

# Liquid Analytical Instrumentation for Process Control



**ELECTRO-CHEMICAL DEVICES**

pH

ORP

Turbidity

Specific Ion

Conductivity

Water Analyzers

Dissolved Oxygen

## ***INDUSTRIAL APPLICATIONS***

Petro-Chemical Processing

Biotech & Pharmaceutical

Waste Water Treatment

Chemical Processing

Power Generation

Food & Beverage

Semi-Conductor

Industrial Water

Drinking Water



**Electro-Chemical Devices (ECD)**, not only provides you access to a broad product line of application specific instruments and sensors .... you are also supported by a company with years of successful installations and application experience. This industry knowledge has been incorporated into each instrument and sensor design we manufacture. The following guide is a partial list and provides as an overview to various industrial applications that utilize ECD's products for a solution. Contact ECD and our worldwide sales representatives to solve your measurement requirements.

the liquid  
analytical  
instrument  
experts  
since 1977

## Waste Water Treatment

Application	Measurements	Recommended Products
Incoming Sample	<b>pH, ORP AC10 Spray Cleaner</b>	Biofilm coating - use the AC10 spray cleaner, T80, S80 sensor with 2005145 pH electrode
Primary Clarifier	<b>Turbidity, Ammonium</b>	Turbidity - Triton®TR80 - High Range Ammonium Measurement - HYDRA NH4-N
Biological Treatment (Aeration Basin)	<b>Dissolved Oxygen, pH, Ammonium, Nitrate, Suspended Solids AC10 Spray Cleaner</b>	Dissolved Oxygen - Triton®DO82 with AC10 pH Measurement - T80 with S80 pH Sensor with 2005145 pH electrode Ammonium - Model DS-HYDRA NH4-N Analyzer with AC10, Nitrate - Model DS-HYDRA NO3-N Analyzer Suspended Solids - Triton®TR82, High Range
Secondary Clarifier	<b>Suspended Solids, Nitrate, Phosphate</b>	Activated Sludge Return-Triton®TR82-High Range Effluent from overflow or centrifuge Triton®TR8 Nitrate-HYDRA NO3-N, CA-6 Phosphate
Sludge Thickening	<b>Suspended Solids</b>	Sludge to Digester - Triton®TR82 - High Range Effluent from overflow - Triton®TR8
Sludge Digester	<b>Suspended Solids, pH, ORP</b>	Feed from Sludge Thickening - Triton® TR82, High range pH & ORP Sensors Model S80
Denitrification	<b>Nitrate</b>	Nitrate - Model DS-HYDRA NO3-N Analyzer with AC10
Chlorination and Dechlorination	<b>Free Chlorine, Total Chlorine</b>	FC80 Free Chlorine Analyzer TC80 Total Chlorine Analyzer
Effluent	<b>pH, ORP, Conductivity, Dissolved Oxygen, Turbidity, Colorimetric</b>	pH & ORP Sensors Model S80 with T80 or LQ800 Toroidal Conductivity S80 Sensors with T80 Dissolved Oxygen-Triton®DO82, CA-6 Total Nitrogen, CA-6 Total Phosphorus Turbidity, suspended solids, Triton®TR80

## S80 Series Sensors

Multiple individual measurement parameters in the same mechanical configuration - **pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity**. Features Include: application specific, replaceable electrode cartridges, Various process fittings with adjustable insertion lengths, Industrial housing materials for compatibility with process fluid.



### Petro-Chemical Processing

Application	Measurements	Recommended Products
Sour water/gas	<b>pH</b>	Sulfides poison electrodes - use X80 with S88 and 2005130
Overhead crude	<b>pH</b>	Oil coating and sulfides - use X80 and s88 Sensor and 2005130
Waste Water Treatment	<b>pH, ORP, Turbidity Dissolved Oxygen, pION</b>	Coating and scaling - use X80 and S88 and 2005145, ORP for sulfide removal Turbidity - Triton®TR82 - High Range / Low Range Dissolved Oxygen - Triton®DO82 or S80 Sensor
Cooling Towers	<b>pH, ORP, Conductivity Cooling Tower Control Free Chlorine</b>	Biofilm coating - use AC10 spray cleaner, X80, S80 and 2005145 pH, 2005067 ORP and Toroidal LQ800 for Cooling Tower Controller, FC80 for oxidant control

