Product Catalog





2013 | Life Science Research

www.bio-rad.com

BIO-RAD

Contact Information

Worldwide Distributors and Sales Offices

Contact your local Bio-Rad representative for product availability and pricing information. To contact Bio-Rad by phone, fax, or email or to write to us, refer to the inside back cover of this catalog or go to **www.bio-rad.com**.

Contact the Life Science Group Headquarters at 2000 Alfred Nobel Drive, Hercules, CA 94547 USA or 510-741-1000.

My Representative		Contact	
Name		Name	
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Notes		Notes	

Online Services

Visit **Bio-Rad.com** to access Bio-Rad's online services for life science research.

- Searchable product catalog
- Extensive product and application literature library
- Software demonstrations and downloads
- Material safety data sheets (MSDSs) available in multiple languages
- Request quotations
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- Requests for Certificates of Analysis
- Quick search on MSDSs, FAQs, instruction manuals, and literature
- Recommended websites to support products and applications
- Contact locator for technical support representatives worldwide

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- View list prices and Web specials
- Request a quote — submit your request to your local sales office
- Shop online with a purchase order or credit card*
- View purchase history and reorder from previous orders
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* Credit cards accepted in select countries only.

Due to the nature of new products, some items in this catalog may not be available for immediate purchase. Some items may not be available for purchase in all countries. Contact your local Bio-Rad sales representative for more information.

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Note: Due to the nature of new products, some items in this catalog may not be available for immediate purchase. For more information, contact your local Bio-Rad sales representative.

Ordering and General Information

About Bio-Rad Laboratories, Inc.

Bio-Rad was founded almost 60 years ago to serve the needs of research, industry, and clinical laboratories. Through a network of more than 30 wholly owned subsidiary offices and local distributors, Bio-Rad offers a broad range of products and services to life science and clinical diagnostics researchers worldwide.

For more information on Bio-Rad Laboratories, Inc. and its product groups, which include Life Science Research, Life Science Education, Process Separations, Food/Animal/Environment Testing, Clinical Diagnostics, and Spectroscopy, visit us on the Web at **www.bio-rad.com**.

How to Contact Bio-Rad

For orders, quotations, or information, see **www.bio-rad.com** or contact your local Bio-Rad office. Or to find the office nearest you, refer to the inside back cover of this catalog. For the most current updates to country-specific contact information, visit us on the Web at **www.bio-rad.com**.

How to Place an Order or Request a Quote

Quotation requests can be submitted online at **www.bio-rad.com** from anywhere in the world for processing through your local sales office. Alternatively, contact your local office to discuss your quotation needs.

Online ordering, access to pricing, and related services are available in an increasing number of countries. Check for availability at **www.bio-rad.com**. Online ordering is available in the following countries, with more being added regularly:

- Australia
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- Belgium
- Brazil
- Canada
- Denmark
- Finland
- France
- Germany
- Iceland
- India
- Israel
- Italy
- Luxembourg
- Mexico
- The Netherlands
- New Zealand
- Norway
- Portugal
- Singapore
- Spain
- Sweden
- Switzerland
- United Kingdom
- United States

Information Needed

When placing orders, please provide the following information:

- Your Bio-Rad customer account number
- Your billing and shipping addresses
- Your purchase order number
- Product catalog number, description, and quantity

Special Orders, Custom Services, and Bulk Packaging

Bio-Rad provides custom orders and services. Many products can also be supplied in bulk; request a quotation for price and delivery information for bulk orders. Contact your local Bio-Rad office for more information.

Prices and Terms

Prices

For current prices, refer to an accompanying price list (selected countries) or contact your local Bio-Rad representative. Prices are FCA our shipping point, unless otherwise quoted, and are subject to change without notice. Prices in effect when your order is received will apply. Freight charges and any special packaging charges, when they apply, will be added to the invoice. Local pricing may also be available on the Web at **www.bio-rad.com** for customers in many countries.

Perishable and Hazardous Materials Surcharges

Orders for products classified as dangerous goods and those requiring special packaging with blue ice or dry ice may be assessed additional charges. Contact your local sales office for more information about these charges.

Patent Disclaimer

Bio-Rad Life Science Research products are intended for research use only. Bio-Rad also does not warrant that the use of products described in this catalog will not infringe the claims of any patents covering the product itself or the use of these products in combination with other products or in the operation of any process.

Customer Services

Phone, Fax, and Email Services

You can contact customer service by phone, fax, or email for any information you need. Contact information for local offices is on the inside back cover of this catalog and is available any time at **www.bio-rad.com**.

Online Services

Visit us on the Web at **www.bio-rad.com** to access Bio-Rad's online services for life science research. Services may vary by country and include:

- Searchable product catalog
- Product specifications, literature, MSDSs, Certificates of Analysis, and instruction manuals
- Software demonstrations and downloads
- Local news and special offers
- Local contact information for customer service or technical support
- Request for quotation
- Online ordering
- Access to local list prices

Sales Calls and Demonstrations

To request a demonstration or a visit from a field sales representative, contact your local Bio-Rad office. To find the office nearest you, refer to the list on the inside back cover of this catalog, or go to **www.bio-rad.com**.

Technical Support

Bio-Rad representatives are available to offer advice if you encounter a problem or have a question about products, techniques, or applications. From anywhere in the world, you can access the following technical support resources online at **www.bio-rad.com**:

- Extensive product and application literature libraries
- Downloadable instruction manuals and material safety data sheets (MSDSs) for most products
- Self-help database of thousands of frequently asked questions
- Contact information for local technical support

Warranty Information

All Bio-Rad products are guaranteed to meet the specifications listed in our catalog. Should a Bio-Rad branded product fail to meet specifications during its warranty period, it shall be repaired or replaced at Bio-Rad's discretion. Warranty periods are listed on quotations for specific products; however, instruments generally receive 1 year of warranty coverage from the date of shipment or installation. Instrument warranties do not include consumable parts, such as lamps, lasers, and platinum wire. Repairs have different warranty periods. Chemicals and other consumables are warranted through their expiration date, or for 1 year from shipment if no expiration date is indicated. Non–Bio-Rad branded products, such as computers and computer peripherals, are covered by the original equipment manufacturer's warranty. Warranties are not transferable from the original purchaser. Warranty coverage may be void if the product is moved outside of the country where the product was originally purchased. For more information, contact your local Bio-Rad office.

Instrument Service and Warranty Programs

Bio-Rad's commitment to customers includes continued technical support and service after purchasing. If the instrument you purchased requires service or repair during the warranty period, you can submit a request for service to the local Bio-Rad office via the "Request Repair Service" link on Life Science Research > Support at **www.bio-rad.com**, or contact your local office by telephone. A trained instrument service engineer will diagnose the problem. If your instrument requires service at a Bio-Rad facility, you will be issued a return authorization number. Bio-Rad provides on-site instrument service for certain instruments when this is the most efficient means of providing prompt service. Extended warranty programs are available.

Bio-Rad Expert Care

Bio-Rad is offering a new global instrument service program for expert service and support. A variety of plans are available to suit your needs and budget, including comprehensive service, preventive maintenance, and customizable plans. Contact your sales representative for more information.

Literature Downloads



For fast service when you need literature, visit us on the Web at **www.bio-rad.com**. Here you can search our extensive literature library. Most literature, including instruction manuals and MSDSs, is available for immediate download and in many cases also by mail.

Claims and Returns

Claims

Bio-Rad attempts to fill, check, and ship orders promptly. If errors or damages occur, report them to your local Bio-Rad office immediately. Report shipping damage to the carrier. Keep all containers and packing materials until an inspection is made.

Returns

If it is necessary to return a product, contact your local Bio-Rad office for instructions. This will prevent delays and allow the situation to be resolved to your satisfaction. Bio-Rad cannot accept returns without prior authorization. Products are returnable for credit only if returned within 60 days of receipt, and only if these products remain unused, unopened, and in their original packaging. There may be a nominal restocking fee on returned products. Bio-Rad cannot authorize return of products erroneously ordered by customers if the products require shipment on dry or blue ice. When you call, be prepared to supply your account number, address, purchase order number, invoice number, shipping date, product description, and catalog number.

Bio-Rad Purchasing and Other Programs

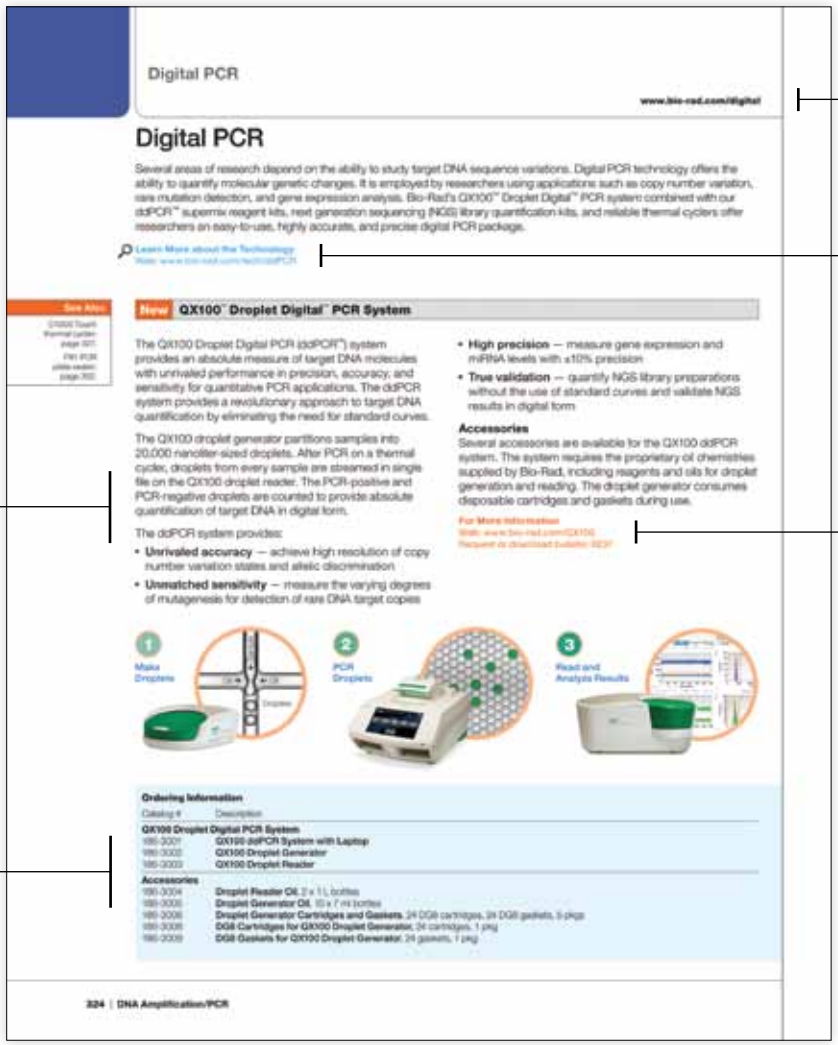
Bio-Rad offers a variety of other programs in selected regions, including seminars, on-site stocking programs, and new laboratory setup programs.

For information on programs in your area, check online at **www.bio-rad.com** or contact your local Bio-Rad office.

New Sources of Information

How to Use This Catalog

Every year we seek feedback on our Life Science product catalog and incorporate suggestions we receive to make it easier for you to use the catalog. With more customers looking to the Web for product information, we have added more specific URLs to enable you to access information quickly. We have also made a few changes to the way information in the catalog is organized.



Related product information — reference to related and complementary products that you might be interested in.

Product-specific information — information to help you distinguish products and decide which ones best fit your needs.

Ordering information — catalog numbers and price information are now found immediately following the products for easy ordering.

Category-level URLs — listed at the top of every page to help you find all products belonging to a specific category at Bio-Rad.com.

Applications & Technologies section-specific URLs — available for groups of products, these links take you to Web pages that have more information on the technology that the products employ or applications for which they can be used.

Product-specific URLs — presented below product descriptions for easy reference to more information on the product.

Insight + Interaction = A Powerful Reaction

Learn why scientists around the world are coming to bioradiations.com to get the most out of the technologies that facilitate their research.

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New Products

Cell Sorting

S3™ Cell Sorter
This walk-up cell sorter offers high-speed sorting with up to 99% purity. Automated setup and quality control enable researchers to perform 1–4 color fluorescent sorts at their bench with confidence.



Chromatography

Chromatography Systems

NGC™ Medium-Pressure Chromatography Systems
NGC laboratory-scale chromatography systems provide a fully customizable and truly modular platform that can be designed to suit the user's current purification needs and is upgradable to meet future throughput and automation requirements. **Page 84.**

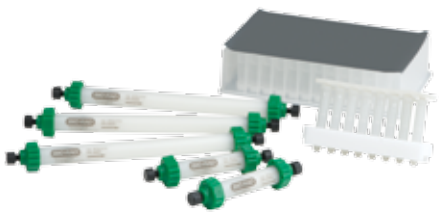


Chromatography Columns

ENrich™ High Resolution Ion Exchange and Size Exclusion Columns
The columns are designed for high-resolution separations even at fast flow rates and lower backpressures than similar media. **Pages 67, 68.**



Foresight™ Prepacked Plates and Columns
These columns enable the use of prepacked formats through the entire purification development cycle, from high-throughput media screening and small-scale method development to scale-up optimization. **Page 126.**



Chromatography Media

Nuvia™ cPrime™ Mixed Mode Media
The unique selectivity of these media allows the use of hydrophobic and cation exchange interaction modes to achieve effective purification. Their large design space for binding and elution allows for the development of highly robust methods in a commercial manufacturing setting. **Page 125.**



Electrophoresis and Blotting



Clarity™ Western ECL Substrate
This chemiluminescent substrate provides bright signal with low background. It is compatible with any HRP-conjugate secondary antibody and is ideal for both digital and film-based imaging. **Page 218.**

V3 Western Workflow™
The V3 workflow combines traditional blotting techniques with innovative tools to rapidly visualize an experiment's progress and simplify protein normalization and quantitation. **Page 202.**



Separate Proteins | Visualize Separation | Transfer Proteins | Verify Transfer | Validate Western Blot

Bio-Plex® Multiplex System

Bio-Plex® MAGPIX™ Multiplex Reader
A compact and robust system for the analysis of up to 50 analytes. Compatible with magnetic bead–based immunoassays. **Page 283.**





Bio-Plex Pro™ Human Cancer Biomarker Panel 2
These magnetic bead–based assays are designed for the quantitation of multiple cancer biomarkers. Panel 2 consists of ligands for panel 1, cytokines, chemokines, and growth factors. **Page 298.**

Bio-Plex Pro Magnetic Cell Signaling Assays
These magnetic bead–based immunoassays enable the detection of intracellular phosphoproteins and total target proteins in cell and tissue lysates. **Page 295.**

Protein Interaction Analysis

ProteOn™ Kits and Reagents
The ProteOn liposome capturing kit, which includes the ProteOn LCP sensor chip, captures lipid assemblies such as liposomes on a hydrophilic chip surface while the GLC lipid kit captures lipid assemblies on a modified lipophilic GLC chip surface. The ProteOn histidine-tag capturing kit has an HTG or HTE chip and reagents designed for the activation and regeneration of the sensor chips. **Page 277.**



DNA Amplification/PCR

Digital PCR

QX100™ Droplet Digital™ PCR System and Reagents
The QX100 system provides an absolute measure of target DNA molecules with precision, accuracy, and sensitivity for qPCR applications. The QX100 Droplet Digital PCR system reagents are optimized for absolute quantification of target DNA, to amplify rare target DNA, and for NGS library preparation and quantification. **Page 324.**



Real-Time PCR

CFX96 Touch Deep Well™ Real-Time PCR Detection System
Offers precise quantification and target discrimination for up to five targets in large-volume reactions up to 125 µl. **Page 334.**



CFX Qualification System
An easy-to-use tool for validating the performance of a CFX real-time PCR system. The plate can be incorporated into any instrument qualification procedure for easy tracking of the instrument's performance. **Page 337.**





PrimePCR™ Assays and Panels
PrimePCR assays and panels for real-time PCR are expertly designed and wet-lab validated to ensure optimal assay performance and compliance with MIQE guidelines. **Page 341.**

DNA Amplification/PCR

Real-Time PCR Reagents

iScript™ Advanced cDNA Synthesis Kit for RT-qPCR
Delivers increased qPCR data throughput and cost-effectiveness with superior sensitivity and broad linear dynamic range from a single 20 µl reverse transcription reaction. **Page 342.**



iTaq™ Universal Supermixes
The iTaq Universal SYBR® Green supermix and iTaq Universal probes supermix deliver robust qPCR results with superior sensitivity, efficiency, and specificity.
Page 345.



Plate Sealer and Heat Seals

PX1™ PCR Plate Sealer and Heat Sealing Films and Foils
The PX1 sealer seals PCR plates consistently by providing uniform heat and pressure across an entire microplate when sealing. The heat sealing films and foils minimize sample evaporation during thermal cycling. **Page 352.**



Hard-Shell PCR Plates

Hard-Shell® PCR Plates
The Hard-Shell low-profile 96-well semi-skirted PCR plates are optimized for low-volume reactions and fast PCR and are compatible with Applied Biosystems' 7500 fast and ViiA 7 fast instruments. The Hard-Shell 96-well 480 PCR plates are optimized to work on the Roche LightCycler 480 96-well block, have a warp-free skirt and deck, and are designed to withstand the stresses of thermal cycling. **Page 358.**



Biotechnology Explorer™

IDEA (inquiry dye electrophoresis activity) and STEM (science, technology, engineering, mathematics) Kits
Kits cover the basic procedures and skills needed for performing horizontal agarose gel electrophoresis and assembling an electrophoresis cell. **Page 386.**





Sample Preparation

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Protein Sample Preparation

Protein Extraction

Protein extraction tools such as cell lysis and extraction kits as well as mini grinders are available for extracting proteins from cultured cells and tissues.

ReadyPrep™ Protein Extraction Kit

The ReadyPrep protein extraction kit (total protein) provides a simple, rapid, and reproducible method for preparation of total cellular protein extracts from a wide variety of biological samples. Use of this kit generates protein samples that can be applied directly to a variety of applications, including IEF and 2-D gel electrophoresis.

For More Information
Web: www.bio-rad.com/proteinextraction



Ordering Information

Catalog #	Description
163-2086	**ReadyPrep Protein Extraction Kit (Total Protein)**, 20 preps

See Also
MicroRotofor cell: page 173.
PROTEAN i12 IEF system: pages 161–162.
Protein assays: pages 20–23.

Kits for Cell Lysis

MicroRotofor™ Lysis Kits
These kits are suitable for sample preparation for analytical (IPG strips) or preparative (Rotofor® and MicroRotofor cells) IEF. The kits are based on a chaotropic protein solubilization buffer (PSB), which contains nondetergent sulfobetaine 201 (NDSB 201) along with urea, thiourea, and CHAPS for particularly effective solubilization (Vuillard et al. 1995). Resulting samples can be used directly for IEF. Cell lysis and extraction protocols are tailored for mammalian, plant, yeast, or bacterial samples.



Bio-Plex® Cell Lysis Kit
The Bio-Plex cell lysis kit has been developed specifically to prepare cell culture and tissue lysate samples for analysis with Bio-Plex nonmagnetic phosphoprotein and total target assays. This cell lysis kit can also be used to prepare cell lysates for western blot analysis. Its protein extraction procedure yields western blotting results similar to those generated by routine cell lysis and protein extraction protocols.



For More Information
Web: www.bio-rad.com/proteinextraction and /bioplexcelllysis
Request or download bulletins: 3033, 3034, and 5517

ReadyPrep™ Mini Grinders

For grinding small biological samples for high recovery of proteins (and nucleic acids), each mini grinder includes a 1.5 ml grinding tube containing a grinding resin and a matching pestle. The grinding resin is a neutral abrasive material made of high tensile strength microparticles that do not bind to proteins or nucleic acids. ReadyPrep mini grinders are disposable and are nuclease- and protease-free. They are a component of the MicroRotofor™ lysis kit (mammal) and are also sold separately as a pack of 20. The mini grinder tubes fit conveniently in most benchtop centrifuges.



For More Information
Web: www.bio-rad.com/proteinextraction

Ordering Information

Catalog #	Description
163-2141	**MicroRotofor Cell Lysis Kit (Mammal)**, 15 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep mini grinders (2 packs of 10 each)
163-2142	**MicroRotofor Cell Lysis Kit (Plant)**, 10 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep 2-D cleanup kit (50 reaction size)
163-2143	**MicroRotofor Cell Lysis Kit (Yeast)**, 15 preps, includes 50 ml protein solubilization buffer (PSB), 15 ml yeast suspension buffer, 2 x 0.5 ml lyticase (1.5 U/µl)
163-2144	**MicroRotofor Cell Lysis Kit (Bacteria)**, 15 preps, includes 50 ml protein solubilization buffer (PSB), 25 ml bacteria suspension buffer, 1 ml lysozyme (1,500 U/µl)
MicroRotofor Lysis Kit Components	
163-2146	**ReadyPrep Mini Grinders**, includes 20 mini grinders, sufficient for twenty 100 mg extractions
163-2145	**Protein Solubilization Buffer (PSB)**, makes 50 ml of solution
Bio-Plex Cell Lysis Kits	
171-304011	**Bio-Plex Cell Lysis Kit**, 1 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2
171-304012	**Bio-Plex Cell Lysis Kit**, 10 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2

Protein Sample Cleanup

General purpose cleanup kits and columns are available for the removal of salts and other contaminants.

Protein Sample Cleanup Kit Selection Guide

Kit Type and Catalog Number	Applications	Procedure	Preparation Time	Number of Preps
Salt Removal				
ReadyPrep 2-D cleanup kits (#163-2130, #163-2140)	Cleanup of protein samples for 1-D and 2-D applications Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	50
Micro Bio-Spin™ 6 columns (see pages 17–18)	Removal of salts and other contaminants	Size exclusion chromatography	5 min	25, 100, 1,000
Removal of Other Contaminants				
ReadyPrep 2-D cleanup kits (#163-2130, #163-2140)	Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	50
Reduction and Alkylation				
ReadyPrep reduction-alkylation kit (#163-2090)	Reduction of streaking on 2-D gels Improved resolution of basic proteins	Reduction, then alkylation of sample to remove disulfide bonds and prevent their re-formation	<2 hr	100

For More Information
Web: www.bio-rad.com/proteincleanup
Request or download bulletins: 2934 and 2961

Ordering Information

Catalog #	Description
ReadyPrep Kits	
163-2130	**ReadyPrep 2-D Cleanup Kit**, 50 preps
163-2140	**ReadyPrep 2-D Cleanup Kit**, 5 preps
163-2105	**ReadyPrep 2-D Starter Kit**, includes protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels for six 17 cm, ten 11 cm, or sixteen 7 cm ReadyStrip IPG strips (ReadyStrip IPG strips*, precast SDS-PAGE gels, and gel stains not included in kit)
163-2090	**ReadyPrep Reduction-Alkylation Kit**, 100 preps
ReadyPrep Kit Components and Related Products	
163-2091	**ReadyPrep Proteomics Grade Water**, 500 ml
163-2083	**ReadyPrep 2-D Rehydration/Sample Buffer 1**, 10 ml, 7 M urea, 2 M thiourea, 1% ASB-14, 40 mM Tris, 0.001% bromophenol blue
163-2106	**ReadyPrep 2-D Starter Kit Rehydration/Sample Buffer**, 10 ml, 8 M urea, 2% CHAPS, 50 mM DTT, 0.2% Bio-Lyte 3/10 ampholyte, 0.001% bromophenol blue
Reducing and Alkylating Agents	
161-0611	**Dithiothreitol (DTT)**, 5 g
163-2101	**Tributylphosphine (TBP)**, 200 mM, 0.6 ml
163-2109	**Iodoacetamide**, 30 g

* See the prepacked Bio-Spin and Micro Bio-Spin gel filtration columns on pages 17–18.

Protein Fractionation

Fractionation kits reduce sample complexity, helping to identify low-abundance proteins. Fractionation kits can be subdivided into three groups that fractionate based on differential solubility, cellular location of the proteins of interest, and protein charge. Instruments are available to separate proteins by size and charge (see page 173 for the MicroRotofor™ cell and pages 175–176 for the Model 491 prep cell).

