

# SP 510 Hardness Monitor

## Features and Benefits

### Continuous Hardness Detection

The Hach SP 510 Hardness Monitor continuously monitors water systems to provide an alarm when total hardness exceeds a pre-set limit (eight alarms are available). By performing an analysis every two minutes, the SP 510 monitor can establish an automatic or semi-automatic system for water softener regeneration in a variety of commercial or industrial applications.

### Simple to Read and Use

The SP 510 monitor detects hardness breakthrough when the capacity of a water softener is exhausted, immediately signaling the need for regeneration. Alarm points are 0.3, 1, 2, 5, 10, 20, 50, and 100 ppm (expressed as mg/L of CaCO<sub>3</sub>) and are selected by using the appropriate model. LED indicators show a simple “HARD” or “SOFT” sample status. Use the monitor’s built-in alarm relay to actuate an external annunciator.

### Rugged Construction

The case of the SP 510 monitor is made of ABS plastic which is lightweight, corrosion-resistant, and shatterproof. This sealed case is IP62-rated and has a hinged door that for easy access to internal components. All electronic circuits are isolated from the hydraulics compartment. A large window allows inspection of both LED indicators and reagent supplies at a glance. Wall-mounting is easy with built-in brackets. The instrument is rated for 115/220 Vac, 50/60 Hz operation, with a switch for voltage selection.

### Making Water Softening Systems Cost-efficient

The traditional method of determining softener regeneration cycles is based on calculation of the water volume that can pass through a softener before its capacity is exhausted. Many variables—temperature, flow rate, and condition of the exchange resin—can affect the accuracy of these calculations. A substantial safety margin is also generally included, which can result in waste of time and brine used for regeneration. The Hach SP 510 monitor can eliminate this guesswork. The softener is regenerated only when needed, based on accurate chemical analysis rather than estimated volume.

### Low Maintenance Requirements

The SP 510 monitor is designed for continuous, unattended use. It is virtually maintenance-free, requiring only about 15 minutes every two months to replenish and standardize the reagents. Tubing in the pump system should be replaced at six-month intervals. Spare pump tubing is supplied with the monitor.



*The Hach SP 510 Hardness Monitor is reliable, accurate, and virtually maintenance free. It can operate unattended for two months and still promptly and immediately signal hardness breakthrough to activate regeneration. Use it to make water softening systems more efficient and less costly.*

DW

WW

PW

IW

### Method of Analysis

The Hach SP 510 Hardness monitor uses an aqueous buffered colorimetric indicator to detect total hardness. Color is developed by addition and mixing of a sample, indicator reagent, and buffer in precise proportions.

A blue color indicates soft water and creates low light transmittance; a red color indicates hard water and creates high light transmittance. The colorimeter assembly measures the transmitted light and differentiates between the colors. When the measured light is 50% or more of the pre-set level, alarm circuits are activated.

DW = drinking water  
IW = industrial water

WW = wastewater municipal  
E = environmental

PW = pure water / power

C = collections FB = food and beverage



Industrial Water Solutions

## Specifications\*

### Range

Hardness levels: 0.3, 1, 2, 5, 10, 20, 50, 100 ppm (expressed as mg/L CaCO<sub>3</sub>)

### Accuracy

±25% of set point value

### Repeatability

±10% of set point value in 0.3 to 2 mg/L ranges

±4% of set point value in 5 to 100 mg/L ranges

### Operating Humidity Range

5 to 95%, noncondensing

### Storage Temperature

-40 to 60°C (-40 to 140°F)

### Sample Inlet Pressure to Instrument

1 to 5 psig, 1.5 psig is optimum

### Analysis Method

Colorimetric

### Light Source

LED with peak wavelength of 610 nm

### Cycle Time

1.9 minutes (60 Hz) or 2.3 minutes (50 Hz), selectable

### Sample Flow Rate

50 to 500 mL/min (1.8 to 18.0 oz/min) flow rate required

### Sample Conditioning Inlet Pressure

1.5 to 75 psig

### Operating Temperature

5 to 40°C (32 to 104°F)