### Food and Beverage

Application	Measurements	Recommended Products
Concentration Control	<b>Conductivity</b>	For Highly Conductive Solutions use a T80 and a KYNAR toroidal sensor.
Waste Water Treatment	<b>pH, Ammonium Dissolved Oxygen</b>	Oily and Coating use a T80 with an S80 sensor and 2005145 electrode. Triton®DO82 dissolved oxygen, DS-HYDRA NH4-N
CIP Control	<b>pH, Conductivity, Resistivity</b>	Two conductivity measurements on the T80 or LQ800, Toroidal for the wash cycle and resistivity for the rinse cycle.
Food Processing Sanitation, Vegetable or Fruit Rinse Wash Water	<b>Chlorine Dioxide Free Chlorine</b>	Use Model CD80 Chlorine Dioxide Analyzer The CD80 design avoids dirty rinse water from easily fouling or clogging the analyzer or if chlorine is used the FC80 will replace the CD80





## Turbidity and Suspended Solids

The Triton® TR80 (with wiper) and TR82 uses the nephelometric method for determining the turbidity of the sample. This method directs a light beam into the sample where it is scattered by suspended particles. The sensors use a long-lived near-infrared LED source, have self-monitoring diagnostics, and Factory Calibration stored in its memory that assures trouble-free service.

### Electronics and Semi Conductor

Application	Measurements	Recommended Products
Concentration Control	<b>Conductivity</b>	For Highly Conductive Solutions use a T80 and a S80 toroidal sensor
Rinsing	<b>pH, Resistivity</b>	The solutions are getting more dilute use T80 and S80 resistivity, also possible pH neutralizations
Waste Treatment	<b>pH, ORP Dissolved Oxygen pION</b>	Possible Copper Ion, Fluoride Ion measurements, coating issues use a T80, S80 pH, ORP, pIon and dissolved oxygen sensors
De-ionized Water	<b>pH, Resistivity CA6 Colorimetric</b>	Resistivity is the control parameter, use T80 and S80 resistivity, pH is a check, use S80 PH 2005145, CA6 for Silica break through on resin bed
Resin Regeneration	<b>Conductivity Resistivity</b>	Two measurements on the T80, Toroidal on the wash and resistivity on the rinse cycle.

### Metals and Mining

Application	Measurements	Recommended Products
Chrome Reduction	<b>pH, ORP</b>	Easy application, but aggressive. Use T80 with S80 PH sensor with 2005130 electrode.
Cyanide Destruction	<b>pH, ORP</b>	Potential poisoning of the electrode. Use T80 with S80 PH sensor with 2005130 electrode.
Waste Water Treatment for Steel Manufacturing	<b>pH CA6 Colorimetric Analyzer</b>	Oily coatings use a T80 with an S80 sensor and 2005169 electrode. CA6 for monitoring metals content of effluent.
Flotation Separations	<b>pH</b>	Mineral coating, use AC10 spray cleaner and T80 with S80 sensor with 2005169 electrode
Chemical Concentration	<b>Conductivity pION</b>	Highly conductive, use T80 and a S80 KYNAR Torodial sensor
Rinse applications	<b>pH, Conductivity</b>	Wide pH swings, use T80 transmitter S80 PH and 2005145 electrode

## Transmitters and Controllers

ECD manufactures a family of transmitters and controllers for multiple measurement parameters. The T80 Universal Transmitter is single or dual channels with 4 to 20 mA, relays and digital communication. The Model X80 is similar to T80 for use in hazardous locations. The LQ800 controller is up to 8 channels with programmable control functions.



