DR/800 Series Colorimeters Multi-parameter analysis in the palm of your hand!

Features and Benefits

Choose from Three Models

Depending on your testing needs, you can select a DR/820, DR/850 or DR/890 Colorimeter, preprogrammed to test for at least 20, 50 or 90 parameters, respectively. All three models include the same convenient features: auto-wavelength selection, datalogging capabilities and user-generated calibrations. Refer to the table on pages 3-4 to select the colorimeter that tests the parameters you require.

These durable, hand-held, filter photometers are designed specifically for the rigors of on-site testing, with rugged components and waterproof, dustproof, chemical-resistant housings. DR/800 Series Colorimeters offer simple, push-button program selection and step-by-step prompts that guide users through the testing procedure. These instruments are equally appreciated by experienced analysts who value test efficiency and by operators who require ease of use with accurate results.

Advanced Features Add Value

- Easy-to-use software offers push-button method selection, automatic wavelength selection and a preprogrammed method timer. Result, units, and parameter name are displayed immediately, with no countdown. The large digit display is very easy to read.
- The DR/800 retains the selected method until a new method is entered, even if it is turned off and then back on. This allows a series of analyses to be performed for the same parameter without reselecting the method.
- Datalogging capability includes push-button record management. Easily store data in the field for later access, with no delay in testing. The instrument stores up to 99 measurements in an internal, non-volatile memory. Data stored includes date/time, parameter, program number, concentration/absorbance/%T, sample number, and instrument serial number.
- Results are displayed directly in units of concentration, absorbance, or % transmittance. In many methods, concentration in alternate chemical forms is also available. For example, phosphate readings are available as P, PO₄ and P₂O₅. Displayed results can be changed from one form to the next at the touch of a button.
- User-program feature allows users to generate up to 10 custom procedures, with up to 12 data points each, and store them in a non-volatile instrument memory for later use.
- Advanced software includes automatic correction for reagent blanks and the option to fine-tune calibration curves with the standard adjust feature.
- Batteries provide self-contained power for field-testing.

DR/800 Series Colorimeters combine ease of use, multiple testing capabilities and field readiness. Analysis requires minimal time and preparation, with results displayed directly on the large liquid-crystal display in concentration, percent transmittance, or absorbance units.

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Accessories Simplify Data Management

The Data Transfer Adapter (DTA) fits on the colorimeter and accepts data sent from the instrument's infrared LED transmitter. The DTA converts data to a standard RS-232 format and connects directly to a computer or printer. Data can be printed or downloaded conveniently, after storage or during collection.

DR/800 Series Colorimeters are compatible with HachLink™ Software, a Microsoft® Windows® compatible application that links instrument and computer, providing a convenient means of accessing and managing test data. Information including date/time, parameter, concentration/absorbance/%T, sample number, operator identity, and instrument serial number is accepted and stored in either text or tabular (spreadsheet) format, and can be easily transferred to popular spreadsheet or word-processing applications.

Easy Quality Control

DR/Check™ ABS Standards are the optional choice to verify the performance of your DR/800 Colorimeter in seconds. Standards are formulated with neutral density gel that produces similar absorbance readings at any wavelength. For all parameters at all wavelengths, running three secondary absorbance standards will verify your instrument's calibration easily, anytime.

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Features and Benefits continued

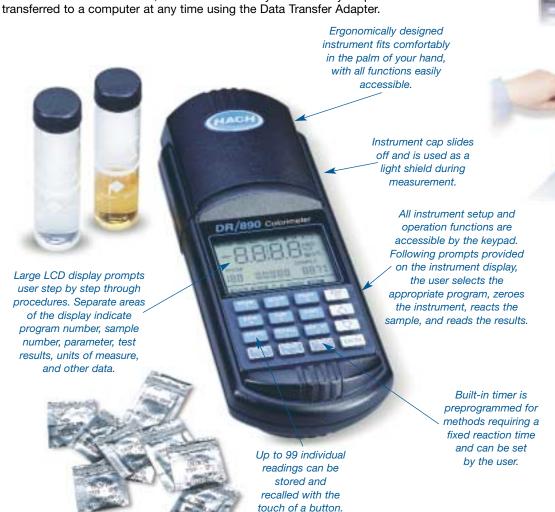
Affordable COD Analysis

All three models include Hach's Manganese III COD procedure (mercury-free version). The DR/850 Colorimeter also performs our traditional USEPA-approved high-range COD procedure, and the DR/890 Colorimeter performs both low-range and high-range USEPA-approved COD procedures. An adapter suitable for COD vials and Test 'N Tube™ (TNT) vials is included with each instrument.