Fractionation by Solubility

Fractionation Using Differential Protein Solubility

The ReadyPrep sequential extraction kit and the ReadyPrep protein extraction kit (soluble/insoluble) both reduce sample complexity using differential solubilization. The two kits can be used independently, or the rehydration/sample buffer from the soluble/insoluble kit can be used with the sequential extraction kit to create a fourth fraction for even better resolution.

- **ReadyPrep sequential extraction kit** — enables the isolation of 3 different fractions of increasing solubility. These fractions are isolated sequentially, allowing the visualization of proteins that might not otherwise be seen. Increasing solubilization strength is provided through the use of stronger detergents for each subsequent fraction
- **ReadyPrep protein extraction kit (soluble/insoluble)** — uses a single fractionation step

ReadyPrep Kit Components and Related Products

Individual ReadyPrep kit components and related products such as reducing agents are also available. See ordering information on pages 3–4.

For More Information
Web: www.bio-rad.com/proteinfractionation
Request or download bulletins: 2934 and 2961

Ordering Information

Catalog #	Description
ReadyPrep Kit Components and Related Products	
163-2102	**ReadyPrep Sequential Extraction Kit Reagent 1**, 50 ml, 40 mM Tris base
163-2103	**ReadyPrep Sequential Extraction Kit Reagent 2**, 10 ml, 8 M urea, 4% CHAPS, 40 mM Tris, 0.2% Bio-Lyte 3/10 ampholyte
163-2104	**ReadyPrep Sequential Extraction Kit Reagent 3**, 10 ml, 5 M urea, 2 M thiourea, 2% CHAPS, 2% SB 3–10, 40 mM Tris, 0.2% Bio-Lyte 3/10 ampholyte

Fractionation by Cellular Location

Fractionation by Cellular Location

ReadyPrep™ protein extraction kits facilitate fractionation of proteins from different cellular locations such as the membrane, nucleus, or cytoplasm.

- **ReadyPrep protein extraction kit (cytoplasmic/nuclear)** — prepares fractions enriched in cytoplasmic or nuclear proteins from eukaryotic samples
- **ReadyPrep protein extraction kit (membrane I)** — offers a quick and effective protocol for isolating most membrane proteins. It does not require ultracentrifugation or preparation of density gradients
- **ReadyPrep protein extraction kit (membrane II)** — offers a protocol for isolating more complex membrane proteins
- **ReadyPrep protein extraction kit (signal)** — for isolating proteins involved in intracellular membrane trafficking and signaling pathways. These include proteins such as GPI-anchored proteins, caveolin and associated proteins, acylated tyrosine kinases, and G proteins

For More Information
Web: www.bio-rad.com/proteinfractionation
Request or download bulletins: 2934 and 2961

Ordering Information

Catalog #	Description
ReadyPrep Protein Extraction Kits and Buffer	
163-2100	**ReadyPrep Sequential Extraction Kit**, 15 preps
163-2083	**ReadyPrep 2-D Rehydration/Sample Buffer 1**
163-2085	**ReadyPrep Protein Extraction Kit (Soluble/Insoluble)**, 20 preps
163-2089	**ReadyPrep Protein Extraction Kit (Cytoplasmic/Nuclear)**, 50 preps
163-2088	**ReadyPrep Protein Extraction Kit (Membrane I)**, 50 preps
163-2084	**ReadyPrep Protein Extraction Kit (Membrane II)**, 10 preps
163-2087	**ReadyPrep Protein Extraction Kit (Signal)**, 50 preps

Fractionation by Charge

Aurum™ ion exchange (AEX or CEX) mini columns allow selective purification of acidic or basic proteins, respectively. Also available in easy-to-use kits, these mini columns selectively enrich either acidic or basic proteins and can be used with a variety of starting samples.

For More Information
Web: www.bio-rad.com/proteinfractionation
Request or download bulletin: 2928



Ordering Information

Catalog #	Description
732-6711	**Aurum CEX Mini Kit**, 2 pack, includes columns and buffers
732-6703	**Aurum CEX Mini Columns**, 25 pack
732-6710	**Aurum AEX Mini Kit**, 2 pack, includes columns and buffers
732-6706	**Aurum AEX Mini Columns**, 25 pack

Protein Depletion

Complex samples often require depletion of high-abundance proteins to allow the detection of the low-abundance ones. Bio-Rad offers two different methodologies for protein depletion — the ProteoMiner™ protein enrichment system (which utilizes hexapeptide libraries) and Aurum™ serum and Affi-Gel® Blue products (which utilize resins).

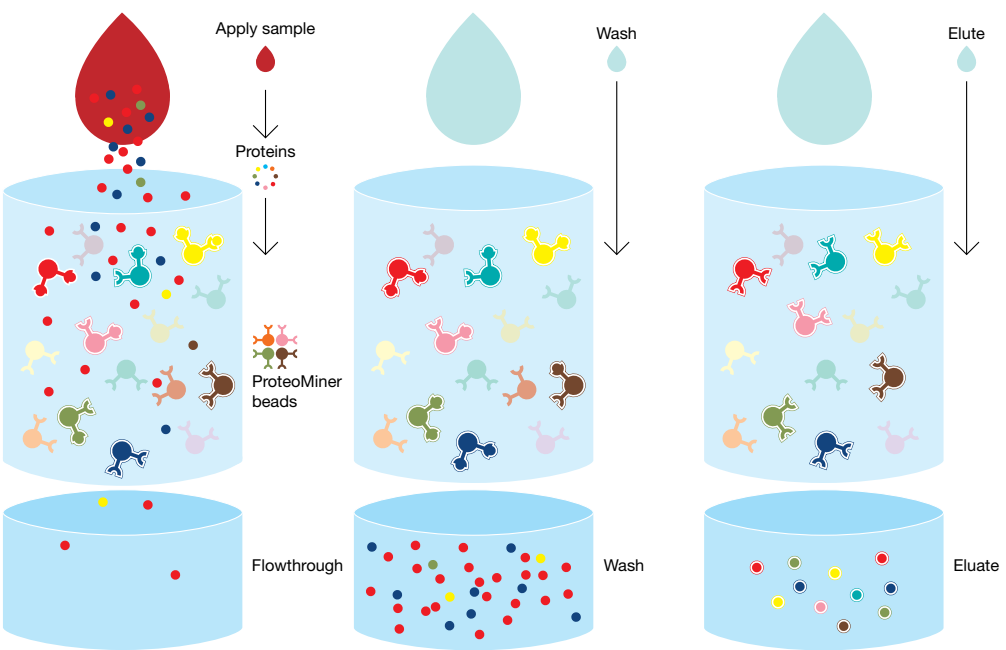
ProteoMiner™ Protein Enrichment System

The ProteoMiner protein enrichment system is a novel sample preparation tool for reducing the dynamic range of protein concentrations in complex biological samples. The ProteoMiner system:

- Enriches and concentrates low-abundance proteins that cannot be detected through traditional methods
- Works with a variety of sample types (serum, plasma, urine, bile, cell lysates, tissues, and platelets) and is not limited by the species' origin
- Utilizes a combinatorial library of hexapeptides rather than immunodepletion, minimizing the dependence on available antibodies and preventing the codepletion of low-abundance proteins

ProteoMiner Protein Enrichment Kits — these kits can be used with a variety of biological samples and are compatible with all major downstream proteomics applications. Small- and large-capacity kits are available for processing two or ten samples.

ProteoMiner Sequential Elution Kits — these kits utilize multiple elution reagents to sequentially elute proteins based on different properties.



ProteoMiner technology is based on the interaction of complex protein samples with a large, highly diverse library of hexapeptides bound to chromatographic supports. In theory, each unique hexapeptide binds to a unique protein sequence. Because the bead capacity limits binding capacity, high-abundance proteins quickly saturate their ligands (red and yellow beads) and excess protein is washed out during the procedure. In contrast, low-abundance proteins are concentrated on their specific ligands (pink and teal beads), thereby decreasing the dynamic range of proteins in the sample. When analyzed in downstream applications, the number of proteins detected is dramatically increased.

ProteoMiner Small- and Large-Capacity Kits

ProteoMiner kits for protein enrichment are now offered in formats optimized for varying starting amounts of sample protein.

- **Small-capacity kits** — optimized for use with limited sample material (minimum 10 mg of protein is recommended)
- **Large-capacity kits** — optimized for use with samples in which at least 50 mg of protein is available

For More Information
Web: www.bio-rad.com/proteominer
Request or download bulletins: 5632, 5635, and 5841

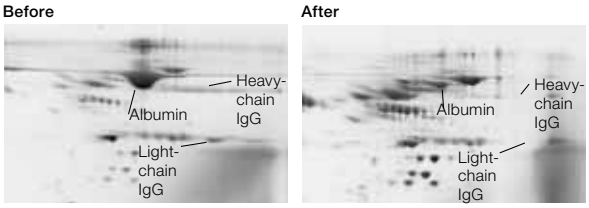
Ordering Information

Catalog #	Description
163-3006	**ProteoMiner Protein Enrichment Small-Capacity Kit**, 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
163-3007	**ProteoMiner Protein Enrichment Large-Capacity Kit**, 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
163-3008	**ProteoMiner Protein Enrichment Introductory Small-Capacity Kit**, 2 preps, for processing 10 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes
163-3009	**ProteoMiner Protein Enrichment Introductory Large-Capacity Kit**, 2 preps, for processing 50 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes
ProteoMiner Sequential Elution Kits	
163-3010	**ProteoMiner Sequential Elution Small-Capacity Kit**, 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes
163-3011	**ProteoMiner Sequential Elution Large-Capacity Kit**, 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes
ProteoMiner Kit Accessories	
163-3003	**ProteoMiner Sequential Elution Reagents**, 10 preps, includes reagents only (columns not included), to be used with #163-3006 or #163-3007
732-6207	**Mini Bio-Spin Chromatography Columns**, empty, 100

Aurum™ Kits and Columns

The Aurum™ Affi-Gel® Blue and Aurum serum kits and columns use affinity chromatography to reduce albumin and IgG, which improves analysis of lower abundance proteins. These products utilize a quick and easy spin-column format and provide eluted proteins ready for analysis.

For More Information
Web: www.bio-rad.com/proteindepletion
Request or download bulletin: 2823



Removal of albumin and IgG from serum using the Aurum serum protein mini kit. Total protein (1.32 mg) was purified on an Aurum serum protein mini column. **Left**, untreated serum; **right**, serum treated with the Aurum kit.

Ordering Information

Catalog #	Description
732-6701	**Aurum Serum Protein Mini Kit**, 10 pack, includes columns and buffers
732-6712	**Aurum Affi-Gel Blue Mini Kit**, 2 preps, includes columns and buffers
732-6708	**Aurum Affi-Gel Blue Mini Columns**, 25 pack

Surface-Enhanced Laser Desorption/Ionization

The biomarker discovery process requires the analysis of large numbers of samples. The ProteinChip® SELDI system's high-throughput profiling technology allows you to easily acquire sufficient data for statistical significance, making the biomarker discovery process more efficient.

ProteinChip® SELDI System

SELDI combines the separation power of two techniques, chromatography and high-sensitivity mass spectrometry, which allows large numbers of proteins and peptides to be detected and profiled. The ProteinChip SELDI system provides the arrays, reagents, kits, and software to rapidly generate a list of candidate disease biomarkers from large numbers of samples.



ProteinChip Arrays and Array Preparation

ProteinChip arrays utilize selective capture strategies to reduce sample complexity, allowing detection of low-abundance proteins for a number of applications such as protein profiling and biomarker discovery.

ProteinChip Kits

ProteinChip kits contain all the reagents, consumables, and protocols necessary to perform SELDI applications ranging from qualification of the ProteinChip SELDI reader through protein profiling and antibody capture.

ProteinChip Software

Software applications tailored for the ProteinChip SELDI system enable fast, effective organization and analysis of the large amounts of data generated during biomarker discovery.

For More Information
Web: www.bio-rad.com/proteinchip
Request or download bulletins: 5524 and 5526

Ordering Information

Catalog #	Description
ProteinChip Arrays and Array Preparation	
C57-30080	**ProteinChip Q10 Arrays**, A–H format, 12
C57-30075	**ProteinChip CM10 Arrays**, A–H format, 12
C57-30078	**ProteinChip IMAC30 Arrays**, A–H format, 12
C57-30065	**ProteinChip H50 Arrays**, A–H format, 12
C57-30028	**ProteinChip H4 Arrays**, A–H format, 12
C57-30081	**ProteinChip SEND ID Arrays**, A–H format, 12
C57-30043	**ProteinChip NP20 Arrays**, A–H format, 12
C55-30058	**ProteinChip PG20 Array**, A–H format
C55-30044	**ProteinChip PS10 Arrays**, A–H format, 12
C57-30045	**ProteinChip PS20 Arrays**, A–H format, 12
C55-30082	**ProteinChip RS100 Arrays**, A–H format, 6
C55-30033	**ProteinChip Gold Array**, A–H format
C20-10001	**ProteinChip Array Reaction Tubes**, 50

continues

Ordering Information

Catalog #	Description
ProteinChip Arrays and Array Preparation (cont.)	
C50-30011	**ProteinChip Cassette-Compatible Bioprocessor**, includes cassette hold-down frame, 12 blank ProteinChip arrays
C50-30012	**ProteinChip Cassette-Compatible Bioprocessor Reservoirs**, 5
C50-30013	**ProteinChip Cassettes**, empty, hold 12 ProteinChip arrays, 5
A30-00010	**Bar Code Scanner**, handheld
K20-00001	**ProteinChip H50 Buffer**, 200 ml
K20-00005	**ProteinChip H50 Buffer**, 1 L
K20-00003	**ProteinChip CM Low-Stringency Buffer**, 200 ml
K20-00007	**ProteinChip CM Low-Stringency Buffer**, 1 L
K20-00004	**ProteinChip CM High-Stringency Buffer**, 200 ml
K20-00002	**ProteinChip IMAC Buffer Set**, includes 30 ml IMAC charging solution, 30 ml IMAC neutralizing solution, 200 ml IMAC binding buffer
K20-00008	**ProteinChip IMAC Charging Solution**, 200 ml
K20-00009	**ProteinChip IMAC Neutralizing Solution**, 200 ml
K20-00006	**ProteinChip IMAC Binding Buffer**, 1 L
C30-00001	**ProteinChip CHCA Matrix**, 5 mg/vial, 20
C30-00002	**ProteinChip SPA Matrix**, 5 mg/vial, 20
C30-00003	**ProteinChip EAM-1 Matrix**, 5 mg/vial, 20
C30-00004	**ProteinChip Matrix Kit**, includes 6 vials each CHCA, SPA, and EAM-1 matrix
C10-00005	**ProteinChip All-In-One Peptide Standard**, lyophilized, 100 spots
C10-00007	**ProteinChip All-In-One Protein Standard II**, lyophilized, 100 spots
C10-00002	**ProteinChip Peptide Calibrant Kit**, includes peptide MW standards (2 sets of 7 standards)
C10-00001	**ProteinChip Protein Calibrant Kit**, includes protein MW standards (2 sets of 10 standards)
ProteinChip Kits	
C70-00080	**ProteinChip OQ Kit**, includes 2 detector calibration arrays, 6 detector qualification arrays, 2 peptide standard arrays, CD with protocols
C70-00081	**ProteinChip System Check Kit**, includes 1 detector calibration array, 1 detector qualification array, 1 peptide standard array, CD with protocols
C70-00082	**ProteinChip Detector Calibration Kit**, includes 1 detector calibration array
C70-00070	**ProteinChip Peptide Mass Calibration Kit**, sufficient for up to 160 calibrations, includes 1 ProteinChip peptide standard array, CD-ROM with video tutorial and protocol
K20-30001	**ProteinChip H50 Kit**, includes 12 ProteinChip H50 arrays, ProteinChip H50 buffer
K20-30002	**ProteinChip IMAC Kit**, includes 12 ProteinChip IMAC30 arrays, ProteinChip IMAC buffer set
K20-30003	**ProteinChip CM Kit**, includes 12 ProteinChip CM10 arrays, ProteinChip CM low-stringency buffer
ProteinChip SELDI System Software	
SW3-040050	**ProteinChip Data Manager Software 4, Desktop Edition**, includes 1-user network license, no instrument control

Nucleic Acid Sample Preparation

RNA Isolation

Bio-Rad offers a broad range of sample preparation products for RNA isolation. Scalable and high-throughput products are available.

See Also

PCR reagents: pages 342–351.

Real-time PCR systems: pages 331–336.

Experion automated electrophoresis system: pages 250–256.

DNA amplification/PCR pages 324–368.

RNA Isolation Product Selection Guide

	Aurum™ Total RNA Kits			PureZOL™ RNA Isolation Reagent
	Mini	**Fatty and Fibrous Tissue**	**96**	
Format	Mini column filtration (vacuum or spin)	Mini column filtration (vacuum or spin)	96-well plate filtration (vacuum or spin)	Single solution organic extraction
Maximum starting material amounts				
Cultured cells	2 x 10^6	1 x 10^7	1 x 10^6	1 x 10^7
Bacterial cells	2.4 x 10^9	2.4 x 10^9	8 x 10^8	2.4 x 10^9
Yeast cells	3 x 10^7	3 x 10^7	2 x 10^7	3 x 10^7
Hard animal tissue	20 mg	100 mg	—	100 mg
Soft to moderately hard animal tissue	40 mg	100 mg	—	100 mg
Plant tissue	40 mg	100 mg	—	100 mg
Isolation method	Silica membrane	Lysis with PureZOL reagent, purification on silica membrane	Silica membrane	Organic extraction
Number of preps	50	50	192 (2 x 96-well plate)	50 or 100 (1 ml/prep)
Number of washes	3	3	3	—
DNase I included*	Yes	Yes	Yes	No
DNase I digest time	15 min (animal tissue, 25 min)	15 min	10 min	—
Total preparation time**	<50–80 min (with DNase I digest)	<50–80 min (with DNase I digest)	<60 min (with DNase I digest)	<60 min
Binding capacity	>100 µg	>100 µg	>40 µg	—
Maximum elution volume	80 µl (2 x 40 µl elutions)	2 x 40 µl	80 µl	30–100 µl
Yield***	20–30 µg/2 x 10^6 NIH 3T3 cells 20–40 µg/2 x 10^6 HeLa cells 15–20 µg/40 mg brain 30–55 µg/20 mg thymus 15–30 µg/40 mg spleen 8–15 µg/40 mg liver 15–20 µg/40 mg kidney 8–15 µg/40 mg lung 15–30 µg/40 mg potato 20–30 µg/3 x 10^7 *S. cerevisiae* cells 35–55 µg/2.4 x 10^9 *E. coli* cells 35–55 µg/2.4 x 10^9 *B. cereus* cells	140–150 µg/1 x 10^7 293H cells 90–100 µg/100 mg brain 50–60 µg/100 mg breast 80–90 µg/100 mg heart 60–70 µg/100 mg skin 50–60 µg/100 mg cartilage 20–30 µg/2.4 x 10^9 *E. coli* cells 60–65 µg/3 x 10^7 *S. cerevisiae* cells 90–100 µg/100 mg potato 5–10 µg/100 mg *Arabidopsis* 10–15 µg/50 mg *A. niger*	10 µg/1 x 10^6 NIH 3T3 cells 17 µg/1 x 10^6 HeLa cells 11 µg/2 x 10^7 *S. cerevisiae* cells 5 µg/8 x 10^8 *E. coli* cells 5 µg/8 x 10^8 *B. cereus* cells	1.37 µg/1 x 10^5 293H cells 1.15 µg/mg brain 1.37 µg/mg fat 1.2 µg/mg heart 0.66 µg/mg cartilage 1.2 µg/mg skin 1.0 µg/mg potato 0.1 µg/mg *Arabidopsis* 0.38 µg/mg *A. niger* 0.63 µg/2.4 x 10^7 *E. coli* cells 0.31 µg/3 x 10^5 *S. cerevisiae* cells
Purity	A_{260}/A_{280} of 1.9–2.1	A_{260}/A_{280} of 1.9–2.1	A_{260}/A_{280} of 1.9–2.1	A_{260}/A_{280} of 1.9–2.1

* Removal not required.
** Total preparation time will vary depending on the tissue or cell type and on which format is used (vacuum or spin).
*** Yields will vary depending on the developmental stage, tissue type or cell line, and growth conditions used.

Aurum™ Total RNA Kits

Aurum total RNA kits are designed and formulated to assist in the isolation of highly pure and intact RNA from a variety of starting materials. Isolated RNA is compatible with downstream applications including real-time qPCR, northern blotting, microarray analysis, and cDNA library construction.

- Isolate high yields of RNA from a wide range of sample types in less than 60 min
- DNase treatment ensures genomic DNA removal
- Produce ready-to-use RNA suitable for the most demanding downstream applications

Aurum total RNA kits offer streamlined processing using a choice of vacuum- or spin-mediated protocols. If vacuum-mediated purification is preferred, the protocol may be performed with the Aurum vacuum manifold.

For More Information
Web: www.bio-rad.com/rna-isolation
Request or download bulletins: 2919, 2920, and 5282

Aurum Total RNA Mini Kit

The Aurum total RNA mini kit produces DNA-free total RNA from a wide range of starting materials, including cultured cells, bacteria, and yeast, as well as animal and plant tissues. The kit utilizes a stringent reagent composed of guanidine isothiocyanate and β-mercaptoethanol for efficient sample lysis and quick RNase inactivation, followed by purification on silica membrane in a spin-column format using a spin- or vacuum-mediated protocol. The kit can also be used for RNA cleanup and desalting.

Aurum Total RNA Fatty and Fibrous Tissue Kit

The Aurum total RNA fatty and fibrous tissue kit isolates total RNA from samples that are difficult to disrupt. The kit is effective for purifications involving fatty and fibrous tissues or samples, such as fungi, that are rich in RNases. The kit utilizes PureZOL™ RNA reagent, a potent phenol-based reagent, which effectively lyses tissues and cells. The kit includes spin columns that can be processed using a choice of vacuum- or spin-mediated protocols.

Aurum Total RNA 96 Kit

The Aurum total RNA 96 kit reproducibly isolates DNA-free total RNA from cultured cells, bacteria, and yeast in under 60 minutes in a 96-well format for high-throughput total RNA isolation. The total RNA binding plate is designed for use on the Aurum vacuum manifold.



Aurum Total RNA Fatty and Fibrous Tissue Kit



Aurum Vacuum Manifold

Aurum Vacuum Manifold

Vacuum-mediated RNA purifications can be carried out in the Aurum vacuum manifold. The manifold serves as a vacuum purification platform for either 96-well plates or individual spin columns. Benefits include:

- Processing of up to 18 spin columns at one time
- Universal manifold that converts from plate to column format by inserting the column adaptor plate

Consumables and Accessories

The reagents and plasticware used in the Aurum RNA kits are available as refill orders. These products can be ordered separately from the Aurum total RNA kits.

See Also

PureZOL reagent: page 12.
Transfection reagents: pages 311–312.
DNA amplification: pages 324–368.

Ordering Information

Catalog #	Description
732-6820	**Aurum Total RNA Mini Kit**, 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 vial lyophilized DNase I, RNase-free reagents
732-6830	**Aurum Total RNA Fatty and Fibrous Tissue Kit**, 50 preps, includes #732-6870, 50 ml PureZOL RNA isolation reagent
732-6870*	**Aurum Total RNA Fatty and Fibrous Tissue Module**, 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 ml of lyophilized DNase I, RNase-free reagents, and plasticware
732-6800	**Aurum Total RNA 96 Kit**, 2 x 96-well preps, includes 2 grow blocks, sealing tape, 2 RNA binding plates, 2 collection microplates, 2 vials lyophilized DNase I, RNase-free reagents
Aurum Vacuum Manifold	
732-6470	**Aurum Vacuum Manifold**, for spin columns or 96-well plates, includes column adaptor plate, 4 replacement luer caps, stage, vacuum regulator, gauge, and tubing
Aurum Consumables and Accessories	
732-6828	**DNase I**, RNase-free, lyophilized, 1 vial
732-6801	**Aurum Total RNA Elution Solution**, RNase-free, 20 ml
732-6802	**Aurum Total RNA Lysis Solution**, RNase-free, 85 ml
732-6803	**Aurum Total RNA Wash High-Stringency Solution**, RNase-free, 150 ml
732-6804	**Aurum Total RNA Wash Low-Stringency Solution**, 60 ml
732-6805	**Aurum DNase Dilution Solution**, 20 ml
732-6826	**Aurum RNA Binding Mini Columns**, 50

* Does not include PureZOL RNA isolation reagent (see catalog #732-6880 or #732-6890 to order separately).

