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NEW Electrochemistry Products

What's New!

NEW!

pH, ORP, and Sodium Probes



pH Ultra

Gives fastest response compared to competitor probes. Ideal for rapid measurement and/or working with difficult samples such as low-ionic strength (pure water).



ORP (Oxidation Reduction Potential)

Features a flat disk design for optimal performance and easy sensor cleaning. Offered in standard, rugged and refillable models.



Sodium ISE (Ion Selective Electrode)

Uses an exclusive ISE design that ensures fast start up and minimal conditioning requirements to prevent calibration re-work.

See pages 27-28.



NEW!

Non-Glass pH Probes & Meters

With stainless steel probes and ISFET silicon chip sensors.

See pages 37-39.



NEW!

Probeless Meters —Just “Dip and Go”

Provide the ultimate ease-of-use for portable spot check testing. Ideal for clean water applications and tap sampling.

See pages 40-41.



NEW! Benchtop Spectrophotometer

Solid VIS benchtop with high-speed scanning plus many extras for simplified operation.

See page 69.



NEW! 2100Q Portable Turbidimeter

The easiest to use turbidimeter available!

- The most accurate turbidity measurement every time, even for rapidly settling samples.
- On-screen calibration assistance.
- Simplified data transfer.

See page 82.

NEW Chemicals & Reagents

NEW! Simplified TKN Analysis

A simple alternative for traditional TKN analysis that anyone can do.



- Eliminate the use of mercury and other harmful chemicals.
- 3 tests in 1! Results for total nitrogen, nitrate and nitrite and TKN are all obtained at once for optimum process control.

See page 73.

NEW! Chlorine Method-Freechlor F Reagent Solution

A "green" alternative—no pretreatment steps for manganese. Eliminate the need to know if manganese or chloramines are present.



See page 145.

MORE! TNTplus™ Chemistries

More parameters for more productivity—as a part of the comprehensive line of TNTplus for drinking water and wastewater facilities.



Total Alkalinity • Chlorine • Mercury-Free COD
Copper • Iron • HR Nitrate • Sulfate
Volatile Acids

See page 73.

See our new TNTplus video at: www.hach.com/tntplus

**EPA
APPROVED**

NEW! MI Media

- 24 hour detection time.
- EPA approved for use in drinking water, surface, ground, well, recreational as well as process water for ultra pure chemical processing.
- Simultaneous detection of coliforms and e-Coli.

See page 234.

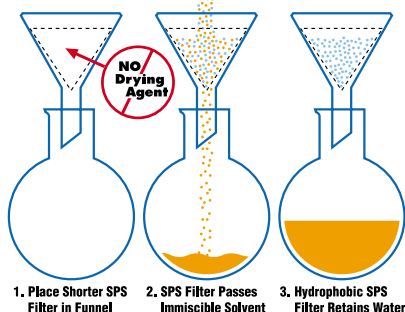


EXPANDED Laboratory Supplies

What's New!

We've added many NEW laboratory supply products, including...

Xenosep SPS™ (Solvent Phase Separator) Filter
Makes Sample Drying Easy for any Density Solvent



Electrochemistry Meters

See pages 343-344.



Solvent Phase Separator Filters

See page 348.

Lead and Copper Scanning Analyzer

See page 363.



Leica® DM500 Compound Microscopes

See page 364.



General Purpose Oven

See page 366.



Digital Thermometers

See pages 379-380.



...and much, much more!

NEW! American Recovery and Reinvestment Act (ARRA)

We are prepared to support ARRA (stimulus) projects by providing you with the highest quality products for your Drinking Water and Wastewater projects.

For additional information,

HACH ARRA HOTLINE: (800) 227-4224 and press #6171

Email us at ARRA@hach.com

Website: www.hach.com/arra

Please note: When requesting a quote or placing an order related to ARRA, please specify that a "Buy American" product is needed.



NEW! Amperometric Chlorine Analyzers

Hach's answer to reagentless amperometric chlorine measurement.

See page 405.

NEW! Dissolved Oxygen Sensor for Power Plants

The first maintenance-free optical oxygen sensor for power plants.

See page 413.



NEW! Dissolved Oxygen Sensor for Beer

Precise oxygen measurement with optical technology for beer and deaerated water.

See page 416.



NEW! A1100 Dissolved Oxygen EC Sensor

Electrochemical (EC) sensor for corrosion control, in-line beverage, and deaerated water applications.

See page 417.



NEW! Easy-To-Maintain Nitrate Sensor

The easiest to maintain nitrate ISE sensor for continuous trending.

See page 430.



NEW! Oil-In-Water Sensor

Continuous oil-in-water monitoring for the right price.

See page 431.



NEW! Ozone Sensor for Bottled Water Applications

Reduce maintenance to only 5 minutes.

See page 435.



What's New!

NEW Process Instrumentation

What's New!

NEW! Sodium Analyzers

Low-level sodium measurement in high purity water.



See page 451.

NEW! Hand-held Suspended Solids & Turbidity Sensor

Hand-held turbidity, suspended solids and sludge blanket level instrument.



See page 456.



NEW! Suspended Solids & Turbidity Sensor

Measures on-line suspended solids in virtually all applications under the strictest regulatory conditions.

See page 455.

NEW! TOC Analyzers

Designed to provide low maintenance, online TOC, TN, TP monitoring even in the most difficult sample applications.



See pages 458-459.

NEW Hach Homeland Security Technologies

NEW! CityGuard™ Security Network Portal and Real-Time Water Distribution Monitoring System

Your virtual command center...from source to tap.