Push-Button Operation Speeds Analysis

Using prepared reagents, testing is normally accomplished in just a few minutes, following this simple procedure:

- When turned on, the instrument automatically recalls the last program used. To change programs, press the program key and enter the program number from the procedures manual. The instrument displays the program number, parameter, units, and the zero icon.
- 2. Prepare the blank (zero) according to the procedure, place it in the instrument, and press the zero key. The instrument displays the zero and the read icon.
- 3. Prepare the sample according to the procedure. (An internal timer is preprogrammed for methods that require a fixed reaction time. Timer duration is automatically displayed for the selected procedure; simply start the timer at the start of the reaction.) After reacting the sample, place the sample cell in the instrument and press the read key.
- 4. The instrument displays the result in concentration units. The user can also toggle the ABS %T key to display absorbance or % transmittance. Some results can be displayed in alternate chemical forms (e.g., Cr may be displayed as mg/L CrO₄ or Cr₂O₇). Scroll through available forms by pressing the CONC key.
- 5. Save the results by pressing the store key. The instrument will store up to 99 measurements in an internal, non-volatile memory. Results may be printed or transferred to a computer at any time using the Data Transfer Adapter.



DR/800 Colorimeters Quick Reference Guide

Parameters marked "EPA" are EPA-approved, accepted, or equivalent for reporting purposes; sample pretreatment may be required on some procedures. If no reagent set is listed for a parameter, order needed reagents and supplies separately.

Test	EPA	Method	Number	DRIB90	ORIBED .	DR1820	Product Number
Aluminum		Aluminon	8012	•	•	•	2242000
Ammonia, Nitrogen		Salicylate	8155	•	•		2668000
Ammonia, Nitrogen (Test 'N Tube), LR		Salicylate	10023	•	•		2604545
Ammonia, Nitrogen (Test 'N Tube), HR		Salicylate	10031	•	•		2606945
Ammonia, Free, Nitrogen		Indophenol	10200	•	•		2879700
Benzotriazole		UV Photolysis	8079	•			2141299
Bromine		DPD	8016	•	•	•	2105669
Bromine (AccuVac)		DPD	8016	•	•	•	2503025
Carbohydrazide		Iron Reduction	8140	•			2446600
Chloramine, Mono, LR		Indophenol	10171/10200	•	•		2802246
Chlorine, Free	•	DPD	8021	•	•	•	2105569
Chlorine, Free (AccuVac)	•	DPD	8021	•	•	•	2502025
Chlorine, Free (Test 'N Tube)		DPD	10102	•	•	•	2105545
Chlorine, Free, HR	•	DPD	10069	•	•	•	1407099
Chlorine, Total	•	DPD	8167	•	•	•	2105669
Chlorine, Total (AccuVac)	•	DPD	8167	•	•	•	2503025
Chlorine, Total (Test 'N Tube)		DPD	10101	•	•	•	2105645
Chlorine, Total, HR	•	DPD	10070	•	•	•	1406499
Chlorine Demand/Requirement		DPD	10223	•	•	•	_
Chlorine Dioxide, DPD		DPD/Glycine	10126	•	•	•	2770900
Chlorine Dioxide, DPD (AccuVac)	•	DPD/Glycine	10126	•	•	•	2771000
Chlorine Dioxide, MR		Direct Reading	8345	•			
Chromium, Hexavalent		1,5 Diphenylcarbohydrazide	8023	•			1271099
Chromium, Hexavalent (AccuVac)		1,5 Diphenylcarbohydrazide	8023	•			2505025
Chromium, Total		Alkaline Hypobromite Oxidatio		•			2242500
COD, LR		Dichromate	8000	•			2125825
COD, HR		Dichromate	8000		_		2125925
COD, HR+	•	Dichromate	8000	•	•		2415925
COD, RR+		Manganese III	10067	•	•		2623425
		<u> </u>		_	•	•	
Copper, LR		Porphyrin	8143				2603300
Copper	•	Bicinchoninate	8506	-			2105869
Copper (AccuVac)		Bicinchoninate	8026	•			2504025
Cyanide		Pyridine-Pyrazalone	8027	•	•		2430200
Cyanuric Acid		Turbidimetric	8139	•	•	•	246066
DEHA (Diethylhydroxylamine)		Iron Reduction	8140	•			2446600
Detergents (Surfactants)		Crystal Violet	8028	•	•		2446800
Dissolved Oxygen (AccuVac), LR		Indigo Carmine	8316	•	•		2501025
Dissolved Oxygen (AccuVac), HR		HRDO	8166	•	•	•	2515025
Erythorbic Acid (Isoascorbic Acid)		Iron Reduction	8140	•			2446600
Fluoride, Arsenic Free		SPADNS 2	10225	•	•		2947549
Fluoride, Arsenic Free (AccuVac)		SPADNS 2	10225	•	•		2527025
Fluoride		SPADNS	8029	•	•		44449
Fluoride (AccuVac)		SPADNS	8029	•	•		2506025
Hardness, Ca & Mg		Calmagite Colorimetric	8030	•	•	•	2319900
Hydrazine		p-Dimethylaminobenzaldehyde	e 8141	•			179032
Hydrazine (AccuVac)		p-Dimethylaminobenzaldehyde	e 8141	•			2524025
Hydroquinone		Iron Reduction	8140	•			2446600
Iron		FerroZine	8147	•			230166
Iron, Ferrous		1,10 Phenanthroline	8146	•	•	•	103769
Iron, Ferrous (AccuVac)		1,10 Phenanthroline	8146	•	•	•	2514025
Iron, Total		FerroMo	8365	•	•		2544800
Iron, Total		TPTZ	8112	•	•		2608799
Iron, Total (AccuVac)		TPTZ	8112	•	•		2510025
Iron, Total	•	FerroVer	8008	•	•	•	2105769
Iron, Total (AccuVac)	•	FerroVer	8008	•	•	•	2507025
Isoascorbic Acid (Erythorbic Acid) (ISA)		Iron Reduction	8140	•			2446600
Manganese, LR		PAN	8149	•			2651700

