Complete Water Analysis Solutions for the

Pulp & Paper Industry

✓ **Ensure Product Quality**
✓ **Protect Equipment**
✓ **Save Time and Costs**

HACH®

Be Right™

The Water Analysis Experts
for the Pulp & Paper Industry

With more than 85 years as the leading expert in water quality analysis, Hach® provides the knowledgeable and responsive support team you trust to address your unique needs for continuous control over the water and steam applications throughout your entire process.

Whatever your water analysis challenge, Hach has the most complete solution—including a broad offering of easy-to-maintain on-line instrumentation, accurate laboratory equipment, comprehensive test kits, and high-quality prepared reagents, measuring the broadest range of test parameters in the industry.

From process monitoring and laboratory verification to extensive training and comprehensive support, Hach is your trusted partner, assuring maximum uptime through preventative protection and superior service.

Influent water treatment

Paper production processes

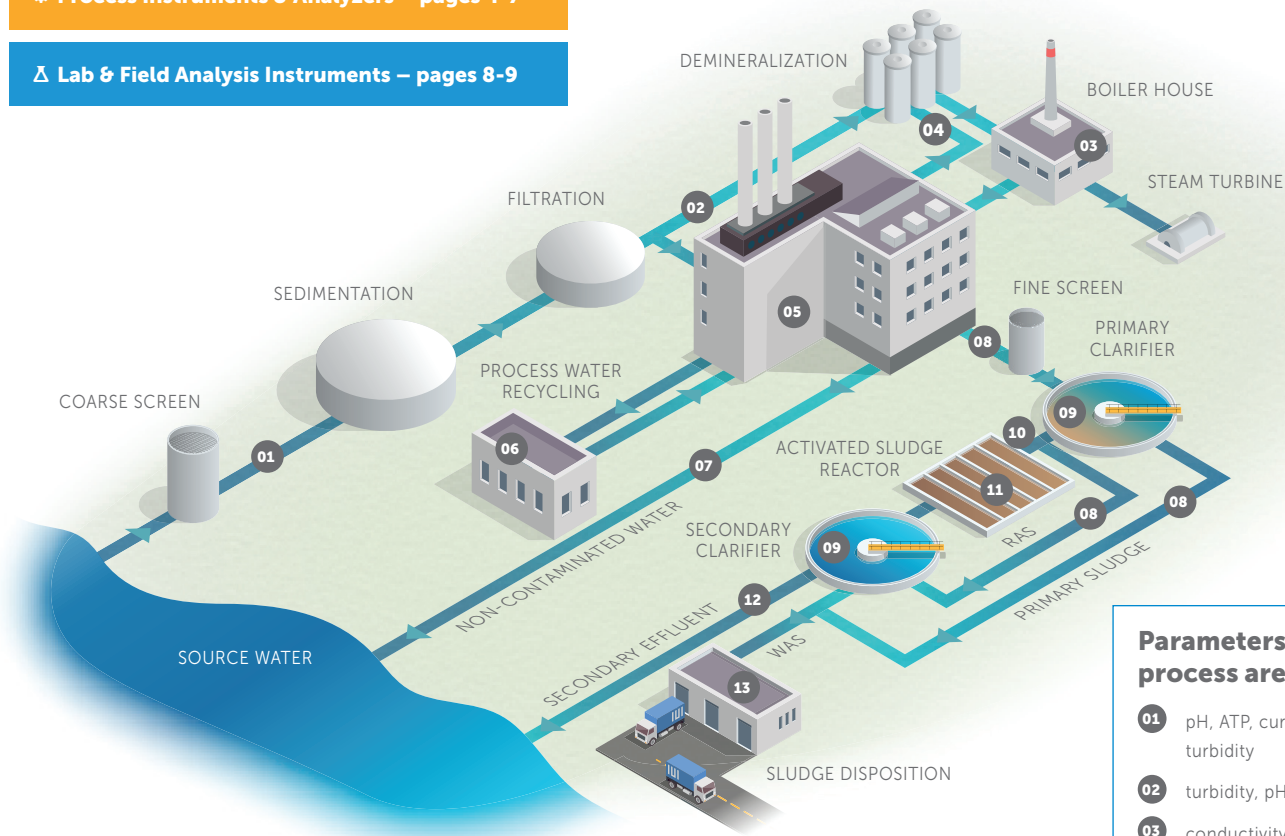**Product/fiber loss monitoring**

Boiler feed water

Wastewater

HACH®

Hach Solutions by Parameter

⚙ **Process Instruments & Analyzers — pages 4-7**

Δ **Lab & Field Analysis Instruments — pages 8-9**

DEMINERALIZATION

BOILER HOUSE

STEAM TURBINE

FILTRATION

04

02

FINE SCREEN

03

PRIMARY CLARIFIER

SEDIMENTATION

05

08

PROCESS WATER RECYCLING

09

COARSE SCREEN

06

10

07

ACTIVATED SLUDGE REACTOR

01

11

SECONDARY CLARIFIER

RAS

09

08

08

NON-CONTAMINATED WATER

12

SECONDARY EFFLUENT

WAS

PRIMARY SLUDGE

13

SOURCE WATER

SLUDGE DISPOSITION

Parameters by process area

01 pH, ATP, current streaming, turbidity

02 turbidity, pH, Cl2

03 conductivity, sodium, silica, DO, phosphate, hydrazine

04 conductivity, silica

05 pH, solids, ATP

06 pH, solids, RTC-DAF