See Also
Aurum total RNA kits: pages 11–12.

PureZOL™ RNA Isolation Reagent

The PureZOL RNA isolation reagent protocol is an improvement over the rapid, widely used, and proven method of RNA isolation developed by Chomczynski and Sacchi (1987). PureZOL RNA isolation reagent is a potent monophasic combination of phenol and the chaotropic agent guanidine isothiocyanate, which effectively lyses cells and tissues, deproteinates RNA, and inactivates endogenous nucleases in a single step. DNA and protein are efficiently removed from the RNA following phase separation.

The ready-to-use PureZOL RNA isolation reagent is a versatile and efficient means of isolating high yields of RNA from a variety of sources including cultured cells, animal and plant tissue, yeast, virus, and bacteria samples. The single-solution format permits recovery of RNA from small quantities of tissues or cells, making it ideally suited for gene expression analysis or whenever sample quantities are limited. Total RNA isolated using PureZOL RNA isolation reagent is free of



DNA and protein and can be used for northern blot analysis, in vitro translation, poly(A)+ selection, RNase protection assays, RT-PCR, and molecular cloning. Since no spin columns are used in the protocol, the protocol is scalable to accommodate a wide range of sample sizes.

For More Information
Web: www.bio-rad.com/purezol

Ordering Information

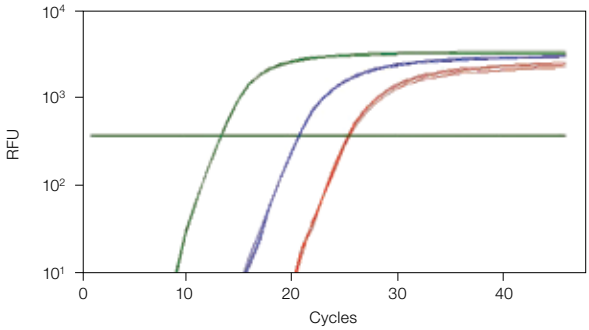
Catalog #	Description
732-6880	**PureZOL RNA Isolation Reagent**, 50 ml
732-6890	**PureZOL RNA Isolation Reagent**, 100 ml

iScript™ RT-qPCR Sample Preparation Reagent

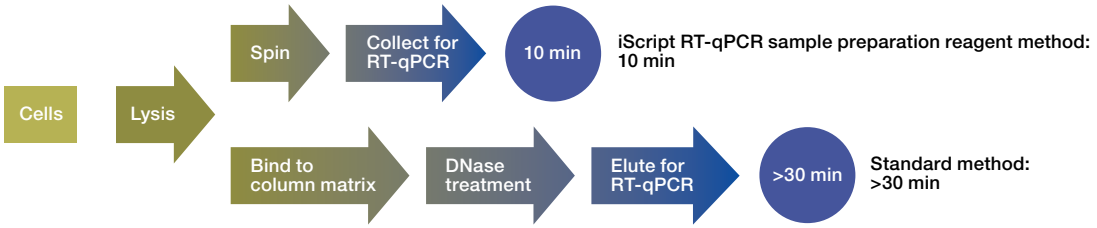
iScript RT-qPCR sample preparation reagent enables efficient cell lysis and RNA stabilization for sensitive quantitative gene expression analysis without RNA purification. This unique reagent accelerates and streamlines RT-qPCR analysis of cultured cells by eliminating the need to purify RNA. Reverse transcription and real-time PCR (qPCR) can be performed directly from cell lysates. This reagent is ideal for rapid, high-throughput gene expression analysis such as validation of siRNA-mediated gene knockdown.

- Rapid protocol (5–10 min) efficiently stabilizes RNA
- Sensitive detection of high-, medium-, and low-copy number gene targets directly from cell lysates
- Reagent enables multiplex qPCR detection of up to 4 targets from as few as 10 cells

For More Information
Web: www.bio-rad.com/iscript-rt-qpcr
Request or download bulletin: 5736



iScript RT-qPCR sample preparation reagent provides rapid yet sensitive gene expression results for high-, medium-, and low-copy number gene targets. HeLa cells were treated with iScript RT-qPCR sample preparation reagent at 125 cells/µl and the expression levels of three different genes were assessed. 18S rRNA (—), β-tubulin (—), and CMYC (—) expression levels were determined by performing reverse transcription (iScript cDNA synthesis kit) and qPCR (iQ™ SYBR® Green supermix) directly from cell lysate preparations. RFU, relative fluorescence units.



Ordering Information

Catalog #	Description
170-8898	**iScript RT-qPCR Sample Preparation Reagent**, 100 reactions, 10 ml, contains RNase inhibitors and RNA stabilizers
170-8899	**iScript RT-qPCR Sample Preparation Reagent**, 500 reactions, 5 x 10 ml, contains RNase inhibitors and RNA stabilizers

DNA Isolation

DNA Isolation Kit Selection Guide

Kit	DNA Yield	Preparation Time	Bacterial Culture Volume	Purification Format	Binding Matrix	Growth Media
Quantum Prep® plasmid miniprep	≤40 µg	<15 min	1–10 ml	Spin	Diatomaceous earth	Enriched or standard
Quantum Prep plasmid midiprep	≤400 µg	45 min	20–40 ml	Spin	Diatomaceous earth	Enriched or standard
Aurum™ plasmid mini	≤20 µg	<10 min	1–5 ml	Vacuum* and spin	Silica membrane	Standard

* Using the Aurum vacuum manifold.

Quantum Prep® Plasmid Kits

Quantum Prep Plasmid Miniprep Kit

The Quantum Prep miniprep kit offers high quality and yield in an easy spin-based procedure that takes less than 15 minutes from cell culture to purified plasmid. Plasmid DNA is recovered in water or TE for immediate use in all downstream molecular biology applications.

Quantum Prep Plasmid Midiprep Kit

The Quantum Prep plasmid midiprep kit uses a simple spin-column procedure that significantly reduces the time required to generate the large quantities of plasmid DNA needed to support applications such as transfection, subcloning, and other enzymatic manipulations.

For More Information
Web: www.bio-rad.com/quantum-prep
Request or download bulletin: 2325



Quantum Prep Plasmid Miniprep Kit



Quantum Prep Plasmid Midiprep Kit

Ordering Information

Catalog #	Description
732-6100	**Quantum Prep Plasmid Miniprep Kit**, 100 preps, includes 25 ml cell resuspension solution, 25 ml cell lysis solution, 25 ml neutralization solution, 20 ml Quantum Prep matrix, 63 ml wash solution, 100 spin columns
732-6120	**Quantum Prep Plasmid Midiprep Kit**, 20 preps, includes 110 ml cell resuspension solution, 110 ml cell lysis solution, 110 ml neutralization solution, 20 ml Quantum Prep matrix, 125 ml wash solution, 20 midi spin columns

Aurum™ Plasmid Mini Kit

The easy-to-use Aurum plasmid mini kit improves the efficiency and throughput of plasmid purifications with a simple bind-wash-elute protocol using silica membranes, all in less than 10 minutes. Spin- and vacuum-mediated protocols are available. The purified plasmid DNA can be immediately used in any downstream molecular biology application.

The Aurum plasmid mini kit delivers high yields of reproducible plasmid DNA preparations for:

- Automa ted fluorescence-based sequencing
- Restriction digestion
- Ligation and transformation
- Transfection
- PCR



For More Information
Web: www.bio-rad.com/aurum-plasmid
Request or download bulletin: 2664

Ordering Information

Catalog #	Description
732-6400	**Aurum Plasmid Mini Kit**, 100 preps, includes plasmid-binding mini columns, 100 capless collection tubes, reagents, protocol overview

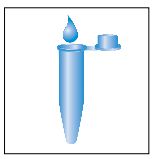
See Also
Transfection reagents: pages 311–312.
DNA amplification/PCR: pages 324–368.

InstaGene™ Matrix

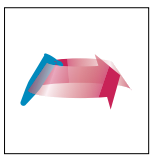
InstaGene matrix is designed for rapid isolation of small amounts of genomic DNA of sufficient purity for PCR in under an hour. The specially formulated 6% w/v Chelex resin adsorbs cell lysis products that interfere with PCR, leaving genomic DNA template in the supernatant where it is immediately available for PCR reactions.

For More Information
Web: www.bio-rad.com/instagene-matrix
Request or download bulletin: 2074

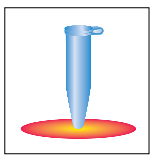
InstaGene Protocol



Add bacterial colony to water.



Spin and remove supernatant.



Add InstaGene matrix and incubate at 56°C for 30 min. Vortex and incubate at 100°C for 8 min.



PCR-ready

Spin; use supernatant for PCR.

Ordering Information

Catalog #	Description
732-6030	**InstaGene Matrix**, 20 ml, sufficient for 100 extractions

See Also
Molecular biology and biotechnology grade resins: pages 41–42.

See Also
Molecular biology and biotechnology grade resins: pages 41–42.

Chelex® 100 Molecular Biology Grade Resin

Nuclease and ligase inhibitor-free, this pipettable, small-scale resin is certified not to inhibit PCR and ensures complete removal of PCR inhibitors and metal ions.

For More Information
Web: www.bio-rad.com/dna-isolation
Request or download bulletin: 2074

Ordering Information

Catalog #	Description
142-1253	**Chelex 100 Resin**, molecular biology grade, 50 g, sodium, 200–400 dry mesh, 75–150 µm wet bead

DNA Cleanup

Bio-Rad offers a variety of sample preparation and cleanup columns; many are also suitable for DNA fragment purification.

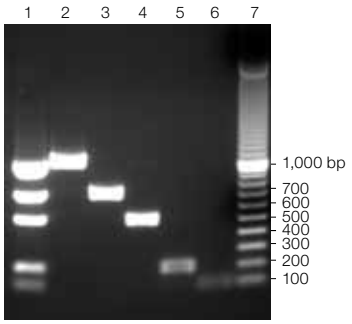
See Also
Agarose gel system: pages 224–232.
DNA ladders: pages 242–243.

Freeze 'N Squeeze™ DNA Gel Extraction Spin Columns

Freeze 'N Squeeze spin columns offer a filtration-based purification method, which provides a quick and effective alternative to chemical extraction and electroelution methods. The Freeze 'N Squeeze method uses centrifugation to draw 50–23,000 bp DNA out of agarose gel slices that have been quickly frozen and thawed. Features include:

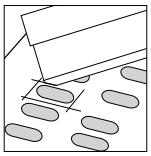
- No solutions to prepare — save time and avoid using toxic chaotropic materials
- DNA immediately available for PCR, subcloning, ligations, and sequencing reactions
- Less than 1 min of hands-on time

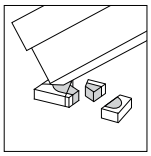
For More Information
Web: www.bio-rad.com/freeze-n-squeeze

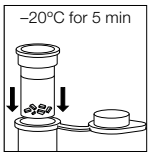


Recovery of DNA fragments using Freeze 'N Squeeze spin columns. Extracted fragments were rerun on a ReadyAgarose™ 1% TAE gel. Lane 1, precision molecular mass ruler; lane 7, EZ Load™ 100 bp PCR molecular ruler.

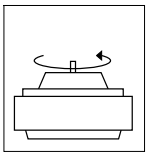
Freeze 'N Squeeze Method

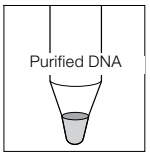

Cut out gel slice.


Chop into pieces.



Transfer to spin column and freeze for 5 min.


Spin for 3 min.



Recover purified DNA.

Ordering Information

Catalog #	Description
732-6165	**Freeze 'N Squeeze DNA Gel Extraction Spin Columns**, 25 columns
732-6166	**Freeze 'N Squeeze DNA Gel Extraction Spin Columns**, 100 columns

Prepacked Spin Columns

Prepacked size exclusion spin columns allow easy cleanup and purification of DNA and proteins from lower MW contaminants. Bio-Spin®, Micro Bio-Spin™, and PCR Kleen™ columns clean up DNA or protein samples quickly and easily using size exclusion chromatography.

These columns are available in multiple sizes and offer multiple MW exclusion limits to accommodate a variety of needs. Use the chart below to choose the column that best meets your needs.

Prepacked Spin Column Selection Guide

	Bio-Spin 6	Micro Bio-Spin 6	Bio-Spin 30	Micro Bio-Spin 30	PCR Kleen
Packed support	Special grade Bio-Gel® P-6 gel	Special grade Bio-Gel P-6 gel	Special grade Bio-Gel P-30 gel	Special grade Bio-Gel P-30 gel	Special grade size exclusion gel
Equilibration buffer	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, 1 mM EDTA, pH 7.0
Applications					
Desalting of oligonucleotides >20 bases	•	•	—	—	—
Labeling reactions: removal of unincorporated nucleotides >20 bases or bp from DNA	—	—	•	•	—
Removal of primers and primer-dimers from PCR products >200 bp	—	—	—	—	•
Buffer exchange (restriction fragments, PCR products, enzyme reactions, sequencing templates)	•	•	—	•	—
DNA sequencing reaction mixture cleanup**	—	—	•	•	—
Riboprobe cleanup***	—	—	—	•	—
Desalting of antibody, enzyme, and protein solutions	•	•	—	•	—
Purification of proteins of molecular weight >6,000	•	•	—	—	—
Purification of proteins of molecular weight >40,000	—	—	•	•	—
Bed volume	1.1 ml	0.7 ml	1.1 ml	0.7 ml	0.6 ml
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs	85% recovery of ≥700 bp, 95% retention of primers and primer-dimers
Molecular weight exclusion limit, globular proteins	6,000	6,000	40,000	40,000	8,000,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl	25–100 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge	Microcentrifuge
Autoclavability	Yes	Yes	Yes	Yes	Yes

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0.
** In Tris buffer.
*** In RNase-free Tris buffer.

See Also

Empty columns: pages 77–83.

Bio-Gel P media: page 60.

Bio-Spin, Micro Bio-Spin, and Mini Bio-Spin empty columns: page 77.

Prepacked Bio-Spin and Micro Bio-Spin Columns

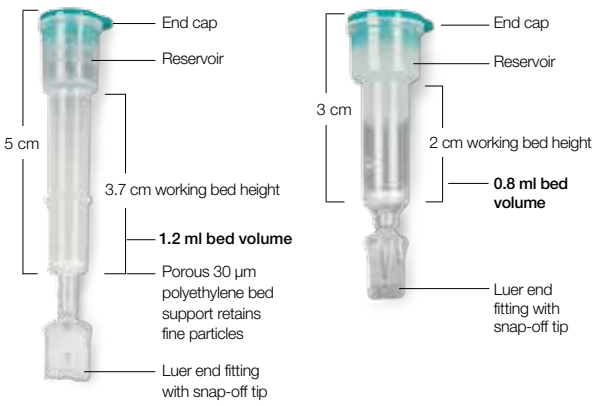
Bio-Spin and Micro Bio-Spin columns clean up and remove salts, nucleotides, dye terminators, and small molecules from DNA, RNA, and protein samples in 10 minutes. Filled with specially sized Bio-Gel® P gels, these columns are shipped fully hydrated in Tris or SSC buffer. They yield 95% recovery of DNA >22 bp and allow sample loads of 10–100 µl. For safe riboprobe preparation use RNase-free Micro Bio-Spin P-30 Tris spin columns.

For More Information
Web: www.bio-rad.com/dna-cleanup and /protein-cleanup

PCR Kleen Spin Columns

PCR Kleen columns are prepacked spin columns for purifying PCR products and other DNA molecules >200 bp directly from reaction mixtures. A simple 4-minute spin effectively removes salts, nucleotides, enzymes, primers, and primer-dimers. Purified DNA fragments are immediately available for secondary PCR, subcloning, restriction digests, ligations, sequencing, and other enzymatic manipulations.

For More Information
Web: www.bio-rad.com/dna-cleanup
Request or download bulletin: 2311



Prepacked Bio-Spin and Micro Bio-Spin Columns



PCR Kleen Spin Columns

Ordering Information

Catalog #	Description
Micro Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
732-6221	**Micro Bio-Spin 6 Columns**, includes 25 columns in Tris buffer, 50 collection tubes
732-6222	**Micro Bio-Spin 6 Columns**, includes 100 columns in Tris buffer, 200 collection tubes
732-6225	**Micro Bio-Spin 6 Columns**, includes 1,000 columns in Tris buffer, 2,000 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
732-6223	**Micro Bio-Spin 30 Columns**, includes 25 columns in Tris buffer, 50 collection tubes
732-6224	**Micro Bio-Spin 30 Columns**, includes 100 columns in Tris buffer, 200 collection tubes
732-6226	**Micro Bio-Spin 30 Columns**, includes 1,000 columns in Tris buffer, 2,000 collection tubes
732-6250	**Micro Bio-Spin 30 Columns**, includes 25 columns in Tris buffer, 50 collection tubes, RNase-free
732-6251	**Micro Bio-Spin 30 Columns**, includes 100 columns in Tris buffer, 200 collection tubes, RNase-free
Micro Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
732-6200	**Micro Bio-Spin 6 Columns**, includes 25 columns in SSC buffer, 50 collection tubes
732-6201	**Micro Bio-Spin 6 Columns**, includes 100 columns in SSC buffer, 200 collection tubes
732-6205	**Micro Bio-Spin 6 Columns**, includes 1,000 columns in SSC buffer, 2,000 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
732-6202	**Micro Bio-Spin 30 Columns**, includes 25 columns in SSC buffer, 50 collection tubes
732-6203	**Micro Bio-Spin 30 Columns**, includes 100 columns in SSC buffer, 200 collection tubes
732-6206	**Micro Bio-Spin 30 Columns**, includes 1,000 columns in SSC buffer, 2,000 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
732-6227	**Bio-Spin 6 Columns**, includes 25 columns in Tris buffer, 50 collection tubes
732-6228	**Bio-Spin 6 Columns**, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
732-6231	**Bio-Spin 30 Columns**, includes 25 columns in Tris buffer, 50 collection tubes
732-6232	**Bio-Spin 30 Columns**, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
732-6002	**Bio-Spin 6 Columns**, includes 25 columns in SSC buffer, 50 collection tubes
732-6213	**Bio-Spin 6 Columns**, includes 1,000 columns in SSC buffer, 2,000 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
732-6006	**Bio-Spin 30 Columns**, includes 25 columns in SSC buffer, 50 collection tubes
PCR Kleen Spin Columns	
732-6300	**PCR Kleen Spin Columns**, 25

Sample Quantitation

Protein Assay Kits 20

Spectrophotometry 23

Cuvettes 25

Protein Assay Kits

See Also

SmartSpec Plus spectrophotometer: pages 23–24.

Microplate readers: pages 306–307.

Cuvettes: pages 25–26.

Determining the concentration of protein samples is critical for many experiments, and most protein samples can be quantitated by a colorimetric assay. In a typical protein assay, a chemical reagent is added to a protein sample solution, producing a color change that is measured with a spectrophotometer or microplate reader and compared to a standard curve of known protein concentrations. Bio-Rad offers four protein assays, each with a unique set of advantages. All assays can be easily automated for large numbers of samples.

Bio-Rad offers four protein assays:

- **Quick Start™ Bradford protein assay** — the single-step method for determining protein concentration in solution
- **Bio-Rad protein assay** — for quantitating most proteins and polypeptides with MWs >3,000
- ***DC*™ protein assay** — for use with samples containing detergent
- ***RC DC*™ protein assay** — for complex sample solutions containing reducing agents and detergents

For More Information
Web: www.bio-rad.com/proteinassays
Request or download bulletin: 1069 and 6234

Protein Assay Selection Guide*

	Quick Start Bradford	Bio-Rad	*DC*	*RC DC*
Application	Single step method	Quantitates most proteins	For samples with detergent	For complex samples with reductants and detergents
Method adapted from	Bradford (1976)	Bradford (1976)	Lowry et al. (1951)	Lowry et al. (1951)
Standard-concentration assay Sample volume Linear range	 100 µl 0.125–1.5 mg/ml	 100 µl 0.125–1.5 mg/ml	 100 µl 0.125–1.5 mg/ml	 100 µl 0.2–1.5 mg/ml
Low-concentration assay Sample volume Linear range	 1 ml 1.25–25 µg/ml	 800 µl 1.25–25 µg/ml	 200 µl 5–250 µg/ml	 200 µl 5–250 µg/ml
Microplate assay sample volume	5 µl	10 µl	5 µl	**
Minimum incubation time	5 min	5 min	15 min	15 min
Assay wavelength	595 nm	595 nm	650–750 nm	650–750 nm

* Standard-concentration assay is designed for smaller sample volumes of higher protein concentration, while the low-concentration assay is designed for larger sample volumes of lower protein concentration.

** To adapt the *RC DC* assay to a microplate format, follow the micro test tube (microfuge tube) assay protocol in the *RC DC* Protein Assay Instruction Manual up to the centrifugation step where the supernatant is discarded. The pellet can then be transferred to the microplate, and the microplate assay protocol in the *DC* Protein Assay Instruction Manual can be followed.

Quick Start™ Bradford Protein Assay

The Quick Start Bradford protein assay is a streamlined, accurate procedure for determining the concentration of protein in solution. Ready-to-use dye reagent and prediluted protein standards allow one-step determination of protein concentration.

Quick Start Bradford kits offer either bovine serum albumin or bovine γ-globulin standard sets. Each kit contains two aliquots each of seven concentrations (0.125, 0.25, 0.5, 0.75, 1.0, 1.5, and 2.0 mg/ml) conveniently packaged in screwcap vials, eliminating ampoules and ensuring protein stability for one year when stored at 4°C. Standards are also available in five 2 mg/ml aliquots for creating your own dilutions.

The 1x dye reagent can be used for performing 1 and 5 ml standard assays, microplate assays, or microassays.



For More Information
Web: www.bio-rad.com/quickstart
Request or download bulletins: 1069 and 2969

Ordering Information

Catalog #	Description
500-0201	**Quick Start Bradford Protein Assay Kit 1**, includes 1x dye reagent (1 L), bovine serum albumin standard (5 x 2 mg/ml); sufficient for 200 standard assays or 4,000 microplate assays
500-0202	**Quick Start Bradford Protein Assay Kit 2**, includes 1x dye reagent (1 L), bovine serum albumin standard set (2 sets of 7 concentration standards, 0.125–2.0 mg/ml, 2 ml)
500-0203	**Quick Start Bradford Protein Assay Kit 3**, includes 1x dye reagent (1 L), bovine γ-globulin standard (5 x 2 mg/ml)
500-0204	**Quick Start Bradford Protein Assay Kit 4**, includes 1x dye reagent (1 L), bovine γ-globulin standard set (2 sets of 7 concentration standards, 0.125–2.0 mg/ml, 2 ml)
Reagents	
500-0205	**Quick Start Bradford 1x Dye Reagent**, 1 L
Accessories	
500-0206	**Quick Start Bovine Serum Albumin Standard**, 5 x 2 ml vials of 2 mg/ml
500-0207	**Quick Start Bovine Serum Albumin Standard Set**, 2 sets of 7 concentration standards, 0.125–2.0 mg/ml
500-0208	**Quick Start Bovine γ-Globulin Standard**, 5 x 2 ml vials of 2 mg/ml
500-0209	**Quick Start Bovine γ-Globulin Standard Set**, 2 sets of 7 concentration standards, 0.125–2.0 mg/ml

Bio-Rad Protein Assay

The Bio-Rad protein assay is a simple colorimetric assay for determining total protein concentration. It is easy to adapt the assay from the standard-concentration range to a low-concentration microassay or for use in 96-well microplates for rapid determinations.

The Bio-Rad protein assay is based on the Bradford dye-binding procedure (Bradford 1976), which measures the color change of Coomassie Brilliant Blue G-250 dye when it binds to protein (primarily to basic and aromatic amino acid residues). The assay quantitates most proteins and polypeptides with MWs >3,000. Some detergents and basic buffers interfere with the assay.