See pages 496-497.



NEW! GuardianBlue® Event Monitor

Adds event detection capabilities to sensor data from the Source Water Monitoring Panel, the Distribution Monitoring Panel or the GuardianBlue System.



See pages 502-503.

The Hach Difference

The Hach Difference

See Inside!

- **Guide to U.S. Customer Service**
- **Guide to International Customer Service**
- **hach.com**
- **Technical Training (HTTC)**
- **Service Partnership Programs**
- **Hach EPA Compliant Methods**



Be Right™

Order Placement

To place an order, or if you have questions about Hach products, ordering, or shipping information, call one of our customer service representatives.

Municipal:
800-227-4224
or 970-669-3050

Industrial:
866-450-4248
or 970-669-3050

You may also fax your order anytime, day or night, to:
970-669-2932

We may require a written or faxed copy of the Purchase Order or confirming document, complete with authorizing signatures.

You may also place your order online at:
www.hach.com

Mailing address (for orders):

Hach Company
P.O. Box 608
Loveland, CO 80539-0608 USA

For Hach Homeland Security Technologies, please call:

800-604-3493
or visit www.hachhst.com

For Radiometer Analytical customer service, please call:

800-998-8110
or visit www.radiometer-analytical.com

For Lachat Instruments customer service, please call:

800-247-7613
or visit www.LachatInstruments.com

For GLI customer service, please call:

800-454-0263
or visit www.hach.com/gliwelcome

For Sigma customer service, please call:

800-227-4224
or visit www.hach.com/sb

For Marsh-McBirney customer service, please call:

800-368-2723
or visit www.hachflow.com

Is Your Shipment Staying Within the United States?

You are responsible for designating in your Purchase Order the true, ultimate country of destination of products you order. The following guidelines apply exclusively to products being used within the United States. For information about products intended for use outside the United States, see page 10.

Prices and Terms

Please contact the Customer Service Department for a complete copy of Hach Company's Terms and Conditions of Sale for U.S. Sales. All prices in this catalog apply to products used within the United States and are shown in U.S. dollars, FOB Hach's shipping point. Catalog prices, specifications, and statements of policy in this catalog are current at the time of printing and are subject to change without notice.

Terms of Payment

Payment may be through established credit, or by VISA®, MasterCard®, or American Express® charge cards. Customers are normally invoiced on the date of shipment, and payment is due within 30 days of invoicing. Invoice is supplied with shipping charges listed separately.

Sales and Use Tax

Hach Company is required to collect sales and use taxes on all sales based on the ship-to location. If orders from your organization are tax-exempt, please provide the appropriate documentation at the time of order.

Cancellations

Hach routinely ships orders within 48 hours of order placement. If a cancelled order has been shipped, the customer must return the order within 30 days or it will be considered accepted. Shipping charges for cancelled orders returned are the responsibility of the customer.

Shipping and Transportation

Hach's Distribution Department will select the best method of shipment and will accommodate rush shipments by air at an additional charge when regulations permit. Hazardous materials are shipped according to applicable transportation regulations. Terms are FOB Ames, Iowa, or FOB Loveland, Colorado. Hach reserves the right to approve carriers, modes, and rate of transportation. Delivery is complete when Hach places the shipment with the first carrier, and risk of loss or damage in transit are the responsibility of the buyer.

Hach reserves the right to back order goods unless buyer expressly states otherwise. Back orders will be invoiced separately.

Simplified Freight Charge Table^{1, 2, 3}

Total Price of Merchandise Ordered	Standard Surface (Mainland USA)	Second Day Delivery (Mainland USA)	Next Day Delivery (Mainland USA)	Second Day Delivery (Alaska & Hawaii)	Next Day Delivery (Alaska & Hawaii)
\$0.00 - \$24.99	\$9.95	\$22.95	\$42.95	\$34.95	\$64.95
\$25.00 - \$49.99	\$12.95	\$30.95	\$58.95	\$44.95	\$89.95
\$50.00 - \$249.99	\$15.95	\$47.95	\$91.95	\$64.95	\$130.95
\$250.00 - \$499.99	\$26.95	\$67.95	\$144.95	\$87.95	\$173.95
\$500.00 - \$999.99	\$36.95	\$96.95	\$198.95	\$121.95	\$240.95
\$1,000.00 - \$2,499.99	\$59.95	\$119.95	\$229.95	\$141.95	\$277.95
\$2,500.00 - \$4,999.99	\$69.95	\$159.95	\$269.95	\$166.95	\$308.95
\$5,000.00 - \$9,999.99	\$99.95	\$184.95	\$310.95	\$195.95	\$334.95
Over \$10,000	2% of Net Order Value	4% of Net Order Value	6% of Net Order Value	4% of Net Order Value	6% of Net Order Value

¹ Freight charges shown are only applicable to orders billing and shipping to U.S. destinations. Freight charges will be prepaid and added to invoice. Freight for the Reagent Delivery Program is charged on each shipment release and is based on the total price of each shipment release. Freight charges are subject to change without notice.

² Additional freight charges will be applied to orders containing bulky and/or heavy items.

³ Orders shipping to Alaska or Hawaii: Additional freight charges may be applied at time of order processing. Second Day and Next Day delivery is not available to all destinations.

Shipping & Transportation Policy

For orders with a U.S.A. billing and shipping destination, Hach's shipping department will select the method of shipment appropriate to the merchandise ordered, and will accommodate rush shipments by air at an additional charge (when regulations permit). Hazardous materials are shipped according to applicable transportation regulations. FOB shipping point is either Ames, Iowa, or Loveland, Colorado (United States).

