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Speedsafe™ from Hanna

There are two types of magnetic stirrers; mechanical and electronic. Most manufacturers of magnetic stirrers use the mechanical approach, using steel and aluminum for the structural material and outdated methods of speed control. These units are not only very heavy, but also very inaccurate. The use of these materials and methods appear to make the units rugged and strong, but they are instead cumbersome and obsolete.

Something as simple as completely dissolving salts in a medium is, in reality, a science. Often this cannot be achieved with simple mechanical processes. The only choice that the user has with mechanical products is to increase the stirring time or the temperature. With electronics, you can do more... the Hanna approach is electronic.

Speed sensor and limiter: Each Hanna stirrer is equipped with a speed sensing device (opto-sensor) coupled with an FVC (frequency voltage converter), which monitors the speed. As the speed reaches a preset maximum level, the speed limiter shuts down the VCO (voltage-controlled oscillator) to slow down the motor speed. This ensures that when the load is suddenly removed from the stirrer, the motor will not accelerate to such a high speed that will be hazardous to both the user and the stirrer; a feature not commonly found in conventional stirrers.

Sophisticated Engineering

Parts are engineered and manufactured to strict specifications to ensure absolute reliability. All components are mounted into a molded casing covered with either ABS plastic or a stainless steel plate, which are splash-proof and chemically-resistant. Minimal vibration and a well-balanced rotating arm provide years of trouble-free operation.

HI190M • HI190M-0 • HI200M

Our Most Popular Magnetic Mini-Stirrers

- **Compact size**
 - The compact size of these stirrers allow users to maximize bench space for efficiency and safety
- **Safety**
 - Speedsafe™ limits the maximum speed to 1000 rpm even if a load is suddenly removed
- **Built to last**
 - The ABS housing of HI190M and HI190 M-0 resists most harmful chemicals in the lab

The HI190M, HI190M-0 and HI200M are compact and lightweight, so that lack of laboratory bench space is no longer a concern.

These stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. Often, in the lab, a sample is removed from the stirrer before reducing the speed. This would cause the motor of conventional equipment to accelerate until it is destroyed. This does not pose a problem with Hanna mini-stirrers, as the Speedsafe™ mechanism ensures that the maximum speed is never exceeded.

HI190M and HI190M-0 come supplied with an ABS cover that will resist the harmful effects of chemicals that are accidentally spilled.

HI200M has an AISI 316 stainless steel cover. This model is ideal for applications that create exothermic reactions.



- Stainless steel cover

Speedsafe™

- ABS plastic cover

Specifications	HI190M	HI190M-0	HI200M
Maximum Stirring Capacity	1 liter (0.26 gallons)	1 liter (0.26 gallons)	1 liter (0.26 gallons)
Min. Speed Range	100 rpm	100 rpm	100 rpm
Max. Speed Range	1000 rpm	1000 rpm	1000 rpm
Power Supply	110/115 VAC or 220/240 VAC, 50/60Hz	12 VDC (sold separately)	110/115 VAC or 230/240 VAC, 50/60Hz
Installation Category	II	II	II
Cover Material	ABS plastic	ABS plastic	AISI 316 stainless steel
Environment	0 to 50°C (32 to 122°F); RH max 95%	0 to 50°C (32 to 122°F); RH max 95%	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	120 x 120 x 45 mm (4.8 x 4.8 x 1.8")	120 x 120 x 45 mm (4.8 x 4.8 x 1.8")	120 x 120 x 45 mm (4.8 x 4.8 x 1.8")
Weight	640 g (1.4 lbs.)	610 g (1.3 lbs.)	710 g (1.6 lbs.)
Ordering Information	HI190M-1 (110/115 Vac), HI190M-2 (230/240 Vac), HI190M-0 (12 VDC), HI200M-1 (110/115 Vac) and HI200M-2 (230/240 Vac) mini-stirrers are supplied with micro stir bar and instructions.		
Accessories	HI731319 Magnetic micro stir bar (10)		

HI300N • HI310N

Heavy-duty Magnetic Stirrers



- Stainless steel cover

HI300N and HI310N are heavy-duty stirrers. HI300N can stir up to 2.5 liters (0.66 gallons) of liquid and the HI310N can stir up to 5.0 liters (1.3 gallons). This makes them perfect for laboratory use as well as for use in production. Electronic controls are incorporated into these stirrers that allow the user to regulate the speed with greater precision. With Hanna's Speedsafe™, a limiter will assure that the maximum speed will never be exceeded.

