

# CL17 Chlorine Analyzer

Chlorine

## Features and Benefits

### Reliable and Economical Chlorine Analysis

The Hach CL17 Chlorine Analyzer uses colorimetric DPD chemistry to monitor water continuously for free or total residual chlorine. The CL17 is a simple, dependable and economical alternative to instruments that rely on electrodes or complex procedures. The CL17 analysis method is not affected by changes in chlorine concentration, sample pH, temperature, flow or pressure, thus offering more accuracy than other methods in the market today.

### Manual or Automatic Feed Pump Control

Both an alarm for manual chlorine feed control and a 4-20 mA output for automatic control of chlorine feed pumps is available in the CL17 Analyzer. When set for manual control, the instrument notifies the operator of out-of-limit chlorine levels for manual intervention in the disinfection process as needed. For automatic control of chlorine feed pumps, the CL17 can use one of two methods:

1. **On-Off Control** turns the feed pumps on when chlorine levels fall too low for disinfection and off when levels rise above a pre-set limit.
2. **Proportional Control** adjusts the amount of chlorine in proportion to the strength of the CL17's output signal.

### Simple Maintenance

Routine maintenance can typically be performed in 15 minutes per month because the sample cell and reaction chamber are easy to clean and the case provides quick access. (Difficult samples may require more frequent cleaning.) The CL17 is also equipped with self-testing diagnostics.

### Method of Analysis

**Free Residual Chlorine**—The CL17 Chlorine Analyzer uses an aqueous buffered colorimetric indicator—N,N-diethylphenylenediamine (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). The reaction takes place at a buffered pH of 6.3 to 6.6.

**Total Residual Chlorine**—To measure total residual chlorine (free residual chlorine plus mono-, di- and trichloramines) an additional reagent is used. 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.



*The Hach CL17 Chlorine Analyzer uses fast, reliable, and economical DPD chemistry for up to 30 days of unattended operation. No electrodes and minimal use of reagents means low operating costs.*

DW

WW

PW

IW

### Applications

**Drinking Water**—The CL17 Chlorine Analyzer can be used in finished water where residual chlorine levels must be maintained during distribution. It can also be used to monitor raw water to facilitate preoxidation, disinfection, and control of taste and odor problems.

**Wastewater**—Large tubing and fittings and a Self-Cleaning By-Pass Y-Strainer Kit for the CL17 ensures continuous operation without clogging.

**Industrial**—The CL17 can be used to monitor disinfection and prevent biological build-up in applications that involve chemical or industrial processes (feed water), heating and cooling water, or food and beverage applications. It is also useful in systems that use reverse osmosis, to protect expensive cellulose acetate membranes.

DW = drinking water WW = wastewater municipal PW = pure water / power  
IW = industrial water E = environmental C = collections FB = food and beverage



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## Specifications\*

### Range

0 to 5 mg/L free or total residual chlorine

### Accuracy

$\pm 5\%$  or  $\pm 0.035$  mg/L as  $\text{Cl}_2$ , whichever is greater

### Precision

$\pm 5\%$  or 0.005 mg/L as  $\text{Cl}_2$ , whichever is greater

### Minimum Detection Limit

0.035 mg/L

### Cycle Time

2.5 minutes

### Inlet Pressure to Instrument

1 to 5 psig (1.5 psig is optimum)

### Inlet Pressure to Sample Conditioning

1.5 to 75 psig

### Air Purge (optional)

0.1 cfm instrument quality air at 20 psig maximum

### Sample Flow

200 to 500 mL per minute minimum required

### Sample Temperature

5 to 40°C (41 to 104°F)

### Operating Temperature

5 to 40°C (41 to 104°F)

### Operating Humidity

90% at 40°C (90% at 104°F) maximum

### 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  $\text{Cr}^{6+}$  = approximately 0.02 mg/L as  $\text{Cl}_2$ .

Hardness must not exceed 1,000 mg/L as  $\text{CaCO}_3$ .

### Recorder Outputs

One 4–20 mA with an output span programmable over any portion of the 0 to 5 mg/L range, 130 V isolation from earth ground, 500 ohm maximum

One isolated recorder output, 4–20 mA (can be adjusted to 0–20 mA), recommended load impedance 3.6 to 500 ohms. Optional AquaTrend® Network interface

### Alarm Relay Outputs

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.

