)
Accuracy	±2% of reading plus 0.1 FNU
Range Selection	automatic
Repeatability	±1% of reading or 0.01 FNU, whichever is greater
Stray Light	< 0.1 FNU
IR Detector	silicon photocell
Light Source	860 nm infrared LED
Lamp Life	greater than 100,000 readings
Method	adaptation of ISO 7027, ratio method with 90° and 180° detector
Measuring Mode	normal, average, continuous.
Turbidity Standards	<0.1, 15, 100 and 750 FNU
Calibration	two, three or four-point calibration
Log Memory	200 records
Serial Interface	USB or RS232
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	1.5V AA alkaline batteries (4) or AC adapter; auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)
Ordering Information	HI98713-01 (115V) and HI98713-02 (230V) is supplied with sample cuvettes and caps (5), calibration cuvettes, silicone oil (HI98703-58), cuvette wiping cloth, batteries, AC adapter, instructions and rugged carrying case.

HI98713

Turbidity Meter

with Fast Tracker™ Technology, ISO

The HI98713 Precision ISO Turbidity Portable Meter is specially designed for water quality measurements, providing reliable and accurate readings, even within low turbidity ranges.

Ratio Measurement Mode

The HI98713 measures turbidity using the ratio method with a 90° and 180° light detector for accurate measurements.

Multiple reading modes

Normal, continuous, or signal averaging measurement reading modes available.

ISO Compliant

The HI98713 meets and exceeds the requirements of ISO 7027 method for turbidity measurements by use of an infrared LED light source.

Calibration

The HI98713 has a powerful calibration function that compensates for variation in light intensity. A two, three, or four-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100 and 750 FNU) standards. Calibration points can be modified if user-prepared standards are used.

AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres that are uniform in size and density. The standards are reusable and stable with a long shelf life.

GLP Data

The HI98713 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.

Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.

Data Transfer

For further storage or analysis options, logged data can be downloaded to a Windows® compatible PC using the USB or RS232 port and the HI92000 software.

Turbidity Benchtop Meter

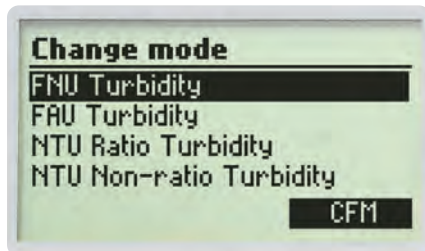
ISO Compliant



The HI88713 Precision ISO Turbidity Benchtop Meter is specially designed for water quality measurements, providing reliable and accurate readings, even within low turbidity ranges. The instrument is based on a state-of-the-art optical system which guarantees accurate results, assures long term stability, and minimizes stray light and color interferences. Periodic calibration with the supplied standards compensates for any variations in intensity of the tungsten lamp. The 25 mm round cuvettes composed of special optical glass guarantee the repeatability of turbidity measurements.

ISO Compliant

The HI88713 meets and exceeds the requirements of ISO 7027 method for turbidity measurements by use of an infrared LED light source.



Four Measurement Modes

The HI88713 features four options for turbidity measurement: FNU (Formazin Nephelometric Units), FAU (Formazin Attenuation Units), and NTU (Nephelometric Turbidity Units) ratio and non-ratio mode. Turbidity ranges for each mode are 0.00 to 1000 FNU, 10.0 to 4000 FAU, 0.00 to 4000 NTU (ratio mode), and 0.00 to 1000 NTU (non-ratio mode).

Multiple Turbidity Units of Measure

Turbidity can be read as Formazin Nephelometric Units (FNU), Formazin Attenuation Units (FAU), European Brewing Convention units (EBC), and Nephelometric Turbidity Units (NTU).

Multiple reading modes

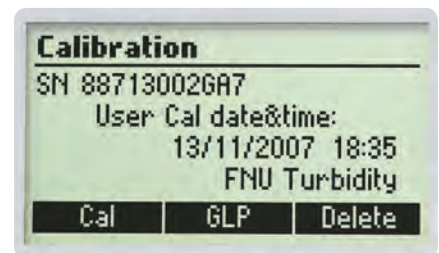
Normal, continuous, or signal averaging measurement reading modes available

AMCO AEPA-1 Primary Turbidity Standard

The AMCO AEPA-1 supplied standards are recognized as a primary standard by the USEPA. These non-toxic standards are made of styrene divinylbenzene polymer spheres that are uniform in size and density. The standards are reusable and stable with a long shelf life.

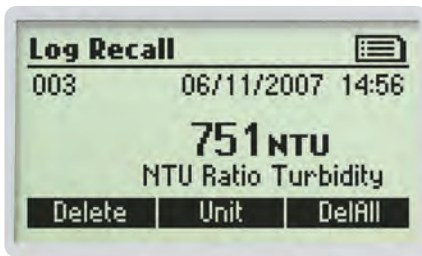
Calibration

The HI88713 has a powerful calibration function that compensates for variation in light intensity. A two, three, four, or five-point turbidity calibration can be performed by using the supplied (<0.1, 15, 100, 750 FNU, and 2000 NTU) standards. Calibration points can be modified if user-prepared standards are used.



GLP Data

The HI88713 features complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Data includes calibration points, date, and time.



Data Logging

Up to 200 measurements can be stored in the internal memory and recalled at any time.

Data Transfer

For further storage or analysis options, logged data can be downloaded to a Windows compatible PC via USB and HI92000 software.

Tutorial Mode

Tutorial mode provides additional information to help during measurements. When enabled, the instrument displays explanations and a confirmation button when a preparation or other operation has to be performed.

Contextual Help

Contextual help is always available through a dedicated HELP button. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.



Backlit Graphic LCD Display

A graphic LCD display provides an easy to understand, user-friendly interface. All messages are in plain text making them easy to read.

Specifications	HI88713	
FNU Mode	Range	0.00 to 1000 FNU
	Resolution	0.01 (0.00 to 9.99 FNU); 0.1 (10.0 to 99.9 FNU); 1 (100 to 1000 FNU)
	Accuracy	±2% of reading plus stray light
FAU Mode	Range	10.0 to 4000 FAU
	Resolution	0.1 (10.0 to 99.9 FAU); 1 (100 to 4000 FAU)
	Accuracy @25°C/77°F	± 10% of reading
NTU Ratio Mode	Range	0.00 to 4000 NTU; 0.00 to 980 EBC
	Resolution	0.01 (0.00 to 9.99 NTU); 0.1 (10.0 to 99.9 NTU); 1 (100 to 4000 NTU) / 0.01 (0.00 to 9.99 EBC); 0.1 (10.0 to 99.9 EBC); 1 (100 to 980 EBC)
	Accuracy	±2% of reading plus stray light; ±5% of reading above 1000 NTU
NTU Non-ratio Mode	Range	0.00 to 1000 NTU; 0.00 to 245 EBC
	Resolution	0.01 (0.00 to 9.99 NTU); 0.1 (10.0 to 99.9 NTU); 1 (100 to 1000 NTU) / 0.01 (0.00 to 9.99 EBC); 0.1 (10.0 to 99.9 EBC); 1 (100 to 245 EBC)
	Accuracy @25°C/77°F	±2% of reading plus stray light
Additional Specifications	Range Selection	automatic
	Repeatability	±1% of reading or stray light, whichever is greater
	Stray Light	< 0.1 NTU (0.05 EBC)
	Light Detector	silicon photocell
	Light Source	IR LED
	Method	ISO 7027 method
	Measuring Mode	normal, average, continuous.
	Turbidity Standards	<0.1, 15, 100, 750 FNU and 2000 NTU
	Calibration	two, three, four or five-point calibration
	Log Memory	200 records
	Serial Interface	USB
	Environment	0°C to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	12 Vdc	
Dimensions / Weight	230 x 200 x 145 mm (9 x 7.9 x 5.7") / 2.5 Kg (88 oz.)	
Ordering Information	HI88713-01 (115V) and HI88713-02 (230V) are supplied with sample cuvettes and caps (6), calibration cuvettes (HI88713-11), silicone oil (HI98703-58), cuvette wiping cloth, power adapter and instruction manual.	