HI310N also has an automatic feedback feature. The motor is electronically controlled to maintain the chosen speed as the load changes. If the viscosity or the level (fluid weight) increases or decreases, the circuitry will adjust the output power to keep the speed constant.

Specifications	HI300N	HI310N
Maximum Stirring Capacity	2.5 liters (0.66 gallons)	5 liters (1.3 gallons)
Min. Speed Range	100 rpm	
Max. Speed Range	800 to 1000 rpm	
Auto-Feedback	-	standard
Power Supply	110/115 VAC or 230/240 VAC, 50/60 Hz	
Installation Category	II	
Cover Material	AISI 316 stainless steel	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	180 x 180 x 70 mm (7.1 x 7.1 x 2.8")	
Weight	1.4 kg (3.1 lbs.)	
Ordering Information	HI300N-1 (115V), HI300N-2 (230V), HI310N-1 (115V), and HI310N-2 (230V) are supplied with micro stir bar and instructions.	
Accessories	HI731320 Magnetic stir bar (10)	

HI302N

Auto-reverse Magnetic Stirrers



- Stainless steel cover

The HI302N model can stir up to 2.5 liters (0.66 gallons). It is often desirable to stir your samples in two directions. This will achieve maximum homogeneity and solubility. An advanced circuit allows HI302N to reverse the direction of the stirring at a user-selected interval. The interval can be adjusted from 30 seconds up to 3 minutes. In addition to precision speed control, a limiter will also assure that the maximum speed will never be exceeded.

Hanna stirrers incorporate a VCO device that stops the motor from accelerating as soon as a load is removed (Speedsafe™).

Specifications	HI302N
Maximum Stirring Capacity	2.5 liters (0.66 gallons)
Low Speed Range	100 rpm
High Speed Range	800 to 1000 rpm
Reverse Interval	from 30 seconds to 3 minutes
Power Supply	110/115 VAC or 220/240V, 50/60 Hz
Installation Category	II
Cover Material	AISI 316 stainless steel
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	180 x 180 x 70 mm (7.1 x 7.1 x 2.8")
Weight	1.4 kg (3.1 lb.)
Ordering Information	HI302N-1 (115V) and HI302N-2 (230V) are supplied with magnetic stir bar and instructions.
Accessories	HI731320 Magnetic stir bar (10)

Auto-reverse Magnetic Stirrers

with Tachometer



- Stainless steel cover

When stirring a solution, to work with a constant speed is an important factor in ensuring that the best repeatability in tests and processes is achieved. Without a tachometer, there is no way of knowing the RPMs.

HI304N is a heavy-duty stirrer with a built-in tachometer. It is often desirable to stir in two directions in order to achieve maximum homogeneity. An advanced circuit allows HI304N to reverse the direction of the stir at a user-selected interval. The interval can be adjusted from 30 seconds up to 3 minutes. In addition to precision speed control, a limiter will also assure that the maximum speed will never be exceeded (Speedsafe™). Often, a sample is removed from the stirrer before the user reduces the speed. This can cause the motor to accelerate until it is destroyed. Hanna stirrers incorporate a VCO device that will stop the motor from accelerating as soon as the load is removed.