Hach reserves the right to approve carriers, modes of transportation and routing of products. Delivery is complete when Hach places the shipment with the first carrier. Shipments in transit are the responsibility of the buyer. Should your purchase not reach its U.S.A. destination, call 800-227-4224 for assistance in tracking your shipment. If freight appears to be damaged upon receipt, do not accept it from the carrier. If acceptance has been completed and hidden damage is discovered, contact the carrier for assistance in filing a claim.

Tracking and Claims

Should your purchase not reach its U.S. destination, Hach will assist you in tracking the shipment. Or, track your order online at www.hach.com. If your freight appears to be damaged when you receive it, do not accept it from the carrier.

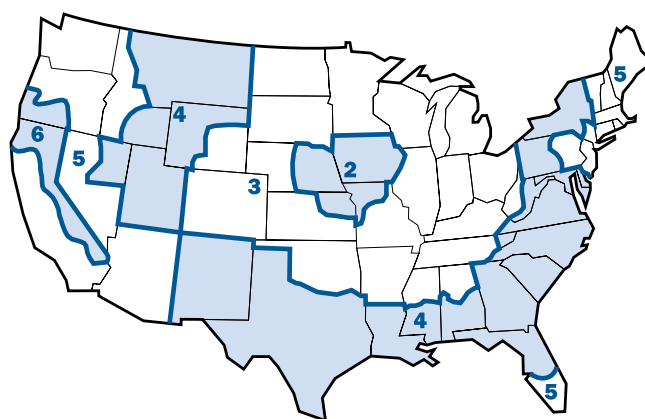
If you have completed acceptance and discover hidden damage, contact the carrier for assistance with filing a claim.

Returning Merchandise

Normal business transactions inevitably require an occasional return of merchandise for exchange or credit. No material may be returned without Hach's express written consent and proper documentation. To expedite return shipments from inside the United States, please follow the return procedure outlined here.

1. Within 30 days of receipt of merchandise, call the Customer Service Department to obtain Return Authorization.
2. Hach will send you Return Authorization documentation, labels, and instructions, or advise you with a Return Authorization number.
3. Attach Return Authorization labels and documents to the outside of the returned goods shipping carton(s), or you may be advised to apply the Return Authorization number on the carton. Ship carton(s) to Hach within 15 days. Shipments not bearing Return Authorization labels or Return Authorization Number will be refused.

Scheduled Delivery Chart



Estimated number of business days until your standard surface shipment will be delivered.

Terms of Return Shipments

Return shipments must meet the following requirements to be accepted or credited:

1. Products must be returned in the original packaging, with labels intact and not defaced. All items returned are inspected to determine credit value. Credit will only be issued on product returned in like-new condition. If items returned are not received in like-new condition, they will be disposed of and credit will not be issued.
2. Freight charges associated with returned merchandise are the responsibility of the customer. Hach cannot accept collect shipments without prior authorization.
3. All returns must be shipped to Hach within 15 days from the date of Return Authorization. Returns not shipped within this time frame will require reauthorization.
4. Hach can only authorize returns for unopened chemicals.

All chemicals must be packaged and shipped in compliance with the regulations of the U.S. Department of Transportation. Hach Company will provide complete instructions with your Return Authorization.

Guide to International Customer Service

Worldwide Sales and Service

Wherever you are—Santiago, Stuttgart, or Singapore—there's an authorized Hach distributor office nearby. Their staff can advise you about Hach products, assist with orders, and obtain instrument service. To find out how to reach the Hach office nearest you, see the contact information at the bottom of this page.

Here's a partial list of countries in which Hach representative offices are located:

<i>Algeria</i>	<i>Cyprus</i>	<i>Honduras</i>	<i>Malta</i>	<i>Poland</i>	<i>Trinidad</i>
<i>Argentina</i>	<i>Czech Republic</i>	<i>Hong Kong</i>	<i>Mauritius</i>	<i>Portugal</i>	<i>Tunisia</i>
<i>Aruba</i>	<i>Denmark</i>	<i>Hungary</i>	<i>Mexico</i>	<i>Puerto Rico</i>	<i>Turkey</i>
<i>Australia</i>	<i>Dom. Republic</i>	<i>Iceland</i>	<i>Morocco</i>	<i>Qatar</i>	<i>United Arab Emirates</i>
<i>Austria</i>	<i>Ecuador</i>	<i>India</i>	<i>The Netherlands</i>	<i>Romania</i>	<i>United Kingdom</i>
<i>Bahrain</i>	<i>Egypt</i>	<i>Indonesia</i>	<i>Netherlands Antilles</i>	<i>Russia</i>	<i>Uruguay</i>
<i>Belgium</i>	<i>El Salvador</i>	<i>Ireland</i>	<i>New Zealand</i>	<i>Saudi Arabia</i>	<i>Venezuela</i>
<i>Belize</i>	<i>Estonia</i>	<i>Israel</i>	<i>Nicaragua</i>	<i>Senegal/Gambia</i>	<i>Vietnam</i>
<i>Bolivia</i>	<i>Ethiopia</i>	<i>Italy</i>	<i>Nigeria</i>	<i>Singapore</i>	<i>Yemen</i>
<i>Brazil</i>	<i>Finland</i>	<i>Jamaica</i>	<i>Norway</i>	<i>Slovenia</i>	<i>Zimbabwe</i>
<i>Bulgaria</i>	<i>France</i>	<i>Japan</i>	<i>Oman</i>	<i>South Africa</i>	
<i>Canada</i>	<i>Germany</i>	<i>Jordan</i>	<i>Pakistan</i>	<i>Spain</i>	
<i>Chile</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Panama</i>	<i>Sri Lanka</i>	
<i>China</i>	<i>Greece</i>	<i>Korea</i>	<i>Papua New Guinea</i>	<i>Sweden</i>	
<i>Colombia</i>	<i>Guam</i>	<i>Kuwait</i>	<i>Paraguay</i>	<i>Switzerland</i>	
<i>Costa Rica</i>	<i>Guatemala</i>	<i>Macao</i>	<i>Peru</i>	<i>Taiwan</i>	
<i>Croatia</i>	<i>Guyana</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	

