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FOR PROCESS
LIQUID ANALYSIS

ECDTech

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FAQ's

What is the portable PHA351? Analyzer or Calibrator? ……. Both

ECD's portable products are both an analyzer and calibrators They are a simple convenient way to obtain fast, accurate pH, ORP or conductivity measurements. They provide a mV output signal for fast field analysis of samples, calibration verification, or trouble-shooting of installed sensors.

Features and Benefits

- Large LCD display read-out
- Easy visual data analysis
- pH analyzer includes manual/ auto temperature control
- Adjustable temperature compensation for field measurements
- pH analyzer includes a built-in "standardize" control feature
- Provides compensation for natural asymmetry shifts in pH or ORP electrodes

Also for Conductivity CA351

- Conductivity analyzer includes temperature control feature
- Adjustable temperature compensation for field measurements
- Choice of three different kit package configurations

New Release - *Triton* DO8

Optical Dissolved Oxygen Sensor

With a state-of-the-art fluorescence sensing element, the breakthrough Triton DO8 Dissolved Oxygen Sensor from Electro-Chemical Devices (ECD) delivers exceptionally accurate DO measurement with greatly reduced maintenance requirements for a low cost of ownership over a long service life in a wide range of municipal and industrial water treatment applications.

The trouble-free Triton DO8 Sensor is designed with precision fluorescence quenching (FQ) optical technology coupled with intelligent microprocessor-based electronics. The self-monitoring DO8 stores calibration data within the sensor, which minimizes maintenance over long service intervals while providing stable, dependable DO measurement.

The highly accurate Triton DO8 Sensor features a maximum error rate of less than 2 percent, repeatability of ±0.5 percent and resolution of 0.01 ppm or 0.01 percent saturation. It operates over a wide measurement range with three different outputs from 0 to 20 mg/l (0-20 ppm), 0-200 percent saturation or 0-500 hPa (0-6 psi).

Developed for rugged municipal and industrial water treatment environments, the Triton DO8 Sensor is designed to withstand ambient temperatures from -20 to 60°C (0-140°F) and records measurements at temperatures from -5 to 50°C (20-120°F). It withstands pressures up to a maximum of 10 bar (145 psi).

The Triton DO8 Sensor relies on a proven FQ method to determine the oxygen concentration in water. A circular layer of optically-active, oxygen-sensitive molecules is integrated into an easily replaceable cap. This durable layer is highly permeable to oxygen and rapidly equilibrates to its surroundings. The cap aligns the optically-active fluorescence layer above two optical components inside the sensor—an emitter and a detector.

The sensor's emitter flashes a green light at the layer and the layer fluoresces back a red light. The duration and intensity of the fluorescence are directly dependent on the amount of oxygen in the layer. With little to no oxygen in the layer, the response is longer and more intense. The presence of more oxygen, however, quenches (reduces) the fluorescence effect.

The Triton DO8 Sensor continuously analyzes the oxygen level and water temperature with an air pressure input setting to calculate dissolved oxygen values. Via digital communications, the DO8 sends DO data to ECD's C-22 Controller, which provides a 4-20mA output signal to a water treatment plant's control room. The RS-485 digital signal is nearly immune to common EMI/RFI noise that is typically a problem in many plant environments.

Unlike many amperometric sensors, the Triton DO8 has no membranes to replace, no electrolytes to refill and no anode/cathode assemblies to service or replace. The only service required is the simple replacement of the DO8's sensor cap, which lasts two years or longer, and the occasional wiping of the sensor head.

ELECTRO-CHEMICAL DEVICES
www.ecdi.com

ECD Application - Measuring Water Hardness

History - The term 'hardness' , as descriptive of water, has its origins in folk terminology relating to the amount of soap required to produce suds. The 'harder' the water, the greater the amount of effort (and soap) required to obtain suds. Soap suds were used as a measure of cleaning ability; no suds meant add soap and elbow grease!

Background Data - We now know that hardness is caused by the presence of Calcium and Magnesium, usually in either the carbonate (CaC03 or MgC03) or bicarbonate (Ca(HC03)2 or Mg(HC03)2) form. In addition to the original detergent-related problems, water hardness is known to be a major source of scale (lime deposits) in heat exchange equipment, boilers and pipelines. Hardness also adversely affects processes such as dyeing, distillation and rinsing.