### Pulp and Paper

Application	Measurements	Recommended Products
Liquor Recovery	<b>pH, Conductivity</b>	Caustic and corrosive use T80, Titanium S80, 2005130 and Toroidal Sensor
Head Box (Paper)	<b>pH</b>	The T80 with a S80 PH and 2005145 for variable insertion length and easy cleaning
Filtrate	<b>Turbidity</b>	Monitor cloudy filtrate and white water with high dry content - Triton®TR80 or TR82
Pulp Stock	<b>pH, Conductivity</b>	Aggressive and Coating use T80 and S80 with 2005160 and Toroidal for conductivity

### Chemical Processing

Application	Measurements	Recommended Products
Neutralizations	<b>pH</b>	Typically aggressive - use T80, S80 & 2005169 electrode
Concentration Control	<b>ORP, Conductivity</b>	Highly conductive - use T80 and S80 KYNAR Toroidal
Waste Water Treatment	<b>pH, ORP, Turbidity Dissolved Oxygen Free &amp; Total Chlorine pION</b>	Potential coating problems - use T80 and S80 PH and 2005145 electrode Turbidity - Triton®TR80 or TR82 - High Range / Low Range Dissolved Oxygen - Triton®DO82 or S80 Sensor FC80 Free Chlorine Analyzer TC80 Total Chlorine Analyzer
Gas Scrubbers	<b>pH, ORP, Conductivity</b>	Caustic and corrosive - use T80, S80 and 2005130 pH and 2005067 for ORP.
Cooling Towers	<b>pH, ORP, Conductivity Cooling Tower Control</b>	Biofilm coating - use AC-10 spray cleaner on pH and ORP, T80 with 2 S80s and 2005145 pH, 2005067 ORP electrodes. T80 with S80 Toroidal. Model LQ800 Controller for Cooling Tower



## Sanitizer and Water Analyzers

ECD manufactures several panel mounted analyzers that allow installation and commissioning to be completed in just a few simple steps. For example, the disinfectant/sanitizer line of analyzers includes: the Model FC80 Free Chlorine Analyzer, TC80 Total Chlorine Analyzer, CD80 Chlorine Dioxide Analyzer and DCA-23 Seawater Chlorination/Dechlorination Analyzer.

### Biotech & Pharmaceutical

Application	Measurements	Recommended Products
Product recovery	<b>pH Conductivity</b>	Solvents and high salt concentrations use X80 S80 with 2005169 and Toroidal sensor
Waste Treatment	<b>pH, ORP Dissolved Oxygen</b>	Oil coating and sulfides - use X80 and S80 and 2005130 electrode
High Purity Water	<b>pH, Resistivity CA6 Colorimetric</b>	Resistivity is the control parameter, use T80 and S80 resistivity, pH is a check, use T80 and S80 PH, CA6 for SiO <sub>2</sub> break through in resin beds
Resin regeneration	<b>Conductivity Resistivity</b>	Two measurements on the T80, Toroidal on the wash and Resistivity on the rinse cycle.
Fermentation and Cell Culture	<b>pH, ORP Dissolved Oxygen</b>	SE Series Sterilizable/Autoclavable electrodes pH, ORP and DO and SF Series electrode fittings

### Drinking Water

Application	Measurements	Recommended Products
Intake Water	<b>Chlorine Dioxide</b>	Use the CD80 Chlorine Dioxide Analyzer for color and odor control
Filtration	<b>pH Turbidity</b>	pH adjustment use T80 with S80 sensor and 2005145 electrode. Turbidity for filter backwash, use the Triton®TR82, Measure turbidity after filtration with Triton®TR82
Contact Tank	<b>pH Free &amp; Total Chlorine Fluoride Ion</b>	For final pH adjust use T80 with S80 sensor and 2005145 electrode Monitor Chlorination, FC80, Monitor Chloramine, TC80, Analyzer Measure Fluoride Ion with T80 and S80 pION
Seawater Desalination	<b>Chlorination Dechlorination</b>	The DCA-23 is designed to monitor the Total Residual Oxidant and the pH of seawater and determine the equivalent chlorine concentration, to protect the RO membranes

## Dissolved Oxygen Measurement

The ECD Triton®DO82 optical dissolved oxygen sensor combines the high technology of Fluorescence Quenching with a rugged, easy to install design, ideal for aeration applications. The Triton®DO90 amperometric DO sensor with auto polarization voltage optimization and 316 SS flow cell is ideal for the low level ppb measurements typical in boiler water.