Turbidity Meter

ISO Compliant

- Positive-locking system ensures cuvette is firmly placed in the cell
- Auto shut-off
- Logging and real time clock (HI93703-11)

The HI93703 turbidity meter is a portable, microprocessor-based instrument used to determine the turbidity of water and wastewater with high precision in the field as well as in the laboratory. The meter is very simple to use and troubleshooting functions can be performed with displayed error code guides.

The HI93703 covers a 0 to 1000 FTU range in two scales: 0.00 to 50.00 FTU and 50 to 1000 FTU. The auto-ranging feature sets the appropriate range for the measurement.

The HI93703-11 adds a real time clock, logging for up to 199 measurements and PC compatibility.

The HI93703 has been designed according to the ISO7027 International Standard, consequently the turbidity unit is the FTU (Formazine Turbidity Unit). FTU is equivalent to the other internationally recognized unit: NTU (Nephelometric Turbidity Unit).

The one-point calibration at 10 FTU* can be easily performed using the available standard. Hanna has chosen 10 FTU* as the calibration point because it is the value that best fits the water turbidity measurements in different applications, from drinking water to wastewater treatment.

HANNA instruments uses the primary standard AMCO-AEPA-1 to avoid all formazine-related problems. Formazine is a very toxic, unstable substance, which requires particular care: its standards have to be prepared only a few minutes before performing the calibration, and can-not be reused because of their short life. The HI93703 can be used with both standards.



Specifications

HI93703

Range	0.00 to 1000 FTU*
Resolution	0.01 (0.00 to 50.00 FTU); 1 (50 to 1000 FTU)
Accuracy @25°C/77°F	±0.5 FTU or ±5% of reading (whichever is greater)
Calibration	three points (0 FTU, 10 FTU and 500 FTU*)
Light Source / Life	infrared LED / Life of instrument
Light Detector	silicon photocell
Battery Type / Life	1.5V AA (4) /approximately 60 hours of continuous use or 900 measurements; auto-off after 5 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% (non condensing)
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight	510 g (1.1 lb.)
	HI93703-11
Data Logging	199 measurement, on-demand
PC Connection	through RS232 and HI92000 PC software (optional)
Real Time Clock	yes

Ordering Information

HI93703 is supplied complete with glass cuvette, batteries and instructions.
HI93703C, includes HI93703 meter, HI731313 maintenance kit (consisting of: cuvettes with caps (2), HI93703-0 AMCO-AEPA-1 0 FTU calibration solution (30 mL), HI93703-10 AMCO-AEPA-1 10 FTU calibration solution (30 mL), HI93703-05 AMCO-AEPA-1 500 FTU calibration solution (30 mL), cuvette wiping cloth, batteries, rugged carrying case and instructions.
HI93703-11 is supplied complete with glass cuvette, batteries and instructions in a rugged carrying case.

*HI93703 has been designed according to the ISO 7027 International Standard, consequently the turbidity unit is the FTU (Formazine Turbidity Unit). FTU is equivalent to the other internationally recognized unit: NTU (Nephelometric Turbidity Unit).

HI83749

Portable Turbidity Meter

and Bentonite Monitoring

- **GLP Features**
 - Meets Good Laboratory Practices
- **Backlight**
 - Backlit LCD
- **Connectivity**
 - PC interface via USB

Wines with low phenol contents, such as rosé, light reds and whites should be checked for protein stability before bottling. Hanna offers a quick test meter to verify the risk of future protein haze formation. If protein instability is detected, a subsequent test can help define the right amount of bentonite to be added for improving protein stability. It is important not to overdose bentonite to avoid stripping wine flavor, body, and significant loss of color, especially in young red wines. Moreover, adding only the necessary amount of bentonite to obtain the desired protein stability also saves costs.

The HI 83749 measures turbidity of samples from 0.00 to 1200 NTU (Nephelometric Turbidity Units) and is USEPA compliant. In the USEPA measurement mode the instrument rounds the readings to meet USEPA reporting requirements.

Fast Tracker™

The HI83749 is equipped with Fast Tracker™ Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever. Fast Tracker™ allows users to record the time and location of a specific measurement or series of measurements using iButton® tags near sampling points for quick and easy readings. Each iButton® tag contains a computer chip with a unique identification code encased in stainless steel.



FastTracker™
location traceability



Specifications	HI83749
Range	0.00 to 1200 NTU
Range Selection	automatic
Resolution	0.01 (0.00 to 9.99 NTU); 0.1 (10.0 to 99.9 NTU); 1 (100 to 1200 NTU)
Accuracy @25°C/77°F	±2% of reading plus 0.05 NTU
Repeatability	±1% of reading of 0.02 NTU, whichever is greater.
Stray Light	< 0.05 NTU
Light Source	tungsten filament lamp
Light Detector	silicon photocell
Method	ratio nephelometric method
Display	60 x 90 mm backlit LCD
Calibration	two, three or four points
LOG Memory	200 records
Serial Interface	RS 232 or USB 1.1
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type	1.5V AA batteries (4) / 12 VDC adapter
Auto Shut-off	after 15 minutes of non-use
Dimensions	224 x 87 x 77 mm (8.8 x 3.4 x 3.0")
Weight	512 g (18.0 oz.)
Ordering Information	HI83749-01 (115V) and HI83749-02 (230V) are supplied with iButton® tags with tag holders (5), sample cuvettes and caps (6), calibration cuvettes (4), bentocheck reagent, silicone oil (HI98703-58), 1000 µL automatic pipette with two tips and instructions sheet, 25 mL glass vials with caps (4), 1 mL syringe with two tips, funnel, filter paper (25), cuvette cleaning cloth, 12 VDC adapter, batteries, instructions and rugged carrying case.
Reagents and Standards	HI83749-11 Turbidity Calibration Set HI83749-20 Bentocheck Solution

* NTU (Nephelometric Turbidity Units)

See page 12.26 for standards and accessories

HI847492

Haze Meter

for Beer Quality Analysis

- Can report measurements in FTU, EBC, ASBC and HELM
- PC compatible via USB
- GLP Features
- Log-on-demand
- Large, backlit LCD

The HI847492 is auto-diagnostic meter designed to measure the haze in beer. Each instrument features a different measuring unit or light source to comply with different standard requirements.

HI847492 is designed according to the ASBC (American Society of Brewing Chemists) standard for haze in beer measurements.