For More Information
Web: www.bio-rad.com/BRprotein
Request or download bulletins: 1069 and 1123

Ordering Information

Catalog #	Description
500-0001	**Bio-Rad Protein Assay Kit I**, includes 450 ml dye reagent concentrate, bovine γ-globulin standard; sufficient for 440 standard assays or 2,200 microplate assays
500-0002	**Bio-Rad Protein Assay Kit II**, includes 450 ml dye reagent concentrate, bovine serum albumin standard; sufficient for 440 standard assays or 2,200 microplate assays
Reagents	
500-0006	**Bio-Rad Protein Assay Dye Reagent Concentrate**, 450 ml
Accessories	
500-0005	**Protein Standard I**, bovine γ-globulin, reconstituted volume 20 ml
500-0007	**Protein Standard II**, bovine serum albumin, reconstituted volume 20 ml

DC™ Protein Assay

The *DC* (detergent compatible) protein assay is a colorimetric assay for protein determination of samples that contain detergents. The reaction is similar to the well-documented Lowry assay (Lowry et al. 1951), but has been modified to save time. The *DC* protein assay requires only a single 15 minute incubation, and the absorbance readings are stable for at least 2 hours.

For More Information
Web: www.bio-rad.com/DCprotein
Request or download bulletins: 1069, 1731, 1770, and 1909



Ordering Information

Catalog #	Description
500-0111	***DC* Protein Assay Kit I**, includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution, bovine γ-globulin standard; sufficient for 450 standard assays
500-0112	***DC* Protein Assay Kit II**, includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution, bovine serum albumin standard; sufficient for 450 standard assays
Reagents	
500-0113	**Protein Assay Reagent A**, 250 ml, alkaline copper tartrate solution
500-0114	**Protein Assay Reagent B**, 1 L, dilute Folin reagent
500-0115	**Protein Assay Reagent S**, 5 ml, surfactant solution
500-0116	***DC* Protein Assay Reagents Package**, includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution; sufficient for 450 standard assays
Accessories	
500-0005	**Protein Standard I**, bovine γ-globulin, lyophilized (reconstituted volume 20 ml)
500-0007	**Protein Standard II**, bovine serum albumin, lyophilized (reconstituted volume 20 ml)

See Also

Protein sample preparation: pages 2–9.

Cuvettes: pages 25–26.

RC DC™ Protein Assay

The *RC DC* (reducing agent and detergent compatible) protein assay is a colorimetric assay for protein determination in the presence of reducing agents and detergents. The *RC DC* protein assay, based on the Lowry protocol (Lowry et al. 1951), includes the features of the original *DC* protein assay. Its compatibility with a broader range of reagents allows simplified protein quantitation directly in complex sample solutions.

For More Information
Web: www.bio-rad.com/RCDCprotein
Request or download bulletins: 1069 and 2610



Ordering Information

Catalog #	Description
500-0121	***RC DC* Protein Assay Kit I**, includes *RC* reagents package, *DC* protein assay reagents package, bovine γ-globulin standard; sufficient for 450 standard assays
500-0122	***RC DC* Protein Assay Kit II**, includes *RC* reagents package, *DC* protein assay reagents package, bovine serum albumin standard; sufficient for 450 standard assays
Reagents	
500-0113	**Protein Assay Reagent A**, 250 ml, alkaline copper tartrate solution
500-0114	**Protein Assay Reagent B**, 1 L, dilute Folin reagent
500-0115	**Protein Assay Reagent S**, 5 ml, surfactant solution
500-0116	***DC* Protein Assay Reagents Package**, includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution; sufficient for 450 standard assays
500-0120	***RC DC* Protein Assay Reagents Package**, includes *RC* reagents package and *DC* protein assay reagents package; sufficient for 450 standard assays
500-0119	***RC* Reagents Package**, includes *RC* reagent I (250 ml) and *RC* reagent II (250 ml); sufficient for 500 standard assays
500-0117	***RC* Reagent I**, 250 ml
500-0118	***RC* Reagent II**, 250 ml
Accessories	
500-0005	**Protein Standard I**, bovine γ-globulin, lyophilized (reconstituted volume 20 ml)
500-0007	**Protein Standard II**, bovine serum albumin, lyophilized (reconstituted volume 20 ml)

Spectrophotometry

SmartSpec™ Plus Spectrophotometer

The SmartSpec Plus spectrophotometer has a more complete range of features and functions than many other benchtop spectrophotometers, offering affordable performance, stability, and functionality.

The SmartSpec Plus is a UV/visible spectrophotometer with a working wavelength range of 200–800 nm. For routine work with nucleic acid and protein samples, the SmartSpec Plus spectrophotometer provides you with an instrument for:

- Quantitation of DNA, RNA, oligonucleotides, and proteins
- Monitoring cell culture growth
- Simple kinetics assays
- Wavelength scans with peak detection

A simple, menu-driven interface simplifies assays and provides common sample computations at the touch of a button. Conversion factors can be stored and modified. The SmartSpec Plus instrument can automatically provide results such as:

- A_{260}/A_{280} ratio for nucleic acid purity
- Quantitation that takes dilution factors into account



- Sample concentration in µg/ml (additionally in pmol/µl for oligonucleotides)
- Molar extinction coefficient and MW of oligonucleotides

At the end of an assay, a report can be printed that shows the user, date, and results.

Nucleic Acid Quantitation

The SmartSpec™ Plus spectrophotometer offers a complete solution for the quantitation of dsDNA, ssDNA, or RNA by using either the preprogrammed conversion factors or entering a value that is best for the sample being assayed. The SmartSpec Plus instrument will provide absorbance, concentration, and purity values so you can proceed confidently with downstream experiments.

Protein Quantitation

The SmartSpec Plus instrument has preprogrammed methods for the quantitation of proteins by the Bradford, Lowry, and BCA methods. Features built into each assay method facilitate data collection and present a complete analysis of assay results.

- Standards can be analyzed in groups of up to nine replicates
- Up to 10 standard curves can be stored under user-assigned names
- Mean and standard deviation values are automatically calculated for each replicate group
- Printable report includes a standard curve with r^2 value

Other Benefits

- Built-in thermal printer
- Xenon flash lamp extends lamp life and reduces maintenance costs
- User interface enables choice of six different languages: English, French, German, Italian, Japanese, and Spanish
- Compact, space-saving design

For More Information
Web: www.bio-rad.com/spectrophotometry
Request or download bulletin: 2826

Cuvettes

Bio-Rad offers compatible quartz and UV-transparent plastic cuvettes.

Spectrophotometer Cuvette Selection Guide

Min. Volume, µl	Max. Volume, µl	Cuvette Type	Pathlength, mm	Catalog #
1,000	3,500	Standard cuvette, quartz	10	170-2502
500	1,400	Semimicrovolume cuvette, quartz	10	170-2503
200	700	Microvolume cuvette, quartz	10	170-2504
80	100	Submicrovolume cuvette, quartz	10	170-2505
50	1,500	trUView™ cuvettes	10	170-2510, 170-2511

Ordering Information

Catalog #	Description
SmartSpec Plus Spectrophotometer	
170-2525	**SmartSpec Plus Spectrophotometer**
Accessories	
170-2502	**Standard Cuvette**, 1–3.5 ml, quartz
170-2503	**Semimicrovolume Cuvette**, 0.5–1.4 ml, quartz
170-2504	**Microvolume Cuvette**, 200–700 µl, quartz
170-2505	**Submicrovolume Cuvette**, 80–100 µl, quartz
170-2506	**SmartSpec Printer Paper**, 5 pack
170-2507	**Spring**, cuvette holder

Cuvettes

trUView™ Cuvettes

These disposable cuvettes are suitable for most UV and visible spectroscopic assays. Highly transparent trUView cuvettes allow accurate and precise quantitation of DNA, RNA, and protein. Individually packaged trUView cuvettes are free of contaminants and guaranteed DNase, RNase, and pyrogen free. Features of trUView cuvettes include:

- Low volume requirement (≥50 µl) that conserves limited samples
- Individual packaging to prevent scratching and contamination
- Up to 70% light transmission at 260 nm, ensuring accurate nucleic acid quantitation



trUView vs. Quartz Cuvettes

trUView cuvettes provide several advantages over traditional quartz cuvettes for quantitative UV applications, having characteristics that can supplement or replace the use of quartz cuvettes. trUView cuvettes are:

- Ready to use without lengthy sterilization procedures
- Disposable and less expensive to replace

For More Information
Web: www.bio-rad.com/spectrophotometry

Ordering Information

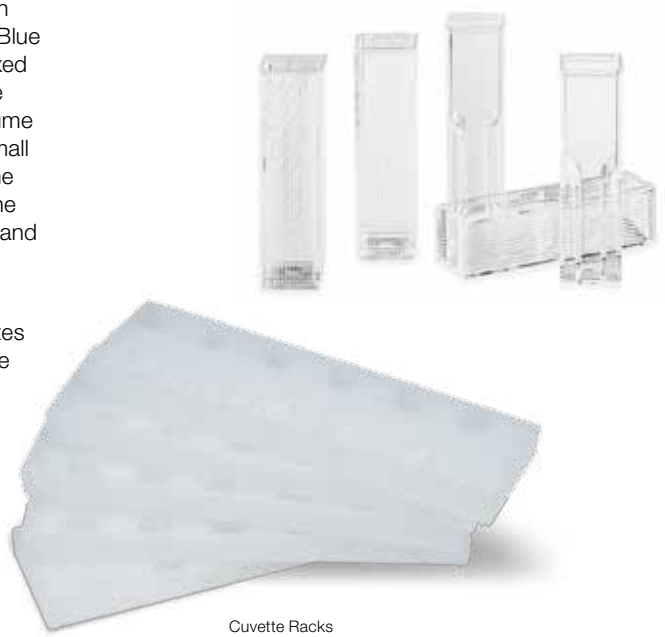
Catalog #	Description
170-2510	**trUView Cuvettes**, pack of 50
170-2511	**trUView Cuvettes**, pack of 100

Standard and Semimicrovolume Cuvettes

Standard 3.5 ml cuvettes are ideal for use with protein assays (pages 20–23). They adsorb less Coomassie Blue dye than glass or quartz cuvettes. Assays can be mixed directly in the cuvette. The volume of reagents can be reduced, yielding more assays per kit. Semimicrovolume 1.5 ml cuvettes are ideal for precise quantitation of small volume samples. Both standard and semimicrovolume cuvettes are sized to fit most spectrophotometers. The cuvettes offer smooth optical surfaces for consistent and accurate readings.

Bio-Rad also offers other cuvettes for specialized applications, including quartz and disposable cuvettes for SmartSpec™ spectrophotometers and disposable trUView™ cuvettes for precise quantitation of small samples of DNA, RNA, and proteins.

For More Information
Web: www.bio-rad.com/spectrophotometry



Cuvette Racks

Ordering Information

Catalog #	Description
Disposable Polystyrene Cuvettes	
223-9950	**Standard Disposable Polystyrene Cuvettes**, 3.5 ml, 100
223-9955	**Semimicrovolume Disposable Polystyrene Cuvettes**, 1.5 ml, 100
Quartz Cuvettes	
170-2502	**Standard Cuvette**, 1–3.5 ml, quartz, for use with the SmartSpec Plus spectrophotometer
170-2503	**Semimicrovolume Cuvette**, 0.5–1.4 ml, quartz, for use with the SmartSpec Plus spectrophotometer
170-2504	**Microvolume Cuvette**, 200–700 µl, quartz, for use with the SmartSpec Plus spectrophotometer
170-2505	**Submicrovolume Cuvette**, 80–100 µl, quartz, for use with the SmartSpec Plus spectrophotometer
VersaFluor Disposable Cuvettes and Cuvette Racks	
170-2415	**Standard Cuvettes**, 12.5 x 12.5 mm (outside dimensions), 4-sided, optically clear polystyrene, 3.5 ml, 100
170-2416	**Microcuvettes**, 3.0 x 3.0 mm (outside dimensions), 4-sided, optically clear polystyrene, 150–350 µl, 100
166-0485	**Cuvette Racks**, hold 12 cuvettes each, set of 5

Cell Counting

Automated Cell Counting System 28

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Automated Cell Counting System

New TC20™ Automated Cell Counter

With its innovative auto-focus and sophisticated cell counting algorithm, the TC20 automated cell counter eliminates subjectivity while delivering reliable counts of mammalian cells in 30 seconds.

- **Compatible with a broad range of cell sizes and types** — counts cell lines, primary cells (from tissue or blood), and stem cells
- **Innovative auto-focus technology** — removes the variation associated with manual focusing and leads to precise cell counts in 30 sec
- **Cell size gates** — user selects a population of interest in complex samples such as primary cells or lets the cell counting algorithm do all the work
- **Cell viability** — analyzes cells accurately using multifocal plane analysis
- **Easy to archive and analyze** — stores up to 100 counts in the onboard memory for access any time, or use the optional TC20 data analyzer software on your PC to further analyze exported cell images

Upon insertion of a counting slide, the TC20 provides a total cell count with or without staining and assesses cell viability via trypan blue exclusion. To determine if a cell is viable, the TC20 counter analyzes each cell on images acquired from multiple focal planes during the focusing step. Auto-focus and multifocal plane analysis reduce counting bias associated with manual focusing.

Accuracy is comparable to results obtained with a hemocytometer. The TC20 counter can count cells with a 6–50 µm cell diameter and within a broad concentration range of 5 x 10^4–1 x 10^7 cells/ml, which eliminates the need to dilute cells, thus reducing the errors associated with sample dilutions prior to counting.

For complex samples composed of multiple cell populations, such as primary cells, the position of cell size gates can be adjusted to define the population of interest.

Results from 100 previous counts are stored in the TC20 cell counter and can be exported via the USB port. Images of cells can be further analyzed on a computer using the TC20 data analyzer software.

For More Information
Web: www.bio-rad.com/TC20
Request or download bulletins: 6282 and 6283

Learn More about the Technology
Web: www.bio-rad.com/tech/cellcounting



TC20 Automated Cell Counter, Counting Slides, and Trypan Blue

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Ordering Information

Catalog #	Description
TC20 Automated Cell Counter	
145-0102	**TC20 Automated Cell Counter**, 120–240 V, includes instrument, power supply, USB flash drive, USB cable, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
145-0103	**TC20 Automated Cell Counter with Thermal Label Printer**, 120–240 V, includes instrument, power supply, USB flash drive, USB cable, thermal label printer, 1 roll of 185 labels, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
Kits and Reagents*	
145-0003	**Counting Kit**, includes 30 dual-chamber counting slides (60 count), 1.5 ml trypan blue
145-0013	**Trypan Blue**, 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered sufficient for 150 counts (10 µl/count), 1 x 1.5 ml
145-0021	**Trypan Blue**, 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered sufficient for 750 counts (10 µl/count), 5 x 1.5 ml
145-0022	**Trypan Blue**, 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered sufficient for 1,500 counts (10 µl/count), 10 x 1.5 ml
145-0015	**Counting Slides**, 150 dual-chamber counting slides (300 counts)
145-0016	**Counting Slides**, 300 dual-chamber counting slides (600 counts)
145-0017	**Counting Slides**, 600 dual-chamber counting slides (1,200 counts)
145-0018	**Counting Slides**, 900 dual-chamber counting slides (1,800 counts)
145-0019	**Counting Slides**, 1,200 dual-chamber counting slides (2,400 counts)
145-0020	**Counting Slides**, 2,400 dual-chamber counting slides (4,800 counts)
145-0014	**System Test Kit**, includes verification slide, instructions
Accessories*	
145-0005	**Thermal Label Printer**, 120–240 V, includes thermal label printer, USB cable, 1 roll of 185 labels
145-0007	**Thermal Printer Labels**, 1 roll of 185 labels, for thermal label printer

* Compatible with TC20 and TC10 automated cell counters.

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Chromatography: Laboratory and Process Separations

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Chromatography Overview

A Range of Options

Bio-Rad offers a wide selection of chromatography tools for the life scientist involved in analytical, preparative, or process chromatography. We have become known as a quality provider of chromatography media for reagent cleanup and biomolecule purification, manufacturing flexible and intuitive instrumentation and software and prepacked and empty columns for sample separations.

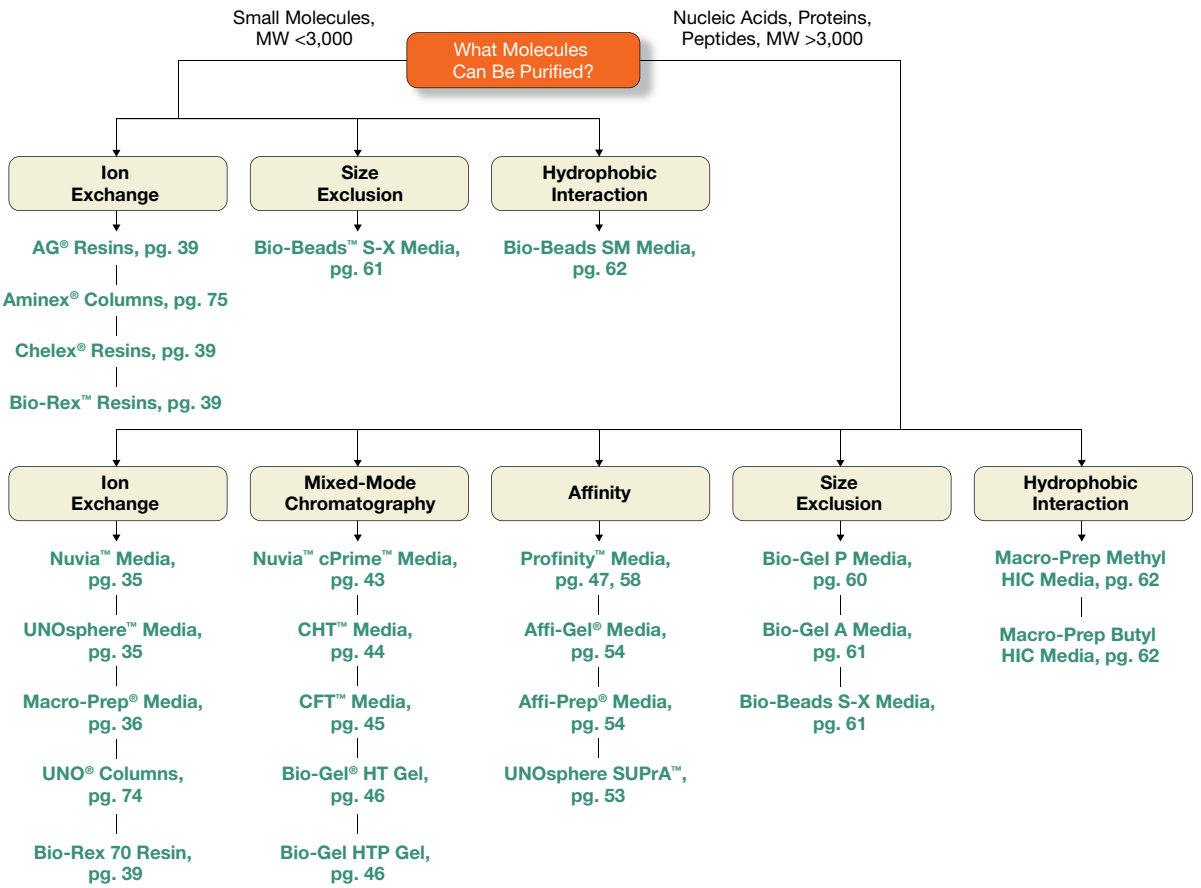
Throughput, capacity, selectivity, resolution, and process economics are among the considerations when selecting any chromatography media, column, or instrument. We offer products for each phase of purification and manufacture media for any scale from nanograms to kilograms.

Bio-Rad offers a wide range of lab and process chromatography media for ion exchange, hydroxyapatite, affinity, size exclusion, and hydrophobic interaction chromatography as well as chromatography standards. For convenient sample preparation products, see pages 2–18. Bio-Rad's process chromatography media are used worldwide to manufacture registered biotherapeutics and diagnostics. All chromatography media are manufactured in an ISO 9001 registered manufacturing facility. The manufacturing processes are audited and registered by National Quality Assurance Limited against the provisions of ANSI/ISO/ASQ 9001:2000.

Development, Application, and Validation Support

Bio-Rad provides development and application support for large-scale separations. We also offer regulatory assistance and regulatory support files to help validate the chromatography media used in your processes. These files contain information essential to validation, including general product information, specification test procedures, identification tests, and biological safety data.

Learn More about the Technology
Web: www.bio-rad.com/tech/chrom



Chromatography Media

Bio-Rad offers a selection of media for separation by ion exchange, hydroxyapatite and fluoroapatite, affinity, size exclusion (gel filtration), and hydrophobic interaction chromatography.

Chromatography Media Selection Guide

Media	Packaging Format*	Suitability** Analytical Scale	Pilot/ Preparative Scale	Process Scale	Application	Page
Anion Exchange						
AG® 1	B, GC	++++	++++	++++	Strong exchanger. Separation of low MW peptides, nucleotides, inorganic ions using different cross-linkages; high selectivity for anions such as chloride; gravity or low-pressure use	39
AG MP-1M	B, GC	++++	++	+	Strong exchanger. Macroporous, equivalent to AG 1 for MW >1,000,000; gravity or low-pressure use	39
Bio-Rex™ 5 and AG 4-X4	B, GC	++++	++		Weak exchanger. Used to remove organic acids from sugars; adsorption of mineral acids; gravity or low-pressure use	39
UNO® Q	MPC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	74
Macro-Prep® High Q	B, C	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
Macro-Prep 25 Q	B	++++	++++	+	Strong exchanger. Similar to Macro-Prep High Q but 25 µm particle size allows higher-resolution separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
Macro-Prep DEAE	B, C	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
UNOsphere™ Q	B, C, F	++++	++++	++++	Strong exchanger. High-productivity, high-capacity biomolecule separation; pH stability 1–14	35
Aminex®	HPLC	++++			High-pressure separation of carbohydrates, sugars, and small organic molecules; delivers industry-standard performance (U.S. Pharmacopeia)	75
Nuvia™ Q	B, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere Q but surface modification allows extremely high-capacity biomolecule separation; pH stability 1–14	35
Cation Exchange						
AG 50W	B, GC	++++	++++	++++	Strong exchanger. Lower cross-linkages useful for peptide and nucleotide separation; higher cross-linkages useful for small peptide and metals separation and removal of cations; gravity or low-pressure use	39
AG MP-50	B, GC	++++	++	+	Strong exchanger. Macroporous equivalent to AG 50W for MW >1,000,000; gravity or low-pressure use	39
Bio-Rex 70	B	++++	++	++	Weak exchanger. High capacity for high MW (>1,000,000) solutes; can be used for purification and fractionation of peptides, proteins, enzymes, and other cationic molecules. Amenable to large-scale purification	39
Chelex® 100	B, GC	++++	++++	++++	Weak exchanger. Chelating resin removes metals and is suitable for PCR applications; can also be used for ultrapurification of buffers and ionic reagents; gravity or low-pressure use. Available in molecular biology and biotechnology grades	39
UNO® S	MPC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	74
Macro-Prep 25 S	B	++++	++++	+	Strong exchanger. Similar to Macro-Prep High S, but 25 µm particle size allows higher-resolution separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
Macro-Prep High S	B, C	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
Macro-Prep CM	B	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	37
UNOsphere S	B, C, F	++++	++++	++++	Strong exchanger. High-capacity biomolecule separation; pH stability 1–14	35
UNOsphere Rapid S	B, C, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere S but with enhanced chemistries to overcome the pH shift that occurs with conductivity transitions and faster equilibration times; pH stability 1–14	35
Nuvia S	B, C, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere S but surface modification allows extremely high-capacity biomolecule separation; pH stability 1–14	35

* B, bottle; C, cartridge (1 or 5 ml); GC, gravity column; SC, spin column; HPLC, high-pressure column; MPC, medium-pressure column; F, Foresight prepacked plates and columns.

** +, low suitability; ++, moderate suitability; +++, suitable; ++++, high suitability.

continues

Chromatography Media Selection Guide (cont.)