### Sample Inlet Connection

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

### Drain Connection

1/2-inch ID flexible hose, hose barb

### 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, two clear polycarbonate windows, IP62-rated with the gasketed door latched

### Mounting

Wall mount

### Display

LCD, 3-digit measurement readout and six-character alphanumeric scrolling text line

### Light Source

Class 1 LED (light emitting diode) with a peak wavelength of 520 nm; 50,000 hours estimated minimum life

### Power

100 to 115/230 Vac, 50/60 Hz (switch selectable), 95 VA maximum, 2.5 Amp fuse

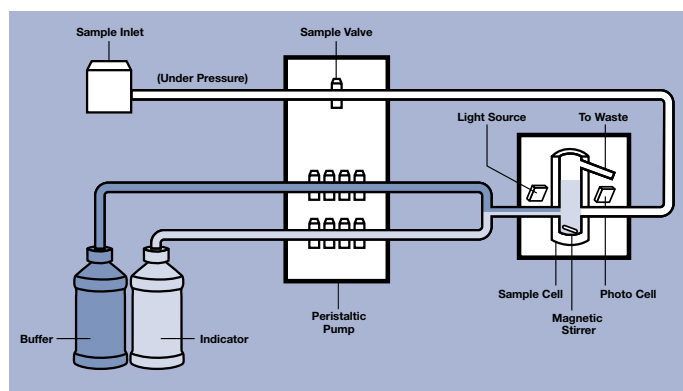
### Dimensions

34.3 x 41.9 x 19.1 cm  
(13.5 x 16.5 x 7.5 in.)

### Shipping Weight

11.3 kg (25 lbs.)

\*Specifications subject to change without notice.



## Principle of Operation

The CL17 Chlorine Analyzer has three operating components:

- A linear peristaltic pump to precisely control the volume of incoming samples and reagents.
- A colorimeter with seal-free, solid-state mixing system that includes a self-cleaning stir bar.
- One-month supply of reagents (indicator and buffer)

A zero reference point is established with the first sample in the cycle by measuring blank absorbance. (This compensates for the sample's color intensity and turbidity before the chlorine measurement is made.) Then, indicator and buffer reagents are added to the sample while a magnetic stirrer mixes the solution and the sample changes color. A compact colorimeter then measures the light transmitted through the sample. The measured color intensity is compared to a reference standard. Finally, the sample cell is flushed with new sample so that the cycle can repeat itself every 2.5 minutes.

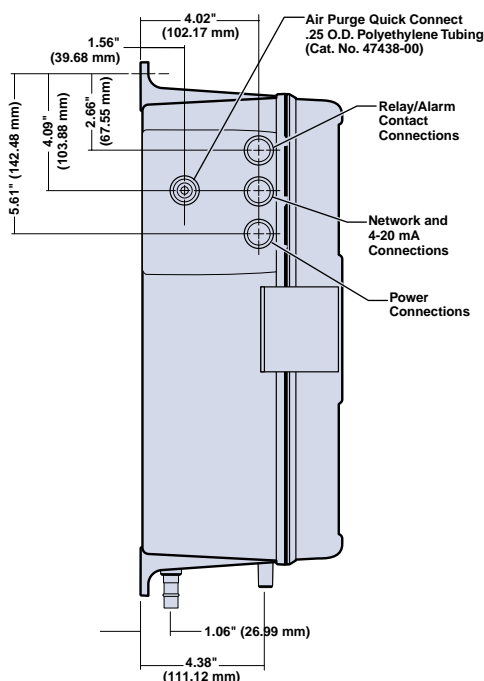
## Engineering Specifications

1. The chlorine analyzer shall employ a DPD colorimetric method of measurement using DPD indicator and a buffer solution.
2. The analyzer shall be capable of measuring free or total residual chlorine by changing the indicator and buffer solutions.
3. 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.
4. The analyzer shall be designed for 30-days unattended operation and use only 473 mL of each reagent per month.
5. The analyzer shall operate with an LED light source with a peak wavelength of 510 nm.
6. The instrument shall 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.
7. 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  $\text{Cl}_2$ , and accuracy better than  $\pm 5\%$  or 0.035 mg/L as  $\text{Cl}_2$ .
8. The analyzer shall be microprocessor-controlled and provide a 4-20 mA recorder output as well as 2 alarms.
9. Each alarm shall be user-selectable for sample concentration alarms (high or low), analyzer system warnings, or analyzer system shut-down alarms.
10. The sample concentration alarms shall be fully adjustable through the entire range.
11. The system warning shall activate for minor variations in analyzer performance.
12. A system alarm shall activate for major variations in analyzer performance and it shall shut down the analyzer until corrective action is taken.
13. The microprocessor shall provide self-diagnostic functions accessible through an alphanumeric, menu-driven keyboard.
14. Two SPDT normally open/normally closed dry contact relays rated at 5A resistive load at 230 Vac shall be provided.
15. Recorder outputs shall be a 4-20 mA.