This instrument compensates beer color to guarantee accurate readings during the brew process. The optical system consists of an LED and multiple detectors. A two, three or four-point calibration can be easily performed at any time using the supplied or user-prepared standards.

HI847492 has all the necessary GLP (Good Laboratory Practice) features to allow maximum traceability of data. Features include a real time clock, log on demand (up to 200 measurements), and Fast Tracker™ –Tag Identification System.

This meter also incorporates a continuous measurement mode to measure the settling rate of suspended matter, and a signal average (AVG) mode to accumulate multiple readings, giving a final average value. The average mode is particularly useful to measure samples with suspended particles with different dimensions.

This meter also features a user-friendly interface, with a large backlit LCD. Acoustic signals and display codes to guide the user step-by-step through routine operations.

No more judging
by eye!



FastTracker™
location traceability

The HI847492 is equipped with Fast Tracker™ Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever. Fast Tracker™ allows users to record the time and location of a specific measurement or series of measurements using iButton® tags near sampling points for quick and easy readings. Each iButton® tag contains a computer chip with a unique identification code encased in stainless steel.



Why this instrument is so important..

Beer haze may be defined as an insoluble or semi-soluble particulate matter which is small enough to form a colloidal suspension in beer. These particles scatter transmitted light and are observed as a degradation in the transparency of the beer.

The beer clarity is a parameter constantly controlled in a brewery, and to assure a consistent product quality, the brewmaster needs more than visual inspection.

Several substances can cause haze in beer, but the most frequently encountered problem is due to a cross-linking of polyphenol and protein.

A range of stabilization treatments are available for avoiding haze problems. The products have to be controlled on several steps during the brewing process, in particular after filtration and before the beer enters the single tanks.

Methods

Many methods were used to measure turbidity over the years. The Jackson Candle Turbidimeter was used to measure turbidity as Jackson turbidity units (JTU). The method is visual and is not considered very accurate. To obtain more accurate readings, a nephelometer should be used as a turbidity reading instrument.

HI847492 can report the measurements in FTU (Formazin Turbidity Units), EBC (European Brewing Convention), ASBC (American Society of Brewing Chemists) and HELM. FTU units are equal to NTU units (Nephelometric Turbidity Units). A conversion table between these measurement units is shown below.

	NTU/FNU/FTU	EBC	ASBC	HELM
1 NTU/1 FNU/1 FTU	1	0.25	17.25	10
1 EBC	4	1	69	40
1 ASBC	0.058	0.014	1	0.579
1 HELM	0.1	0.025	1.725	1

Beer Haze Table

Grade	EBC	ASBC
Brilliant	0.0 to 0.5	0.0 to 34.5
Almost Brilliant	0.5 to 1.0	34.5 to 69
Very Slightly Hazy	1.0 to 2.0	69 to 138
Slightly Hazy	2.0 to 4.0	138 to 276
Hazy	4.0 to 8.0	276 to 552
Very Hazy	> 8.0	> 552

Specifications

HI847492

Range	0.00 to 9.99; 10.0 to 99.9; 100 to 1000 FTU; 0.00 to 9.99; 10.0 to 99.9; 100 to 250 EBC; 0.00 to 9.99; 10.0 to 99.9; 100 to 17250 ASBC; 0.00 to 9.99; 10.0 to 99.9; 100 to 100000 HELM
Range Selection	automatic
Resolution	0.01, 0.1, 1 FTU, EBC, ASBC, HELM
Accuracy	±2% of reading plus 0.05 FTU (0.01 EBC, 0.86 ASBC, 0.5 HELM)
Repeatability	±1% of reading or 0.02 FTU, 0.01 EBC, 0.035 ASBC, 0.2 HELM; whichever is greater
Stray Light	<0.1 FTU, 0.03 EBC, 1.73 ASBC, 1 HELM
Light Source	LED @ 580 nm
Light Detector	silicon photocell
Method	ratio nephelometric method.
Display	60 x 90 mm backlit LCD
Calibration	two, three or four-point calibration
Log Memory	200 records
Serial Interface	USB
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	1.5V AA alkaline batteries (4) or AC adapter
Auto-off	after 15 minutes of non-use
Dimensions	224 x 87 x 77 mm (8.8 x 3.4 x 3.0")
Weight	512 g (18 oz.)

Ordering Information

HI847492-01 (115V) and **HI847492-02** (230V) is supplied with iButton® tags with tag holders (5), sample cuvettes and caps (6), calibration cuvettes (4), silicone oil (HI98703-58), 25 mL glass vials with caps (4), cuvette cleaning cloth, batteries, AC adapter, HI98501 thermometer, instrument quality certificate, instructions and rugged carrying case.

Accessories

HI847492-11 Calibration standard cuvette



HI83414 Standards and Accessories

Reagent Code	Description
HI93414-11	CAL Check™ calibration standards for free and total chlorine
HI93701-01	free chlorine (Cl ₂) reagent kit, 100 tests
HI93701-03	free chlorine (Cl ₂) reagent kit, 300 tests
HI93711-01	total chlorine (Cl ₂) reagent kit, 100 tests
HI93711-03	total chlorine (Cl ₂) reagent kit, 300 tests
HI88703-11	turbidity calibration standards (<0.1, 15, 100, 750 and 2000 NTU)

Accessory Code	Description
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI740234	replacement lamp for EPA turbidimeter
HI92000	Windows® compatible software
HI920013	USB cable for PC connection

See HI83414 on page 12.6

HI93414 Standards and Accessories

Reagent Code	Description
HI93414-11	CAL Check calibration standards for free and total chlorine
HI93701-01	free Chlorine (Cl ₂) reagent kit, 100 tests
HI93701-03	free Chlorine (Cl ₂) reagent kit, 300 tests
HI93711-01	total Chlorine (Cl ₂) reagent kit, 100 tests
HI93711-03	total Chlorine (Cl ₂) reagent kit, 300 tests
HI98703-11	turbidity calibration standards (<0.1, 15 100 and 750 NTU)

Accessory Code	Description
HI920005	tag holders with tags (5)
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI740234	replacement lamp for EPA turbidimeter
HI92000	Windows® compatible software
HI920013	USB cable for PC connection
HI920011	5 to 9 pin RS232 connection cable

See HI93414 on page 12.12

HI88703 Standards and Accessories

Reagent Code	Description
HI88703-11	turbidity calibration standards (<0.1, 15, 100, 750 and 2000 NTU)

Accessory Code	Description
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI740234	replacement lamp for EPA turbidimeter
HI92000	Windows® compatible software
HI920013	USB cable for PC connection

See HI88703 on page 12.10

HI98703 Standards and Accessories

Reagent Code	Description
HI98703-11	turbidity calibration standards (<0.1, 15, 100 and 750 NTU)

Accessory Code	Description
HI920005	tag holders with tags (5)
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI740234	replacement lamp for EPA turbidimeter
HI92000	Windows® compatible software
HI920013	USB cable for PC connection
HI920011	5 to 9 pin RS232 connection cable