07 oil in water, conductivity

08 solids

09 sludge level

10 UV254, TN, TOC, TP, solids, COD, BOD

11 DO, solids, ORP, ATP

12 phosphate, ammonia, nitrate, nitrite, total inorganic nitrogen, solids, pH, RTC-DOS, TN, TOC, TP, COD, BOD

13 solids, pH, RTC-SD

Water Supply Conditioning

- ⚙ Δ ATP
- Δ Color
- ⚙ Δ Chlorine, free and total
- ⚙ Δ Chlorine Dioxide
- ⚙ Δ Conductivity / Total Dissolved Solids (TDS)
- ⚙ Δ Dissolved Oxygen
- ⚙ Δ Hardness / Alkalinity
- ⚙ Δ Iron
- ⚙ Δ Manganese
- ⚙ Δ pH
- ⚙ Δ Silica
- ⚙ Streaming Current
- ⚙ Total Nitrogen (TN)
- ⚙ Δ Total Organic Carbon (TOC)
- ⚙ Total Phosphorus (TP)
- ⚙ Δ Turbidity and Suspended Solids (TSS)

Steam & Power

- ⚙ Δ Conductivity
- ⚙ Δ Dissolved Oxygen
- ⚙ Δ Hydrazine / Oxygen Scavenger

- ⚙ Δ Laser Turbidity / Iron Transport
- ⚙ Δ pH
- ⚙ Δ Phosphate
- ⚙ Δ Silica
- ⚙ Sodium
- ⚙ Total Nitrogen (TN)
- ⚙ Δ Total Organic Carbon (TOC)
- ⚙ Total Phosphorus (TP)

Paper Machine Wet End Operations Monitoring

- Δ ATP
- ⚙ Δ Chlorine, free and total
- ⚙ Δ Conductivity / Total Dissolved Solids (TDS)
- ⚙ Δ Dissolved Oxygen
- ⚙ Δ Hardness
- ⚙ Δ ORP
- ⚙ Δ Laser Turbidity / Iron Transport
- ⚙ Δ pH
- ⚙ Sulfate
- ⚙ Total Nitrogen (TN)
- ⚙ Δ Total Organic Carbon (TOC)
- ⚙ Total Phosphorus (TP)

- ⚙ Δ Turbidity and Suspended Solids (TSS)

Wastewater Treatment

- ⚙ Δ Absorbance UV
- ⚙ Δ Ammonia
- ⚙ Δ ATP
- ⚙ Δ Biochemical Oxygen Demand (BOD)
- ⚙ Δ Conductivity / Total Dissolved Solids (TDS)
- ⚙ Δ Dissolved Oxygen
- ⚙ Flow
- ⚙ Δ Nitrate
- ⚙ Δ Nitrite
- ⚙ Δ Oil in Water
- ⚙ Δ ORP
- ⚙ Δ pH
- ⚙ Δ Phosphate
- ⚙ Sludge Level
- ⚙ Total Nitrogen (TN)
- ⚙ Δ Total Organic Carbon (TOC)
- ⚙ Total Phosphorus (TP)
- ⚙ Δ Turbidity and Suspended Solids (TSS)

HACH®

Process Instruments & Analyzers

Ammonia

Amtax sc Ammonium Analyzer

Install directly on the tank edge for fast reaction times in the closed loop control.