How to Reach the International Department

Contact the offices below for: Orders, Quotations, Products and Procedures, Claims and Returns, Instrument Service (except Canada*), and Free Technical Literature. If you are calling Hach from outside the United States, dial 970-669-3050, press 0 and ask for International Operations. If you are calling from inside the United States, call 800-227-4224.

U.S. exporters and customers in the United States, Canada, Latin America, Africa, Asia, and Australia/New Zealand contact:

HACH COMPANY WORLD HEADQUARTERS
P.O. Box 389
Loveland, CO 80539-0389 U.S.A.
Telephone: 970-669-3050
800-227-4224 (U.S. callers)
Fax: 970-461-3939
E-mail: intl@hach.com
www.hach.com

Visit the *NEW* Latin American Website:

www.hach-latinoamerica.com

In Europe, the Middle East, and Mediterranean Africa, contact:

HACH LANGE GmbH
Willstätterstraße 11
D-40549 Düsseldorf GERMANY
Telephone +49 (0) 211 5288-0
Fax: +49 (0) 211 5288-143
E-mail: info@hach-lange.de
www.hach-lange.com

In People's Republic of China, Hong Kong, and Macau, contact:

HACH CHINA
Room 301, Scitech Tower
#22 Jianguomen wai Avenue
Beijing, P.R. CHINA
Customer Support Hotline: 400-610-9290 - Toll Free
Customer Support Hotline: 800-810-9290
Hach Beijing Office: 8610-65150290
E-mail: Hachchina@hachservice.com
www.hach.com.cn

***For instrument service in Canada, use the information below:**

HACH SALES & SERVICE CANADA LTD.
400 Britannia Road East, Unit 1
Mississauga, Ontario L4Z 1X9
Telephone: 1-800-665-7635
Fax: 1-866-259-0984
E-mail: infocanada@hach.com

Is Your Shipment Going Outside the United States?

If your Hach product is to be used outside the United States—whether you are a U.S.-based trading company, a multinational corporation with shipping points all over the world, or an individual wishing to export a Hach product—you are considered an international customer. As such, you qualify for a wide range of services, all of which have been designed to expedite your shipments in the most reliable and efficient means possible.

For proper processing, please be sure to note on your Purchase Order the country in which the products will ultimately be used.

Worldwide Sales and Service Network

Distributors are located throughout the world to sell, service, and replenish Hach products. Contact International Customer Support at Hach Company, or consult our website at www.hach.com to locate the Hach office or authorized distributor nearest you.

Rapid Quotation Service

When the International Department at Hach receives a direct request for a quotation, we respond quickly, often within 24 hours of your request. Simply tell us the product number and the quantity of the product you need, and we will mail, e-mail, or fax a Pro Forma Invoice, complete with your price, the terms and conditions of the sale, and a freight estimate (if required) based on documentation needs and shipping preferences. Ultimate country of destination is required for quotes.

You can contact us for your quotation request by e-mail at:

intl@hach.com

Or by fax at:

970-461-3939

For convenient local service, outside the U.S., contact the Hach office or authorized distributor serving your area. Please visit our website, www.hach.com to locate the distributor nearest you.

Product Inquiries and Order Placement

If you are calling from within the United States, use our toll-free number to reach the International Department:

800-227-4224

If you are calling from outside the United States, call Hach World Headquarters, and an operator will direct your call to International Customer Support:

970-669-3050

Terms of Payment

Hach offers many payment methods to international customers, including:

1. *Open account. If you anticipate a long-term relationship with Hach Company, we invite you to supply the references and financial statements necessary to establish an open account.*
2. *Credit card. For your convenience, we accept VISA®, MasterCard®, and American Express® cards issued by U.S. banks.*
3. *Advance payment. Your order will be immediately released for shipment, if you pay by cashier's check or wire transfer to our bank.*
4. *Documentary drafts. If you provide Hach with the appropriate information, we send necessary collection documents to your bank at the time of shipment.*
5. *Letters of credit. Hach has a streamlined system of guidelines to speed processing of international letters of credit.*

Be sure to request the "Letter of Credit Instructions" before contacting your bank. Ask your Hach representative for assistance in setting up the best method of payment for your circumstances.

Tax-Free

Avoid paying unnecessary taxes and surcharges. Orders destined for export are not charged U.S., state, or local taxes when routed through the International Department. Resale certificates or proof of export and destination may be required.

Shipping and Transportation

Among the services Hach can provide to customers taking delivery at an international location are:

Packaging and Compliance Documents

Your shipments may contain materials which are regulated as hazardous. Hach can provide packaging, marking, labeling, and documentation for safe and legal transport via ocean or air. Wooden crating is available at an additional charge.