Media	Packaging Format*	Suitability** Analytical Scale	Pilot/ Preparative Scale	Process Scale	Application	Page
Specialty Ion Exchange						
AG 11 A8	B	++++	++	++	Ion retardation — contains cation and anion exchange sites that weakly interact with mobile ions; can be used for desalting of nonionic molecules with water elution, such as removal of SDS from protein and adsorption of mineral acids	39
AG 501-X8	B	++++	+++	+++	Mixed bed, consists of equivalent amounts of AG 1-X8 and AG 50W-X8. May be used to deionize impure water, urea, formamide, and acrylamide to provide extremely pure reagents	39
Bio-Rex MSZ 501	B	++++	++	++	Mixed bed, consists of equivalent amounts of Bio-Rex MSZ 1 and Bio-Rex MSZ 50 media. Monosized ion exchange; desalting of water and nonelectrolytes. Ideal for large-scale industrial applications	39
Size Exclusion (Gel Filtration)						
Bio-Gel® P	B, C, SC, GC	++++	++++		Separation of molecules by size; desalting and buffer exchange; several particle size ranges available with MW exclusion limits ranging from 100–100,000 D; pH stability 2–10	60
Bio-Beads™ S-X	B	++++	++++	++	Fractionation of low MW organic polymers and other hydrophobic substances in nonpolar solvents from 400–14,000 D	61
Affinity						
UNOsphere SUPrA™	B, C	++++	++++	++++	Antibody purification; Fc-fusion purification from large volumes of feed/cell culture; development and commercial-scale mAb purification process applications	53
Affi-Gel® protein A	B, C, GC	++++	++++		IgG purification from ascites, serum, and culture fluid; low-pressure media	54
Affi-Prep® protein A	B, C	++++	++++	++	IgG purification from ascites, serum, and culture fluid; pressure-stable media	54
Affi-Gel Blue	B, C, SC	++++	++++		Albumin removal and enzyme purification; Cibacron Blue F3GA dye covalently attached; purification of proteins with dinucleotide fold	55
DEAE Affi-Gel Blue	B, C, GC	++++	++++		Albumin and protease removal for IgG purification; Cibacron Blue F3GA dye covalently attached to DEAE Bio-Gel A	55
CM Affi-Gel Blue	B	++++	++++		Albumin and protease removal for IgG purification; Cibacron Blue F3GA dye covalently attached to CM Bio-Gel A	56
Affi-Gel heparin	B	++++	++++		Purification of coagulation factors, plasma proteins, and enzymes including nucleases, lipases, and proteases; binding specific to a variety of enzymes and other proteins	57
Profinity™ IMAC	B, C	++++	++++	++	Histidine-tagged protein purification	47
Profinity GST	C	++++	++++	++	GST-tagged protein purification	48
Profinity eXact™	B, C, SC	++++	++++	++	One-step affinity tag purification and on-column cleavage	48
Affi-Prep polymyxin	B	++++	++++	++++	Removal of endotoxins; pressure-stable media capable of sanitization procedures with NaOH	57
Affi-Gel boronate	B	++++	++		Affinity for low MW molecules containing *cis* hydroxyl (cis-diol) groups; separation of AMP from cyclic AMP	56
Profinity epoxide	B	++++	++++	++++	Affinity coupling; coupling of nucleophiles such as hydroxy (–OH), amino ($–NH_2$), or thiol (–SH) groups; based on UNOsphere base matrix for superb pressure flow characteristics	58
Affi-Gel 10	B	++++	++++		Affinity coupling; immobilization of ligands with $–NH_2$ groups, coupling of proteins with pI 6.5–11; low-pressure media	58
Affi-Gel 15	B	++++	++++		Affinity coupling; immobilization of ligands with $–NH_2$ groups, coupling of proteins with pI <6.5; low-pressure media	58
Affi-Gel Hz	B	++++	++++		Affinity coupling; immobilization of IgG molecules via their Fc region	59
Affi-Gel 102	B	++++	++++		Affinity coupling of ligands with –COOH groups via EDAC coupling chemistry	59
Mixed-Mode Media						
Nuvia™ cPrime™	B, C, F	++++	++++	++++	Recombinant protein purification. Uses hydrophobic and weak cation exchange modes	43
CHT™ Type I	B, C, MPC, F	++++	++++	++++	Antibody purification (higher capacity than Type II); virus purification/removal; DNA purification/removal; aggregate and endotoxin removal; Fab purification	44
CHT Type II	B, C, F	++++	++++	++++	Antibody purification; removal of albumin from feedstream; Fab purification	44
CFT™ Type II	B, C, F	++++	++++	++++	Similar properties to CHT but exhibits greater stability in the lower pH range (5.5); suitable for Fab purification	45
Bio-Gel HT	B	++++	+++		Purification of proteins, nucleic acids, and other biomolecules; crystalline hydroxyapatite not as mechanically stable as CHT (ceramic hydroxyapatite)	46
Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HT but in powder form	46
DNA grade Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HTP with smaller particle size; selectivity for dsDNA; separation of ss- and dsDNA	46
Hydrophobic Interaction						
Macro-Prep methyl	B	++++	++++	++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	62
Macro-Prep t-butyl	B	++++	++++	++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	62

* B, bottle; C, cartridge (1 or 5 ml); GC, gravity column; SC, spin column; HPLC, high-pressure column; MPC, medium-pressure column; F, Foresight™ prepacked plates and columns.

** +, low suitability; ++, moderate suitability; +++, suitable; ++++, high suitability.

Ion Exchange Media

UNOsphere™ and Nuvia™ Ion Exchange Media

Bio-Rad's ion exchange media are scalable and fast. They are designed to meet the needs of the biopharmaceutical industry for capture, intermediate, and polishing stages of purification. UNOsphere and Nuvia media are bioprocess-compatible and may also be used at laboratory scales for high-performance applications. Benefits include:

- Efficient capture from crude feedstreams
- Optimization to operate under 2 bar at 1,200 cm/hr
- Large pore design results in ultra-high binding capacities at fast linear velocities
- Fully supported for regulatory information

UNOsphere Q, S, and Rapid S Media

UNOsphere Q and S media are strong anion and cation exchange resins respectively and may be used at any stage of the purification process. The Rapid S media have enhanced chemistries that overcome the pH shifts that occur with conductivity transitions.

For More Information
Web: www.bio-rad.com/unosphere
Request or download bulletins: UNOsphere Q media — 2724 and 2729; UNOsphere S media — 2669 and 2678

Nuvia Ion Exchange Media

Nuvia ion exchange media is an ultra high-capacity, next-generation ion exchange media built on an industry-proven proprietary base matrix technology. Nuvia media provides very high capture and exceptional flow properties designed to meet current and future process needs. Nuvia media is a flexible alternative that may be used as a capture and polishing solution.

- Use less media to purify a given amount of product
- Reduce cycle time and increase productivity by operating at higher flow rates
- Reduce costs and space requirements by decreasing buffer consumption
- Reduce capital and operating expenses by using smaller columns
- Chemical stability for repetitive clean-in-place cycles
- Flexibility for capture or polish steps
- Fully supported for regulatory submission

For More Information
Web: www.bio-rad.com/nuvia
Request or download bulletins: 5984, 5987, 6129, and 6128

Specifications

	UNOsphere Q	UNOsphere S	UNOsphere Rapid S	Nuvia Q	Nuvia S
Type of ion exchanger	Strong anion	Strong cation	Strong cation	Strong anion	Strong cation
Functional group	$-N^+(CH_3)_3$	$-SO_3^-$	SO_3^-	$-N(CH_3)_3^+$	$-SO_3^-$
Total ionic capacity	75–163 µeq/ml	219–315 µeq/ml	110–170 µeq/ml	100–170 µeq/ml	90–150 µeq/ml
Median particle size	120 ± 15 µm	80 ± 10 µm	100 ± 10 µm	85 ± 15 µm	85 ± 15 µm
Dynamic binding capacity*					
At 150 cm/hr	180 mg BSA/ml	60 mg IgG/ml	60 mg IgG/ml	—	—
At 300 cm/hr	—	—	—	>170 mg/ml	>110 mg/ml
At 600 cm/hr	125 mg BSA/ml	30 mg IgG/ml	30 mg IgG/ml	—	—
Recommended linear flow rate range	50–1,200 cm/hr	50–1,200 cm/hr	50–1,200 cm/hr	50–600 cm/hr	50–600 cm/hr
pH stability (accelerated, 60°C)	1–14 —	1–14 —	1–14 —	2–14 short term 4–12 long term	2–14 short term 4–13 long term
Sanitation	0.5–1.0 M NaOH	0.5–1.0 M NaOH	0.5–1.0 M NaOH	0.5–1.0 M NaOH	0.5–1.0 M NaOH

* 10% breakthrough capacity determined with a 5.0 mg/ml human IgG and 5.0 mg/ml BSA in a 1.1 x 20 cm column.

See Also
Chromatography systems: pages 84–123.
Prepacked columns: pages 66–76.
AEX and CEX standards: pages 64–65.
Sample preparation products: pages 2–18.

See Also
Media sampler packs: page 63.
Bio-Scale Mini cartridges: pages 70–71.

Ordering Information

Catalog #	Description	Comments
156-0311	**Nuvia S Media**, 25 ml	Ultra-high capacity strong cation process media
156-0313	**Nuvia S Media**, 100 ml	
156-0315	**Nuvia S Media**, 500 ml	
156-0317	**Nuvia S Media**, 10 L	
156-0411	**Nuvia Q Media**, 25 ml	Ultra-high capacity strong anion process media
156-0413	**Nuvia Q Media**, 100 ml	
156-0415	**Nuvia Q Media**, 500 ml	
156-0417	**Nuvia Q Media**, 10 L	
156-0101	**UNOsphere Q Media**, 25 ml	High-capacity strong anion media
156-0103	**UNOsphere Q Media**, 100 ml	
156-0105	**UNOsphere Q Media**, 500 ml	
156-0107	**UNOsphere Q Media**, 10 L	
156-0111	**UNOsphere S Media**, 25 ml	High-capacity strong cation media
156-0113	**UNOsphere S Media**, 100 ml	
156-0115	**UNOsphere S Media**, 500 ml	
156-0117	**UNOsphere S Media**, 10 L	
156-0211	**UNOsphere Rapid S Media**, 25 ml	High-capacity strong cation fast equilibration media
156-0213	**UNOsphere Rapid S Media**, 100 ml	
156-0215	**UNOsphere Rapid S Media**, 500 ml	
156-0217	**UNOsphere Rapid S Media**, 10 L	

Description	1 x 1 ml	5 x 1 ml	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges*				
Nuvia S Media	732-4420	732-4421	732-4422	732-4423
UNOsphere Q Media	—	732-4100	732-4102	732-4104
UNOsphere S Media	—	732-4110	732-4112	732-4114
UNOsphere Rapid S Media	—	732-4400	732-4401	732-4402

Adaptor Fittings for Bio-Scale Mini Cartridges

732-0111	**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
732-0112	**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
732-0113	**Luer to BioLogic System Fittings Kit**, includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect 1 cartridge to a BioLogic DuoFlow system

* Also available in Foresight prepacked plates and columns, see page 69 for ordering information.

See Also
Bio-Scale Mini, UNOsphere Q and S, Macro-Prep High Q and S, affinity, P-6 cartridges: pages 70–71.

Macro-Prep® Ion Exchange Media

Macro-Prep ion exchange media are designed to provide high resolution and high capacity for preparative separations. The rigid methacrylate beads exhibit little shrinkage and swelling, making them suitable for both low- and medium-pressure chromatography. The macroporous media allow both small and large molecules to access exchange sites located throughout the chromatography bed. The physical structure of the media permits high flow rates at low backpressure. Depending on the media, pH conditions, and samples, the media can act in mixed mode.

Benefits include:

- High capacity for biomolecules
- High resolution of complex biological mixtures
- Rigid methacrylate polymer matrix that allows high flow rates at modest pressures



Macro-Prep Media



Bio-Scale™ Mini Macro-Prep Cartridges

Macro-Prep High Q, DEAE, High S, and CM Media

For maximum flexibility, the product offerings include Macro-Prep High Q strong anion exchange media, Macro-Prep DEAE weak anion exchange media, Macro-Prep High S strong cation exchange media, and Macro-Prep CM weak cation exchange media.

For More Information
Web: www.bio-rad.com/macroprep
Request or download bulletins: Macro-Prep DEAE media — 1942; High S and High Q media — 5643 and 5644

Macro-Prep 25 S and Q Media

Macro-Prep 25 S strong cation exchange media and Macro-Prep 25 Q strong anion exchange media offer high-resolution separations at high flow rates with medium pressures. Both media possess the same rigid, macroporous, and hydrophilic properties of 50 µm Macro-Prep High Q and High S media, but in a 25 µm bead that offers higher resolution.

For More Information
Web: www.bio-rad.com/macroprepSandQ
Request or download bulletin: 2292

Specifications

Property	High Q	DEAE	High S	CM	25 Q*	25 S
Type of media	Strong anion	Weak anion	Strong cation	Weak cation	Strong anion	Strong cation
Functional ligand	$-N^+(CH_3)_3$	$-N^+(C_2H_5)_2$	$-SO_3^-$	$-COO^-$	$-N^+(CH_3)_3$	$-SO_3^-$
Ionic capacity	400 ± 75 µeq/ml	175 ± 75 µeq/ml	160 ± 40 µeq/ml	210 ± 40 µeq/ml	220 ± 40 µeq/ml	110 ± 30 µeq/ml
Typical binding capacity	40 mg BSA/ml	35 mg BSA/ml	70 mg IgG/ml	35 mg hemoglobin/ml	>30 mg/ml BSA	>40 mg/ml BSA
Counter ion	Cl^-	Cl^-	Na^+	Na^+	Cl^-	Na^+
Nominal particle size	50 µm	50 µm	50 µm	50 µm	25 µm	25 µm
Nominal pore size	1,000 Å	1,000 Å	1,000 Å	1,000 Å	725 Å	725 Å
Recommended linear flow rate range	—	—	—	—	50–300 cm/hr	50–300 cm/hr
Maximum recommended linear flow rate	3,000 cm/hr	3,000 cm/hr	3,000 cm/hr	3,000 cm/hr	3,000 cm/hr	3,000 cm/hr
Chemical stability						
1% SDS, 24 hr	•	•	•	•	•	•
6 M guanidine-HCl, 24 hr	•	•	•	•	•	•
Volume changes						
pH 4–10	<1%	<1%	<3%	<1%	<1%	<1%
0.1–1.0 M NaCl	<5%	<5%	<9%	<4%	<5%	<5%
Autoclavability (121°C, 80 min)	•	•	•	•	•	•
pH stability	1–10	1–10	1–10	1–10	1–10	1–10
Storage conditions	20% ethanol	20% ethanol	20% ethanol	20% ethanol	20% ethanol	20% ethanol

* Do not autoclave the OH^- form.

Ordering Information

Catalog #	Description	Comments
Macro-Prep High Q Media		
158-0040	**Macro-Prep High Q Media**, 25 ml	High-capacity strong anion exchange media; very high flow rates and resolution
156-0040	**Macro-Prep High Q Media**, 100 ml	
156-0041	**Macro-Prep High Q Media**, 500 ml	
156-0042	**Macro-Prep High Q Media**, 5 L	
156-0043	**Macro-Prep High Q Media**, 10 L	
Macro-Prep DEAE Media		
158-0020	**Macro-Prep DEAE Media**, 25 ml	High-capacity weak anion exchange media; very high flow rates and resolution
156-0020	**Macro-Prep DEAE Media**, 100 ml	
156-0021	**Macro-Prep DEAE Media**, 500 ml	
156-0022	**Macro-Prep DEAE Media**, 5 L	
156-0023	**Macro-Prep DEAE Media**, 10 L	

continues

Ordering Information

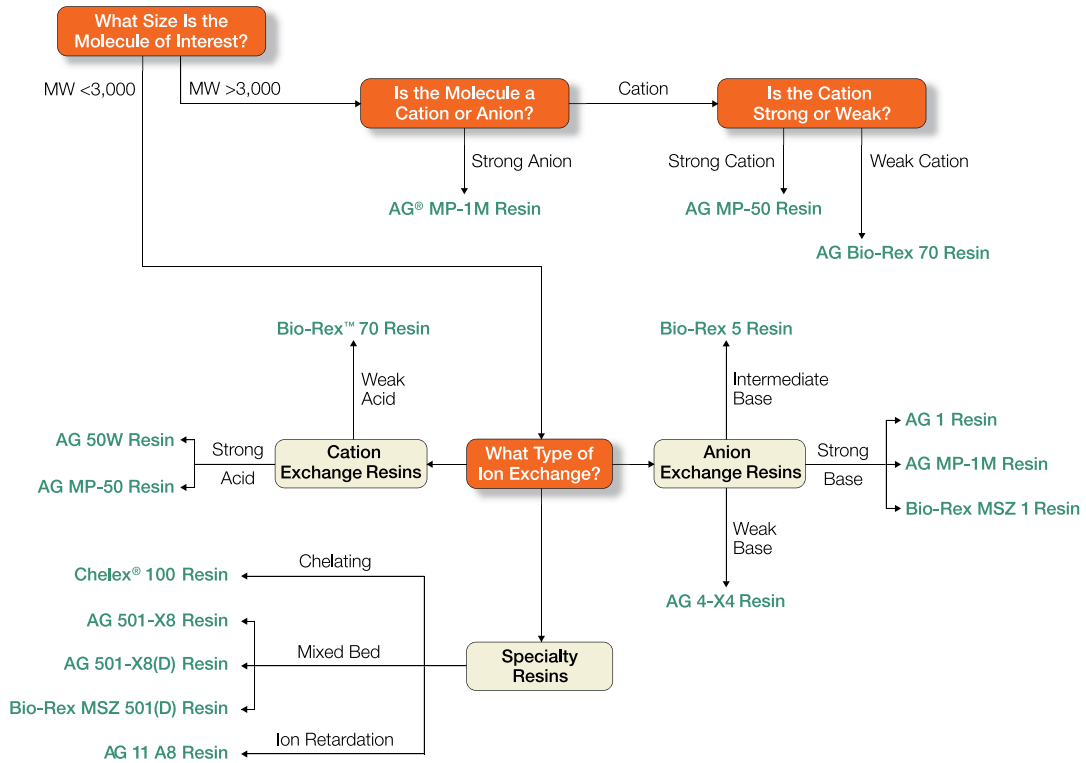
Catalog #	Description	Comments
Macro-Prep High S Media		
158-0030	**Macro-Prep High S Media**, 25 ml	High-capacity strong cation exchange media; very high flow rates and resolution
156-0030	**Macro-Prep High S Media**, 100 ml	
156-0031	**Macro-Prep High S Media**, 500 ml	
156-0032	**Macro-Prep High S Media**, 5 L	
156-0033	**Macro-Prep High S Media**, 10 L	
Macro-Prep CM Media		
158-0070	**Macro-Prep CM Media**, 25 ml	High-capacity weak cation exchange media; high flow rates and resolution
156-0070	**Macro-Prep CM Media**, 100 ml	
156-0071	**Macro-Prep CM Media**, 500 ml	
156-0072	**Macro-Prep CM Media**, 5 L	
156-0073	**Macro-Prep CM Media**, 10 L	
Macro-Prep 25 Q Media		
153-0021	**Macro-Prep 25 Q Media**, 50 ml	Strong anion exchange media; 25 µm bead that offers higher resolution
153-0022	**Macro-Prep 25 Q Media**, 200 ml	
153-0023	**Macro-Prep 25 Q Media**, 1 L	
153-0024	**Macro-Prep 25 Q Media**, 5 L	
Macro-Prep 25 S Media		
153-0031	**Macro-Prep 25 S Media**, 50 ml	Strong cation exchange media; 25 µm bead that offers higher resolution
153-0032	**Macro-Prep 25 S Media**, 200 ml	
153-0033	**Macro-Prep 25 S Media**, 1 L	
153-0034	**Macro-Prep 25 S Media**, 5 L	

Description	**5 x 1 ml**	**1 x 5 ml**	**5 x 5 ml**
Prepacked Bio-Scale Mini Cartridges			
Macro-Prep High Q Media	732-4120	732-4122	732-4124
Macro-Prep High S Media	732-4130	732-4132	732-4134
Macro-Prep DEAE Media	732-4140	732-4142	732-4144

Catalog #	Description
Adaptor Fittings for Bio-Scale Mini Cartridges	
732-0111	**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
732-0112	**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
732-0113	**Luer to BioLogic System Fittings Kit**, includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect 1 cartridge to a BioLogic DuoFlow system

Larger volumes and special packaging for industrial applications are available on request.

Analytical Grade Ion Exchange Resins



AG®, Bio-Rex™, and Chelex® Resins

AG (analytical grade) resins — AG resins are primarily used for the separation of low MW compounds such as inorganic ions, organic acids, nucleic acids, or carbohydrates. They are available as both strong and weak cation and anion exchangers and as mixed-bed ion exchangers. Many are available in several ionic forms and can be converted from one form to another

Bio-Rex resin — available as weak anion and cation exchangers and as monosized mixed-bed ion exchangers. Bio-Rex 70 resins are macroreticular resins with a high capacity for high molecular weight compounds used for the purification and fractionation of proteins and peptides

Chelex resins — contain paired iminodiacetate ions coupled to a styrene divinylbenzene support. They are unique chelating resins that bind polyvalent cations with high selectivity and are used to remove metal ions from samples and buffers

Analytical Grade Resin Wet Mesh and Equivalent Diameters

Wet mesh (U.S. standard)	16	20	40	50	80	100	140	200	270	325	400
Diameter, µm	1,180	850	425	300	180	150	106	75	53	45	38

For More Information
Web: www.bio-rad.com/agresins

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	Wet Bead Size, µm	Nominal Shipping % Water
AG Resins					
140-1231	**AG 1-X2 Resin**, 500 g	Chloride	50–100	180–500	70–78
140-1241	**AG 1-X2 Resin**, 500 g	Chloride	100–200	106–250	70–78
140-1251	**AG 1-X2 Resin**, 500 g	Chloride	200–400	75–180	70–78
140-1253	**AG 1-X2 Resin**, 500 g	Acetate	200–400	75–180	70–78
140-1331	**AG 1-X4 Resin**, 500 g	Chloride	50–100	180–425	59–65
140-1341	**AG 1-X4 Resin**, 500 g	Chloride	100–200	106–250	59–65
140-1351	**AG 1-X4 Resin**, 500 g	Chloride	200–400	63–150	59–65
140-1421	**AG 1-X8 Resin**, 500 g	Chloride	20–50	300–1,180	39–45
140-1431	**AG 1-X8 Resin**, 500 g	Chloride	50–100	180–425	39–45
140-1441*	**AG 1-X8 Resin**, 500 g	Chloride	100–200	106–180	39–45
140-1451*	**AG 1-X8 Resin**, 500 g	Chloride	200–400	45–106	39–45
140-1422	**AG 1-X8 Resin**, 500 g	Hydroxide	20–50	300–1,180	39–45
140-1443	**AG 1-X8 Resin**, 500 g	Acetate	100–200	106–180	39–45
140-1453	**AG 1-X8 Resin**, 500 g	Acetate	200–400	45–106	39–45
140-1444	**AG 1-X8 Resin**, 500 g	Formate	100–200	106–180	39–45
140-1454	**AG 1-X8 Resin**, 500 g	Formate	200–400	45–106	39–45
142-1231	**AG 50W-X2 Resin**, 500 g	Hydrogen	50–100	300–1,180	75–83
142-1241*	**AG 50W-X2 Resin**, 500 g	Hydrogen	100–200	106–300	75–83
142-1251	**AG 50W-X2 Resin**, 500 g	Hydrogen	200–400	75–180	75–83
142-1331	**AG 50W-X4 Resin**, 500 g	Hydrogen	50–100	180–425	64–72
142-1341	**AG 50W-X4 Resin**, 500 g	Hydrogen	100–200	106–250	64–72
142-1351*	**AG 50W-X4 Resin**, 500 g	Hydrogen	200–400	63–150	64–72
142-1421	**AG 50W-X8 Resin**, 500 g	Hydrogen	20–50	300–1,180	50–56
142-1431	**AG 50W-X8 Resin**, 500 g	Hydrogen	50–100	180–425	50–56
142-1441*,**	**AG 50W-X8 Resin**, 500 g	Hydrogen	100–200	106–250	50–56
142-1451*,**	**AG 50W-X8 Resin**, 500 g	Hydrogen	200–400	63–150	50–56
142-1641	**AG 50W-X12 Resin**, 500 g	Hydrogen	100–200	106–250	42–48
142-1651	**AG 50W-X12 Resin**, 500 g	Hydrogen	200–400	53–106	42–48
141-1831	**AG MP-1M Resin**, 500 g	Chloride	50–100	150–300	56–64
141-1841	**AG MP-1M Resin**, 500 g	Chloride	100–200	75–150	56–64
141-1851	**AG MP-1M Resin**, 500 g	Chloride	200–400	38–75	56–64
143-0841	**AG MP-50 Resin**, 500 g	Hydrogen	100–200	75–150	46–52
140-4341*	**AG 4-X4 Resin**, 500 g	Free base	100–200	75–150	—
142-6424*,**,***	**AG 501-X8 Resin**, 500 g	$H^+ + OH^-$	20–50	300–1,180	43–55
142-6425*,**	**AG 501-X8(D) Resin**, 500 g	$H^+ + OH^-$	20–50	300–1,180	43–55
142-7834*	**AG 11 A8 Resin**, 500 g	Self-adsorbed	50–100	180–425	—
Bio-Rex Resins					
140-7841	**Bio-Rex 5 Resin**, 500 g	Chloride	100–200	75–150	50–58
140-7851	**Bio-Rex 5 Resin**, 500 g	Chloride	200–400	45–75	50–58
142-5822	**Bio-Rex 70 Resin**, 500 g	Sodium	20–50	300–1,180	65–74
142-5832*	**Bio-Rex 70 Resin**, 500 g	Sodium	50–100	150–300	65–74
142-5842	**Bio-Rex 70 Resin**, 500 g	Sodium	100–200	75–150	65–74
142-5852*	**Bio-Rex 70 Resin**, 500 g	Sodium	200–400	45–75	65–74
142-7425*	**Bio-Rex MSZ 501(D) Resin**, 500 g	$H^+ + OH^-$	25–35	500–700	—

Larger volumes and special packaging for industrial applications are available on request.