Natural Sources of Hardness - Aqueous calcium and magnesium carbonates are usually formed when slightly acidic rain, formed by the dissolution of atmospheric carbon dioxide (C02) into the rainwater, comes in contact with limestone and magnesium bearing deposits. This is why rainwater (which has not come into contact with calcium and magnesium sources) is usually much "softer" (i.e. less hard) than well water. Unique local conditions affect both the total and relative amounts of calcium and magnesium. In general, the ratio of dissolved calcium to magnesium is 3:1. Therefore, measuring the amount of one allows for the inferential determination of the second. It is typically the CaC03 that is measured. The unit of measurement is either milligrams per liter (mg/L) or parts per million (ppm). In most cases, concentrations in the

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range of 0.1 to 10 ppm are encountered. The usual *unit of common measurement and discussion is as equivalent ppm or* mgll CaC03.

Sodium Zeolite Softening - The most common method of Ca/Mg removal is via the sodium zeolite softening method. The term zeolite is applied to insoluble, solid materials which have the property of exchanging various ions with which they come into contact. In most cases this material is in the form of small resin beads which, collectively, are called a resin 'bed". When water containing the Ca and Mg compounds is passed through the bed, sodium (Na+) ions (attached to the resin beads) replace both the calcium (Ca++) and magnesium (Mg++) ions.

Hot & Cold Lime-Soda Softening - Another softening method is a process in which Ca and Mg are chemically precipitated and removed through the use of calcium hydroxide (Ca(OH)2) and sodium carbonate (NaC03). Insoluble products are removed by sedimentation and filtration. Although *ECD* Hardness equipment will work in this softening processes, the high temperatures (>100 degrees C) frequently used in this method can be a problem for the Ca electrode. This is no *problem, of course, for an ECD Conductivity* measurement!

What *ECD* Measures and Why - Since magnesium salts are more soluble than those of calcium, there are more Mg++ ions available for replacement by the Na+ attached to the resin. As the resin bed deteriorates (sodium is 'consumed' or replaced by Ca++/Mg++), a gradual increase in Ca will precede the increase in Mg. The *ECD* **Hardness** measurement/control system is used to detect this increase (termed `breakthrough's of Ca'*indicating a need for the* zeolite *bed to be regenerated).* Because the Na-Ca *exchange* does not reduce the alkalinity of the softened water, many times a Hydrogen (H+) zeolite process will be run in parallel. Water from the H+ zeolite process, which has a lower pH from the formation of Carbonic acid (H2C03) can be blended with water from the sodium zeolite to achieve a desired pH.

Existing Measurement Techniques - *"On-Line" Titration is still often used to analyze* **HARDNESS and pH** in water softening systems. These devices require having to isolate a representative sample and condition and protect it from contamination. Continuously using expensive chemical reagents, while requiring large amounts of time for cleaning the sample handling ware is part of the 'cure' of using photometric/colorimetric on-line titration devices. In addition, the sample used (10 -100 mV min) by the titration devices must be "wasted'. Frequent grab-sampling with laboratory determination of hardness is required to maintain calibration of these devices.

The *ECD* Electrode System - The drawbacks associated with using the titration devices make continuous, on-line measurement and control systems *using a unique electrode* system a popular alternative. The specific equipment models ECD recommends for this measurement are as follows:

Typical Instrumentation used:

The transmitter: T23-CA/MA-SP1-UM, the SP1 option for the control relays. Set points are set in "ON-OFF" ppm values.

The sensor: MVS17-T23-CBL-EG-VSS-2005043.VIT Valve retractable calcium ion sensor with p/n 2005043.VIT calcium ion electrode and Viton o-rings.

The electrode to use for those harsh chemical environments

S10/S17 Sensors with 2005066 Electrode

ECD also has the answer for pH in those difficult chemical environments ……

the 2005066 electrode.

The ECD S10/S17 sensor design has been field proven in harsh chemical applications. This chemically resistant electrode has a two tine PEEK body, double junction reference and slightly radiused pH bulb for strength. The PEEK body is suitable for use in the most aggressive solvents, oxidizing solutions and acids or bases. This electrode is optimized for a harsh chemical environment and is suitable for service up to 130^{o}C. Chemical separations and solvent recovery in the CPI and pharmaceutical industries along with chlorine production and flotation in mining are suggested applications.

Take a look at the S10/S17 product brochure for the ECD six point advantage. This can be downloaded from the ECD website homepage.

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