Forwarder and Carrier Selection

U.S. and international regulations mandate the use of only those forwarders, carriers, and brokers who have demonstrated or attested to Hach that they have the necessary training to handle Hach shipments in total compliance with applicable regulations. Customers who are planning to use a forwarder, carrier, or broker should first check with Hach to assure that the forwarder, carrier, or broker selected is qualified to handle Hach products. Hach reserves the right to refuse to tender shipments to forwarders, carriers, or brokers who are not certified to handle hazardous materials shipments.

Tracking and Claims

We take extreme care to fill and package your orders properly. If errors or damages do occur, file a report with your carrier immediately and contact the International Department at Hach.

Continued on next page.

Returns

Normal business transactions inevitably require an occasional return of merchandise for exchange or credit. To expedite your international return shipments, please follow the return procedure outlined here:

1. *To return merchandise or to return an instrument for service (whether or not under warranty), first contact the International Department to inform them that you wish to return an item.*
2. *Upon authorization, Hach will send return information or "Import Routing Instructions." This information will give you the details you need for preparing, shipping, and documenting the return goods.*
3. *Please use the Import Routing Instructions to create a commercial invoice before returning to Hach. Return shipments not accompanied by or deviating from the Import Routing Instructions may be lost, delayed in transport, or refused upon arrival at Hach Company.*

Terms for Return Shipments. Return shipments must meet the following requirements to be accepted or credited:

- *Products must be returned in the original packaging, with labels intact and not defaced. All items returned are inspected to determine credit value. Credit will only be issued on product which is returned in like-new condition. If items returned are not received in like-new condition they will be disposed of and credit will not be issued.*
- *Freight charges and U.S. Customs clearance charges and duties associated with return merchandise are the responsibility of the customer. Hach will not accept "freight collect" shipments unless prior authorization is obtained.*
- *Hach can only authorize returns for unopened chemicals. All chemicals should be packaged and shipped in compliance with the regulations of the U.S. Department of Transportation and other international regulatory organizations' guidelines, appropriate to the mode of transportation used for the original shipment. Hach Company will provide complete instructions with your Import Routing Instructions.*

Warranties

Hach warrants most products against defective materials or workmanship for at least one year from the date of shipment; longer warranties may apply to some items.

HACH WARRANTS TO THE ORIGINAL BUYER THAT HACH PRODUCTS WILL CONFORM TO ANY EXPRESS WRITTEN WARRANTY GIVEN BY HACH TO THE BUYER. EXCEPT AS EXPRESSLY SET FORTH IN THE PRECEDING SENTENCE, HACH MAKES NO WARRANTY OF ANY KIND WHATSOEVER WITH RESPECT TO ANY PRODUCTS. HACH EXPRESSLY DISCLAIMS ANY WARRANTIES IMPLIED BY LAW, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

LIMITATION OF REMEDIES: Hach shall, at its option, replace or repair the nonconforming products or refund the price paid for the product. THIS IS THE EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

LIMITATION OF DAMAGES: IN NO EVENT SHALL HACH BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND FOR BREACH OF ANY WARRANTY, NEGLIGENCE, ON THE BASIS OF STRICT LIABILITY, OR OTHERWISE.

Catalog descriptions, pictures, and specifications, although accurate to the best of Hach's knowledge, are not a guarantee or warranty.

Warranty of products destined for shipment outside the United States applies to the original purchaser only. Authorized Hach distributors normally extend a similar warranty to customers who purchase Hach products from them.

Limits of Use

Hach products are sold only for the purposes identified in Hach catalogs and literature, and are not intended for any other purpose. Hach products sold in this catalog are not intended to be used as drugs, food additives, foods, or cosmetics, whether for humans or animals. Products that are intended for research and development use may not be used in a manufacturing process or in manufactured products. Any warranty granted by Hach is void if products are not used as intended.

Find it here.. buy it today on **www.hach.com**
24 Hours a Day–7 Days a Week.



Order Online

- Secure and safe online ordering
- Create quotes with 60-day product price hold
- Create pre-scheduled reagent deliveries
- Quick product add to order
- View all orders online and check status

Live Help

- Get technical support on products and applications
- Help with finding product information
- Assistance with product ordering
- Quickly engage with lab, process, and customer service operators

(Available only in U.S.)



Web Tools

- Express order entry
- MSDS Downloads
- Certificate of analysis download
- Reagent expiration date lookup
- Invoice request for registered users

Online ordering valid to U.S. customers only, for products to be used in the United States.

Hach expertise delivered to your inbox from **hach.com**

Sign up to get the latest Hach news, products, and information to help with your application needs.

- Receive product news and announcements specific to your industry/application
- Sign-up for any of our popular "application-focused" Hach.Communicator email newsletters
- Receive special promotions and Hach product offers
- Stay informed of Seminars, Webcasts, and events



Simply go to: **www.hach.com/email-request** and sign-up!

HACH Hach O

Drinking Water HACH.COMMUNICATOR

Comparison of On-Site Chlorine Analysis Methods and Instrumentation — Amperometric vs. Colorimetric

Amperometric Historically, both amperometric and colorimetric technologies have been used widely for monitoring free and total chlorine residual concentrations within water treatment processes and distribution systems. However, the accuracy of the amperometric sensors and the necessity to regularly calibrate them against accepted methods brings into question their suitability for regulatory reporting.