- High-precision, gas-sensitive electrode
- Selective GSE instrumentation
- Automatic cleaning, calibration, self-diagnosis
- Optional weatherproof housing for outdoor setup or transparent door for use indoors

Claros Enabled **Prognosys® Enabled**

Free/Total Chlorine

CL10sc Amperometric Chlorine Analyzer

Continuous readings of disinfection processes equipped with Cal-Watch self-diagnostics to alert users when the process has changed or the instrument needs service.

- 0-20 ppm
- Warning of pH and chlorine calibration deviation
- Non-contacting flow sensor
- Reagentless method

Claros Enabled **Prognosys® Enabled**

CL17 Free/Total Chlorine Analyzer

Dependable, colorimetric DPD free and total chlorine analysis.

- Chlorine analysis independent of pH, temperature, and sample flow
- 0.035 to 5 mg/L free or residual chlorine range
- Unattended operation up to 30 days
- Colorimetric DPD chemistry—fast, reliable, economical

EPA COMPLIANT

Conductivity

AF7000 Streaming Current Monitor

Durable source water monitoring thanks to an industrial sized motor and stainless steel castings.

- Automatic flush feature
- Easy routine maintenance
- Sub-1 second response time to source water changes
- Auto-zeros in less than 5 seconds

9525sc Degassed Cation Conductivity System

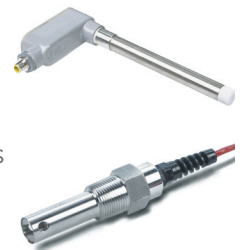Simple to integrate. Simple to operate.

- Measures specific conductivity (SC), cation conductivity (CC), and degassed cation conductivity (DCC)
- The 9523 sc cation conductivity analyzer can be combined with the degassed conductivity system in a single panel or separate panels
- Works with SC200 platform

3400 Digital Contacting Conductivity Sensors

Enhanced performance sensors for demanding applications including ultra-pure water, clean-in-place (CIP), and boiler/condensate monitoring.

- Each sensor is tested to determine its unique, absolute four-digit cell constant
- Built-in Pt 1000 RTD temperature element for fast response to temperature changes with $\pm$0.1ºC accuracy
- Measure from theoretically pure water (0.057 µS/cm or 18.2 MΩ) up to 200,000 µS/cm
- Multiple sensor inputs including conductivity, resistivity, TDS, salinity or one of six calculated measurements

HACH®

3700sc Digital Inductive (Electrodeless) On-Line Sensors

No direct contact between the measuring element and the sample.

- Ideal for demineralizer regeneration
- 200 to 2,000,000 µS/cm range
- Rugged, non-fouling design
- Sensor works with a Hach SC200 or SC1000 Digital Controller

Nitrate

Nitratax sc Nitrate Sensors

Digital optical probes for high precision.

- UV measurement
- Low-maintenance, reagent-free, self-cleaning
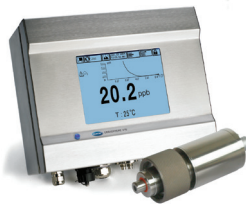- Compatible with all SC controllers

Dissolved Oxygen

Orbisphere® K1100 Optical Dissolved Oxygen Sensor

The first maintenance-free optical oxygen sensor for steam generation

- Only 1 calibration per year
- No membranes = 2 minutes of annual maintenance
- Compatible with Orbisphere 28mm flow chamber for a low cost retrofit

LDO sc Luminescent Dissolved Oxygen Sensors

- No calibration for the entire 2-year life of the sensor cap
- No membranes to replace or electrolyte solution to replenish
- Diagnostic alert indicators for routine cleaning cycles
- Start measuring right out of the box with 3D calibration

Oxygen Scavengers

9586sc Oxygen Scavenger Analyzer

Save time on design. Accelerate your installation. Reduce training complexity. Simplify maintenance and operation.