Chelex Resins					
142-2822	**Chelex 100 Resin**, 500 g	Sodium	50–100	300–1,180	68–76
142-2832*	**Chelex 100 Resin**, 500 g	Sodium	100–200	150–300	68–76
142-2842**	**Chelex 100 Resin**, 500 g	Sodium	200–400	75–150	68–76
142-2825	**Chelex 100 Resin**, 100 g	Iron	100–200	150–300	—

* Also available as biotechnology grade resin.

** Also available as molecular biology grade resin.

*** Also available as reactor grade resin.

continues

Ordering Information

Catalog #	Description
AG Resins in Larger Volumes and Special Packaging for Industrial Applications	
140-1255	**AG 1-X2 Resin**, acetate, 200–400 mesh, 10 kg
140-1342	**AG 1-X4 Resin**, chloride, 100–200 mesh, 10 kg
140-1445	**AG 1-X8 Resin**, chloride, 100–200 mesh, 10 kg
140-1424	**AG 1-X8 Resin**, hydroxide, 20–50 mesh, 10 kg
140-2341	**AG 4-X4 Resin**, free base, 100–200 mesh, 5 kg
142-1424	**AG 50W-X8 Resin**, ultrapure, hydrogen, 20–50 mesh, 10 kg
142-1423	**AG 50W-X8 Resin**, hydrogen, 20–50 mesh, 10 kg
142-1442	**AG 50W-X8 Resin**, hydrogen, 100–200 mesh, 10 kg
142-1254	**AG 50W-X12 Resin**, hydrogen, 200–400 mesh, 1 kg
141-1842	**AG MP-1M Resin**, chloride, 100–200 mesh, 10 kg
141-1853	**AG MP-1M Resin**, nitrate, 200–400 mesh, 10 kg
143-7428*	**AG 501-X8 Resin**, H^+ + OH^-, 20–50 mesh, 10 kg
143-6427**	**AG 501-X8(D) Resin**, H^+ + OH^-, 20–50 mesh, 10 kg

Catalog #	Description	Particle Size, µm	Ionic Form	Application
Prepacked Poly-Prep Ion Exchange Columns				
731-6211	**Poly-Prep Columns**, AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
731-6212	**Poly-Prep Columns**, AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution general purpose separations
731-6221	**Poly-Prep Columns**, AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as nucleotides, peptides, and carboxylic acids
731-6213	**Poly-Prep Columns**, AG 50W-X8 resin, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
731-6214	**Poly-Prep Columns**, AG 50W-X8 resin, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution general purpose separations

* Also available as biotechnology grade resin.

** Also available as molecular biology grade resin.

Molecular Biology and Biotechnology Grade Resins

Molecular biology grade resins, chemically identical to the equivalent analytical grade resins, are certified to be free of endo- and exonuclease activities and ligase inhibitors.

- **AG® 50W-X8 strong cation exchanger** — particularly useful for the removal of ethidium bromide and propidium iodide from DNA samples
- **AG 501-X8 mixed-bed resins** — useful for deionization of water and nonelectrolyte solutions
- **Chelex® 100 molecular biology grade resins** — offered in 200–400 mesh range for easy transfer after resuspension. Packaged in 50 g quantities for the small-scale reagent user and accompanied by a certificate of analysis
- **Biotechnology grade resins** — undergo special processing and contain fewer than 100 microorganisms/gram

For More Information
Web: www.bio-rad.com/agresins

Ordering Information

Catalog #	Description	Dry Mesh Ionic Form	Wet Bead Size	Size, µm	Application
Molecular Biology Grade Resins					
143-6424	**AG 501-X8 Resin**, molecular biology grade, 100 g	$H^+ + OH^-$	20–50	300–1,180	Deionization
143-6425	**AG 501-X8(D) Resin**, molecular biology grade, 100 g	$H^+ + OH^-$	20–50	300–1,180	~1,000 MW limit
142-1253	**Chelex 100 Resin**, molecular biology grade, 50 g	Sodium	200–400	75–150	DNA extraction for PCR sample preparation
Biotechnology Grade Resins					
143-1255	**AG 1-X2 Resin**, biotechnology grade, 100 g	Hydroxide	200–400	75–180	Separation of small peptides, nucleotides, and large metal complexes
143-1345	**AG 1-X4 Resin**, biotechnology grade, 100 g	Hydroxide	100–200	63–150	Separation of organic acids, nucleotides, phosphoinositides, and other anions
143-2445	**AG 1-X8 Resin**, biotechnology grade, 100 g	Hydroxide	100–200	106–180	Separation of inorganic and organic anions with MW <1,000
143-2446	**AG 1-X8 Resin**, biotechnology grade, 100 g	Hydroxide	200–400	45–106	
143-5241	**AG 50W-X2 Resin**, biotechnology grade, 100 g	Hydrogen	100–200	106–300	Separation of peptides, nucleotides, and cations
143-5341	**AG 50W-X4 Resin**, biotechnology grade, 100 g	Hydrogen	200–400	75–150	Separation of amino acids, nucleotides, and cations
143-5441	**AG 50W-X8 Resin**, biotechnology grade, 100 g	Hydrogen	100–200	106–250	Separation of amino acid and cations
143-5451	**AG 50W-X8 Resin**, biotechnology grade, 100 g	Hydrogen	200–400	63–150	
143-7834	**AG 11 A8 Resin**, biotechnology grade, 100 g	Self-adsorbed	50–100	180–425	Removal of ionic compounds
143-7424	**AG 501-X8 Resin**, biotechnology grade, 100 g	$H^+ + OH^-$	20–50	300–1,180	Deionization
143-7425	**AG 501-X8(D) Resin**, biotechnology grade, 100 g	$H^+ + OH^-$	20–50	300–1,180	
143-2832	**Chelex 100 Resin**, biotechnology grade, 100 g	Sodium	100–200	150–300	PCR sample preparation
143-5832	**Bio-Rex 70 Resin**, biotechnology grade, 100 g	Sodium	50–100	150–300	Separation of cationic proteins and amines
143-5852	**Bio-Rex 70 Resin**, biotechnology grade, 100 g	Sodium	200–400	45–75	

Technical and Reactor Grade Resins

Bio-Rad offers reactor grade Bio-Rex® RG 501 X-8 resins for power plant deionization systems and large-scale cleanup of metals from waste water.

For More Information
Web: www.bio-rad.com/agresins

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	MW Exclusion
Molecular Biology Grade Resins				
444-9998*	**Bio-Rex RG 501-X8 Resin**, 1 ft^3, for water purification and GE stator systems	$H^+ + OH^-$	20–50	1,000
444-9999	**Bio-Rex RG 501-X8 Resin**, 500 g	$H^+ + OH^-$	20–50	1,000

* 1 ft^3 corresponds to approximately 20 kg. Larger volumes and special packaging are available on request.

Mixed-Mode Media Chromatography

Mixed-mode media offer unique separation properties and unparalleled selectivity and resolution for a variety of molecules. These media can be used at any stage in a process from initial capture to final polishing.

See Also
Media sampler pack: page 63.
Bio-Scale Mini CHT cartridges: page 70.
Bio-Scale CHT Type I columns: page 73.

New Nuvia™ cPrime™ Mixed-Mode Media

Nuvia cPrime hydrophobic cation exchange media are a new addition to Bio-Rad's family of mixed-mode purification products. These media are designed for process-scale purification of a wide variety of therapeutic proteins. Nuvia cPrime media's unique selectivity allows method developers to use hydrophobic and cation exchange interaction modes to achieve effective purification. Importantly, the media have a large design space for binding and elution, allowing for the development of highly robust methods in a commercial manufacturing setting. Nuvia cPrime media are built on a rigid, mechanically and chemically stable macroporous base matrix with a particle size optimized to deliver exceptional flow properties, fast mass transfer, and stability.

Nuvia cPrime delivers value by providing:

- New and unique selectivity
- Simple method development
- Large design space for capture and elution of a variety of biotherapeutic proteins
- High recovery of target protein
- Salt-tolerance
- Mechanical and chemical stability

For More Information
Web: www.bio-rad.com/nuvia
Request or download bulletins: 6241 and 6242

Properties of Nuvia cPrime

Property	Description
Functional group	Hydrophobic weak cation exchange
Base matrix composition	Macroporous highly cross-linked hydrophilic polymer
Particle size	70 ± 10 µm
Dynamic binding capacity* hIgG	≥40 mg/ml
Dynamic binding capacity* lactoferrin	>60 mgl/ml
Ligand density	55–75 µeq/ml
Recommended linear flow rate range	50–600 cm/hr
Pressure vs. flow performance**	Under 2 bar, flow rate of 600 cm/hr
pH stability	2–14 short term 3–13 long term
Chemical stability	1.0 N NaOH, 1.0 N HCl, 25% HOAc, 8 M urea, 6 M Gu-HCl, 6 M KSCN, 3 M NaCl, 1% Triton X-100, 2% SDS + 0.25 M NaCl, 20% EtOH, 70% EtOH, 30% IPA
Shipping solution	20% ethanol
Storage conditions	20% ethanol
Shelf life***	5 yrs

* At 10% breakthrough hIgG.
** 20 x 20 cm packed bed (1.17 compression factor).
*** Stored at room temperature in 20% ethanol under accelerated conditions.

Ordering Information

Catalog #	Description
156-3401	**Nuvia cPrime**, 25 ml
156-3402	**Nuvia cPrime**, 100 ml
156-3403	**Nuvia cPrime**, 500 ml
156-3404	**Nuvia cPrime**, 1 L
156-3405	**Nuvia cPrime**, 5 L
156-3406	**Nuvia cPrime**, 10 L
732-4722	**Foresight Nuvia cPrime column**, 1 ml
732-4742	**Foresight Nuvia cPrime column**, 5 ml
732-4705	**Foresight Nuvia cPrime plates**, 20 µl*
732-4807	**Foresight Nuvia cPrime RoboColumn Unit**, 200 µl**
732-4808	**Foresight Nuvia cPrime RoboColumn Unit**, 600 µl**

* Package size: 2 x 96-well plates.
** Package size: 1 row of 8 columns.

Hydroxyapatite, $(Ca_5(PO_4)_3OH)_2$, and fluoroapatite, $Ca_{10}(PO_4)_6F_2$, are forms of calcium phosphate, that offer unique selectivities and often separate biomolecules that appear homogeneous using other chromatographic and electrophoretic techniques. Hydroxyapatite and fluoroapatite chromatography can be used at any stage from initial capture to final polishing.

CHT™ Ceramic Hydroxyapatite

CHT ceramic hydroxyapatite $(Ca_5(PO_4)_3OH)_2$ is a spherical macroporous form of hydroxyapatite that overcomes the limitations of the crystalline material for use in process- and laboratory-scale columns. Crystalline hydroxyapatite protocols can be transferred directly to the ceramic material with little or no modification. CHT retains the unique separation properties of crystalline hydroxyapatite, but it can be used reproducibly for hundreds of cycles at high flow rates and in large columns.

CHT is available as Type I, sintered at 400ºC, and Type II, sintered at 700ºC for durability. Type I has a high protein binding capacity and higher capacity for acidic proteins. Type II has a lower protein binding capacity and gives better resolution of nucleic acids and of proteins that elute early. Type II also has very low affinity for albumin, so it is often more suitable for purification of many species and classes of immunoglobulins. The three particle sizes, 20, 40, and 80 µm, make it easy to scale up from analytical to process-scale manufacturing. Prepacked Bio-Scale™ Mini CHT™ cartridges are available in a 5 ml format.

Specifications

Functional groups	Ca^{2+}, PO_4^{3-}, OH^-	
Nominal mean particle size	20, 40, and 80 µm	
Recommended linear flow rate	50–1,000 cm/hr	
Operating pH range	6.5–14	
Chemical compatibility (>24 hr)	1 M NaOH, 8 M urea, 6 M guanidine-HCl, ethanol, methanol, 100% acetonitrile	
Sanitization	1–2 M NaOH	
	Type I	**Type II**
Packing density, (g/ml packed bed)	.63 g/ml	.63 g/ml
Dynamic binding capacity, lysozyme	≥25 mg/g	≥12.5 mg/g
Typical IgG binding capacities at 500 cm/hr	25–60 mg/ml	15–25 mg/ml
Maximum operating pressure	100 bar (1,500 psi)	100 bar (1,500 psi)
Nominal pore diameter	600–800 Å	800–1,000 Å

For More Information
Web: www.bio-rad.com/CHT
Request or download bulletins: 2849, 2940, 5667, 5709, and 5853

Ordering Information

Description	Type I	Type II
CHT Ceramic Hydroxyapatite, 20 µm		
20 µm particle size, 10 g	158-2000	158-2200
20 µm particle size, 100 g	157-0020	157-2000
20 µm particle size, 1 kg (1.6 L)	157-0021	157-2100
20 µm particle size, 5 kg (7.9 L)	157-0025	157-2500
CHT Ceramic Hydroxyapatite, 40 µm		
40 µm particle size, 10 g	158-4000	158-4200
40 µm particle size, 100 g	157-0040	157-4000
40 µm particle size, 1 kg (1.6 L)	157-0041	157-4100
40 µm particle size, 5 kg (7.9 L)	157-0045	157-4500
CHT Ceramic Hydroxyapatite, 80 µm		
80 µm particle size, 10 g	158-8000	158-8200
80 µm particle size, 100 g	157-0080	157-8000
80 µm particle size, 1 kg (1.6 L)	157-0081	157-8100
80 µm particle size, 5 kg (7.9 L)	157-0085	157-8500
CHT Foresight Plates, Columns, and RoboColumns		
Foresight CHT Plate, 40 µm, 20 µl*	732-4716	732-4718
Foresight CHT Robocolumn, 40 µm, 200 µl**	732-4822	732-4825
Foresight CHT Robocolumn, 40 µm, 600 µl**	732-4823	732-4826
Foresight CHT Column, 40 µm, 1 ml	732-4735	732-4736
Foresight CHT Column, 40 µm, 5 ml	732-4755	732-4756
Description	**1 x 5 ml**	**5 x 5 ml**
CHT Prepacked Bio-Scale Mini Cartridges		
CHT Type I Ceramic Hydroxyapatite	732-4322	732-4324
CHT Type II Ceramic Hydroxyapatite	732-4332	732-4334

* Package size: 2 x 96-well plates. ** Package size: 1 row of 8 columns.

continues

Ordering Information

Catalog #	Description
732-4407	**Bio-Scale Mini Apatite Purification Kit**, CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
732-4408	**Bio-Scale Mini mAb Purification Kit**, UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I cartridge, 1 x 5 ml each

Larger volumes and special packaging for industrial applications are available on request.

CFT™ Ceramic Fluoroapatite

CFT ceramic fluoroapatite ($Ca_{10}(PO_4)_6F_2$) is a rigid spherical macroporous media used in the purification of biologically significant compounds. CFT is a composite of fluoroapatite and hydroxyapatite prepared by chemically converting hydroxyapatite nanocrystals to fluoroapatite with a fluorine reagent.

CFT possesses separation characteristics similar to those of CHT ceramic hydroxyapatite. However, when CFT is used, purification can be performed across a range of lower pH values to obtain optimal results for the targeted biomolecule. CFT Type II is available in a 40 µm size and is sintered at high temperature to produce physically and chemically stable media.

CFT can be used under stringent chromatography conditions to separate acidic proteins requiring buffered conditions as low as pH 5.6 with minimal compromise to the solubility or lifespan of the media.

CFT has high binding capacity and may be used reproducibly over an extended number of chromatography runs. Its increased tensile strength, chemical durability, and density provide excellent throughput and consistent performance for all separations, including biopharmaceutical process-scale manufacturing.

Features of CFT include:

- Acidic protein separation for applications requiring pH as low as 5.6
- High-density particles for fast, simple column packing
- Sintering at high temperatures for heavy-duty, durable media
- Rigid particles for fast cleaning and equilibration
- Inorganic calcium phosphate for distinct selectivities

For More Information
Web: www.bio-rad.com/CFT
Request or download bulletins: 3111 and 5853

Specifications

Functional groups	Ca^{2+}, $PO4^{3-}$, F^-
Particle sizes	40 ± 4 µm
Recommended linear flow rate	300 cm/hr
Operating pH range	5–14
Chemical compatibility	2 M NaOH, 6 M guanidine-HCl, 8 M urea, 0.1 M sodium acetate, pH 5.7
Regeneration	
Normal conditions	400 mM sodium phosphate, pH 7.4
Difficult conditions	400–1,000 mM sodium phosphate, pH 11–12
Sanitization	1–2 M NaOH or KOH
Autoclavability (121ºC, 20 min)	Yes
Packing density (g/ml packed bed)	0.86 g/ml
Dynamic binding capacity	14–21.5 mg lysozyme/g
Typical IgG binding capacities at 300 cm/hr	33 mg/ml
Nominal pore diameter	600–800 Å
Maximum operating pressure	55 bar (800 psi)

Note: A small amount (up to 5 mM) of sodium phosphate should be added to all unbuffered solutions as a counterion.

Ordering Information

Catalog #	Description
CFT Ceramic Fluoroapatite, Type II, 40 µm	
158-5200	40 µm particle size, 10 g
157-5000	40 µm particle size, 100 g
157-5100	40 µm particle size, 1 kg (1.2 L)
157-5500	40 µm particle size, 5 kg (5.8 L)

continues

Ordering Information

Description	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges		
CFT Type II Ceramic Fluoroapatite	732-4405	732-4406

Catalog #	Description
Bio-Scale Mini Cartridge Kits	
732-4407	**Bio-Scale Mini Apatite Purification Kit**, CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
732-4408	**Bio-Scale Mini mAb Purification Kit**, UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I cartridge, 1 x 5 ml each

See Also
CHT ceramic hydroxyapatite: page 44.
Bio-Scale Mini CHT cartridges: page 70.
Bio-Scale CHT Type I columns: page 73.

Bio-Gel® Hydroxyapatite HT and HTP Media

Hydroxyapatite ($Ca_5(PO_4)_3OH)_2$ is a form of calcium phosphate used in the chromatographic separation of biomolecules. Bio-Gel crystalline hydroxyapatite media is compatible with a wide range of aqueous buffers and organic modifiers and can be sanitized in up to 1 M NaOH. Typical pH tolerance is >6.8, however it can be used at 5.5 in single-use applications. Bio-Gel hydroxyapatite can be autoclaved in buffers that maintain the pH above 7 during the autoclaving cycle.

- **Bio-Gel HT media** — shipped in 10 mM sodium phosphate, pH 6.8 buffer containing 0.02% NaN_3. The flow rate range is 25–100 cm/hr at 10 cm bed height gravity packed column. Bio-Gel HT media has a shelf life of at least one year when stored at 4°C in the shipping buffer
- **Bio-Gel HTP powder** — the dry form of Bio-Gel HT media. When hydrated, it should be stored similarly to Bio-Gel HT media; the flow rate range is similar to Bio-Gel HT media
- **DNA grade Bio-Gel HTP powder** — a smaller particle size version of Bio-Gel HTP powder, it exhibits higher capacity for biomolecules. It is generally used for single- and double-stranded DNA separations. It has an increased capacity for RNA, making it useful for DNA-RNA hybridization studies. Its flow rate is limited in gravity feed columns, but it can be used in medium-pressure columns to enhance flow rate



For More Information
Web: www.bio-rad.com/biogelHTandHTP
Request or download bulletin: LIT217

Specifications

	Bio-Gel HT	Bio-Gel HTP	Bio-Gel HTP (DNA Grade)
Flow rate* (cm/hr)	>25	>25	>5
BSA adsorbed** (mg per dry gram)	10	10	10
Calf thymus DNA adsorbed (µg per dry gram)	>500	>500	>800
Hydrated volume	—	2–3 ml/g	2–3 ml/g

* Flow rate determined on a 1.5 x 10 cm column with 40 cm hydrostatic pressure.
** Batch-wise uptake.

Ordering Information

Catalog #	Description
Bio-Gel Hydroxyapatite	
130-0150	**Bio-Gel HT Hydroxyapatite**, hydrated, 250 ml
130-0151	**Bio-Gel HT Hydroxyapatite**, hydrated, 500 ml
130-0420	**Bio-Gel HTP Hydroxyapatite**, powder, 100 g
130-0421	**Bio-Gel HTP Hydroxyapatite**, powder, 1 kg
130-0425	**Bio-Gel HTP Hydroxyapatite**, powder, 5 kg
130-0520	**Bio-Gel HTP Hydroxyapatite**, DNA grade, 100 g
Accessories	
737-6201	**Econo-Column Open-Ended Jacketed Chromatography Column**, 1 x 30 cm, includes 2 flow adaptors for DNA hydroxyapatite chromatography, 25 ml

Recombinant-Tagged Affinity Purification

Profinity™ IMAC Cartridges and Media

Profinity IMAC resins are an affinity chromatography support for the purification of recombinant histidine-tagged proteins. Profinity IMAC resins, based on UNOsphere™ beads, contain iminodiacetic acid (IDA) as the chelating ligand for di- or trivalent metal ions. Its chemical structure allows highly selective binding of recombinant histidine-tagged proteins when charged with Ni^{2+} or other transition metals such as Zn^{2+} or Cu^{2+}. They offer high capacity at high flow rates and can be used under either nondenaturing or denaturing conditions. The resins are suitable for purification using liquid chromatographic instrumentation, gravity-flow columns, or spin columns. The resin is available in two forms: uncharged and precharged with Ni^{2+}. The uncharged form can be charged with the metal ion of your choice for even greater purification flexibility.

Features of Profinity IMAC resin include:

- Optimal ligand density for higher purity of target protein
- Superb mechanical strength
- Excellent pressure-flow properties, for high maximum operating pressures and flow rates, allowing rapid purification, column cleaning, and re-equilibration
- Stability from pH 1–14
- Compatibility with denaturing agents, detergents, and reducing agents



Profinity IMAC Resin



Bio-Scale™ Mini Profinity™ IMAC Cartridges

For More Information
Web: www.bio-rad.com/profinityIMAC

See Also

Affinity media selection guide: page 34.
Bio-Scale Mini cartridges: page 70.

Ordering Information

Catalog #	Description
Ready-to-Use Affinity Media	
156-0121	**Profinity IMAC Uncharged Resin**, 10 ml
156-0123	**Profinity IMAC Uncharged Resin**, 50 ml
156-0125	**Profinity IMAC Uncharged Resin**, 500 ml
156-0127	**Profinity IMAC Uncharged Resin**, 1 L
156-0131	**Profinity IMAC Ni-Charged Resin**, 10 ml
156-0133	**Profinity IMAC Ni-Charged Resin**, 25 ml
156-0135	**Profinity IMAC Ni-Charged Resin**, 100 ml
156-0137	**Profinity IMAC Ni-Charged Resin**, 500 ml

Description	5 x 1 ml	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges			
Profinity IMAC Ni-Charged Resin	732-4610	732-4612	732-4614

Larger volumes and special packaging for industrial applications are available on request.

