

CL17 Chlorine Analyzer



Reliable, economical chlorine control

The Hach CL17 Chlorine Analyzer uses colorimetric DPD chemistry to continuously monitor water for free or total residual chlorine. This low-cost analyzer provides a dependable and economical alternative to instruments that rely on costly electrodes or complex procedures. Unaffected by even large swings of pH, the CL17 performs an analysis every 2.5 minutes, 24 hours a day.

The CL17 offers both an alarm for manual chlorine feed control and a 4-20 mA output for automatic control of chlorine feed pumps for drinking water, wastewater and other water applications. Set for manual control, the instrument notifies the operator of out-of-limit chlorine levels – and allows manual intervention in the disinfection process as needed. The CL17 can be set for automatic control of chlorine feed pumps using one of two methods:

- 1) *On-Off Control* – which turns the feed pumps on when chlorine levels fall too low for disinfection, off when levels rise above a pre-set limit;
- 2) *Proportional Control* – which controls the amount of chlorine in proportion to the strength of the CL17's output signal. This is done through the REC MIN and REC MAX keys. For automatic operation, the CL17 has one output control with a range of 4-20 mA, programmable over any portion of the instrument's 0-5 mg/L range.

The unit is housed in an ABS plastic case that is lightweight, shatterproof and corrosion-resistant. The case includes built-in mounting brackets that simplify installation. Two windows clearly show chlorine measurements, alarms and reagent levels. A hinged door allows quick access to internal components.

The CL17 is designed to operate continuously for up to 30 days without replacing reagents or

cleaning the sample cell. Because of its low reagent use, low maintenance requirement and its ability to prevent overfeeding, the CL17 is exceptionally cost-efficient.

Applications – water, wastewater and more

For drinking water applications, the CL17 can be used to monitor the raw water stage to facilitate preoxidation, disinfection and the control of taste and odor problems. It can also be used at the finished water stage, where residual chlorine levels must be maintained during the distribution phase. For wastewater applications, the CL17 has large tubing and fittings along with a Self-Cleaning By-Pass Y-Strainer Kit to ensure continuous operation without clogging.

Because it can be used to monitor disinfection – and help prevent biological build-up – the CL17 is also ideal for applications involving chemical or industrial process or feed water (e.g., textile and paper mills), heating and cooling water or food and beverage applications. In systems using reverse osmosis, the CL17 can help protect expensive cellulose acetate membranes through continuous monitoring of chlorine.

Fast, dependable operation

The CL17's internal pump, seal-free mixer and compact colorimeter combine to deliver reliable, low-maintenance operation – around the clock, seven days a week. The instrument's easy-to-clean sample cell and quick-access reagent chamber allow users to perform routine maintenance in 15 minutes or less per month (difficult samples may require more frequent cleaning). The CL17 is equipped with self-testing diagnostics and alarms that activate in the event of system problems or shut-down.



The Hach CL17 Chlorine Analyzer

- Colorimetric DPD chemistry – fast, reliable, economical
- Unattended operation up to 30 days
- Manual or automatic feed pump control
- Large tubing, strainer ideal for wastewater applications
- Low operating cost – no electrodes, minimal reagents, no risk of overfeeding

**THERE'S ONLY ONE
WAY TO BE SURE**

Principle of operation

The CL17 Chlorine Analyzer consists of five main components – a linear peristaltic pump (A); a menu-driven LCD display that presents easy-to-read, scrolling messages explaining system status and operation (B); a colorimeter with a seal-free, solid-state mixing system* that includes a self-cleaning stir bar (C); and a one-month supply of reagents (D); all housed in a corrosion-resistant ABS, IP62 plastic case.

**Patent pending.*



Programming, set-up and manual diagnostics are simple with the CL17's keypad menu options. With a programmable 4-20 mA output, recorder options include the flexibility to set the limits to be output to a variety of devices such as a chart recorder, PLC or SCADA.