Specifications	HI304N
Maximum Stirring Capacity	2.5 liters (0.66 gallons)
Low Speed Range	100 rpm
High Speed Range	800 to 1000 rpm
Tachometer	four-digit LCD
Reverse Interval	from 30 seconds to 3 minutes
Power Supply	110/115 VAC or 220/240 VAC, 50/60 Hz
Installation Category	II
Cover Material	AISI 316 stainless steel
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight	180 x 180 x 70 mm (7.1 x 7.1 x 2.8") / 1.4 kg (3.1 lbs.)
Ordering Information	HI304N-1 (115V) and HI304N-2 (230V) is supplied with magnetic stir bar and instructions
Accessories	HI731320 Magnetic stir bar (10)

Timer Controlled Magnetic Stirrers



- Stainless steel cover

HI324N is a heavy-duty stirrer that incorporates a timer control that will turn the motor off after a selected amount of time. The time is adjustable from 5 minutes to 2 hours. This feature allows the user to carry out other tasks without worrying about over or under stirring. HI324N can stir up to 5.0 liters (1.3 gallons), making it ideal for laboratory and production use.

This stirrer allows regulated speed control. A limiter will assure the maximum speed is never exceeded (Speedsafe™).

HI324N has an automatic feedback feature and incorporates an LCD tachometer. The motor is electronically-controlled to maintain the chosen speed as the load changes. If the viscosity or the level increases or decreases, the circuitry will adjust the output power. The HI324N's RPM display guarantees repeatability in QC tests and research by constantly displaying the RPMs.

Specifications	HI324N
Maximum Stirring Capacity	5 liters (1.3 gallons)
Low Speed Range	100 rpm
High Speed Range	800 to 1000 rpm
Auto-Feedback	standard
Timer Range	from 5 minutes to 2 hours
Tachometer	four-digit LCD
Power Supply	110/115 VAC or 220/240 VAC, 50/60 Hz
Installation Category	II
Cover Material	AISI 316 stainless steel
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	180 x 180 x 70 mm (7.1 x 7.1 x 2.8")
Weight	1.4 kg (3.1 lb.)
Ordering Information	HI324N-1 (115V) and HI324N-2 (230V) are supplied with magnetic stir bar and instructions
Accessories	HI731320 Magnetic stir bar (10)

HI181

Compact Magnetic Mini-Stirrers

with Electrode Holder

- **Electrode holder**
 - The HI181 series features an electrode holder that fits into the base.
- **Round edge**
- **Dynamic design**
 - Easy to handle, these lightweight and compact stirrers need little room and are quickly recognizable on busy benches
- **Built to last**
 - Chemical resistant housing resists damage by accidental falls

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. Hanna HI181 series is compact, lightweight and inexpensive.

Often, in the lab, a sample is removed from a stirrer before reducing the speed. Normally, this would cause the motor to accelerate until it is destroyed. Hanna stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. In addition to speed control, the Speedsafe™ mechanism will assure that the maximum speed is never exceeded. HI181 mini-stirrers are available in eleven colors. The various colors can allow easy sample identification at a distance.

Speedsafe™



11 colors to choose from



HI181 - Black



HI181W - Arctic White



HI181F - Blue



HI181K - Orange



HI181J - Charcoal



HI181I - Ivory



HI181C - Glacier Blue



HI181A - Yellow



HI181M - Moss Green



HI181E - Green



HI181L - Lavender

Specifications**HI181**

Maximum Stirring Capacity	1 liter (0.26 gallons)
Min. Speed Range	100 rpm
Max. Speed Range	1000 rpm
Power Supply	110/115 VAC or 220/240 VAC, 50/60 Hz
Installation Category	II
Cover Material	ABS plastic
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	137 mm (dia) x 51 mm (h)
Weight	640 g (1.4 lbs.)