### Inlet Fitting

1/4-in. OD tube quick-disconnect fitting

### Outlet Fitting

1/2-in. ID flexible hose

### Reagent Use

500 mL each indicator and buffer every 2 months

### Output

1 SPDT relay for external annunciator or automatic water softener shutoff/regeneration cycle (rated 5 amp resistive at 115 Vac)

### Alarm Delay

2 consecutive cycles above set point activate alarm

1 cycle below set point cancels alarm

### Alarm Type

LED indicators, HARD or SOFT

### Enclosure

ABS plastic, IP62 enclosure rating, wall-mountable (brackets included), large plastic windows to view alarm and reagents levels

### Power

115/220 Vac, 50/60 Hz, selectable, 18 W

### Service

Standardize and replenish reagents every 2 months using EDTA or high-level sample

Replace pump tubes every 6 months

### Certification

NRTL certified to UL and CSA standards, and CE approved

### Dimensions

Approximately 41.9 x 31.8 x 17.8 cm (16.5 x 12.5 x 7 in.)

### Weight

11.3 kg (25 lb.)

\*Specifications subject to change without notice.

## Principle of Operation

The Hach SP 510 Hardness Monitor consists of five main components—a linear peristaltic pump, an electronic control panel, a colorimeter with a solid-state mixing system, a two month supply of Hach reagents, and a corrosion-resistant case.

- A linear peristaltic pump/valve module is the heart of the SP 510 monitor. This module precisely controls flow of the incoming sample, meters reagents and sample, and injects them into the sample cell.
- Following injection, a magnetic stirrer mixes the sample and reagents in the cell, causing color development to take place.
- Light transmittance through the sample is then measured photometrically.
- A new sample is introduced and an analysis performed every two minutes. A hard water condition is indicated by the "HARD" LED display. Two consecutive "HARD" readings are required (over a span of approximately four minutes) before the alarm circuit is activated—eliminating alarms caused by momentary fluctuations. One "SOFT" indication is required before an alarm is canceled.
- A SPDT relay in the instrument can be configured to trigger remote alarms or drive regeneration controls.