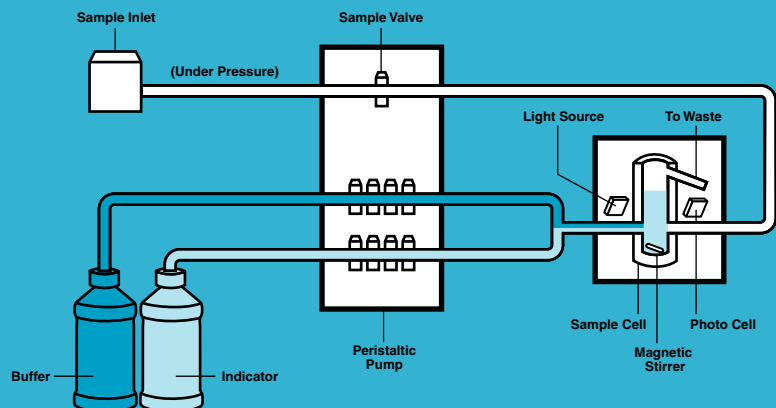
For further flexibility in data output, the CL17 is also available in an AquaTrend Network-ready configuration. (See How To Order for details.)

The linear peristaltic pump precisely controls the volume of incoming samples and reagents. The first sample is used to establish a zero reference point by measuring blank absorbance – compensating for the sample's color intensity and turbidity before the chlorine measurement is taken. Indicator and buffer reagents are added, a magnetic stirrer mixes the solution, and color development takes place. A compact colorimeter measures the light transmitted through the sample and compares the resulting color intensity to a reference standard.

The sample cell is then flushed with new sample, allowing the cycle to repeat itself every 2.5 minutes. An LED alarm can signal an out-of-limit sample concentration. The CL17's output can also be used to trigger external chlorine feed pumps, which automatically adjust chlorine injected into the system.

Method of analysis

The CL17 Chlorine Analyzer uses an aqueous buffered colorimetric indicator – N,N-diethyl-*p*-phenylenediamine (DPD) – to determine levels of chlorine. DPD turns a magenta color in response to the amount of free residual chlorine (as hypochlorous acid or hypochlorite ion). This reaction takes place at a buffered pH of 6.3 to 6.6. By simply changing reagents, the CL17 also measures *total* residual chlorine (free residual chlorine plus mono-, di- and trichloramines). This is done by adding potassium iodide to the sample – chloramines in the sample oxidize iodide to iodine, which then oxidizes the DPD indicator to the magenta color at a buffered pH of 5.1.



CL 17 Chlorine Analyzer Specifications*

Range

0 to 5 mg/L free or total residual chlorine

Accuracy

±5% or ±0.035 mg/L as Cl₂, whichever is greater

Precision

±5% or 0.005 mg/L as Cl₂, whichever is greater

Minimum Detection Limit

0.035 mg/L

Cycle time

One complete sample analysis every 2-1/2 minutes

Sample Conditioning

Inlet Pressure

1 to 75 psig

Sample Flow Required

200 mL per minute minimum flow rate required

Sample Temperature Range

5°C to 40°C

Operating Temperature

5°C to 40°C

Operating Maximum Humidity

90% at 40°C

Interferences

Other oxidizing agents such as bromide, chlorine dioxide, permanganate and ozone will cause a positive interference. Hexavalent chromium will cause a positive interference: 1 mg/L Cr6+ = approximately 0.02 mg/L as Cl₂

Hardness must not exceed 1,000 mg/L as CaCO₃

Recorder Outputs

One 4-20mA with an output span programmable over any portion of the 0 to 5 mg/L range
130 V isolation from earth ground

Alarms

Two alarms selectable for sample concentration alarm, analyzer system warning or analyzer system shut-down alarm; each is equipped with an SPDT relay with contacts rated for 5A resistive load at 230 VAC

Optional External Outputs

AquaTrend Network interface

Power

100-115/230 VAC 50/60 Hz (switch selectable), 90 VA maximum

Sample Inlet Connection

1/4-inch OD tube, quick-disconnect fitting

Drain Connection

1/2-inch ID flexible hose

Air Purge (optional)

1/4-inch OD tube, quick-disconnect fitting, 0.1 cfm instrument quality air at 20 psig maximum