DR/800 Colorimeters Quick Reference Guide continued

Test	EPA	Method	Number	DR1890	DR1850	DR1820	Product Number
Manganese, HR	•	Periodate Oxidation	8034	•	•	•	2430000
Methylethylketoxime (MEKO)		Iron Reduction	8140	•			2446600
Molybdenum, Molybdate, LR		Ternary Complex	8169	•	•		2449400
Molybdenum, Molybdate, HR		Mercaptoacetic Acid	8036	•			2604100
Molybdenum, Molybdate (AccuVac), HR		Mercaptoacetic Acid	8036	•			2522098
Nickel		PAN	8150	•			2242600
Nitrate, Nitrogen, LR		Cadmium Reduction	8192	•	•		2429800
Nitrate, Nitrogen, MR		Cadmium Reduction	8171	•	-		2106169
Nitrate, Nitrogen (AccuVac), MR		Cadmium Reduction	8171	•			2511025
Nitrate, Nitrogen (Test 'N Tube), HR		Chromotropic Acid	10020	•			2605345
Nitrate, Nitrogen, HR		Cadmium Reduction	8039	•			2106169
Nitrate, Nitrogen (AccuVac), HR		Cadmium Reduction	8039	•	•	•	2511025
Nitrite, Nitrogen, LR	•	Diazotization	8507		•		2107169
				•	•		2512025
Nitrite, Nitrogen (AccuVac), LR		Diazotization	8507	•	•	•	
Nitrite, Nitrogen (Test 'N Tube), LR	•	Diazotization	10019		•	•	2608345
Nitrite, Nitrogen, HR		Ferrous Sulfate	8153	•			2107569
Nitrogen, Ammonia (See Ammonia, Nitrogen)		Demonstrate D' "	400=1				00700:5
Nitrogen, Total (Test 'N Tube), LR		Persulfate Digestion	10071	•			2672245
Nitrogen, Total (Test 'N Tube), HR		Persulfate Digestion	10072	•			2714100
Nitrogen, Total Inorganic (TIN) (Test 'N Tube)		Titanium Trichloride Reduction	10021	•	•		2604945
Nitrogen, Total Kjeldahl (TKN)		Nessler		•			2495300
Organic Carbon, Total (See TOC)							
Oxygen Demand, Chemical (See COD)							
Oxygen, Dissolved (See Dissolved Oxygen)							
Oxygen Scavengers (See specific compounds)							
Ozone (AccuVac), LR		Indigo	8311	•	•		2516025
Ozone (AccuVac), MR		Indigo	8311	•	•		2517025
Ozone (AccuVac), HR		Indigo	8311	•	•		2518025
pH		Colorimetric Phenol Red	10076	•	•	•	2657512
Phosphonates		Persulfate UV Oxidation	8007	•	•		2429700
Phosphorus, Reactive	•	PhosVer 3	8048	•	•		2106069
Phosphorus, Reactive (AccuVac)	•	PhosVer 3	8048	•	•		2508025
Phosphorus, Reactive (Test 'N Tube)	•	PhosVer 3	8048	•	•		2742545
Phosphorus, Reactive		Amino Acid	8178	•	•	•	2244100
Phosphorus, Reactive		Molybdovanadate	8114	•			2076032
Phosphorus, Reactive (AccuVac)		Molybdovanadate	8114	•			2525025
Phosphorus, Reactive (Test 'N Tube), HR		Molybdovanadate	8114				2767345
Phosphorus, Acid Hydrolyzable (Test 'N Tube)		PhosVer 3 with Acid Hydrolysis	8180	•	•		2742645
Phosphorus, Total (Test 'N Tube)	•	PhosVer 3 with Acid Persulfate Digestion	8190	•	•		2742645