- 0 to 500 ppb hydrazine programmable range
- 0 to 100 ppb carbohydrazide programmable range

pH / ORP

pHD™ Digital Differential On-Line pH/ORP Sensors

For moderate- or high-conductive applications (>10 µS/cm) such as monitoring cooling water blowdown, drum boiler water, or raw water treatment.

- Field-proven differential electrode measurement technique offers better accuracy
- Replaceable salt-bridge/protector simplifies maintenance and extends sensor life
- Sensor works with a Hach SC200 or SC1000 Digital Controller

8362 High Purity Water System

Simple to integrate. Simple to operate.
- Works with SC200 platform
- -1500 to +1500 mV ORP range
- 0 to 4 bar (58 psi) pressure range

HACH®

Phosphate / Silica

Series 5500sc Phosphate or Silica Analyzer
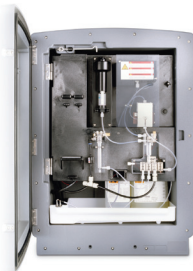
Lower Maintenance. Less Downtime.

- Only two liters of reagent are required for the analyzer to perform unattended for up to 90 days
- The industry's only pressurized reagent delivery system eliminates the frequent maintenance associated with pumps
- Predictive diagnostic tools, including Hach's proprietary Prognosys technology,
  warning LEDs, and high-visibility notification screens let you avoid unplanned downtime
- Grab-Sample-In and Grab-Sample-Out features allow quick analysis of a grab sample poured into the analyzer, and facilitate taking a sample out of the analyzer to verify in a lab test

Phosphax sc Phosphate Analyzer

Ideal for precise orthophosphate measurements directly at the tank.

- Detection limits as low as 0.05 mg/L
- Response time of less than 5 minutes
- Minimum reagent consumption

Sodium

NA5600sc Analyzer

Protect the metallurgy in your system and monitor for leaks at sub ppb. Our newest analyzer has a smaller footprint and uses the same interface as the 5500 sc.

- Automatic calibration
- Automatic electrode reactivation
- Optimum response time in a variety of power applications
- Reagent replenishment only every 90 days

Total Organic Carbon

BioTector® B7000i TOC Analyzer

- Configurations available for TOC, TOC/TN, TOC/TN/TP
- Patented Two-Stage Advanced Oxidation Technology
- Unique self-cleaning oxidation technology allows the analyzer to handle difficult samples and reduce scheduled maintenance

HACH®

FP360sc Oil-in-Water Sensor

- Continuous online monitoring solution
- Low maintenance
- Easy-to-clean sensor

UVAS plus sc Sensor

Reagent-free determination of organic load via the spectral absorption coefficients (SAC)

- Low-maintenance, self-cleaning
- Compatible with all SC controllers

Claros Enabled Prognosys® Enabled

Turbidity & Suspended Solids

Solitax® sc Sensors

- Accurate, color-independent measurements
- Self-cleaning device prevents erroneous values
- Easy one-point calibration
- Sensors work with a Hach SC200 or SC1000 Digital Controller

TSS sc Turbidity and Suspended Solids Sensor

- Can measure both online suspended solids and turbidity
- Withstands operating temperatures of 90° C and pressures up to 10 bar
- Sensor works with a Hach SC200 and SC1000 Digital Controller

Sonatax sc Sensor

Digital ultrasonic probe to measure sludge level.