See HI88703 on page 12.14

HI93102 Solutions and Accessories

Reagent Code	Description
HI93102-0	AMCO-AEPA-1 calibration solution, 0 NTU, 30 mL bottle
HI93102-20	AMCO-AEPA-1 calibration solution, 20 NTU, 30 mL bottle
HI93701-01	free chlorine (Cl ₂) reagent kit, 100 tests
HI93701-03	free chlorine (Cl ₂) reagent kit, 300 tests
HI93710-01	pH reagent kit, 100 tests
HI93710-03	pH reagent kit, 300 tests
HI93711-01	total chlorine (Cl ₂) reagent kit, 100 tests
HI93711-03	total chlorine (Cl ₂) reagent kit, 300 tests
HI93716-01	bromine (Br) reagent kit, 100 tests
HI93716-03	bromine (Br) reagent kit, 300 tests
HI93718-01	iodine (I) reagent kit, 100 tests
HI93718-03	iodine (I) reagent kit, 300 tests
HI93722-01	cyanuric acid (CYAC) reagent kit, 100 tests
HI93722-03	cyanuric acid (CYAC) reagent kit, 300 tests
HI93746-01	iron (Fe) low range reagent kit, 100 tests
HI93746-03	iron (Fe) low range reagent kit, 300 tests

Accessory Code	Description
HI920005	tag holders with tags (5)
HI93703-50	cuvette cleaning solution, 230 mL
HI731318	cuvette wiping cloth (4)
HI731321	spare glass cuvettes, small (4)

See HI93102 on page 12.16

HI98713 Standards and Accessories

Reagent Code	Description
HI98713-11*	turbidity calibration standards (<0.1, 15, 100 and 750 FNU)

Accessory Code	Description
HI920005	tag holders with tags (5)
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI92000	Windows® compatible software
HI920013	USB cable for PC connection
HI920011	5 to 9 pin RS232 connection cable

* Vials marked FNU cannot be used in FNU mode – for Ratio NTU calibration only.

See HI98713 on page 12.17

HI88713 Standards and Accessories

Reagent Code	Description
HI88713-11*	turbidity calibration standards (<0.1, 15, 100, 750 FNU and 2000 NTU)

Accessory Code	Description
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large, turbidity (4)
HI92000	Windows® compatible software
HI920013	USB cable for PC connection
HI920011	5 to 9 pin RS232 connection cable

* Vials marked FNU cannot be used in FNU mode – for Ratio NTU calibration only.

See HI88713 on page 12.18

HI93703 Standards and Accessories

Reagent Code	Description
HI93703-0	AMCO-AEPA-1 calibration solution, 0 FTU, 30 mL bottle
HI93703-05	AMCO-AEPA-1 calibration solution, 500 FTU, 30 mL bottle
HI93703-10	AMCO-AEPA-1 calibration solution at 10 FTU, 30 mL bottle

Accessory Code	Description
HI731313	maintenance kit: rugged carrying case containing HI93703-0, HI93703-05 and HI93703-10 calibration standards, cuvettes with caps (2) and cuvette wiping cloth
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731321	spare glass cuvettes, small (4)

See HI93703 on page 12.20

HI83749 Standards and Accessories

Reagent Code	Description
HI83749-11	turbidity calibration kit (<0.10, 10, 100, 500 NTU)
HI83749-20	bentocheck, 100 mL

Accessory Code	Description
HI920005	tag holders with tags (5)
HI740220	25 mL glass vial with cap (2)
HI731341	1000 µL automatic pipette
HI731351	1000µL automatic pipette tips (25)
HI740233	filter paper type II (100)
HI740142P	1 mL graduated syringe (10)
HI740144P	1 mL graduated syringe tips (10)
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI740234	replacement lamp for EPA turbidimeter
HI92000	Windows® compatible software
HI920013	USB cable for PC connection

See HI83749 on page 12.21

HI847492 Standards and Accessories

Reagent Code	Description
HI847492-11	calibration standard cuvette (<0.10, 15, 100 and 800 FTU)

Accessory Code	Description
HI920005	tag holders with tags (5)
HI93703-50	cuvette cleaning solution, 230 mL
HI98703-58	silicone oil, 15 mL
HI731318	cuvette wiping cloth (4)
HI731331N	glass cuvettes, large (4)
HI731335N	caps for cuvettes, large (4)
HI92000	Windows® compatible software
HI920013	USB cable for PC connection

See HI847492 on page 12.22



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Hanna Digital Refractometers

- **Automatic Temperature Compensation**
 - For exceptionally accurate measurements
- **Easy measurement**
 - Place a few drops of the sample in the well and press the READ key
- **BEPS**
 - (Battery Error Prevention System) alerts the user in the event that low battery power could adversely affect readings
- **IP65 water protection**
 - Built to perform under harsh laboratory and field conditions
- **Single-point calibration**
 - Calibrate with distilled or deionized water
- **Small sample size**
 - Sample size can be as small as 2 metric drops
- **Stainless steel sample well**
 - Easy to clean and corrosion-resistant
- **ABS thermoplastic casing**
- **Startup**
 - When powered on, the meter displays battery life and the set measurement units
- **Unit selection**
 - Pressing the RANGE key quickly cycles through the units of measurement (if applicable)



Refractive Index

Refractive Index is an optical characteristic of a substance and the dissolved particles in it.

The refractive index of a substance is strongly influenced by temperature and the wavelength of light used to measure it. Therefore, care must be taken to control or compensate for temperature differences and wavelength. The refractive index measurements are usually reported at a reference temperature of 20°C (68°F), which is considered to be room temperature.

Refractive index is defined as the ratio of the speed of light in a vacuum to the speed of light in a substance. A result of this property is that light will "bend," or change direction, when it travels through a substance with a different refractive index. This is called refraction.

When passing from a material with a higher to lower refractive index, there is a critical angle

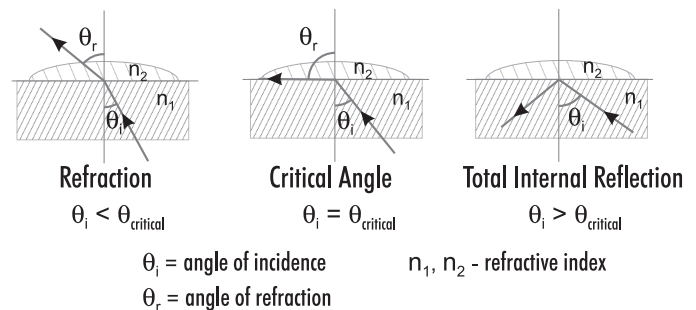
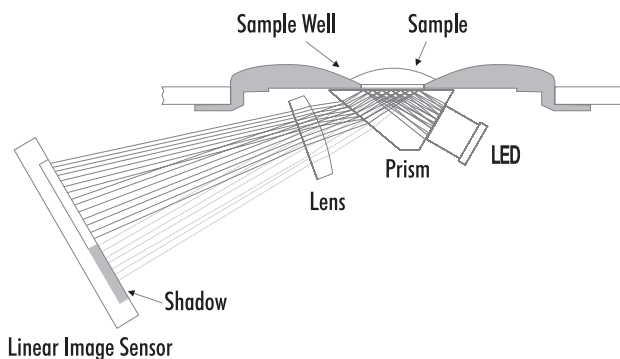
at which an incoming beam of light can no longer refract, but will instead be reflected off the interface between the two substances. This is called total internal reflection.