Phosphorus, Total (Test 'N Tube), HR		Molybdovanadate with Acid Persulfate Digestion	10127	•			2767245
Silica, LR		Heteropoly Blue	8186	•	•		2459300
Silica, HR		· ·	8185	•			2459300
	•	Silicomolybdate				_	
Sulfate		SulfaVer 4	8051	•	•	•	2106769
Sulfate (AccuVac)	•	SulfaVer 4	8051	•		•	2509025
Sulfide	•	Methylene Blue	8131	•	•		2244500
Surfactants (See Detergents)		Di i	225				
Suspended Solids		Photometric	8006	•	•		_
Tannin & Lignin		Tyrosine	8193	•	•		2244600
TOC (Total Organic Carbon), LR		Direct Method	10129	•	•		2760345
TOC (Total Organic Carbon), MR		Direct Method	10173	•	•		2815945
TOC (Total Organic Carbon), HR		Direct Method	10128	•	•		2760445
Tolyltriazole		UV Photolysis	8079	•			2141299
Toxicity		ToxTrak	10017	•	•		2597200
Volatile Acids		Esterification	8196	•	•	•	2244700
Zinc		Zincon	8009	•	•		2429300

Specifications*

Wavelength Selection

Auto Select

Photometric Range

0 to 2 Abs

Operational Modes

Concentration, Abs, %T

External Outputs

Infrared to RS-232 Serial using the optional Data Transfer Adapter

Datalogging

99 sample readings (each reading includes date/time, parameter, program number, concentration, absorbance, % transmittance, sample number, instrument serial number)

User Programs

10 user-entered programs, 12 data points each

Display

Large liquid-crystal display (LCD) shows results, parameter name, program number and units

Dimensions

23.6 x 8.7 x 4.7 cm (9.3 x 3.4 x 1.9")

Weight

470 g (1 lb)

Power

4 AA alkaline or rechargeable alkaline batteries, nominal life of six months

Storage Temperature Range

-40 to 60°C (-40 to 140°F)

Operating Temperature Range

0 to 50°C (32 to 122°F)

Environmental

Meets IP67 standard, dustproof and waterproof to one meter for 30 minutes

Compliance

European CE Mark

*Specifications subject to change without notice.

Ordering Information

DR/800 Series Colorimeters

Each DR/800 Series Colorimeter includes two 1-in. round sample cells marked at 10, 20 and 25 mL, two 1 cm sample cells, 16 mm COD/TNT adapter, batteries and illustrated instrument and procedure manuals.

4844000 DR/820 Colorimeter **4845000** DR/850 Colorimeter **4847000** DR/890 Colorimeter

Optional Instrumentation

8505900 pH Starter Kit

HQ11d pH meter, gel pH probe with 1 m cable, HQd meter stand, pH Buffer Kit (500 mL), pH storage solution (500 mL), and probe stand.

8506400 pH Ultra Starter Kit

HQ40d meter with A/C power and USB adapters, pH Ultra probe with 1 m cable, HQd meter stand, pH buffer kit (500 mL) and probe stand.