- Automatically adjusts sensitivity to match varying solids concentrations and sludge profiles in the tank.
- Reflected signals are removed by the software
- Factory calibration
- Various mounting devices available

Claros Enabled Prognosys® Enabled

TU5300sc™ or TU5400sc™ Online Laser Turbidimeters

- Groundbreaking 360° x 90° Detection™ Technology
- Matching lab and online results
- Everything about turbidity— faster

Surface Scatter® 7 sc High Range Turbidimeter (SS7)

Minimizes sensitivity loss and makes sample cell cleaning and replacement unnecessary in high turbidity conditions

- The original non-contact turbidimeter
- Measurement range of 0 to 9999 NTU
- Corrosion-resistant construction
- High-temperature model (up to 70°C) available

Claros Enabled Prognosys® Enabled

HACH®

Lab & Field Analysis Instruments

Photometric & Colorimetric

DR3900 Spectrophotometer

- Easy step-by-step testing procedure
- Elimination of false readings
- Accurate results every time

DR6000 Spectrophotometer

- Accessories for high volume and high accuracy testing needs
- Guided procedures and elimination of false readings
- Automatically avoids errors
- Measures on the UV/VIS spectrum

DR900 Colorimeter

- Fastest and simplest water testing for the most demanding field environments
- Field ready in every way possible
- Intuitive user interface
- Simple data communication

SL1000 Portable Parallel Analyzer® (PPA)

The same chloramination tests can now be performed 75% faster, with less than half the manual steps.

- Up to six parameters (up to 4 chem keys and 2 probes) tested in parallel
- Uses self-contained Chemkey reagents instead of powder pillows or glass vials
- Tests include: monochloramine, extended range chlorine (up to 10 mg/L), combined free and total ammonia, free and total chlorine, nitrite, copper, orthophosphate, hardness (normal and high range), peracetic acid, alkalinity, dissolved iron. Probe-based tests include: pH, conductivity, ORP, dissolved oxygen, nitrate, fluoride; temperature included with each probe.

TNTplus® Bar-Coded Chemistries

- Instrument automatically detects and runs the correct method
- Easy, accurate recognition, color-coded parameters and ranges
- 10 measurements in one rotation, eliminating outliers; optically superior glassware
- For use with Hach spectrophotometers

Barcode reading, vial spinning, and outlier rejection features not available on DR1900.

Electrochemical

HQD® Meters and Intellical™ Probes

Use a single handheld HQD meter and interchangeable Intellical probes for quick, simple, and reliable measurements.

- Designed for your water applications, the Hach HQD smart probes automatically recognize the testing parameter, calibration history, and method settings to minimize errors and set-up time
- Hach gives measurement flexibility and ease of operation with its HQD portable and benchtop meter and full suite of interchangeable Intellical laboratory and field probes for testing Conductivity, DO, ORP, pH, Ammonia, and many more

Microorganisms

LuminUltra® Photonmaster Luminometer with PBM

Rugged, low-cost, portable luminometer that uses 2nd generation ATP test kits

- Accurate results within minutes
- Simple, straightforward method to minimize error and produce actionable results
- Considerable cost-per-test savings over competing devices
- Compatible with PBM for data transfer to mobile devices using the LuminUltra Cloud ™ mobile app for real-time analysis

Sampling

AS950 Peristalitic Samplers

- Lightweight design, low power requirements
- Equipped with standard memory and USB connectivity allowing all data to be logged and transferred via USB drive
- Large, full color display allows intuitive programming to make these critical, remote sampling applications virtually error-free

Titration

Titralab® AT1000 Series

- One-touch automatic analyzers
- Pre-set methods that can quickly deliver accurate and reliable results straight from the box

Turbidity & Suspended Solids

TU5200 Benchtop Laser Turbidimeter

- Groundbreaking 360° x 90° Detection™
- Technology Matching lab and online results
- Everything about turbidity—faster

TL23 Series Benchtop Turbidimeter

- Designed for the most demanding industrial and wastewater applications
- Feature the trusted technology of Hach's legacy benchtop turbidimeters with improved functionality

TSS Portable

Broad measuring range for turbidity and suspended solids; ideal for remote monitoring in municipal and industrial wastewater, drinking water and rivers

- Multi-beam alternating light method
- Infrared diode system
- Use to easily monitor processes or calibrate/validate online sensors
- Automatically compensates for air bubbles

HACH®

Hach Water Analysis Tools for Pulp & Paper

Hach offers reagents, and portable, laboratory, and process instruments for more than 100 parameters: the broadest range for industry water analysis.