Profinity™ GST Cartridges and Kits

Profinity GST resins are an affinity chromatography support for the purification of recombinant GST-tagged proteins. Bio-Scale™ Mini Profinity™ GST cartridges are 1 and 5 ml Bio-Scale Mini cartridges filled with Profinity GST support.

For More Information
Web: www.bio-rad.com/profinityGST

Ordering Information

Catalog #	Description
732-4620	**Bio-Scale Mini Profinity GST Cartridges**, 5 x 1 ml
732-4622	**Bio-Scale Mini Profinity GST Cartridge**, 1 x 5 ml
732-4624	**Bio-Scale Mini Profinity GST Cartridges**, 5 x 5 ml
620-0240	**GST Buffer Kit**, includes GST lysis, wash, and elution buffers
620-0223	**Profinia GST Buffer Kit**, includes lysis, wash, and elution buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications
620-0243	**GST Purification Kit**, 1 ml, includes GST purification buffer kit and 2 x 1 ml GST cartridges
620-0244	**GST Purification Kit**, 5 ml, includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge
620-0226	**Profinia GST Purification Kit**, 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
620-0236	**Profinia GST Purification Kit**, 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
620-0230	**Profinia GST Starter Kit**, includes Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, *E. coli* lysate, glutathione reagent

Profinity eXact™ Cartridges and Media

Profinity eXact Purification Resin, Prepacked Cartridges, and Mini Spin Columns

The Profinity eXact purification resin consists of a highly engineered subtilisin protease conjugated to an agarose-based matrix. Purity of the eluted protein using this purification is typically higher than that for other affinity-tag systems due to the specific recognition of subtilisin for its prodomain sequence (K_D <100 pm).

The resin can be packed into different column formats, including low- to medium-pressure columns, gravity-flow columns, and mini spin columns, offering added purification flexibility. Bio-Scale™ Mini cartridges are available in 1 and 5 ml volumes. Mini spin columns contain 0.1 ml resin. Additional advantages of Profinity eXact purification resin include:

- Purification and processing of fusion-tagged proteins in a single step
- On-column cleavage in as little as 30 min
- No protease addition is required
- Precise cleavage at N-terminus to generate native protein sequence



Profinity eXact Media Available in Cartridges, Spin Columns, and Bottles

Resin is supplied in 100 mM sodium phosphate (pH 7.2) containing 0.02% sodium azide. It is also available prepacked in 1 and 5 ml cartridges and in mini spin columns.

For More Information
Web: www.bio-rad.com/affinitycartridges
Request or download bulletin: 5655

See Also
Bio-Scale Mini cartridges: page 70.

Profinity eXact Expression and Purification Starter Kit

The Profinity eXact expression and purification starter kit can be used to easily evaluate Profinity eXact fusion-tag technology. It is suitable for new purifications requiring tag removal and for purifications where cleavage has resulted in inferior results. The Profinity eXact expression and purification starter kit includes two kits:

- **Profinity eXact cloning and expression starter kit** — for the cloning and expression of a target gene using pPAL vectors and competent cells
- **Profinity eXact mini spin purification starter kit** — for single-step purification and on-column cleavage of the tagged protein; also includes a lyophilized lysate to ensure that preliminary purifications are a success



Profinity eXact Expression and Purification Starter Kit

Media Specifications

Functional ligand	Subtilisin protease, 27.8 kD
Base bead	6% agarose bead
Form	50% suspension in 100 mM sodium phosphate (pH 7.2), 0.02% sodium azide
Particle size range	60–160 µm
Dynamic binding capacity*	>3 mg tag-free protein/ml resin
Recommended linear flow rate	1,000 cm/hr at 25°C
pH stability	2–13
Chemical compatibility	Common reagents including detergents, reducing agents, buffering agents, and additives
Storage	4°C
Shelf life in 20% ethanol	>1 year at 4°C
Operational temperature	4–40°C

* Dynamic binding capacity determination of a 40 kD maltose binding protein.

Note: Dynamic binding capacity is protein dependent.

Ordering Information

Catalog #	Description
156-3004	**Profinity eXact Monoclonal Antibody**, 100 µl, 1 mg/ml
156-3005	**Profinity eXact Purification Resin***, 10 ml
156-3007	**Profinity eXact Mini Spin Columns**, includes 10 spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes
732-4646	**Bio-Scale Mini Profinity eXact Cartridges**, 2 x 1 ml
732-4647	**Bio-Scale Mini Profinity eXact Cartridges**, 4 x 1 ml
732-4648	**Bio-Scale Mini Profinity eXact Cartridge**, 1 x 5 ml
156-3000	**Profinity eXact Cloning and Expression Starter Kit**, includes 25 µl of 20 ng/µl RIC-ready pPAL vector, 100 µl of 100 ng/µl supercoiled pPAL vector, chemi-competent cells, SOC growth media, 20 reactions
156-3008	**Profinity eXact Expression and Purification Starter Kit**, includes 1 Profinity eXact cloning and expression starter kit (20 reactions) and 1 Profinity eXact mini spin purification starter kit (10 spin columns)
156-3006	**Profinity eXact Mini Spin Purification Starter Kit**, includes 10 prepacked spin columns, 50 x 2 ml collection tubes, lyophilized control protein lysate, bacterial lysis reagent, 50 ml bind/wash buffer, 20 ml elution buffer

* Larger volumes are available on request.

Profinity eXact™ System

The Profinity eXact fusion-tag system is a family of expression, detection, purification, and on-column cleavage products, consisting of expression vectors, competent cells, SOC growth media, loose and prepacked purification resin, and detection reagents. Key benefits include:

- Rapid purification and on-column cleavage
- Reduced operating costs, purification steps, and reagent use
- High purity of tag-free target protein

For More Information
Web: www.bio-rad.com/exactfusiontag
Request or download bulletins: 5646, 5652, 5655, 5656, 5668, 5811, and 5813

Profinity eXact Expression Vector Kits and Cloning Products

Two pPAL expression vector kits are available. Both kits contain a 5901 bp pPAL7 vector — one kit contains a versatile predigested form for restriction enzyme–free cloning of any target gene regardless of internal restriction sites. The other contains a supercoiled plasmid. The pPAL vectors are derived from a T7-based expression plasmid and utilize the T7 lac promoter and terminator and a T7 RNA polymerase expression host for inducible protein production. The plasmids confer ampicillin resistance, constitutively express the LacI repressor for tight control of target gene transcription, and have a pMB1-derived ColE1 origin of replication. Gene targets cloned into Profinity eXact pPAL vectors express the subtilisin prodomain as their fusion partner or tag.

Profinity eXact pPAL7 RIC-Ready Expression Vector Kit

The pPAL7 restriction-independent cloning (RIC)-ready expression vector is predigested with SapI and EcoRI and is then dephosphorylated to reduce postligation background transformants.



Profinity eXact System Family of Products

Profinity eXact pPAL7 Supercoiled Expression Vector Kit

The pPAL7 supercoiled plasmid expression vector is used for routine cloning of target DNA sequences using a conventional restriction digest cloning strategy.

BL21 (DE3) Chemi-Competent Expression Cells

BL21 (DE3) *E. coli* cells* are the preferred host for T7 vector-based protein expression. The cells are DE3 λ lysogens with the T7 RNA polymerase gene under the control of the lacUV5 promoter. Induction with IPTG allows production of T7 RNA polymerase, which then directs the expression of the target gene located downstream of the T7 lac promoter in the expression vector. The strain is deficient in ompT and lon proteases, which provides improved recombinant protein stability.

Profinity eXact Antibody Reagent

The Profinity eXact antibody reagent is a mouse monoclonal antibody used to detect expression of the target protein. The Profinity eXact antibody specifically recognizes the prodomain of the subtilisin protease, which is fused to the protein of interest. For convenient western blot detection of the fusion protein, Bio-Rad offers colorimetric detection kits.

* Genotype: *E. coli* B F$^-$ *dcm ompT hsdS*(r_B^-, m_B^-) *gal γ(DE3).*

Ordering Information

Catalog #	Description
156-3001	**Profinity eXact pPAL RIC-Ready Expression Vector Kit**, includes 25 µl of 20 ng/µl vector, 20 reactions
156-3002	**Profinity eXact pPAL Supercoiled Expression Vector Kit**, includes 100 µl of 100 ng/µl vector, 20 reactions
156-3003	**BL21 (DE3) Chemi-Competent Expression Cells**, includes 10 x 0.05 ml BL21 (DE3) cells, pUC19 control plasmid, 10 ml vial of SOC growth media
156-3004	**Profinity eXact Monoclonal Antibody**, 100 µl, 1 mg/ml
156-3005	**Profinity eXact Purification Resin***, 10 ml

* Larger volumes are available on request.

continues

Ordering Information

Catalog #	Description
156-3007	**Profinity eXact Mini Spin Columns**, includes 10 spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes
732-4646	**Bio-Scale Mini Profinity eXact Cartridges**, 2 x 1 ml
732-4647	**Bio-Scale Mini Profinity eXact Cartridges**, 4 x 1 ml
732-4648	**Bio-Scale Mini Profinity eXact Cartridge**, 1 x 5 ml
156-3000	**Profinity eXact Cloning and Expression Starter Kit**, includes 25 µl of 20 ng/µl RIC-ready pPAL vector, 100 µl of 100 ng/µl supercoiled pPAL vector, chemi-competent cells, SOC growth media, 20 reactions
156-3008	**Profinity eXact Expression and Purification Starter Kit**, includes 1 Profinity eXact cloning and expression starter kit (20 reactions) and 1 Profinity eXact mini spin purification starter kit (10 spin columns)
156-3006	**Profinity eXact Mini Spin Purification Starter Kit**, includes 10 prepacked spin columns, 50 x 2 ml collection tubes, lyophilized control protein lysate, bacterial lysis reagent, 50 ml bind/wash buffer, 20 ml elution buffer

Profinia™ System Reagents and Kits

Buffers

Bio-Rad premade affinity buffer kits for recombinant tagged protein purification come with concentrated formula sufficient for ten purifications for a 1 ml affinity cartridge. These kits provide easy and fast purification for histidine-tagged (native IMAC buffer) proteins.

- Denaturing IMAC purification can be performed with native buffer IMAC kits with the addition of urea in the purification buffers
- Kits for desalting and cartridge cleaning after affinity purification are also available
- Purification kits containing both buffer kits and appropriate cartridges are provided, if purification cartridges are desired

For More Information
Request or download bulletins: 3193, 5283, 5444, and 5456



His and GST Purification *E. Coli* Control Lysate



Glutathione



Histidine and GST Antibodies

Kits

Buffer and starter kits can be used with any instrument, gravity-flow, or spin-column purification procedure.

Profinia purification, buffer, and starter kits are designed specifically for use on the Profinia protein purification system for time savings and highly reproducible results. These kits are directly installed on the system; manual dilution of the concentrated buffers provided in the kits is not required.

For More Information
Request or download bulletin: 5574

Reagents

Individually packaged reagents are available for use with the Profinia system. While designed specifically to work with the Profinia system, these reagents also have general applicability within all stages of an affinity purification workflow, from sample preparation to protein detection.

Histidine and GST Purification *E. coli* Control Lysate

The histidine and GST purification *E. coli* control lysate is a lyophilized, dual-tagged 51 kD target protein that is meant to eliminate concerns over variability in purification buffer solutions or in the purification matrix itself. The control lysate facilitates system setup and initial purification; it is included in every Profinia IMAC and GST starter kit.

Glutathione Reagent

Powdered glutathione reagents are available for use with GST applications. The glutathione pack is essential for eluting GST fusion proteins from immobilized glutathione resins.

Histidine and GST Antibodies

Histidine-tagged and GST-tagged monoclonal antibodies are used to detect target protein expression of overexpressed 6x histidine and GST fusion proteins. They are supplied at a concentration of 1 mg/ml in phosphate buffered saline (pH 7.4) with 0.05% NaN_3.

Affinity Purification Kit Selection Guide

	Buffer Sets		Bio-Scale Mini Cartridges*	
	Lysis, Wash, and Elution	Desalting and Cartridge Cleaning	Affinity	Desalting
IMAC Kits				
Native IMAC buffer kit	•			
Native IMAC purification kits (1 and 5 ml)	•		•	
Profinia native IMAC buffer kit	•	•		
Profinia native IMAC purification kits (1 and 5 ml)	•	•	•	•
Profinia native IMAC starter kit	•	•	•	•
GST Kits				
GST buffer kit	•			
GST purification kits (1 and 5 ml)	•		•	
Profinia GST buffer kit	•	•		
Profinia GST purification kits (1 and 5 ml)	•	•	•	•
Profinia GST starter kit	•	•	•	•
Desalting and Cartridge Cleaning Kits				
Desalting and cartridge cleaning buffer kit		•		
Profinia desalting purification kits (10 and 50 ml)		•		•

* Starter kits include histidine and GST control lysate, one 1 ml affinity cartridge, and one 10 ml desalting cartridge.

Ordering Information

Catalog #	Description
Affinity Buffer Kits	
620-0239	**Native IMAC Buffer Kit**, includes native IMAC lysis, wash, and elution buffers
620-0240	**GST Buffer Kit**, includes GST lysis, wash, and elution buffers
620-0224	**Desalting and Cartridge Cleaning Buffer Kit**, includes desalting buffer, cleaning buffers, and cartridge storage buffer
Affinity Purification Kits	
620-0241	**Native IMAC Purification Kit**, 1 ml, includes IMAC purification buffer kit and 2 x 1 ml IMAC cartridges
620-0242	**Native IMAC Purification Kit**, 5 ml, includes 2 IMAC purification buffer kits and 1 x 5 ml IMAC cartridge
620-0243	**GST Purification Kit**, 1 ml, includes GST purification buffer kit and 2 x 1 ml GST cartridges
620-0244	**GST Purification Kit**, 5 ml, includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge
Profinia Buffer Kits	
620-0221	**Profinia Native IMAC Buffer Kit**, includes lysis, wash, and elution buffers, cleaning and storage solutions; sufficient for 10 applications
620-0223	**Profinia GST Buffer Kit**, includes lysis, wash, and elution buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications
Profinia Purification Kits	
620-0225	**Profinia Native IMAC Purification Kit**, 1 ml, includes Profinia native IMAC buffer kit, 2 x 1 ml IMAC and 2 x 10 ml desalting cartridges
620-0235	**Profinia Native IMAC Purification Kit**, 5 ml, includes 2 Profinia native IMAC buffer kits, 1 x 5 ml IMAC and 1 x 50 ml desalting cartridge
620-0226	**Profinia GST Purification Kit**, 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
620-0236	**Profinia GST Purification Kit**, 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
620-0228	**Profinia Desalting Purification Kit**, 10 ml, includes desalting and cartridge cleaning buffer kit, 2 x 10 ml desalting cartridges
620-0238	**Profinia Desalting Purification Kit**, 50 ml, includes 2 desalting and cartridge cleaning buffer kits, 1 x 50 ml desalting cartridge
Profinia Starter Kits	
620-0229	**Profinia Native IMAC Starter Kit**, includes Profinia native IMAC buffer kit, 1 x 1 ml IMAC and 1 x 10 ml desalting cartridge, *E. coli* lysate
620-0230	**Profinia GST Starter Kit**, includes Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, *E. coli* lysate, glutathione reagent
Bio-Scale Mini Affinity and Desalting Cartridges	
732-4610	**Bio-Scale Mini Profinity IMAC Cartridges**, 5 x 1 ml
732-4612	**Bio-Scale Mini Profinity IMAC Cartridge**, 1 x 5 ml
732-4614	**Bio-Scale Mini Profinity IMAC Cartridges**, 5 x 5 ml
732-4620	**Bio-Scale Mini Profinity GST Cartridges**, 5 x 1 ml
732-4622	**Bio-Scale Mini Profinity GST Cartridge**, 1 x 5 ml

continues

Ordering Information

Catalog #	Description
Bio-Scale Mini Affinity and Desalting Cartridges (cont.)	
732-4624	**Bio-Scale Mini Profinity GST Cartridges**, 5 x 5 ml
732-5304	**Bio-Scale Mini Bio-Gel P-6 Desalting Cartridges**, 5 x 10 ml
732-5312	**Bio-Scale Mini Bio-Gel P-6 Desalting Cartridge**, 1 x 50 ml
732-5314	**Bio-Scale Mini Bio-Gel P-6 Desalting Cartridges**, 5 x 50 ml
Individual Affinity Buffers	
620-0205	**2x Native IMAC Lysis Buffer**, 125 ml
620-0206	**2x Native IMAC Wash Buffer 1**, 125 ml
620-0207	**2x Native IMAC Wash Buffer 2**, 100 ml
620-0208	**2x Native IMAC Elution Buffer**, 100 ml
620-0213	**2x GST Lysis Buffer**, 100 ml
620-0214	**2x GST Wash Buffer**, 200 ml
620-0215	**2x GST Elution Buffer**, 100 ml
620-0216	**5x Desalting Buffer**, 200 ml
620-0217	**2x Cleaning Solution 1**, 125 ml
620-0218	**4x Cleaning Solution 2**, 125 ml
620-0219	**2x Storage Solution**, 200 ml

Affinity Purification

UNOsphere SUPrA™ Protein A Media

See Also

Bio-Scale Mini cartridges: page 70.

Developed for monoclonal antibody capture chromatography, UNOsphere SUPrA media provides an ideal balance between dynamic binding capacity, flow properties, and stability. The UNOsphere™ hydrophilic polymeric support provides high-quality purifications and batch-to-batch reproducibility. As part of the proven UNOsphere media platform, UNOsphere SUPrA media offer flexibility and a predictable scale-up path.

Key features include:

- Built on robust polymeric beads engineered for high mechanical stability, low backpressures, and resistance to repeated clean-in-place cycles
- Designed with large pores that result in high dynamic binding capacities at fast flow rates
- Optimized to operate under a wide range of flow rates up to 600 cm/hr
- Available in prepacked Bio-Scale™ Mini cartridges for evaluation and method development; also available in manufacturing-scale quantities
- Regulatory support file and application notes are available

For More Information

Web: www.bio-rad.com/unospheresupra
Request or download bulletins: 5728, 5729, and 6053

Specifications

Composition	Highly cross-linked polymer
Particle size range	53–61 µm
Ligand	Recombinant protein A
Coupling chemistry	Epoxy
Dynamic binding capacity*	30 ± 3 mg/ml at 150 cm/hour 25 ± 2 mg/ml at 300 cm/hour 20 ± 2 mg/ml at 450 cm/hour (Minimum spec: 20 mg/ml at 300 cm/hour)
Chemical stability**	10 mM hydrochloric acid 6 M guanidine hydrochloride 0.1 M arginine (pH 2.8) 0.1 M citrate (pH 2.8) 0.1 M glycine (pH 2.8)
Working pH range	3–11
Clean-in-place (CIP) solutions	6 M guanidine hydrochloride 10 mM hydrochloric acid 0.1 M sodium hydroxide 1 M acetic acid/20% ethanol
Recommended mobile phase velocity range	100–600 cm/hr
Temperature stability	2–40ºC
Delivery conditions	50% slurry in 20% ethanol
Storage conditions	2–8ºC

* 10% breakthrough capacity determined with 1.0 mg/ml polyclonal human IgG in 1.1 x 10 cm column.

** No significant change in chromatographic performance after storage for 24 hr at room temperature.

Ordering Information

Catalog #	Description
UNOsphere SUPrA rProtein A Media	
156-0250	**UNOsphere SUPrA rProtein A Media**, 5 ml
156-0218	**UNOsphere SUPrA rProtein A Media**, 25 ml
156-0219	**UNOsphere SUPrA rProtein A Media**, 100 ml
156-0220	**UNOsphere SUPrA rProtein A Media**, 500 ml
156-0221	**UNOsphere SUPrA rProtein A Media**, 5 L
156-0222	**UNOsphere SUPrA rProtein A Media**, 10 L

Description	1 x 1 ml	5 x 1 ml	1 x 5 ml
Prepacked Bio-Scale Mini Cartridges			
UNOsphere SUPrA Affinity Media	732-4200	732-4201	732-4202

Affi-Gel® and Affi-Prep® Protein A Media

Chromatography on Affi-Gel and Affi-Prep protein A media yields highly purified immunoglobulins (IgG), selectively removes IgG prior to analysis of other IgG classes, or adsorbs immune complexes for antigen purification. Protein A binds to the Fc region of immunoglobulins, especially IgG from mammalian species. Advantages include:

- High purity of IgGs
- High affinity for mammalian IgG
- High capacities for mouse IgG_1 as well as other subclasses with MAPS optimized buffer

In addition, Affi-Prep media offer high linear flow rates up to 2,000 cm/hr, pressure stability up to 1,000 psi (70 bar), and high chemical stability, which allows sanitization with 0.1 M NaOH.

With Affi-Gel and Affi-Prep protein A media and MAPS II buffer, you can purify up to 10 mg of IgG_1/ml of media. This is 8–10 times higher than with standard methods. In addition, the MAPS process and Affi-Gel protein A permit greater binding of mouse IgG_1 than do immobilized protein G media.

Capacities of Protein A Media

Immunoglobulin	Affi-Gel Protein A Capacity, mg/ml	Affi-Prep Protein A Capacity, mg/ml
Mouse IgG_1	6–10	7–9
Mouse IgG_{2a}	6–10	7–9
Mouse IgG_{2b}	6–10	7–9
Mouse IgG_3	6–10	7–9
Mouse IgM*	6–10	7–9
Human IgG	15	10–12
Sheep, cow, horse, goat, rabbit, dog, pig IgG	8–10	7–9

* Approximately 50% of all mouse IgMs bind using the MAPS buffer system.

For More Information
Web: www.bio-rad.com/affigelproteina

Ordering Information

Catalog #	Description
Affi-Prep Protein A Media	
156-0006	**Affi-Prep Protein A Media**, 5 ml
156-0005	**Affi-Prep Protein A Media**, 25 ml
153-6153	**Affi-Gel Protein A Media**, 5 ml
153-6154	**Affi-Gel Protein A Media**, 50 ml
153-6159	**Affi-Gel Protein A MAPS II Kit**, includes 5 ml Affi-Gel protein A media, Affi-Gel protein A MAPS II buffers, 1 x 10 cm Econo-Column column; enough to purify 500 mg of mouse IgG_1
153-6161	**Protein A MAPS II Binding Buffer**, makes 5 L
Prepacked Econo-Pac Columns	
732-2022	**Econo-Pac Protein A Columns**, prefilled with Affi-Gel protein A media, 5
732-2020	**Econo-Pac Protein A Kit**, 1 x 2 ml Affi-Gel protein A column, 1 x 10 ml 10DG column, buffers

Description	5 x 1 ml	1 x 5 ml
Prepacked Bio-Scale Mini Cartridges		
Affi-Prep Protein A media	732-4600	732-4602

Affinity Media

Affi-Gel® Blue Media

Affi-Gel Blue media is a cross-linked agarose bead with covalently attached Cibacron Blue F3GA dye. The blue dye functions as an ionic, hydrophobic, aromatic, or sterically active binding site in various applications. Affi-Gel Blue media is ideally suited for albumin removal (using 50–100 mesh) and enzyme purification (using 100–200 mesh).

Proteins and peptides are bound and released with a high degree of specificity by manipulating the composition of the eluent buffers.

The media is available in bottle and cartridge form.