The critical angle can be used to easily calculate the refractive index according to the equation:

$$\sin(\theta_{\text{critical}}) = n_2 / n_1$$

Where n_2 is the refractive index of the lower-density medium; n_1 is the refractive index of the higher-density medium.

A digital refractometer uses an LED to pass light through a prism in contact with the sample. An image sensor determines the critical angle at which the light is no longer refracted through the sample. Specialized algorithms then apply temperature compensation to the measurement and convert the refractive index to the specified parameter.





°Plato scale in Brewing

The °Plato scale is a way to quantify the concentration of sugars and dissolved solids in wort. It is used as an indicator of the potential alcoholic strength of a brewing and expresses the fermentability. The HI96841 converts the refractive index reading to °Plato based on the tables maintained by the International Commission for Uniform Methods of Sugar Analysis (ICUMSA) and the American Society of Brewing Chemists (ASBC).



HI96841

Digital Refractometer

for Measurement of Wort Sugar Analysis

- **Dual-level LCD**
 - Dual-level LCD displays measurement and temperature readings simultaneously
- **ATC**
 - Automatic Temperature Compensation
- **BEPS**
 - Alerts the user of low battery power that could adversely affect readings.
- **IP65 water protection**
 - Built to perform under harsh laboratory and field conditions.
- **Quick, accurate results**
 - Readings are displayed in approximately 1.5 seconds
- **One-point calibration**
 - Calibrate with distilled or deionized water
- **Small sample size**
 - Sample size can be as small as 2 metric drops
- **Automatic shut-off**
 - After three minutes of non-use
- **Stainless steel sample well**
 - Easy to clean and corrosion-resistant
- **Easy measurement**
 - Place a few drops of the sample in the well and press the READ key
- **ABS thermoplastic casing**

Specifications

HI96841

Sugar Content	Range	0 to 30 °Plato
	Resolution	0.1 °Plato
	Accuracy (@25°C/77°F)	±0.2 °Plato
Temperature	Range	0 to 80°C (32 to 176°F)
	Resolution	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (±0.5°F)
Additional Specifications	Temperature Compensation	automatic between 0 and 40°C (32 to 104°F)
	Measurement Time	approximately 1.5 seconds
	Minimum Sample Volume	100 µL (to cover prism totally)
	Light Source	yellow LED
	Sample Cell	stainless steel ring and flint glass prism
	Auto-off	after three minutes of non-use
	Enclosure Rating	IP65
	Battery Type / Battery Life	9V / approximately 5000 readings
	Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4.01 x 2.6") / 420 g (14.8 oz.)
Ordering Information	HI96841 is supplied with battery and instruction manual.	

Digital Refractometer for Brewing

The HI96841 Digital Refractometer combines form and function into one compact unit. Featuring a 1.5 second response time, the HI96841 measures the refractive index of wort and converts it to °Plato with temperature compensation. The improved easy-to-read LCD screen displays temperature units (°C or °F) and measurements simultaneously. The HI96841's IP65 water-resistant casing and sealed sample well are built to perform under harsh conditions, making it suitable for use in any brewery.

HI96811 · HI96812 · HI96813
HI96814 · HI96816

Digital Refractometers

for Measurement of Sugar in Wine

- **Dual-level LCD**
 - Dual-level LCD displays measurement and temperature readings simultaneously
- **ATC**
 - Automatic Temperature Compensation
- **BEPS**
 - Alerts the user of low battery power that could adversely affect readings.
- **IP65 water protection**
 - Built to perform under harsh laboratory and field conditions.
- **Quick, accurate results**
 - Readings are displayed in approximately 1.5 seconds
- **One-point calibration**
 - Calibrate with distilled or deionized water
- **Small sample size**
 - Sample size can be as small as 2 metric drops
- **Automatic shut-off**
 - After three minutes of non-use
- **Stainless steel sample well**
 - Easy to clean and corrosion-resistant
- **Easy measurement**
 - Place a few drops of the sample in the well and press the READ key
- **ABS thermoplastic casing**

Five Instruments for Wine Analysis

Hanna offers five wine refractometers to meet the various requirements throughout the wine industry. The HI96811, HI96812, HI96813, HI96814 and HI96816 Digital Wine Refractometers are rugged, lightweight and waterproof for measurements in the lab or field.

Refractive Index

These optical instruments employ the measurement of the refractive index to determine parameters pertinent to the wine industry.

The actual measurement of the refractive index is simple and quick and provides the vintner a standard accepted method for sugar content analysis. Samples are measured



after a simple user calibration with deionized or distilled water. Within seconds, the instrument measures the refractive index of the grape must. These digital refractometers eliminate the uncertainty associated with mechanical refractometers and are ideal for fast, reliable measurements.

Instrument Descriptions

HI96811, HI96813 and HI96814 convert the refractive index of the sample to sucrose concentration in units of percent by weight, % Brix (also referred to as °Brix). The conversion used is based on the ICUMSA Methods Book (International Commission for Uniform Methods of Sugar Analysis). Since the majority of sugar in grape juice is fructose and glucose and not sucrose, the reading is sometimes referred to as "Apparent Brix".

HI96812 has units of °Baumé. The °Baumé scale is based on density and was originally designed to measure the mass of sodium chloride in water. °Baumé is used in winemaking to measure the sugar in must. The HI96812 converts the % Brix reading to °Baumé based on the table found in the Official Methods of Analysis of AOAC International, 18th Edition. One °Baumé is approximately equal to 1.8 % Brix, and 1°Baumé is roughly equivalent to 1% alcohol when the wine is fully fermented.

In addition to % Brix, **HI96814** includes two other scales used in the wine industry: °Oechsle and °KMW.

°Oechsle (°Oe) is mainly used in the German, Swiss and Luxembourgish winemaking industry to measure the sugar content of must. The °Oe scale is based on specific gravity at 20°C (S.G.(20/20)) and is the first 3 digits following the decimal point. One °Oe is roughly equal to 0.2 % Brix.

$$^{\circ}\text{Oe} = [(S.G.(20/20)) - 1] \times 1000$$

°Klosterneuburger Mostwaage (°KMW) is used in Austria to measure the sugar content of must. °KMW is related to °Oe by the following equation:

$$^{\circ}\text{Oe} = ^{\circ}\text{KMW} \times [(0.022 \times ^{\circ}\text{KMW}) + 4.54]$$

1 °KMW is roughly equivalent to 1% Brix or 5 °Oe. °KMW is also known as °Babo.

"Potential" or "probable" alcohol is an estimation of the alcohol content (% vol/vol) in finished wine based on the conversion of sugar to alcohol. This conversion depends on many factors, such as the type of grapes, the grape maturity, the growing region and yeast fermentation efficiency and temperature.