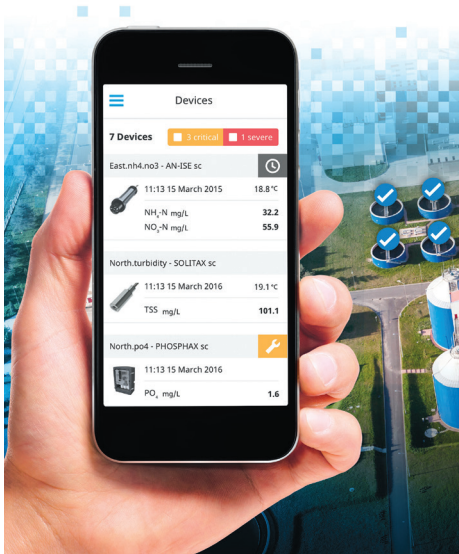| Parameter	⚙ Process Solutions	△ Lab & Field Solutions	Water Supply Conditioning	Steam & Power	Paper Machine Wet End	Wastewater Treatment
Absorbance UV	UVAS plus sc Sensor; NX7500 UV Sensor	DR1900, 3900, 6000 Spectrophotometers	✔			✔
Ammonia	Amtax sc Analyzer; A-ISE sc Sensors	All DR Series Instruments; SL1000 PPA				✔
ATP	EZ7300 Microbial Load ATP Analyzer	LuminUltra® Luminometers	✔		✔	✔
Biochemical Oxygen Demand (BOD)	BioTector B7000i	HQD® Meters; BODTrak II BOD Manager™ Software				✔
Color	NV3300 Color Probes	DR3900 and DR6000 Spectrophotometers DR900 Colorimeter; SL1000 PPA; Lico; TNTplus®	✔			✔
Chlorine, free and total	CL10sc Analyzer; CL17 Analyzer	All DR Series Instruments; AT1000 Titrators	✔		✔	✔
Chlorine Dioxide	9187sc Clorine Dioxide Analyzer	All DR Series Instruments	✔		✔	✔
Conductivity / Total Dissolved Solids (TDS)	9525sc System; 3400 Contacting or 3700 sc Inductive Conductivity Sensors	Sension+ Portable Meters; HQD® Meters; HQD®–Intellical Probes	✔	✔	✔	✔
Dissolved Oxygen	LDO sc Sensors; Orbisphere® K1100 Sensors	HQD® Meters; Orbisphere® 3100 Analyzer; HQD®–Intellical Probes	✔	✔	✔	✔
Flow	FL1500 Flow Logger; FH950 Handheld Flow Meter; Impeller Flow Sensors		✔	✔	✔	
Hardness / Alkalinity	EZ5000 Series Hardness Analyzer EZ5000 Series Alkalinity Analyzer APA6000 Analyzers; Orbisphere 410/510 Controllers	Digital Titrators; SL1000 PPA; All DR Series Instruments	✔	✔	✔	
Hydrazine / Oxygen Scavenger	9586sc Analyzer			✔		
Iron	EZ1000 and EZ2000 Series Iron Analyzers	All DR Series Instruments	✔			
Laser Turbidity / Iron Transport	TU5400 Laser Turbidimeter	All DR Series Instruments		✔	✔	
Manganese	EZ1000 and EZ2000 Series Manganese Analyzers	All DR Series Instruments	✔			
Microorganisms	EZ7300 Series Analyzers	LuminUltra® Luminometers; Microtest Peel Plate®–Heterotrophic Plate Count Media	✔	✔	✔	✔
Nitrate	Nitratax sc Sensors; NX7500 UV Sensor; AN-ISE sc	All DR Series Instruments; ISE				✔
Nitrite	NX7500 Multi-parameter UV Sensor	All DR Series Instruments				✔
Oil in Water	FP360sc Sensor	DR300 Pocket Colorimeter; DR900 Colorimeter; DR3900 and DR6000 Spectrophtometers				✔
pH / ORP	pHD™ Differential Sensors; 8362 High Purity System	Sension+ Portable Meters; HQD® Meters	✔	✔	✔	✔
Phosphate	5500sc Phosphate Analyzer; Phosphax sc Analyzers EZ Series Phosphate Analyzer EZ Series Total Phosphorus Analyzer	All DR Series Instruments	✔	✔		✔
Silica	5500sc Silica Analyzer	All DR Series Instruments	✔	✔		
Sludge Level	Sonatax sc Sensors	TSS Portable; "Sludge Judge" Water Core Sampler				✔
Sodium	NA5600sc Sodium Analyzer	HQD® Meters w/ ISE; AT1000 Potentiometric Titrator		✔		
Streaming Current	AF7000 Streaming Current Monitors		✔			
Total Nitrogen (TN)	BioTector® B7000i Analyzer		✔	✔	✔	✔
Total Organic Carbon (TOC)	BioTector® B7000i Analyzer; EZ Series Analyzers	All DR Series Instruments; TNT plus®–Vial Tests	✔	✔	✔	✔
Total Phosphorus (TP)	BioTector® B7000i Analyzer		✔	✔	✔	✔
Turbidity and Suspended Solids (TSS)	Solitax® sc and TSS Sensors TU5 Series® Laser Turbidimeters Surface Scatter® 7 sc Turbidimeters	TSS Portable; 2100Q Portable Turbidimeter TU5200 and TL23 Benchtop Turbidimeters	✔		✔	✔