8506100 Conductivity Starter Kit

HQ14d conductivity meter, standard conductivity probe with 1 m cable, HQd meter stand, conductivity standard (1000 μS/cm, 100 mL), and probe stand.

8506000 Complete Water Quality Lab Kit:

DO/pH/Conductivity

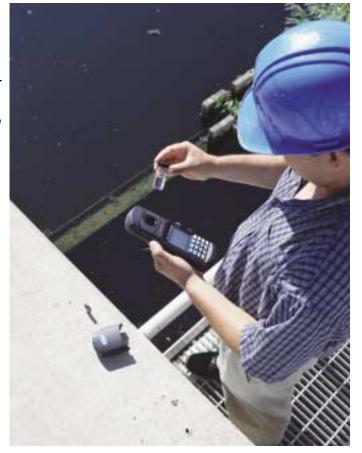
HQ40d meter with A/C power and USB adapters, refillable pH probe with 1 m cable, conductivity probe with 1 m cable, standard LDO probe with 1 m cable, HQd meter stand, pH Buffer Kit (500 mL), pH storage solution (500 mL), conductivity standard (1000 μS/cm, 100 mL), disposable BOD bottle and stopper for calibration, and probe stand.

LTV082.53.44001

DRB200 Reactor for digestion of up to 30 COD/TNT vials

4650000 2100P Portable Turbidimeter

1690001 Digital Titrator



Continued on next page.

Ordering Information continued

CEL/800 Series Portable Laboratories*

The heart of all CEL/800 Laboratories is a DR/800 Series Colorimeter with two sample cells, 16-mm COD/TNT adapter, and illustrated instrument and procedure manuals. Preconfigured labs also include complete reagent sets and all necessary apparatus. Many labs include additional instrumentation to expand your testing capabilities. CEL/800 Portable Labs are housed in durable carrying cases designed to accommodate all equipment comfortably, and to protect and organize the contents.

*Colorimeter Environmental Laboratory

2688500 CEL/890 Advanced Portable Laboratory

Our most versatile portable laboratory, this fully configured system meets the most demanding needs. It includes a full complement of instruments and reagent sets for more than 20 parameters. The Advanced Portable Laboratory includes DR/890 Colorimeter, sensION1 pH Meter, sensION5 Conductivity/TDS Meter, Digital Titrator, illustrated instrument and procedures manuals, reagent sets, and all required apparatus in a rugged carrying case.

2690600 Replacement Reagent Set, complete

2687800 CEL/850 Environmental Water Quality Laboratory

Most important environmental tests can be performed using just one portable laboratory, with everything necessary for determining water quality in the field, and fast, on-the-spot results. The Environmental Water Quality Laboratory includes DR/850 Colorimeter, Digital Titrator, reagent sets, apparatus, and illustrated instrument and procedures manuals in a sturdy field case.

2690800 Replacement Reagent Set, complete

2688100 CEL/890 Advanced Drinking Water Laboratory

The CEL/890 Advanced Drinking Water Laboratory provides complete field capabilities, with instrumentation and tests that cover every major drinking water parameter. The Advanced Drinking Water Laboratory includes DR/890 Colorimeter, sensION1 pH Meter, sensION5 Conductivity/TDS Meter, Digital Titrator, reagent sets, apparatus, illustrated instrument and procedures manuals, and a sturdy field case.

2690200 Replacement Reagent Set, complete

2688000 CEL/850 Basic Drinking Water Laboratory

Designed to include the most commonly tested parameters for drinking water, the CEL/850 Basic Drinking Water Laboratory offers operators basic analytical capabilities in a single convenient package. Monitor influent, finished product, and distribution water quickly and easily. The Basic Drinking Water Laboratory includes DR/850 Colorimeter, sensION5 Conductivity/TDS Meter, reagent sets, apparatus, illustrated instrument and procedures manuals, and a sturdy field case.

2689800 Replacement Reagent Set, complete

2688300 CEL/890 Advanced Wastewater Laboratory

The CEL/890 Advanced Wastewater Laboratory includes the testing capabilities of the DR/890 Colorimeter, providing an analytical platform suited to a wide array of additional optional parameters. The Advanced Wastewater Laboratory includes DR/890 colorimeter, sensION1 pH Meter, reagent sets, apparatus, illustrated instrument and procedures manuals, and a sturdy field case.