### Power Generation

Application	Measurements	Recommended Products
Boiler Water	<b>pH, Conductivity, Resistivity, pION, ppb DO, Silica ppb, Sodium ppb</b>	Each boiler will have 4-6 measurements typically on a water panel, conductivity, resistivity, DO and pH, Use 2 channel T80 with S80. The Model CA6 Silica and NA6 Sodium analyzers
De-mineralizers	<b>pH, Conductivity, Resistivity</b>	Noisy and expect shorter electrode life, use T80 and S80 PH sensor with 2005145 electrode
Resin Regeneration	<b>Conductivity Resistivity</b>	Two measurements with the T80, Toroidal on the wash and resistivity on the rinse cycle.
Cooling Towers	<b>pH, ORP, pION, Cooling Tower Control System, Free &amp; Total Chlorine</b>	Biofilm coating is the problem use a spray cleaner with the T80 and S80 with 2005145 electrode Cooling Tower Control System for pH and conductivity to control acid or base feed Model FC80 Free Chlorine Analyzer Model TC80 Total Chlorine Analyzer
Gas Scrubbers	<b>pH, ORP Conductivity</b>	Coating with lime needing regular cleaning use T80 with S80 PH and 2005160 electrode

### Aquaculture - Environmental

Application	Measurements	Recommended Products
Fish Farming	<b>Dissolved Oxygen</b>	The Triton®DO82 to maintain the oxygen for optimal growing conditions.
Aquatic Parks and Aquariums	<b>pH, ORP, pION Free Chlorine</b>	The T80 with S80 ORP sensor to control ozonation to improve water clarity, The FC80 Free Chlorine Analyzer for water sanitation at Aquatic Parks Monitor low level chlorine to protect sea life
Environmental Monitoring	<b>pH, ORP, pION Nitrate, Ammonium</b>	Monitor Streams, rivers, ponds, lakes, etc. Use T80 and S80 pION to monitor specific ions. The Hydra Analyzer to monitor Nitrate or Ammonium ions from agricultural runoff.



# Industrial Applications



Model CA-6

The Model CA-6 Analyzers are a family of on-line sequential sampling colorimetric analyzers. These easy to use analyzers can perform most colorimetric analysis that use less than 4 reagents. 1-4 Analyzer channels



DS-HYDRA Nutrient Analyzers are designed for monitoring nitrification and denitrification processes in a waste water treatment plant. The HYDRA-NH4 measures ammonium and the HYDRA-NO3, nitrate ion.



Model T80

The Model T80 Universal transmitter provides simplicity in a powerful package. This 24 VDC loop powered, 4-20 mA transmitter can measure pH, ORP, pION, Dissolved Oxygen, Conductivity or Resistivity.



Easy to use, plumb and play designs for measuring Chlorine. The FC80 for Free Chlorine, the TC80 for Total Chlorine and the CD80 for Chlorine Dioxide. Amperometric designs that require no reagents.



Model X80

The Model X80 microprocessor based single or dual transmitter with 4 to 20 mA, relays and digital comm outputs FM, ATEX and IECEx approved for hazardous locations in intrinsically safe and explosion proof applications.



The Triton® TR80 and TR82 is a nephelometric turbidity analyzer designed for use in water and wastewater. There are Low Range, High Range and Suspended Solid (TSS) versions.



LQ800 Controller

The LQ800 multi-Channel controller features a touch screen color display that allows up to (8) inputs and (8) 4-20 mA outputs and (8) field configurable SPDT relays, and various control programming..



Model CA900 Titration Analyzers, measure Alkalinity, Fluoride, Sulfide Ion or H2S in Water. On-line sequential sampling for industrial applications. Also see NA6 for Sodium ppb measurements



Triton® DO82

The TRITON® DO82 optical dissolved oxygen sensor combines high technology in a rugged reliable design for aerated water, while the DO90 ppb dissolved oxygen sensor excels in boiler water.



The TOC Model 3S Total Organic Carbon Analyzer for sequential sampling and monitoring of organic compounds in various water applications from drinking water to process water.



S80 Sensors

The ECD S80 sensors are 3/4" O.D. with signal conditioner, temperature and replaceable sensing electrodes. Ball Valve Retractable and insertion, submersion designs are available in 316 SS, Titanium and Hastelloy C.



DG800 / CE800 - Degassed Cation and Cation Conductivity Analyzer Series for Power Generation Industries. Multiple output and multi-stream options.

Specifications subject to change without notice.

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