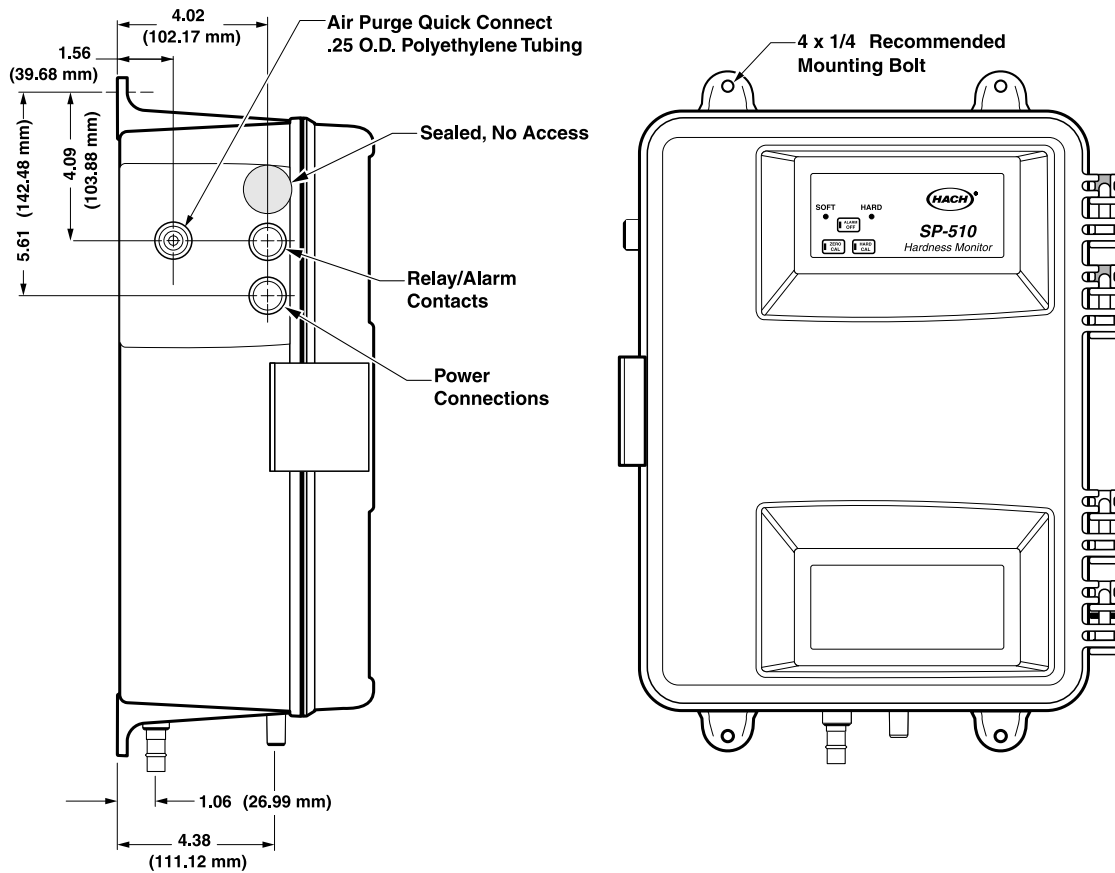
## Engineering Specifications

- The hardness monitor shall provide an alarm when total hardness in a water sample exceeds a preset limit.
- The monitor shall use a buffered wet chemical colorimetric indicator to detect total hardness.
- A light-emitting diode (LED) with a peak wavelength of 610 nm shall be provided as a light source.
- A solid state mixer shall be provided to enhance sample color development.
- The monitor shall have models available with alarm limits at 0.3, 1, 2, 5, 10, 20, 50, or 100 mg/L total hardness as CaCO<sub>3</sub>.
- "Hard" and "Soft" status shall be indicated by two LEDs.
- The monitor shall require that two consecutive cycles exceed the alarm trip point to activate an alarm.
- One SPDT relay, rated at 5 A resistive at 115 Vac shall be provided.
- An ABS plastic enclosure (IP62 enclosure rating) shall allow for wall mounting and provide plastic windows to view reagent levels and alarm status.
- The monitor shall analyze a new sample every 1.9 minutes at 60 Hz or 2.3 minutes at 50 Hz.
- The monitor shall use a two point calibration to determine alarm trip point.
- The reagent supply shall last a minimum of sixty days.
- The monitor shall be designed to meet UL 3101-1, CSA C22.2 No. 1010.1 and EN61010-1 safety standards.
- Power requirement shall be selectable between 115 Vac at 60 Hz and 220 Vac at 50 Hz.
- The analyzer shall be the SP 510 Hardness Monitor manufactured by Hach Company.