Certification

CE approved

ETL listed to UL 1262

ETL certified to CSA 22.2 No. 142

Enclosure

ABS plastic, IP62 enclosure rating with two clear polycarbonate windows

Dimensions

Approximately 16.5" tall, 12.5" wide, 7" deep

Mounting

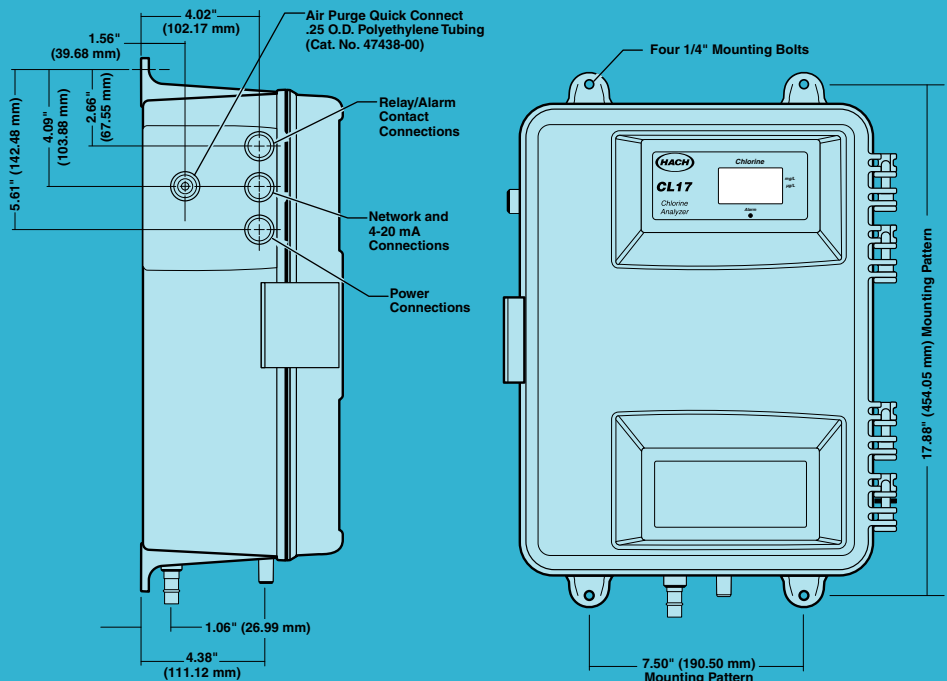
Wall mount

Shipping Weight

25 lbs. (11.3 kg)

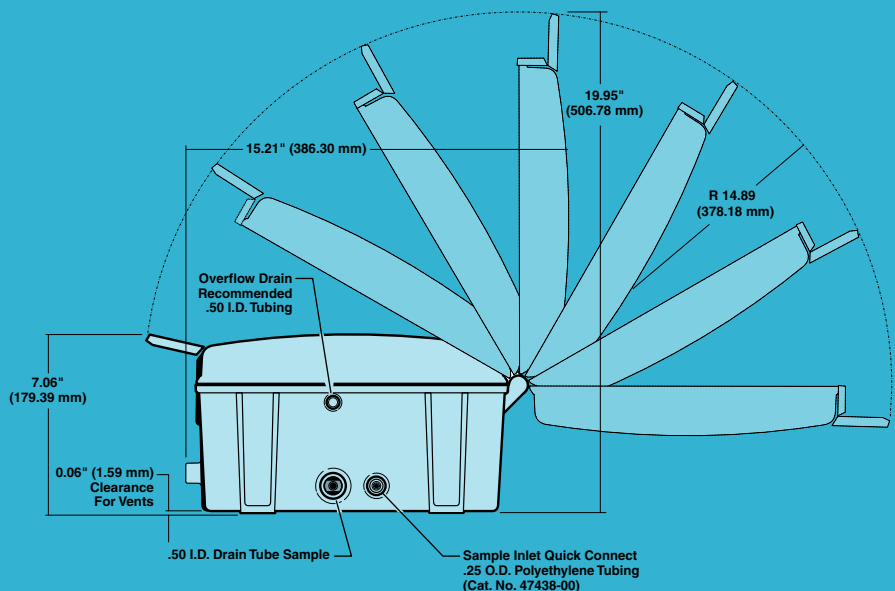
Installation

The CL17 is designed to be wall-mounted in minutes with four 1/4-inch screws. Adequate clearance must be left at the sides and bottom of the case for plumbing and electrical connections. The sample inlet connection is 1/4-inch quick-disconnect fitting and the drain connection is 1/2-inch I.D. flexible hose. Electrical connections are inside the instrument case. Holes for three 1/2-inch conduit fittings are provided.