Accessories

HI731319 Magnetic micro stir bar (10)

Ordering Information

All models include electrode holder, micro stir bar and instructions

HI181-1	Black mini-stirrer (115V)
HI181-2	Black mini-stirrer (230V)
HI181W-1	Arctic White mini-stirrer (115V)
HI181W-2	Arctic White mini-stirrer (230V)
HI181F-1	Blue mini-stirrer (115V)
HI181F-2	Blue mini-stirrer (230V)
HI181K-1	Orange mini-stirrer (115V)
HI181K-2	Orange mini-stirrer (230V)
HI181J-1	Charcoal mini-stirrer (115V)
HI181J-2	Charcoal mini-stirrer (230V)
HI181I-1	Ivory mini-stirrer (115V)
HI181I-2	Ivory mini-stirrer (230V)
HI181C-1	Glacier Blue mini-stirrer (115V)
HI181C-2	Glacier Blue mini-stirrer (230V)
HI181A-1	Yellow mini-stirrer (115V)
HI181A-2	Yellow mini-stirrer (230V)
HI181M-1	Moss Green mini-stirrer(115V)
HI181M-2	Moss Green mini-stirrer (230V)
HI181E-1	Green mini-stirrer(115V)
HI181E-2	Green mini-stirrer (230V)
HI181L-1	Lavender mini-stirrer(115V)
HI181L-2	Lavender mini-stirrer (230V)



11 colors to choose from



HI180 - Black



HI180W - Arctic White



HI180F - Blue



HI180K - Orange



HI180J - Charcoal



HI180I - Ivory



HI180C - Glacier Blue



HI180A - Yellow



HI180M - Moss Green



HI180E - Green



HI180L - Lavender

Specifications

HI180

Maximum Stirring Capacity	1 liter (0.26 gallons)
Min. Speed Range	100 rpm
Max. Speed Range	1000 rpm
Power Supply	110/115 VAC or 220/240 VAC, 50/60 Hz
Installation Category	II
Cover Material	ABS plastic
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	137 mm (dia) x 51 mm (h)
Weight	640 g (1.4 lbs.)
Accessories	HI731319 Magnetic micro stir bar (10)

HI180

Compact Magnetic Mini-Stirrers

- Round edge
- Dynamic design
 - Easy to handle, these lightweight and compact stirrers need little room and are quickly recognizable on busy benches
- Built to last
 - Chemical resistant housing resists damage by accidental falls

Hanna HI180 series is compact, lightweight and inexpensive.

Often, in the lab, a sample is removed from a stirrer before reducing the speed. Normally, this would cause the motor to accelerate until it is destroyed. Hanna stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. In addition to speed control, the Speedsafe™ mechanism will assure that the maximum speed is never exceeded. HI180 mini-stirrers are available in eleven colors. The various colors can allow easy sample identification at a distance.

Ordering Information

All models are supplied with micro stir bar and instructions

HI180-1	Black mini-stirrer (115V)
HI180-2	Black mini-stirrer (230V)
HI180W-1	Arctic White mini-stirrer (115V)
HI180W-2	Arctic White mini-stirrer (230V)
HI180F-1	Blue mini-stirrer (115V)
HI180F-2	Blue mini-stirrer (230V)
HI180K-1	Orange mini-stirrer (115V)
HI180K-2	Orange mini-stirrer (230V)
HI180J-1	Charcoal mini-stirrer (115V)
HI180J-2	Charcoal mini-stirrer (230V)
HI180I-1	Ivory mini-stirrer (115V)
HI180I-2	Ivory mini-stirrer (230V)
HI180C-1	Glacier Blue mini-stirrer (115V)
HI180C-2	Glacier Blue mini-stirrer (230V)
HI180A-1	Yellow mini-stirrer (115V)
HI180A-2	Yellow mini-stirrer (230V)
HI180M-1	Moss Green mini-stirrer (115V)
HI180M-2	Moss Green mini-stirrer (230V)
HI180E-1	Green mini-stirrer (115V)
HI180E-2	Green mini-stirrer (230V)
HI180L-1	Lavender mini-stirrer (115V)
HI180L-2	Lavender mini-stirrer (230V)



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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.



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.

See page 9.36

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.