The **HI96813** allows the user to tailor the instrument to their specific needs based on their experience, since no fixed conversion factor is universally applicable. The first conversion is based on the % Brix value and an adjustable conversion factor between 0.50 and 0.70 (0.55 is a common value).

$$\text{Potential alcohol (\% v/v)} = (0.50 \text{ to } 0.70) \times \% \text{ Brix}$$

One drawback of the above equation is that it does not take into account the nonfermentable sugars and extract. A second equation was also added that takes these factors into account and can give a more accurate estimate of the potential alcohol content in the finished wine. This conversion is named "C1" on the meter, and uses the following equation:

$$\text{Potential Alcohol (\%V/V)} = 0.059 \times [(2.66 \times ^\circ\text{Oe}) - 30] (\text{C1})$$

The HI 96816 potential alcohol curve is based on the tables found in the European Economic Community Commission Regulation No 2676/90 of September 17, 1990, Determining Community Methods for the Analysis of Wine and International Organization of Vine and Wine (OIV). The potential alcohol curve is based on the following equation:

$$\text{Potential alcohol (\%v/v)} = \text{g/L of Sugar} / 16.83$$



Specifications	HI96811	HI96812	HI96813	HI96814	HI96816	
Sugar Content	Range	0 to 50% Brix	0 to 28°Baumé	0 to 50% Brix; 0 to 25% V/V Potential Alcohol	0 to 50% Brix; 0 to 230°Oechsle; 0 to 42°KMW	4.9 to 56.8% V/V potential alcohol; (10 to 75% Brix)*
	Resolution	0.1% Brix	0.1°Baumé	0.1% Brix; 0.1% V/V Potential Alcohol	0.1% Brix; 1°Oechsle 0.1°KMW	0.1 %V/V Potential Alcohol
	Accuracy (@25°C/77°F)	±0.2% Brix	±0.1°Baumé	±0.2% Brix; ±0.2 %V/V Potential Alcohol	±0.2% Brix; 1°Oechsle ±0.2°KMW	±0.2 %V/V Potential Alcohol
Temperature	Range	0 to 80°C (32 to 176°F)				
	Resolution	±0.1°C (0.1°F)				
	Accuracy (@25°C/77°F)	±0.3°C (±0.5°F)				
Additional Specifications	Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)				
	Measurement Time	approximately 1.5 seconds				
	Minimum Sample Volume	100 µL (to cover prism totally)				
	Light Source	yellow LED				
	Sample Cell	stainless steel ring and flint glass prism				
	Auto-off	after three minutes of non-use				
	Enclosure Rating	IP65				
	Battery Type / Battery Life	9V / approximately 5000 readings				
Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4.01 x 2.6") / 420 g (14.8 oz.)					
Ordering Information	HI96811, HI96812, HI96813, HI96814 and HI96816 are supplied with battery and instruction manual.					
Standard	HI4020-11 Brix standard 50%, 10 mL					

* hidden range

HI96800 · HI96801 · HI96802
HI96803 · HI96804

Digital Refractometers

for Sugar Analysis Throughout the Food Industry

- **Ideal for the analysis of:**
 - Fruits, energy drinks, puddings, soy milk, juices, jam, marmalade, honey, soups, jelly, tofu and condiments
- **Dual-level LCD**
 - The dual-level LCD displays measurement and temperature readings simultaneously
- **ATC**
 - Automatic Temperature Compensation
- **Easy measurement**
 - Place a few drops of the sample in the well and press the READ key
- **BEPS**
 - Alerts the user of low battery power that could adversely affect readings
- **IP65 water protection**
 - Built to perform under harsh laboratory and field conditions
- **Quick, accurate results**
 - Readings are displayed in approximately 1.5 seconds
- **One-point calibration**
 - Calibrate with distilled or deionized water
- **Small sample size**
 - Sample size can be as small as 2 metric drops
- **Automatic shut-off**
 - After three minutes of non-use
- **Stainless steel sample well**
 - Easy to clean and corrosion-resistant
- **ABS thermoplastic casing**



Five Instruments for Sugar Analysis

Hanna offers five sugar refractometers to meet the requirements of the food industry. The HI96800 Refractive Index/Brix, HI96801 % Brix (sucrose), HI96802 Fructose, HI96803 Glucose and HI96804 Invert Sugar digital refractometers are rugged, portable and water-resistant for measurements in the lab or field.

These optical instruments employ the measurement of the refractive index to determine parameters pertinent to sugar concentration analysis.

Refractive Index

The actual measurement of refractive index is simple, quick and provides the operator a standard accepted method for sugar content analysis. Samples are measured after a simple user calibration with deionized or distilled water. Within seconds these instruments measure the refractive index, apply any necessary calculations and display the results in the selected unit. These digital refractometers eliminate the uncertainty associated with mechanical refractometers and are easily portable for measurements in the field.

Features

These five instruments utilize internationally recognized references for unit conversion and temperature compensation and employ methodology recommended in the ICUMSA Methods Book (internationally recognized body for sugar analysis).

Temperature (in °C or °F) is displayed simultaneously with the measurement on the large dual-level display along with icons for low power and other helpful messages.

5 Digital Refractometers for Sugar Analysis to Choose from

HI96800

Measures the refractive index in aqueous solutions. Readings can also be displayed with sucrose temperature compensation ($n_{D_{20}}$) or % Brix.

- 1.3300 to 1.5080 Refractive Index range with ± 0.0005 accuracy
- 0 to 85% Brix range with $\pm 0.2\%$ accuracy

HI96801

Measures the refractive index to determine the % Brix of sugar in aqueous solutions. The refractive index of the sample is converted to % Brix concentration units.

- Temperature Compensation algorithms based on sucrose solution
- 0 to 85% Brix range with an accuracy of $\pm 0.2\%$

HI96802

Measures the refractive index to determine the % fructose in aqueous solutions. The refractive index of the sample is converted to % mass (% w/w) concentration units.

- Temperature Compensation algorithms based on fructose solution
- 0 to 85% fructose by weight range with an accuracy of $\pm 0.2\%$

HI96803

Measures the refractive index to determine the % glucose in aqueous solutions. The refractive index of the sample is converted to % mass (% w/w) concentration units.

- Temperature Compensation algorithms based on glucose solution
- 0 to 85% glucose by weight range with an accuracy of $\pm 0.2\%$

HI96804

Measures the refractive index to determine the % invert sugar in aqueous solutions. The refractive index of the sample is converted to % mass (% w/w) concentration units.

- Temperature Compensation algorithms based on invert sugar solution
- 0 to 85% invert sugar by weight range with an accuracy of $\pm 0.2\%$

Making a Standard % Brix Solution

To make a Brix Solution, follow the procedure below:

- Place container (such as a glass vial or dropper bottle that has a cover) on an analytical balance.
- Tare the balance.
- To make an X % Brix solution, weigh out X grams of high purity sucrose (CAS #: 57-50-1) directly into the container.
- Add distilled or deionized water to the container so the total weight of the solution is 100 g.

Note: Solutions above 60% Brix need to be vigorously stirred or shaken and heated in a water bath. Remove solution from bath when sucrose has dissolved. The total quantity can be scaled proportionally for smaller containers but accuracy may be sacrificed.