SIDE VIEW

FRONT VIEW



BOTTOM VIEW

*Subject to change without notice.

How to Order

Hach CL17 Chlorine Analyzers are shipped with a one-month supply of reagents, spare pump tubing, a wall mounting kit and manual. The power cord is ordered separately.

Call Hach today to order the CL17 Chlorine Analyzer for your application.

Catalog #	CL17 Analyzer Model
54400-01	Model CL17 Free Residual Chlorine Analyzer
54400-02	Model CL17 Total Residual Chlorine Analyzer
54400-03	Model CL17 Free Residual Chlorine Analyzer with AquaTrend Network Capability
54400-04	Model CL17 Total Residual Chlorine Analyzer with AquaTrend Network Capability
Accessory	
46964-00	Power Cord, 125V, 10A, 1.83 m (6')
47439-00	Power Cord, 230V, 10A, 1.83 m (6') Continental European plug
54443-00	Maintenance Kit* (1 year)
54443-01	Maintenance Kit with pre-assembled tubing* (1 year)

46436-00	Flow Meter with 1/4-inch OD tubing
44278-00	Serial I/O Kit (optional)

Additional Reagents

One unit each of three reagents (DPD indicator powder**, indicator and buffer solutions) is sufficient for 30 days of operation. Reagent sets include all three of the required reagents, sufficient for a 30-day operating period.

Catalog #	Reagent
25569-00	Reagent Set, Chlorine Free CL17
25570-00	Reagent Set, Chlorine Total CL17
22972-55	DPD Indicator Powder (free and total)
23140-11	Free Chlorine Indicator Solution, 473 mL
23141-11	Free Chlorine Buffer Solution, 473 mL
22634-11	Total Chlorine Indicator Solution, 473 mL
22635-11	Total Chlorine Buffer Solution, 473 mL

* Kit includes tubing, caps, funnel and fittings.

**DPD indicator powder is added to indicator solution.



For current price information, technical support and ordering assistance, contact the Hach office or distributor serving your area.

Hach Company is ISO 9001 Certified

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Typical Proposal Specification

The chlorine analyzer shall employ a DPD colorimetric method of measurement using DPD indicator and a buffer solution and be capable of measuring free or total residual chlorine by changing the indicator and buffer solutions. A measurement shall be taken every 2.5 minutes and results displayed by a three digit LCD readout in the range of 0 to 5 mg/L. The analyzer shall be designed for 30-days unattended operation and use only 473 mL of each reagent per month.

Operating with an LED light source with a peak wavelength of 510 nm, the instrument shall be constructed to measure a sample blank before each sample measurement to provide automatic zero reference to compensate for sample color and turbidity and changes in light intensity due to voltage fluctuations or light source aging. The instrument shall provide a minimum detection limit of 0.035 mg/L or better, precision better than $\pm 5\%$ or 0.005 mg/L as Cl_2 , accuracy better than $\pm 5\%$ or 0.035 mg/L as Cl_2 .

The analyzer shall be microprocessor-controlled and provide a 4-20 mA recorder output as well as 2 alarms. Each alarm is user-selectable for sample concentration alarms (high or low), analyzer system warnings, or analyzer system shut-down alarms. The sample concentration alarms shall be fully adjustable through the entire range. The system warning shall activate for minor variations in analyzer performance. A system alarm shall activate for major variations in analyzer performance and it shall shut down the analyzer until corrective action is taken. The microprocessor also shall provide self-diagnostic functions accessible through an alphanumeric, menu-driven keyboard. Two SPDT normally open/normally closed dry contact relays rated at 5A resistive load at 230 VAC shall be provided.

Recorder outputs shall be a 4-20 mA. Recorder span minimum and maximum values shall be operator programmable at the menu-driven keypad over the entire operating range.

The chlorine analyzer shall be housed in an IP-62 rated, ABS plastic enclosure which is designed for wall mounting. The enclosure shall have two clear polycarbonate windows for viewing the measurement readout and reagent levels. Power requirements shall be 100-115/230 VAC, 50/60 Hz, switch selectable, 90 VA maximum.