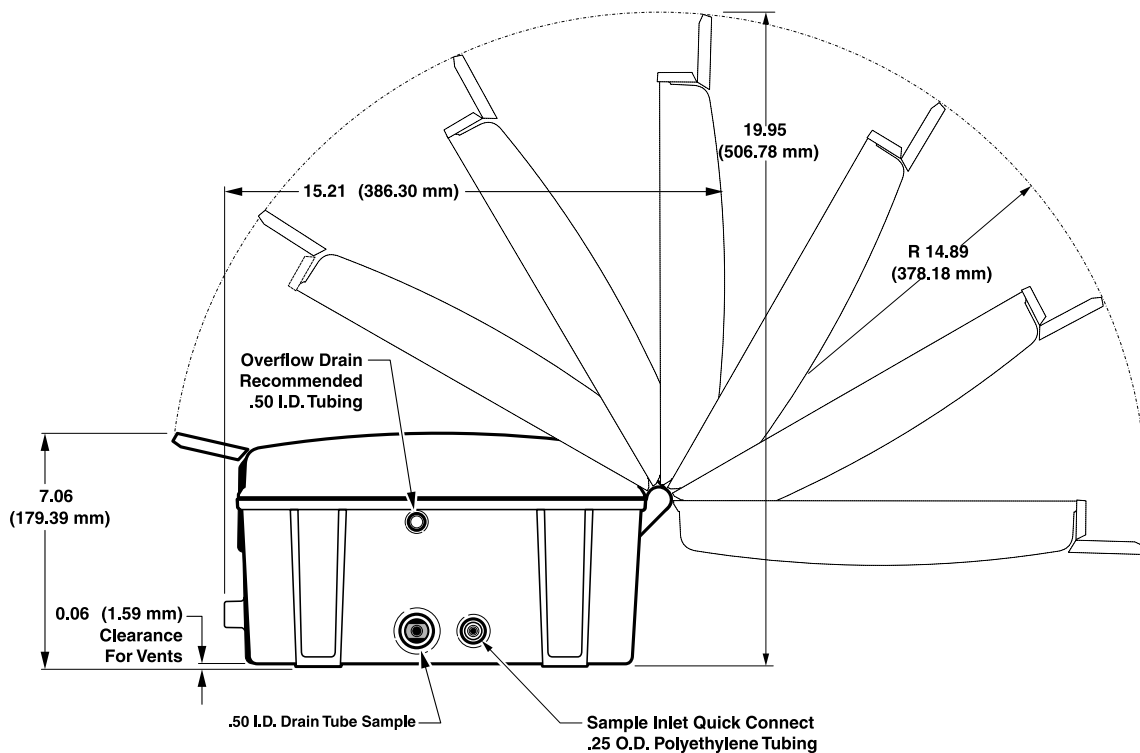
## Dimensions

The Hach SP 510 Hardness Monitor 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 flexible hose. Electrical connections are made inside the instrument case. Holes for two 1/2-inch conduit fittings are provided.

### Side and Front



### Bottom and Clearance



## Ordering Information

The Hach SP 510 Hardness Monitor includes: installation kit, maintenance kit (stirring bar, strainer, spare tube assemblies, shut-off valve) and two-month supply of reagents.

*NOTE: When choosing the appropriate model/trip point, the alarm trip point selected should be 40 to 50% higher than the normal effluent hardness. Call Hach Company for assistance in ordering the SP 510 Hardness Monitor that is appropriate for the application.*

### Instrument

<b>5410003</b>	SP 510 Hardness Monitor with 0.3 mg/L Trip Point
<b>5410001</b>	SP 510 Hardness Monitor with 1 mg/L Trip Point
<b>5410002</b>	SP 510 Hardness Monitor with 2 mg/L Trip Point
<b>5410005</b>	SP 510 Hardness Monitor with 5 mg/L Trip Point
<b>5410010</b>	SP 510 Hardness Monitor with 10 mg/L Trip Point
<b>5410020</b>	SP 510 Hardness Monitor with 20 mg/L Trip Point
<b>5410050</b>	SP 510 Hardness Monitor with 50 mg/L Trip Point
<b>5410099</b>	SP 510 Hardness Monitor with 100 mg/L Trip Point

### Accessories

<b>4630600</b>	Power Cord, 115 Vac
<b>4630800</b>	Power Cord, 220 Vac

### Buffer and Indicator Reagents

Buffer and Indicator are sold separately. All orders are for 2-month supply.

<u>Buffer</u>	<u>Indicator</u>	<u>Range</u>
<b>2768549</b>	<b>2794649</b>	0.3 mg/L
<b>2768549</b>	<b>2769049</b>	1 mg/L
<b>2768549</b>	<b>2769149</b>	2 mg/L
<b>2768549</b>	<b>2769249</b>	5 mg/L
<b>2768649</b>	<b>2769249</b>	10 mg/L
<b>2768749</b>	<b>2769249</b>	20 mg/L
<b>2768849</b>	<b>2769249</b>	50 mg/L
<b>2768949</b>	<b>2769249</b>	100 mg/L

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.



Industrial Water Solutions

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