Example with 25% Brix:

% Brix	25
g Sucrose	25.000
g Water	75.000
g Total	100.000

Specifications	HI96800	HI96801	HI96802	HI96803	HI96804	
Sugar Content	Range	1.3300 to 1.5080 nD; 1.3330 to 1.5040 $n_{D_{20}}$; 0 to 85% Brix 0.0 to 85.0% Brix	0 to 85% Brix	0 to 85% mass (% w/w fructose)	0 to 85% mass (% w/w glucose)	0 to 85% mass (% w/w invert sugar)
	Resolution	0.0001 nD; 0.0001 $n_{D_{20}}$; 0.1 % Brix	0.1 % Brix	0.1 % mass	0.1 % mass	0.1 % mass
	Accuracy (@25°C/77°F)	± 0.0005 nD; ± 0.0005 $n_{D_{20}}$; $\pm 0.2\%$ Brix	$\pm 0.2\%$ Brix	$\pm 0.2\%$ mass	$\pm 0.2\%$ mass	$\pm 0.2\%$ mass
Temperature	Range	0.0 to 80.0°C (32.0 to 176.0°F)				
	Resolution	0.1°C (0.1°F)				
	Accuracy (@25°C/77°F)	$\pm 0.3^\circ\text{C}$ ($\pm 0.5^\circ\text{F}$)				
Additional Specifications	Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)				
	Measurement Time	approximately 1.5 seconds				
	Minimum Sample Volume	100 μL (to cover prism totally)				
	Light Source	yellow LED				
	Sample Cell	stainless steel ring and flint glass prism				
	Auto-off	after three minutes of non-use				
	Enclosure Rating	IP65				
	Battery Type / Battery Life	9V / approximately 5000 readings				
Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4.01 x 2.6") / 420 g (14.8 oz.)					
Ordering Information	HI96800, HI96801, HI96802, HI96803 and HI96804 are supplied with battery and instruction manual.					
Standard	HI4020-11 Brix standard 50%, 10 mL					

HI96821

Digital Refractometer

for Sodium Chloride Measurement
Throughout the Food Industry

- **Ideal for the analysis of:**
 - Salad dressings, cheeses, condiments, pickles, canned foods, jarred foods, milk, juices, energy drinks, soups, brines and whey
- **High accuracy measurements in g/100 g, g/100 mL, specific gravity and °Baume**
- **Dual-level LCD**
 - The dual-level LCD displays measurement and temperature readings simultaneously
- **ATC**
 - Automatic Temperature Compensation
- **Easy measurement**
 - Place a few drops of the sample in the well and press the READ key
- **BEPS**
 - Alerts the user of low battery power that could adversely affect readings.
- **IP65 water protection**
 - Built to perform under harsh laboratory and field conditions
- **Quick, accurate results**
 - Readings are displayed in approximately 1.5 seconds.
- **Single-point calibration**
 - Calibrate with distilled or deionized water
- **Small sample size**
 - Sample size can be as small as 2 metric drops
- **Automatic shut-off**
 - After three minutes of non-use
- **Stainless steel sample well**
 - Easy to clean and corrosion resistant
- **ABS thermoplastic casing**



Ideal for the Food Industry

Hanna offers the HI96821 digital sodium chloride refractometer to meet the requirements of the food industry. This optical instrument employs the measurement of the refractive index to determine sodium chloride concentration in aqueous solutions used in food preparation. It is not intended for seawater salinity measurements.

Refractive Index

The measurement of refractive index is simple and quick and provides the user an accepted method for sodium chloride analysis. Samples are measured after a simple user calibration with deionized or distilled water. Within seconds the instrument measures the refractive index of the solution, apply the necessary calculations and display the results in the selected unit. The digital refractometer eliminates the uncertainty associated with mechanical refractometers and is portable for measurements where you need them.

Features

The instrument utilizes internationally recognized references for unit conversion and temperature compensation. It can display the measurement of NaCl concentration 4 different ways: g/100 g, g/100 mL, Specific Gravity, and °Baumé.

Temperature (in °C or °F) is displayed simultaneously with the measurement on the large dual level display along with icons for Low Power and other helpful message codes.

Easy to Operate

Startup Screens

When the HI96821 is turned on, all of the LCD segments will be displayed followed by the percentage of battery life remaining.

Calibration

Perform a quick and easy calibration after startup:

1. Using a pipette, completely cover the prism in the sample well with distilled or deionized water.
2. Press the ZERO key.

Unit Selection

Just press the RANGE key to cycle through the HI96821's units of measurement (g/100 g, g/100 mL, Specific Gravity and °Baumé).

Measurement

Achieve fast, accurate results:

1. Using a plastic pipette, place sample onto the prism surface until the well is full.
2. Press the READ key and the results are displayed in the selected units.

Making a Standard Sodium Chloride Solution

To make a standard NaCl solution (g/100 g), follow the procedure below:

- Place a container (such as a glass vial or dropper bottle that has a cover) on an analytical balance.
- Tare the balance.
- To make an X NaCl solution weigh out X grams of high purity dried Sodium Chloride (CAS #: 7647-14-5; MW 58.44) directly into the container.
- Add distilled or deionized water to the container so the total weight of the solution is 100 g.

Example with g/100 g NaCl:

g/100 g NaCl	10
g NaCl	10.000
g Water	90.000
g Total	100.000

Specifications	HI96821	
g/100 g	Range	0 to 28
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
g/100 mL	Range	0 to 34
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
Specific Gravity (S.G.)	Range	1.000 to 1.216
	Resolution	0.001
	Accuracy (@25°C/77°F)	±0.002
°Baumé	Range	0 to 26
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
Temperature	Range	0 to 80°C (32 to 176°F)
	Resolution	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (±0.5°F)
Additional Specifications	Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)
	Measurement Time	approximately 1.5 seconds
	Minimum Sample Volume	100 µL (to cover prism totally)
	Light Source	yellow LED
	Sample Cell	stainless steel ring and flint glass prism
	Auto-off	after three minutes of non-use
	Enclosure Rating	IP65
	Battery Type / Battery Life	9V / approximately 5000 readings
Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4.01 x 2.6") / 420 g (14.8 oz.)	
Ordering Information	HI96821 is supplied with battery and instruction manual.	

HI96822

Digital Refractometer

for Natural or Artificial Seawater Analysis

- Designed for seawater salinity analysis
- High accuracy measurements displayed as PSU, ppt and specific gravity
- Dual-level LCD
 - The dual-level LCD displays measurement and temperature readings simultaneously
- ATC
 - Automatic Temperature Compensation
- Easy measurement
 - Place a few drops of the sample in the well and press the READ key
- BEPS
 - Alerts the user of low battery power that could adversely affect readings
- IP65 water protection
 - Built to perform under the harsh field conditions associated with environments containing seawater.
- Quick, accurate results
 - Readings are displayed in approximately 1.5 seconds
- Single-point calibration
 - Calibrate with distilled or deionized water
- Small sample size
 - Sample size can be as small as 2 metric drops
- Automatic shut-off
 - After three minutes of non-use
- Stainless steel sample well
 - Easy to clean and corrosion-resistant
- ABS thermoplastic casing



Ideal for Seawater Analysis

Hanna's HI96822 Digital Refractometer is a rugged, portable, water resistant device that utilizes the measurement of the refractive index to determine the salinity of natural and artificial seawater, ocean water or brackish intermediates. The HI96822 reflects Hanna's years of experience as a manufacturer of analytical instruments. This digital refractometer eliminates the uncertainty associated with mechanical refractometers and is durable and compact enough to be used at home, in the lab, or out in the field.

The HI96822 is an optical device that is quick and easy to use. After a simple user calibration with distilled or deionized water, a seawater sample can be introduced into the sample well.

Within seconds, the refractive index and temperature are measured and converted into one of three popular measurement units: Practical Salinity Units (PSU), parts per thousand (ppt), or specific gravity (S.G. (20/20)). All conversion algorithms are based upon respected scientific publications using the physical properties of seawater.