Colorimetric To help determine the best applications for each, our team tested both amperometric and colorimetric systems under varying conditions in controlled lab settings and on-site at multiple water treatment facilities. The results and conclusions from this testing were presented at Hach's Virtual Trade Show in early November and at Sweets at the Water Quality Technology Conference (On-Site Analysis session) in mid-November. Both presentations included the bench testing and on-site case studies performed to evaluate the accuracy of the amperometric technology for measuring chlorine residual concentrations.

View the delivered Virtual Trade Show presentation, sign in as an attendee and navigate to the "Presentation Center" to view the recorded presentation and download the slides. The presentation is approximately 40 minutes long. Available until 02/02/10.

For a more thorough analysis, download the original transcript on which the presentation was based.

Events and Training Hach's Virtual Trade Show is the perfect time to download and review information from our Drinking Water Industry Guide.

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Save More with Hach's Differential pH Technology

We don't make money grow on trees, but Hach's breakthrough Differential pH Technology does provide these money-saving features:

- Purchase only one differential pH sensor over three years versus buying a combination probe every six months.
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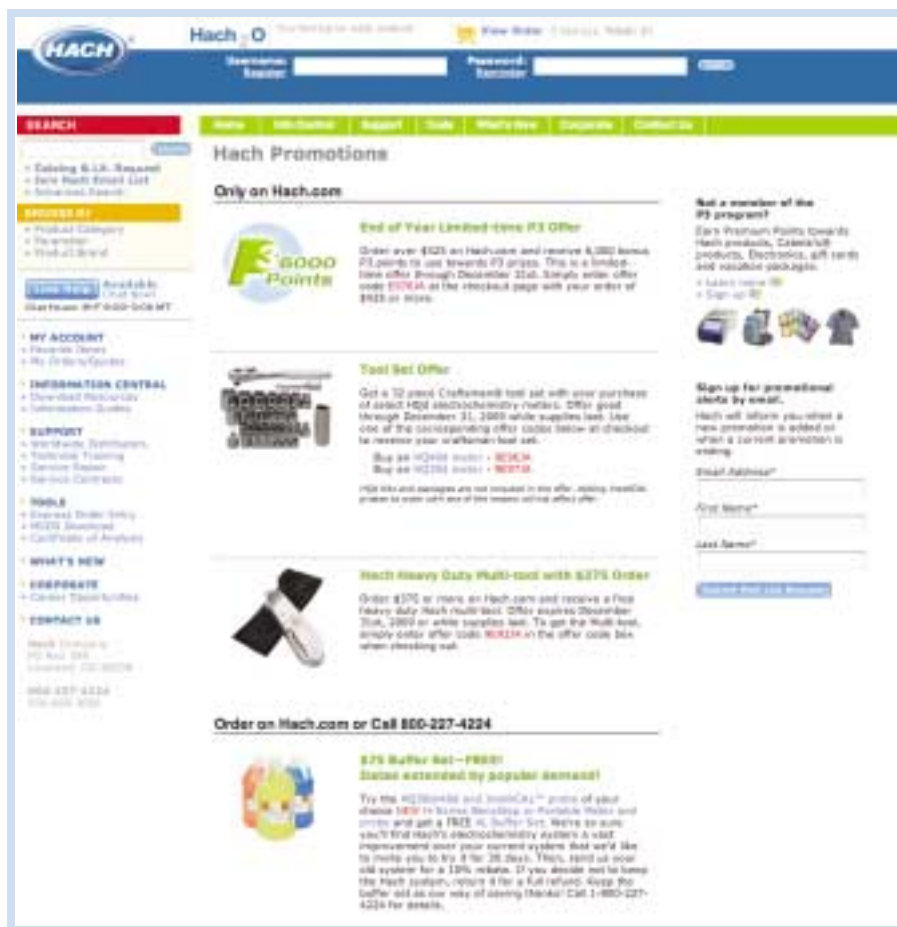
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Many of our courses focus on basic laboratory practices and methods, which include electrochemical (pH, conductivity, dissolved oxygen, etc.), colorimetry (chlorine, fluoride, phosphate, nitrogen species, metals, TOC, etc.), turbidity measurement and titrations (alkalinity, hardness, chlorine, etc.). Advanced courses address more complex methods including digital applications. HTTC's application-based, hands-on training classes are available to fit every budget:



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- For more information, call 1-800-227-4224 x2344 or email the Hach Technical Training Center at httc@hach.com



Hach's knowledgeable instructors, each with extensive experience in instruction and water analysis, can increase the skill and confidence of your operators through practical, hands-on training with Hach instrumentation.

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Service Selection Guide

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Hach EPA Compliant Methods

EPA-Approved Methods

The EPA has evaluated and approved new technological methods developed by Hach Company. All EPA-Approved methods are cited in the Federal Register and compiled in the Code of Federal Regulations at 40 CFR 136 and CFR 141.

EPA-Accepted Methods

The EPA has reviewed Hach methods and accepted them for use in compliance monitoring. These methods are defined by EPA as Acceptable versions of previously approved methods. These methods are generally not published in the Federal Register or in the Code of Federal Regulations. A facsimile of the EPA- Acceptance letter is available upon request.

Hach Equivalent Methods

All EPA-Approved methods have specification criteria built into their procedural steps. When an approved or accepted EPA method has been packaged by Hach from the EPA reference method as a test method that meets or exceeds these specification criteria, these methods are deemed to be equivalent for use in EPA compliance monitoring (40 CFR 136.6). EPA does not normally issue equivalence letters of packaged reference methods. Hach maintains the formulation, procedure, and data demonstrating equivalency and is available upon request.