Claros™
The Water Intelligence System

Imagine the time savings, cost reductions, and peace of mind that a complete "water intelligence system" could provide—a system that would address uncertainties about efficiency and compliance, changing regulations, unpredictable influent levels, unplanned instrument downtime, and errors in sampling and data logging.

Claros™, the Water Intelligence System from Hach, brings together 85 years of instrument expertise and 25 years of software development to address three critical areas: instrument management, data management, and process management, harnessing information to deliver guided insights for optimized plant operations.

Eliminate uncertainty. Increase confidence. See the power of Claros.

Learn more at hach.com/claros

Process Management

Claros RTC (Real Time Control)

Manage your process in real time based on constantly changing process conditions. This complete off-the-shelf system that adjusts treatment processes in real time, keeping your facility compliant while reducing treatment costs.

Data Management

Claros™ Collect

Access data immediately via an intuitive, easy-to-read interface on your desktop, mobile or tablet. Consolidate your data and reduce errors at the source of collection.

Claros WIMS™

Combine your water system data sources in a central, secure database, that provides the tools needed for electronic and paper reporting, analysis, and monitoring. When investigating data, the filters, drill-downs and custom forms help operators find insights hidden in raw data.

Instrument Management

Prognosys™

This predictive diagnostic system allows you to be proactive in your maintenance by alerting you to upcoming instrument issues.

Mobile Sensor Management

Mobile Sensor Management lets you verify and adjust process instrument measurements using laboratory reference values on your web-enabled devices. Receive status alerts for all connected instruments within a single view so you can see your system's complete performance.

Hach is your partner for water analysis in the pulp & paper industry.

We invite you to take a look at our comprehensive line of product solutions and services. They're the most accurate, dependable, and cost-effective products you can buy.

Hach offers:

- On-line process, laboratory, and field instrumentation
- Equipment, reagents, and supplies
- More EPA-approved methods than any other company
- Portable test kits and field instruments
- Automatic samplers and flow meters
- Local sales and service teams
- Service partnership programs and customized training

**For more information,
visit: hach.com/industries/pulp-and-paper or call toll-free: 800-227-4224**

HACH
SERVICEPLUS®
CERTIFIED PROGRAMS

Get your problems solved with Hach ServicePlus programs.

Hach Service can help with your maintenance and support challenges whether it is a lack of resources, an instrument that is down, bringing your plant back online, or the need for a predictable budget. We offer a range of service offerings, including the option to extend product warranty for up to 5 years!

hach.com/service | 800-227-4224

HACH

P.O. Box 389

Loveland, Colorado 80539-0389 U.S.A.

Telephone: 970-669-3050

Fax: 970-669-2932

E-mail: orders@hach.com

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