The Importance of Salinity Measurement Throughout a Variety of Applications

Salinity is a critical measurement in many applications, such as aquaculture, environmental monitoring, aquariums, desalination plants, well water, and many more. Until now, the available technology to measure salinity has relied on mechanical instruments, such as hydrometers and mechanical refractometers, or on high-tech conductivity meters. While easy to use, getting a reading on a mechanical refractometer can be difficult since they are highly susceptible to changes in temperature. Hydrometers, though inexpensive, are typically made of glass and subject to breakage.

The Hanna HI96822 is the solution to all these issues. It is lightweight, easy to use, cost-efficient, and extremely accurate. With the ability to read in three of the most widely used salinity units (PSU, ppt, and Specific Gravity), it is the ideal instrument for any application.

Easy to Operate

Start-up Screens

When the HI96822 is turned on, all of the LCD segments will be displayed followed by the percentage of battery life remaining.

Calibration

Perform a quick and easy calibration after start-up:

1. Using a plastic pipette, completely cover the prism in the sample well with distilled or deionized water.
2. Press the ZERO key.

Unit Selection

Just press the RANGE key to cycle through the HI96822's units of measurement. PSU, ppt, Specific Gravity (20/20).

Measurement

Achieve fast, professional results:

1. Using a plastic pipette, drip sample onto the prism surface until the well is full.
2. Press the READ key and the results are displayed in the selected units.

Making a Standard Sodium Chloride Solution

Sodium Chloride solutions can be used to check the accuracy of the meter. The table below lists two Sodium Chloride solutions and their expected ppt Seawater value. To make a Standard NaCl Solution (g/100 g), follow the procedure below:

- Place container (such as a glass vial or dropper bottle that has a cover) on an analytical balance.
- Tare the balance.
- To make an X NaCl solution weigh out X grams of high purity dried Sodium Chloride (CAS #: 7647-14-5; MW 58.44) directly into the container.
- Add distilled or deionized water to the beaker so the total weight of the solution is 100g.

Example Standard NaCl solution:

	NaCl (g)	Water (g)	Total	Expected Seawater Value (ppt)
3.5% NaCl	3.50	96.50	100.000	34
10% NaCl	10.00	90.00	100.000	96

Specifications	HI96822	
PSU	Range	0 to 50
	Resolution	1
	Accuracy (@25°C/77°F)	±2
ppt	Range	0 to 150
	Resolution	1
	Accuracy (@25°C/77°F)	±2
Specific Gravity (S.G.)	Range	1.000 to 1.114
	Resolution	0.001
	Accuracy (@25°C/77°F)	±0.002
Temperature	Range	0 to 80°C (32 to 176°F)
	Resolution	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (0.5°F)
Additional Specifications	Temperature Compensation	automatic between 0 and 40°C (32 to 104°F)
	Measurement Time	approximately 1.5 seconds
	Minimum Sample Volume	100 µL (to cover prism totally)
	Light Source	yellow LED
	Sample Cell	stainless steel ring and flint glass prism
	Auto-off	after three minutes of non-use
	Enclosure Rating	IP65
	Battery Type / Life	9V / approximately 5000 readings
	Dimensions	192 x 102 x 67 mm (7.6 x 4.01 x 2.6")
Weight	420 g	
Ordering Information	HI96822 is supplied with battery and instruction manual.	

Some specific examples of the importance of salinity:

Aquaculture: Young salmon start their lives in fresh water. As they mature, they reach a stage ("smolt") when they transition to salt water. When farming salmon, it is critically important to maintain proper salinity levels at each life stage to prevent unnecessary stress that could negatively affect growth and development.

Salinity is a vital parameter to monitor accurately when raising eggs and larval fish, optimizing juvenile and adult growth, and culturing live food such as rotifers and artemia.

Aquaria: Whether it is the world-renowned, eight million gallon Georgia Aquarium, or a 20 gallon reef tank at home, salinity is a crucial parameter to measure. In closed systems such as these, salinity is easily affected. As water evaporates, it leaves the salt behind, raising the salinity. When evaporated water is replaced with fresh water, the salinity is lowered. The potential for disaster is inherent in both situations. Use Hanna's digital refractometer to accurately measure salinity and to help prevent any mishaps.

HI96831 · HI96832

Digital Refractometers

for Ethylene and Propylene Glycol Analysis

- 0 to -50 °C freezing point range with ± 0.5 °C accuracy
- Dual-level LCD
 - Displays measurement and temperature readings simultaneously
- Automatic Temperature Compensation (ATC)
- Easy measurement
 - Place a few drops of the sample in the well and press the READ key
- BEPS
 - Alerts the user of low battery power that could adversely affect readings
- IP65 water protection
 - Built to perform under harsh laboratory and field conditions.
- Quick, accurate results
 - Readings are displayed in approximately 1.5 seconds
- Single-point calibration
 - Calibrate with distilled or deionized water
- Small sample size
 - Sample size can be as small as 2 metric drops
- Automatic shut-off
 - After three minutes of non-use
- Stainless steel sample well
 - Resists corrosion from salt water
- ABS thermoplastic casing

The HI96831 for Ethylene Glycol and HI96832 for Propylene Glycol Digital Refractometers are rugged, portable, water-resistant devices that utilize the measurement of the refractive index to determine the percent volume and freezing point of ethylene and propylene glycol based solutions respectively.

These digital refractometers eliminate the uncertainty associated with mechanical refractometers. Samples are measured after a simple user calibration with distilled or deionized water. Within seconds, the refractive index and temperature are measured and converted into one of two measurement units; % volume or freezing point. Both meters use internationally recognized references for unit conversion and temperature compensation for glycol solutions (e.g. CRC Handbook of Chemistry and Physics, 87th Edition).



Specifications	HI96831 Ethylene Glycol	HI96832 Propylene Glycol	
% Volume (% v/v)	Range	0 to 100%	0 to 100%
	Resolution	0.1 %	0.1 %
	Accuracy (@25°C/77°F)	± 0.2 %	± 0.3 %
Freezing Point (FP)	Range	0 to -50°C (32 to -58°F)	0 to -51°C (32 to -59.8°F)
	Resolution	0.1°C (0.1°F)	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	± 0.5 °C (± 1.0 °F)	± 0.5 °C (± 1.0 °F)
Temperature	Range	0 to 80°C (32 to 176°F)	0 to 80°C (32 to 176°F)
	Resolution	0.1°C (0.1°F)	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	± 0.3 °C (± 0.5 °F)	± 0.3 °C (± 0.5 °F)
Additional Specifications	Temperature Compensation	automatic between 0 and 40°C (32 to 104°F)	
	Measurement Time	approximately 1.5 seconds	
	Minimum Sample Volume	100 μ L (to cover prism totally)	
	Light Source	yellow LED	
	Sample Cell	stainless steel ring and flint glass prism	
	Auto-off	after three minutes of non-use	
	Enclosure Rating	IP65	
	Battery Type / Battery Life	9V / approximately 5000 readings	
	Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4.01 x 2.6") / 420 g (14.8 oz.)	
Ordering Information	HI96831 and HI96832 are supplied with battery and instruction manual.		