Hach Approved Methods

These methods may be used for compliance monitoring. They have either obtained an EPA Approval or Acceptance letter, or the method is a packaged product that follows an EPA Reference method and is deemed Equivalent by Hach. With any method used for compliance reporting, always consult with your local regulatory authority.



Analyte	Sample Matrix†	Hach Method	Approval Type	Reference Method	See Page
Acidity, as CaCO ₃	WW	8010	Accepted	SM 2310 B(4a)	130
Acidity, Methyl Orange, Digital Titration	WW	8201	Equivalent	SM 2310 B(4a)	130
Acidity, Phenolphthalein, Digital Titration	WW	8202	Equivalent	SM 2310 B(4a)	130
Alkalinity, Digital Titration	WW	8203	Equivalent	SM 2320 B	132
Alkalinity, Titration	DW	8221	Equivalent	SM 2320 B	132
Ammonia as Nitrogen	WW	10205	Equivalent	EPA 350.1, SM 4500-NH ₃ G or H	134
Ammonia as Nitrogen	WW	10205	Equivalent	EPA 350.1, SM 4500-NH ₃ G or H	134
Ammonia as Nitrogen	WW	10205	Equivalent	EPA 350.1, SM 4500-NH ₃ G or H	134
Ammonia Nitrogen, Electrode	WW	10001	Equivalent	SM 4500-NH ₃ D, E, F, or G	47
Ammonia Nitrogen, Known Addition, Electrode	WW	10002	Equivalent	SM 4500-NH ₃ D, E, F, or G	47
Ammonia, as Nitrogen	WW	8038	Accepted	SM 4500-NH ₃ C	134
Arsenic, Total	WW	8013	Accepted	SM 3500-As B or C	137
BOD	WW	8043	Accepted	SM 5210 B	139
Chemical Oxygen Demand	WW	8000	Approved	40 CFR 136	151
Chemical Oxygen Demand	WW	8231	Accepted	EPA 410.3 or SM 5220 C	—
Chemical Oxygen Demand	WW	8000	Equivalent	EPA 410.3 or SM 5220 C	151
Chemical Oxygen Demand	WW	8000	Equivalent	EPA 410.3 or SM 5220 C	151
Chloride, Mercuric Nitrate	WW	8206	Accepted	SM 4500-Cl C	143
Chloride, Mercuric Nitrate, Digital Titration	WW	8206	Accepted	SM 4500-Cl C	143
Chloride, Silver Nitrate	WW	8225	Accepted	SM 4500-Cl B	144
Chlorine, Free	DW	10231	Equivalent	SM 4500-Cl G	145
Chlorine, Free	DW	8021	Accepted	SM 4500-CL G	145-147
Chlorine, Free Amperometric Titration	DW	8334	Equivalent	SM 4500-CL D	145
Chlorine, Free Amperometric Titration	WW	8334	Equivalent	SM 4500-CL D	145
Chlorine, Free & Total	WW	10232	Equivalent	SM 4500-Cl G	145
Chlorine, Total Amperometric Forward Titration	DW	10026	Equivalent	SM 4500-CL D	146

†DW = Drinking Water; SS = Sewage Sludge; SW = Surface Water; WW = Wastewater

Hach EPA Compliant Methods

The Hach Difference

Analyte	Sample Matrix†	Hach Method	Approval Type	Reference Method	See Page
Chlorine, Total Residual	WW	8167	Accepted	SM 4500-Cl G	145, 147
Chlorine, Total Residual	DW	8167	Accepted	SM 4500-Cl G	145, 147
Chlorine, Total Residual	DW	8168	Accepted	SM 4500-Cl D	146
Chlorine, Total Residual	WW	8168	Accepted	SM 4500-Cl D	146
Chlorine, Total Residual, Amperometric Back Titration	WW	10025	Accepted	SM 4500-Cl C	146
Chlorine, Total Residual, DPD	WW	10014	Accepted	SM 4500-CL G	—
Chlorine, Total, DPD	DW	8370	Accepted	SM 4500-CL G	144
Chromium VI	WW	10218/10219	Equivalent	SM 3500-Cr D	149
Chromium VI, Dissolved	WW	8023	Accepted	SM 3500-Cr B or D	149
Coliform, Fecal, EC Medium with/MUG	DW	10018	Equivalent	SM 9221 D	229
Coliform, Total and <i>E. coli</i> , m-ColiBlue24	DW	8433	Approved	40 CFR 141.21, page 349	229
Coliforms, <i>E. coli</i> , m-TEC	SW	8367	Equivalent	EPA 1103.1	230
Coliforms, Fecal and Total, MPN, A1 Medium	DW	8368	Equivalent	SM 9221 B/D	230
Coliforms, P/A	DW	8319	Equivalent	SM 9221 D	235
Color, APHA Pt-CO	DW	8025	Equivalent	SM 2120 B	153
Conductivity	DW	8160	Accepted	SM 2510 B	22-54
Copper, Bicinchoinate Procedure	WW	8506	Approved	SM 3500-CU C or E	154
<i>E. coli</i> , m-ColiBlue24	WW	10029	Approved	Federal Register March 26, 2007	230
<i>E. coli</i> , m-ColiBlue24, enumeration	SW	10029	Approved	68 FR 43274, July 21, 2003	230
<i>E. coli</i> , m-ColiBlue24, P/A	DW	10029	Approved	40 CFR 141.21, page 349	230
Fecal Coliform, LT Broth and EC	SW	8001A	Accepted	SM 9221 E	230
Fecal Coliform, LT Broth and EC	SS	8001A	Accepted	SM 9221 E	230
Fecal Coliform, Sludge, MPN, A1 Medium	WW	10028	Equivalent	SM 9221 D/E	230
Fecal Coliform, Sludge, MPN, LTB/EC Medium	WW	10027	Equivalent	SM 9221 D/E	236
Fluoride	DW	8029	Accepted	SM 4500-F C	158-159
Fluoride, Electrode	DW	8323	Equivalent	SM 4500-F C	46
Fluoride, Electrode	WW	8323	Equivalent	SM 4500-F C	46
Fluoride, SPADNS	WW	8029	Accepted	SM 4500-F D	158-159
Fluoride, SPADNS	DW	8029	Accepted	SM 4500-F D	158-159
Fluoride, SPADNS2, Arsenic Free	WW	10225	Equivalent	SM 4500-F D	158-159
Fluoride, SPADNS2, Arsenic Free	DW	10225	Equivalent	SM 4500-F D	158-159
Fluoride, Total	WW	8029	Accepted	SM 4500-F-B or C	158-159
Hardness, Calcium, Digital Titration	WW	8204	Equivalent	SM 3500-Ca D	141
Hardness, Calcium, Titration	WW	8222	Equivalent	SM 3500-Ca D	141
Hardness, Calcium, Titration	DW	8222	Equivalent	SM 3500-Ca D	141
Hardness, Total	WW	8226	Accepted	SM 2340 B or C	161
Hardness, Total, Digital Titration	WW	8213	Equivalent	SM 2340 B or C	161-162
Hydrogen Ion, pH	WW	8156	Accepted	SM 4500-H+ B	—
Iron, Total	WW	8008	Approved	Federal Register June 27, 1980	166-167
Iron	DW	10229	Equivalent	SM 3500-Fe B, D	166
Lead, Total	WW	8033	Accepted	SM 3500-Pb B or D	168
Manganese	WW	8034	Approved	40 CFR 136	169
Nickel, Total	WW	8037	Accepted	SM 3500-Ni D	172