2690400 Replacement Reagent Set, complete





CEL/850 Basic Drinking Water Laboratory

Ordering Information continued

2688200 CEL/820 Basic Wastewater Laboratory

Offering broad analytical capabilities to meet the needs for basic wastewater analysis, the CEL/820 Basic Wastewater Laboratory provides accurate results, wherever you need them. The Basic Wastewater Lab includes DR/820 Colorimeter, Pocket PalTM pH tester, reagent sets, apparatus, and illustrated instrument and procedures manuals in a sturdy field case.

2690000 Replacement Reagent Set, complete

2687700 CEL/850 Professional Water Conditioning Laboratory

The CEL/850 Professional Water Conditioning Laboratory features the DR/850 Colorimeter, affording extended testing capabilities with the option of adding more parameters for site or application-specific needs. The Professional Water Conditioning Laboratory includes DR/850 Colorimeter, sensION1 pH Meter, sensION5 Conductivity Meter, Digital Titrator, reagent sets, apparatus, a water softener, and illustrated instrument and procedures manuals in a sturdy field case.

2689600 Replacement Reagent Set, complete

2689100 CEL/820 Water Conditioning Laboratory

The CEL/820 Water Conditioning Laboratory offers the water quality improvement/purification professional a capable instrument and all equipment needed to accomplish fast, accurate testing on-site. The Water Conditioning Laboratory includes DR/820 Colorimeter, TDS Pocket Pal™ Tester, reagent sets, apparatus, a water softener, and illustrated instrument and procedures manuals in a sturdy field case.

2689400 Replacement Reagent Set, complete

2688400 CEL/890 Professional Water Treatment Laboratory

For boiler/cooling water applications. Offering quick, on-the-spot results, the CEL/890 Professional Water Treatment Laboratory covers parameters critical to effective treatment and corrosion prevention. The Professional Water Treatment Laboratory includes DR/890 Colorimeter, sensION1 pH Meter, sensION5 Conductivity/TDS Meter, Digital Titrator, BARTsTM for bacterial detection, reagent sets, apparatus, and illustrated instrument and procedures manuals in a sturdy field case.

2690900 Replacement Reagent Set, complete

2687600 CEL/820 Water, Water Everywhere Education Laboratory

The CEL/820 Water, Water Everywhere Education Laboratory offers one easy-to-store, easy-to-use portable system for a complete range of parameters. Students can easily follow the step-by-step instructions to obtain accurate, high-confidence results. The Water, Water Everywhere curriculum is available for download at www..com. It covers the basics of water quality, the water cycle, and more. CEL/820 Water Water Everywhere Education Laboratory includes DR/820 Colorimeter, reagent sets, apparatus, and illustrated instrument and procedures manuals in a sturdy field case.

2723200 Replacement Reagent Set, complete

2687900 CEL/850 Aquaculture Laboratory

Maintain water quality easily with the portable CEL/850 Aquaculture Laboratory. Fast, on-the-spot results can identify problems early and help determine corrective action. The laboratory includes the sensION[™]1 pH Meter, Digital Titrator, TDS Pocket Pal[™] Tester, reagent sets, apparatus, and illustrated instrument and procedure manuals in a sturdy field case.

2691700 Replacement Reagent Set, complete

2688800 MEL/850 Potable Water Laboratory*

The MEL/850 Potable Water Laboratory offers field testing for the most common water-quality parameters, plus microbiological testing. The laboratory includes the DR/850 Colorimeter, a TDS Pocket Pal™ Tester, a pH Pocket Pal™ Tester, a pocket thermometer, a Portable Incubator, coliform presence/absence testing capabilities, and illustrated instrument and procedures manuals in a sturdy field case.

*Microbiological Environmental Laboratory

Ordering Information continued

Accessories

4849000 Data Transfer Adapter, IR to RS-232, with cable

2763900 DR/Check™ Absorbance Standards for DR/800 verification

4942500 Instrument carrying case (hard sided)

2722000 Instrument carrying case with shoulder strap (soft sided)

4943000 CEL Portable Laboratory carrying case. Roomy field case includes space

for the colorimeter, optional instrumentation, accessories, reagent sets

and apparatus.

4966500 HachLink™ Software Package1938004 Alkaline batteries size AA, pk/4



The optional carrying case provides room for the instrument, all accessories, and additional reagent sets.



Data Transfer Adapter converts infrared signals from the instrument to standard RS-232 protocol. The adapter fits over the instrument in place of the cap and connects directly to a printer or computer.

At, 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.