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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 - 80 TH		HI3890 (Pool Line)	9.20	
	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/ HI38444 (Pool Line)	9.22	
Hypochlorite	Hypochlorite (as Cl ₂)	titration	50-150 g/L (ppt)	100 avg.	HI3843/ HI38434 (Pool Line)	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	

	Parameter	Method	Range	# of Tests	Code	Page
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
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	Sulfate (as SO ₄ ²⁻)	turbidimetric	20-100 mg/L (ppm)	100	HI38000	9.29
	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	9.30

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	
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.	
HI3823 Marine Test Kit	pH	electronic pH tester	0.0-14.0 pH	life of the meter	9.35
	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.	
	Salinity	titration	0.0-40.0 g/kg	110 avg.	
HI3887 Pool Line 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	9.39
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	9.41
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	9.43
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

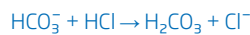
Significance of Use

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/bromophenol 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.

Pool
Line



HI3890 • HI38904

Total Hardness Control Kit

Hardness, or TH, gives the total concentration of calcium and magnesium salts on: 1°FH / 0.562°dH hardness corresponds to 10 mg/L (ppm) calcium carbonate.

The harder the water, the bigger the risk of calcium and magnesium salt deposits on the walls of pools and spas. On the other hand, water that is too soft can be corrosive.

	°FH	°dH
very soft	0–7	0–4
soft	7–15	4–8
slightly hard	15–25	8–14
medium hard	25–32	14–18
hard	32–42	18–23
very hard	>42	>23

The ideal TH for pool water is between 10 and 20°FH or 5 and 11°dH.

- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and buffer.

Specifications	HI3890/HI38904 Total Hardness (*as CaCO ₃)
Type	titration
Range	0 - 80 TH **
Smallest Increment	1 TH **
Method	calmagite
Ordering Information	HI3890 and HI38904 test kits comes with 30 mL hardness buffer, 10 mL calmagite indicator and 50 mL plastic beaker with cap.

**1 °TH = 1 °FH = 0,562 °dH = 0,7 °gH = 0,2 meq/l = 10 mg/l CaCO₃



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 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 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.

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 for 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.

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 · HI38444

Hydrogen Peroxide Test Kit

The HI3844 and HI38444 (Pool Line) are titration-based chemical test kits that determine the hydrogen peroxide concentration in two ranges: 0.00 to 2.00 mg/L and 0.0 to 10.0 mg/L. These test kits are supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

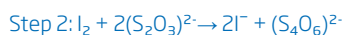
- **Complete setup**
 - All required materials are included with the test kit, such as the sample beaker, indicator and reagent bottles, spoon, and plastic pipettes.
- **High resolution**
 - Readings from 0.00 to 2.00 mg/L are determined to 0.25 mg/L resolution.
 - Readings from 0.0 to 10.0 mg/L are 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 kits.



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 both the HI3844 and HI38444 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).



*Pool
Line*

Specifications	HI3844 Hydrogen Peroxide (as H ₂ O ₂)	HI38444 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 and HI38444 (Pool Line) test kits come 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 · HI38434

Bleach Test Kit

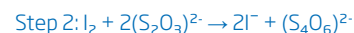
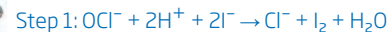
The HI3843 and HI38434 (Pool Line) are titration-based chemical test kits that determine the hypochlorite concentration within the 50 to 150 g/L Cl₂ range. These test kits are supplied with all of the necessary reagents and equipment to perform the analysis. The test kit contains enough reagents for perform approximately 100 tests.

- **Complete setup**
 - All required materials are included with the test kit, such as the 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).



*Pool
Line*

Specifications	HI3843 Hypochlorite (as Cl ₂)	HI38434 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 and HI38434 (Pool Line) test kits come 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



backpacklab.com



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)				

Backpack Lab™ contents subject to change



backpacklab.com

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
	Buffer solution	-	HI70007P	25
	Buffer solution	-	HI70010P	25
	EC Calibration Standard	-	HI70031P	25
	TDS Calibration Standard	-	HI70032P	25
HI3897	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