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Continued on next page.

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Hach EPA Compliant Methods

The Hach Difference

Analyte	Sample Matrix [†]	Hach Method	Approval Type	Reference Method	See Page
Nitrate, ISE	DW	8324	Accepted	SM 4500-NO ₃ D	46
Nitrite as Nitrogen	WW	10207	Equivalent	SM 4500-NO ₂ B	175
Oil and Grease, Gravimetric	WW	10056	Equivalent	EPA 1664 or SM 5520 B	177
Oxygen, Dissolved, Luminescence	WW	10360	Approved*	ASTM D888-05 or Hach Method 10360	24-45
Oxygen, Dissolved, Polarographic	WW	8157	Accepted	SM 4500-O G	42-45
Oxygen, Dissolved, Winkler	WW	8229	Accepted	SM 4500-O C	157
Ozone, Colorimetric	DW	8311	Equivalent	SM 4500-O ₃ B	178
pH	DW	8156	Accepted	EPA 151.1, 2; SM 4500-H+ B	24-47
Phenols, 4AAP Procedure	WW	8047	Accepted	EPA 420.1	181
Phosphate, Ortho	WW	8048	Accepted	SM 4500-P E	183-184
Phosphate, Ortho	WW	10209	Equivalent	SM 4500-P E	183
Phosphate, Ortho	WW	10209	Equivalent	SM 4500-P E	183
Phosphate, Ortho	WW	10209	Equivalent	SM 4500-P E	183
Phosphorus, Total	WW	10209	Equivalent	SM 4500-P E	183
Phosphorus, Total	WW	10209	Equivalent	SM 4500-P E	183
Phosphorus, Total	WW	10209	Equivalent	SM 4500-P E	183
Silica, Colorimetric	DW	8186	Equivalent	SM 4500-Si E; SM 4500-SiO ₂ E	187
Solids, Dissolved	WW	8277	Equivalent	SM 2540 C	189
Solids, Filterable	WW	8163	Equivalent	SM 2540 C	189
Solids, Settleable	WW	8165	Equivalent	SM 2540 F	189
Solids, Total	WW	8271	Equivalent	SM 2540 B	189
Solids, Total Non-filterable	WW	8158	Accepted	SM 2540 D	189
Solids, Volatile, Non-filterable	WW	8164	Equivalent	EPA 160.4	189
Specific Conductance	WW	8160	Accepted	EPA 120.1; SM 2510 B	24-45
Sulfate as SO ₄	WW	8051	Accepted	ASTM D516-90, O ₂	190
Sulfide as S	WW	8131	Accepted	SM 4500-S ₂ E or F	190
Sulfite as SO ₃	WW	8071	Accepted	SM 4500-SO ₃ B	191
Sulfite, Digital Titration	WW	8216	Equivalent	SM 4500-SO ₃ B	191
Total and Fecal Coliforms, m-Endo	DW	8074	Equivalent	SM 9222 A/D	229
Total and Fecal Coliforms, m-Endo	SW	8074	Equivalent	SM 9222 A/D	229
Total Coliform, LT Broth and BGB Broth	WW	8001	Accepted	SM 9221 B	229
Turbidity	DW	8195	Approved	40 CFR 141	82-84
Turbidity	DW	10133	Approved	40 CFR 141	82-84
Turbidity	DW	GLI	Approved	40 CFR 141	—
Zinc	WW	8009	Approved	40 CFR 136	197

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