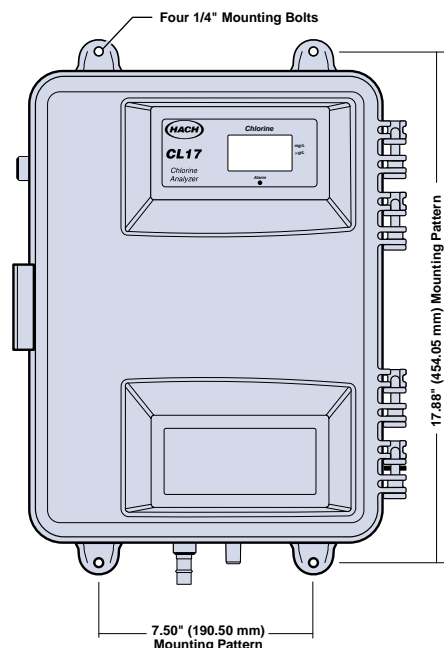
## Dimensions

The CL17 is designed to be wall-mounted 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.

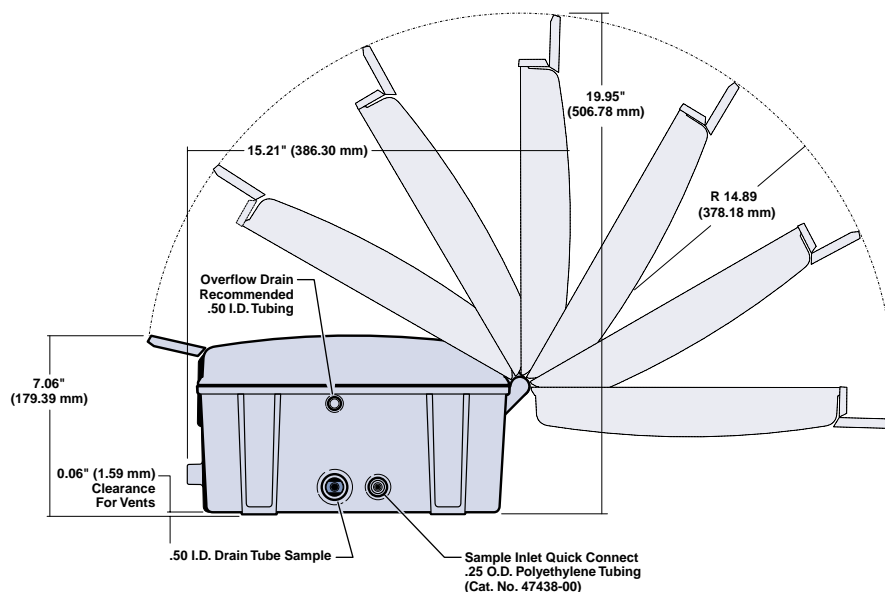
**SIDE VIEW**



**FRONT VIEW**



**BOTTOM VIEW**



16. Recorder span minimum and maximum values shall be operator programmable at the menu-driven keypad over the entire operating range.
17. The chlorine analyzer shall be housed in an IP-62 rated, ABS plastic enclosure designed for wall mounting.
18. The enclosure shall have two clear polycarbonate windows for viewing the measurement readout and reagent levels.
19. Power requirements shall be 100-115/230 Vac, 50/60 Hz, switch selectable, 95 VA maximum.
20. The instrument shall be the Model CL17 Chlorine Analyzer, manufactured by Hach Company.

## Ordering Information

Hach CL17 Chlorine Analyzers are shipped with a one-month supply of reagents, maintenance kit, installation kit, and manual. (The power cord is ordered separately.)

- 5440001** Model CL17 Free Residual Chlorine Analyzer
- 5440002** Model CL17 Total Residual Chlorine Analyzer
- 5440003** Model CL17 Free Residual Chlorine Analyzer with AquaTrend® Network Capability
- 5440004** Model CL17 Total Residual Chlorine Analyzer with AquaTrend® Network Capability

## Accessories

- 5448800** Power Cord, 125V, 10A, 1.83 m (6 ft.)
- 5448900** Power Cord, 230V, 10A, 1.83 m (6 ft.), continental European plug
- 5444300** Maintenance Kit, 1 year, includes tubing, caps, funnel, and fittings
- 5444301** Maintenance Kit with preassembled tubing, 1 year, includes tubing, caps, funnel, and fittings
- 4643600** Flow Meter with 1/4-inch OD tubing
- 4427800** Serial I/O Kit
- 5449000** CL17 CAL/Verification Kit

## Reagents

Reagent sets include all three of the required reagents [DPD indicator powder (added to indicator solution), indicator and buffer solutions] is sufficient for a 30-day operating period.

- 2556900** Reagent Set, CL17 free chlorine
- 2557000** Reagent Set, CL17 total chlorine
- 2297255** DPD Indicator Powder (free and total)
- 2314011** Free Chlorine Indicator Solution, 473 mL
- 2314111** Free Chlorine Buffer Solution, 473 mL
- 2263411** Total Chlorine Indicator Solution, 473 mL
- 2263511** Total Chlorine Buffer Solution, 473 mL
- 2835900** Calibration Refill Kit

*At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...*

*Keep it pure.*

*Make it simple.*

*Be right.*

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