For More Information
Web: www.bio-rad.com/affigelblue

Ordering Information

Catalog #	Description
153-7301	**Affi-Gel Blue Media**, 100 ml, 50–100 mesh
153-7302	**Affi-Gel Blue Media**, 100 ml, 100–200 mesh
732-4642	**Bio-Scale Mini Affi-Gel Blue Cartridge**, 1 x 5 ml
732-4644	**Bio-Scale Mini Affi-Gel Blue Cartridges**, 5 x 5 ml

DEAE Affi-Gel® Blue Media

DEAE Affi-Gel Blue media is a bifunctional affinity gel containing Cibacron Blue F3GA dye covalently attached to DEAE Bio-Gel® A media. The dye binds albumin, proteases, and other complement proteins; the DEAE group binds remaining acidic proteins. Features of DEAE Affi-Gel Blue media include:

- Single-step IgG purification from serum; the eluted IgG contains a small amount of transferrin (samples are diluted approximately five fold)
- No detectable proteolytic activity in the eluted IgG fraction
- Economical alternative to protein A affinity chromatography
- Available in bottle and cartridge form

For More Information
Web: www.bio-rad.com/affigelDEAE

Ordering Information

Catalog #	Description
153-7307	**DEAE Affi-Gel Blue Media**, 100 ml
732-4632	**Bio-Scale Mini DEAE Affi-Gel Blue Cartridge**, 1 x 5 ml
732-4634	**Bio-Scale Mini DEAE Affi-Gel Blue Cartridges**, 5 x 5 ml

Description	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges		
DEAE Affi-Gel Blue Media	732-4632	732-4634
Affi-Gel Blue Media	732-4642	732-4644

CM Affi-Gel® Blue Media

CM Affi-Gel Blue media contains Cibacron Blue F3GA dye covalently coupled to CM Bio-Gel® A media. This bifunctional gel binds both albumin and serum proteases. CM Affi-Gel Blue chromatography provides a convenient initial step in the purification of serum proteins. Features of CM Affi-Gel Blue media include:

- Rapid removal of ≥90% of albumin and all plasminogen in serum samples
- No prior sample preparation needed
- ≥80% yield of stable antiserum free of albumin and protease activity

For More Information
Web: www.bio-rad.com/affigelcm

Ordering Information

Catalog #	Description
153-7304	**CM Affi-Gel Blue Media**, 100 ml

Affi-Gel® Boronate Media

Affi-Gel boronate-derivatized polyacrylamide media has affinity for coplanar adjacent *cis*-hydroxyl groups (*cis*-diols) and a high binding capacity, which provides highly efficient separation of low MW molecules such as nucleotides, nucleosides, catecholamines, and sugars. It has a sorbitol capacity of 130 µmol/ml.

For More Information
Web: www.bio-rad.com/affigelboronate
Request or download bulletin: 1066

Ordering Information

Catalog #	Description
153-6103	**Affi-Gel Boronate Media**, 5 g
153-6104	**Affi-Gel Boronate Media**, 50 g

Affi-Prep® Polymyxin Media

Affi-Prep polymyxin media consists of 2–4 mg of USP-grade polymyxin per ml of the macroporous polymeric Affi-Prep support. Affi-Prep polymyxin media binds endotoxins from a number of different strains of gram-negative bacteria including *E. coli, Salmonella abortus, S. minnesota,* and *Serratia marcescens*. Features of Affi-Prep polymyxin media include:

- Endotoxin removal in research and process-scale applications
- Linear flow rates to 2,000 cm/hr
- Pressure stability to 1,000 psi (70 bar)
- High chemical stability (withstands sanitization with 0.1 M NaOH)



Affi-Prep Polymyxin Media

For More Information
Web: www.bio-rad.com/affigelpolymyxin

Ordering Information

Catalog #	Description
156-0010	**Affi-Prep Polymyxin Media**, 25 ml

Affi-Gel® Heparin Media

Affi-Gel heparin media is a ready-to-use support for the purification of a range of proteins such as coagulation factors, other plasma proteins, polynucleotide polymerases, nucleases, lipases, lipoproteins, and proteases. Heparin binds a variety of enzymes and other proteins, either ionically or by other specific enzyme-inhibitor (or enzyme-activator) interactions. Features of Affi-Gel heparin media include:

- Heparin content ≥0.6 mg/ml
- Human antithrombin III binding capacity ≥1.2 mg/ml
- Linear flow rates of 10–20 cm/hr



Affi-Gel Heparin Media

For More Information
Web: www.bio-rad.com/affigelheparin

Ordering Information

Catalog #	Description
153-6173	**Affi-Gel Heparin Media**, 40 ml

Activated Affinity Media

Profinity™ Epoxide Media

Profinity epoxide media is an activated affinity chromatography support for the immobilization of biomolecules. Profinity epoxide is a useful support for the immobilization of ligands that contain nucleophiles such as amino, thiol, or hydroxyl groups. These groups couple to the epoxy groups on the media, which is then used for the purification of proteins, carbohydrates, or DNA.

Profinity epoxide media is based on UNOsphere™ beads, which have an open pore structure. The open pore structure allows coupling of large ligands for the purification of large targets such as protein A, recombinant proteins containing MBP, and calmodulin. It is supplied as a dry powder (1 g of powder gives ~8 ml final volume).



For More Information
Web: www.bio-rad.com/profinityepoxide

Ordering Information

Catalog #	Description
156-0200	**Profinity Epoxide Media**, 5 g
156-0201	**Profinity Epoxide Media**, 25 g

Affi-Gel® 10 and Affi-Gel 15 Media

Affi-Gel 10 and Affi-Gel 15 activated affinity media provide spontaneous, rapid, and highly efficient coupling of ligands via primary amines. Affi-Gel 10 media is most efficient for coupling neutral or basic proteins with pI from 6.5–11. Affi-Gel 15 media is recommended for coupling acidic proteins with pI <6.5. Affi-Gel 10 and 15 media offer:

- Aqueous or anhydrous coupling conditions
- Complete protein coupling within 4 hr at 4°C
- Protein coupling capacity up to 35 mg/ml of media

For More Information
Web: www.bio-rad.com/affigel10and15
Request or download bulletin: 1085

Ordering Information

Catalog #	Description
153-6099	**Affi-Gel 10 Media**, 25 ml
153-6046	**Affi-Gel 10 Media**, 4 x 25 ml
153-1000	**Affi-Gel 10 Media**, 1 L
153-6051	**Affi-Gel 15 Media**, 25 ml
153-6052	**Affi-Gel 15 Media**, 4 x 25 ml
153-1500	**Affi-Gel 15 Media**, 1 L
153-6098	**Affi-Gel 10/15 Combination**, includes 2 x 25 ml Affi-Gel 10 media and 2 x 25 ml Affi-Gel 15 media

Affi-Gel® Hz Hydrazide Media

Affi-Gel Hz hydrazide activated media couple immunoglobulin G (IgG) molecules via carbohydrate moieties on the Fc region of antibody molecules. Fc attachment results in a more specific antigen-antibody interaction and 100–300% higher antigen binding capacity than other media. Affi-Gel Hz media advantages include:

- Stable covalent hydrazone bonds
- Mild oxidation without alteration of antibody activity
- High antigen binding capacity
- pH stability

For More Information
Web: www.bio-rad.com/affigelhydrazide

Ordering Information

Catalog #	Description
153-6047	**Affi-Gel Hz Hydrazide Media**, 25 ml
153-6060	**Affi-Gel Hz Immunoaffinity Kit**, includes 5 ml Affi-Gel Hz media, 2 x 25 mg Affi-Gel Hz oxidizer, 25 ml Affi-Gel Hz coupling buffer concentrate, 2 Econo-Pac 10DG desalting columns, 1 x 10 cm Econo-Column column
153-6054	**Affi-Gel Hz 10x Coupling Buffer Concentrate**, 500 ml

Carbodiimide Activated Media

See Also
Affinity media selection guide: page 34.

Affi-Gel® 102 media is for use with 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (EDAC or EDC) carbodiimide coupling reagent, which immobilizes ligands that contain primary or terminal carboxyl groups. The media offers flexible alternative chemistries and economy.

Affi-Gel 102 amino-terminal cross-linked agarose media, with a six-atom hydrophilic arm, feature:

- EDAC carbodiimide coupling reagent
- Compatibility with carboxyl-containing ligands

For More Information
Web: www.bio-rad.com/carbodiimide

Ordering Information

Catalog #	Description
153-2401	**Affi-Gel 102 Media**, 50 ml
153-0990	**EDAC**, 5 g

Size Exclusion Chromatography

See Also

Sample preparation products: pages 2–18.

Gel filtration chromatography standards: page 64.

Bio-Spin and Micro Bio-Spin prepacked columns: pages 71–72.

Empty Econo-Pac columns: page 78.

Bio-Gel® P Media

Bio-Gel P polyacrylamide media, for high-resolution gel filtration, is prepared by copolymerization of acrylamide and N,N'-methylene-*bis*-acrylamide. Bio-Gel P media:

- Is available in several particle size ranges with molecular weight exclusion limits ranging from 100–100,000
- Is extremely hydrophilic and essentially nonionic
- Provides efficient, gentle gel filtration of sensitive compounds
- Does not support microbial growth or leach carbohydrates (due to its synthetic composition) as dextrose and agarose gels can

Bio-Gel P media is autoclavable at pH 5.5–6.5 and operates over a pH range of 2–10 at room temperature. Flow rate and resolution increase with increasing temperature in the range of 4–80°C.

Bio-Gel P polyacrylamide media is available as bottled media or as prepacked spin columns and cartridges. Cartridges are packed with Bio-Gel P-6 media, while spin columns come prepacked with both P-6 and P-30 media in either Tris or SSC buffer.

For More Information
Web: www.bio-rad.com/biogelp
Request or download bulletin: 2068



Bio-Gel P Media



Bio-Scale™ Mini Bio-Gel Cartridges

Bio-Gel P Polyacrylamide Media Selection Guide

	MW Fractionation Range
Bio-Gel P-2 media	100–1,800
Bio-Gel P-4 media	800–4,000
Bio-Gel P-6 media	1,000–6,000
Bio-Gel P-6 media	1,000–6,000
Bio-Gel P-6DG media	1,000–6,000
Bio-Gel P-10 media	1,500–20,000
Bio-Gel P-30 media	2,500–40,000
Bio-Gel P-60 media	3,000–60,000
Bio-Gel P-100 media	5,000–100,000

Ordering Information

Catalog #	Description	Comments
150-4114	**Bio-Gel P-2 Media**, fine, 100 g	Rapid carbohydrate, peptide, and protein desalting
150-4115	**Bio-Gel P-2 Media**, fine, 500 g	
150-4118	**Bio-Gel P-2 Media**, extra fine, 100 g	
150-4120	**Bio-Gel P-4 Media**, medium, 100 g	Carbohydrate and peptide separations, protein desalting
150-4124	**Bio-Gel P-4 Media**, fine, 100 g	
150-4128	**Bio-Gel P-4 Media**, extra fine, 100 g	
150-4130	**Bio-Gel P-6 Media**, medium, 100 g	Purification of proteins and polypeptides
150-4134	**Bio-Gel P-6 Media**, fine, 100 g	
150-4138	**Bio-Gel P-6 Media**, extra fine, 100 g	
150-0738	**Bio-Gel P-6DG Media**, 100 g	Rapid carbohydrate, peptide, and protein desalting;
150-0739	**Bio-Gel P-6DG Media**, 1 kg	also available in prepacked columns and cartridges
150-4140	**Bio-Gel P-10 Media**, medium, 100 g	Purification of proteins and polypeptides
150-4144	**Bio-Gel P-10 Media**, fine, 100 g	
150-4150	**Bio-Gel P-30 Media**, medium, 100 g	
150-4154	**Bio-Gel P-30 Media**, fine, 100 g	
150-4160	**Bio-Gel P-60 Media**, medium, 100 g	
150-4164	**Bio-Gel P-60 Media**, fine, 100 g	
150-4170	**Bio-Gel P-100 Media**, medium, 100 g	
150-4174	**Bio-Gel P-100 Media**, fine, 100 g	

Catalog #	Description
Prepacked Econo-Pac Columns	
732-2010	**Econo-Pac 10DG Desalting Columns**, 30

continues

Ordering Information

Description	Pack of 1	Pack of 5
Prepacked Bio-Scale Mini Cartridges		
Bio-Gel P-6 Media (Desalting), 5 ml	732-4502	732-4504
Bio-Gel P-6 Media, 10 ml	—	732-5304
Bio-Gel P-6 Media, 50 ml	732-5312	732-5314

Catalog #	Description
Adaptor Fittings	
732-0111	**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
732-0112	**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
732-0113	**Luer to BioLogic System Fittings Kit**, includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect 1 cartridge to a BioLogic DuoFlow system

Bio-Gel® A 1.5 m Media

Bio-Gel A 1.5 m media, ideal for purification of antibodies and aggregates, consists of agarose beads in which the pore size is controlled by the percentage of agarose in the gel. It is compatible with all commonly used buffers and can be used with high-salt buffers without significantly changing the bed volume. Bio-Gel A 1.5 m media may be used at pH 4–13 and at temperatures 2–30°C. The fractionation range is from 10,000–1,500,000.

For More Information
Web: www.bio-rad.com/biogela

Ordering Information

Catalog #	Description
151-0450	**Bio-Gel A 1.5 m Media**, fine

Bio-Beads™ S-X Media

Bio-Beads S-X media are neutral, porous styrene divinylbenzene beads for size exclusion chromatography of lipophilic polymers and other solutes that require organic eluents. MW exclusion limits range from 400–14,000. This range is useful for fractionation of low MW organic polymers and other hydrophobic substances. Exclusion limits are influenced by the eluent used. Bio-Beads S-X media require an eluent that is mobile; therefore, the beads must be used in a column. The beads are compatible with benzene, toluene, xylene, carbon tetrachloride, dimethylformamide, ketones, aromatics, methylene chloride, *o*-dichlorobenzene, perchloroethylene, tetrahydrofuran, and trichlorobenzene.

Recommended flow rates depend upon the cross-linkage:

- 1% cross-linked media are used only with gravity flow
- 3% cross-linked media can withstand a flow of 5 ml/min with a backpressure of 20 bar or 300 psi
- 8% and 12% cross-linked media can withstand up to 33 bar or 500 psi

For More Information
Web: www.bio-rad.com/biobeads

See Also
Media sampler pack: page 63.

Ordering Information

Catalog #	Description	Size, µm	ml/dry g*	Application**
152-2150	**Bio-Beads S-X1 Media**, 100 g	40–80	7.5	1% cross-linked; for lipophilic polymers of MW 600–14,000
152-2151	**Bio-Beads S-X1 Media**, 1 kg			1% cross-linked; for lipophilic polymers of MW 600–14,000
152-2750	**Bio-Beads S-X3 Media**, 100 g	40–80	4.75	3% cross-linked; for organic compounds of MW ≤2,000
152-3350	**Bio-Beads S-X8 Media**, 100 g	40–80	3.1	8% cross-linked; for organic compounds of MW ≤1,000
152-3650	**Bio-Beads S-X12 Media**, 100 g	40–80	2.5	12% cross-linked; for organic compounds of MW ≤400

* Swollen in benzene.

** MW range is for beads fully swollen in benzene.

Larger volumes and special packaging for industrial applications are available on request.

Hydrophobic Interaction Chromatography

Macro-Prep® HIC Media

Macro-Prep HIC media are methacrylate-based 50 µm beads for protein, polypeptide, enzyme, and nucleic acid purification. They are autoclavable and can withstand treatment in acid, base (pH up to 10), chaotropic agents, or detergents while retaining high protein binding capacities. They are available in two functional forms: a weakly hydrophobic methyl support for purification of compounds with strong hydrophobic regions, and a mildly hydrophobic t-butyl support for purification of compounds with few or weakly hydrophobic regions. Both media are chemically and thermally stable. They can be cleaned in place with ethanol or sodium hydroxide.

For More Information
Web: www.bio-rad.com/macroprepHIC
Request or download bulletin: 1841

Ordering Information

Description	Methyl HIC	t-Butyl HIC
Macro-Prep HIC Media, 25 ml	158-0080	158-0090
Macro-Prep HIC Media, 100 ml	156-0080	156-0090
Macro-Prep HIC Media, 500 ml	156-0081	156-0091
Macro-Prep HIC Media, 5 L	156-0082	156-0092
Macro-Prep HIC Media, 10 L	156-0083	156-0093

Bio-Beads™ SM-2 Adsorbents

Bio-Beads SM-2 nonpolar polystyrene adsorbents are analytical-grade neutral macroporous polymeric beads with a high surface area for adsorbing organics of MW <2,000. These beads can be used in aqueous solution, with solvents or solvent mixtures, including alcohols, petroleum ether, diethyl ether, and hexane, without expansion or contraction of the beads.

Common applications of Bio-Beads SM-2 adsorbents include the removal of detergents such as Triton X-100, the removal of organics such as polyaromatic hydrocarbons from water, cleanup of drugs from plasma and urine, clean up of biological metabolites and pesticides, and clean up of dyes and mycotoxins from food products.

For More Information
Web: www.bio-rad.com/biobeads_SM2
Request or download bulletin: 1461

Ordering Information

Catalog #	Description
152-3920	**Bio-Beads SM-2 Adsorbents**, 100 g
152-8920	**Bio-Beads SM-2 Adsorbents**, biotechnology grade, 25 g

Media and Cartridge Sampler Packs, Kits, and Standards

Sampler Packs

Bio-Rad offers its most popular media in a variety of convenient sampler packs:

- **Media sampler pack** — includes 25 ml each of UNOsphere™ Q, S, and Rapid S, Macro-Prep® DEAE, High Q, and High S; 5 ml of UNOsphere SUPrA™; 10 g each of CHT™ ceramic hydroxyapatite Types I and II, 40 µm; and 10 g of CFT™ ceramic fluoroapatite Type II media
- **Deluxe media sampler pack** — includes 100 ml bottles of the media in the media sampler pack
- **Bio-Scale™ Mini ion exchange sampler pack** — includes one 1 ml cartridge each of UNOsphere Q and S, and Macro-Prep High Q, High S, and DEAE media
- **Bio-Scale Mini affinity sampler pack** — includes one 1 ml cartridge each of IMAC and Affi-Prep® protein A media and one 5 ml cartridge each of DEAE Affi-Gel® Blue and Affi-Gel Blue media

For More Information
Web: www.bio-rad.com/mediasampling



Media Sampler and Deluxe Media Sampler Packs



Bio-Scale Mini Cartridges



Bio-Scale Mini Ion Exchange and Affinity Sampler Packs

Ordering Information

Catalog #	Description
Process Scale Media	
158-0100	**Media Sampler Pack**, includes 25 ml each of Macro-Prep DEAE, Macro-Prep High Q, Macro-Prep High S, UNOsphere Q, UNOsphere S, UNOsphere Rapid S, 5 ml of UNOsphere SuPrA, 10 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm, and 10 g of CFT ceramic fluoroapatite Type II, 40 µm
158-0150	**Deluxe Media Sampler Pack**, includes 100 ml each of Macro-Prep DEAE, Macro-Prep High Q, Macro-Prep High S, 100 ml each of UNOsphere Q, UNOsphere S, UNOsphere Rapid S, 5 ml of UNOsphere SuPrA, 100 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm, and CFT ceramic fluoroapatite Type II, 40 µm
Lab Scale Media	
732-4650	**Bio-Scale Mini Ion Exchange Sampler Pack**, includes one 1 ml cartridge each of UNOsphere S, UNOsphere Q, Macro-Prep High Q, Macro-Prep High S, Macro-Prep DEAE
732-4651	**Bio-Scale Mini Affinity Sampler Pack**, includes one 1 ml cartridge each of IMAC and Affi-Prep protein A, one 5 ml cartridge each of EAE Affi-Gel Blue and Affi-Gel Blue

See Also

Ion exchange media: pages 35–38.

Macro-Prep ion exchange media: pages 36–38.

UNOsphere and Nuvia ion exchange media: pages 35–36.

CHT ceramic hydroxyapatite: page 44.

CFT ceramic fluoroapatite: page 45.

Macro-Prep HIC media: page 62.

Bio-Scale Mini cartridges: page 70.

Bio-Scale™ Mini Kits

Bio-Scale Mini Apatite Purification Kit

CHT™ ceramic hydroxyapatite and CFT™ ceramic fluoroapatite have comparable biomolecule separation characteristics, differing mostly in the pH buffer range in which they optimally perform. Ceramic hydroxyapatite exhibits pH stability as low as 6.5, whereas the fluorine substitution in ceramic fluoroapatite extends pH stability to values as low as 5.6. The Bio-Scale Mini apatite purification kit is designed as a convenient way to evaluate which apatite material provides optimal chromatographic performance for your application.

- Prepacked cartridges with CHT Type II ceramic hydroxyapatite and CFT Type II ceramic fluoroapatite for convenient process development
- Low bed volume allowing minimum requirements for sample and buffer
- Luer fitting for convenient connection to any chromatographic system
- Distinct selectivity and different pH ranges

Bio-Scale Mini mAb Purification Kit

Maximize method optimization and parameter screening for monoclonal antibodies with the Bio-Scale Mini mAb purification kit. This convenient process development workflow-based kit contains UNOsphere SUPrA™ affinity media, UNOsphere™ Q media, and CHT Type I ceramic hydroxyapatite to address the entire range of needs for monoclonal antibody capture, intermediate contaminant removal, and final polishing.

- Convenient prepacked columns with a simple luer fitting for easy connection to any chromatography system
- Ideal for screening and optimization of purification protocols
- Reproducible and scalable results

For More Information
Web: www.bio-rad.com/mediasampling

Ordering Information

Catalog #	Description
732-4407	**Bio-Scale Mini Apatite Purification Cartridge Kit**, includes one each, 5 ml prepacked CFT ceramic fluoroapatite Type II, 40, µm and CHT ceramic hydroxyapatite Type I, 40 µm, multimodal chromatography media cartridges
732-4408	**Bio-Scale Mini mAb Purification Cartridge Kit**, includes one each, 5 ml prepacked UNOsphere SUPrA affinity media, UNOsphere Q media, and CHT ceramic hydroxyapatite Type I, 40 µm, cartridges

Chromatography Standards

Ion Exchange Chromatography Standards

Bio-Rad offers two protein standards for ion exchange chromatography that are suitable for use with bulk media, cartridges, or columns. Each standard is supplied as a set of six vials of lyophilized protein mixture for qualitative analysis only.

Organic Acid Standard

Bio-Rad's organic acid standard is supplied as a set of six vials of lyophilized mixture for qualitative analysis only.

Carbohydrate Standard

Bio-Rad's carbohydrate standard is supplied as a set of six vials of lyophilized mixture for qualitative analysis only. The standards can be used for column testing or semiquantitative determination.

Gel Filtration Chromatography Standard

Bio-Rad's gel filtration standard is a calibration standard for size exclusion columns used in protein purification. The mixture includes vitamin B_{12} and myoglobin, which are visible when eluting from glass or clear plastic columns, to ensure that the column is properly packed and the sample is eluting evenly. The standard can be used with most size exclusion HPLC columns. The standard is supplied as a set of six vials of lyophilized protein mixture.

For More Information
Web: www.bio-rad.com/chromstandards

Standard Specifications

Description	Contents	MW	pI	For Use with
Protein Standard for Anion Exchange Chromatography	Equine myoglobin Conalbumin Chicken ovalbumin Soybean trypsin inhibitor	17,000 77,000 45,000 21,500	6.9 4.9 4.6 4.5	UNO Q columns; Bio-Scale Mini UNOsphere Q cartridges; Macro-Prep High Q and DEAE media; UNOsphere Q media
Protein Standard for Cation Exchange Chromatography	Equine myoglobin Ribonuclease A Cytochrome c	17,000 13,500 12,000	6.9 8.7 10.7	UNO S columns; Bio-Scale Mini UNOsphere S cartridges; Macro-Prep High S and CM media; UNOsphere S media
Organic Acid Analysis Standard	Sodium oxalate Sodium citrate Sodium malate Sodium succinate Sodium formate Sodium acetate	134 294 196 270 69 82		Aminex HPX-87H column; organic acid analysis kit
Carbohydrate Analysis Standard	Melezitose Maltose Glucose Mannose Fructose Adonitol (ribitol)	504 360 180 180 180 152		Aminex HPX-87C column; carbohydrate analysis kit
Gel Filtration Standard	Thyroglobulin Bovine γ-globulin Chicken ovalbumin Equine myoglobin Vitamin B_{12}	670,000 158,000 44,000 17,000 1,350	4.5 5.1 4.6 6.9 4.5	SEC columns; Bio-Gel P media

Ordering Information

Catalog #	Description	Contents	MW	pI	For Use with
125-0561	**Protein Standard for Anion Exchange Chromatography**, 6 vials	Equine myoglobin Conalbumin Chicken ovalbumin Soybean trypsin inhibitor	17,000 77,000 45,000 21,500	6.9 4.9 4.6 4.5	UNO Q columns; Bio-Scale Mini UNOsphere Q cartridges; Macro-Prep High Q and DEAE media; UNOsphere Q media
125-0562	**Protein Standard for Cation Exchange Chromatography**, 6 vials	Equine myoglobin Ribonuclease A Cytochrome c	17,000 13,500 12,000	6.9 8.7 10.7	UNO S columns; Bio-Scale Mini UNOsphere S cartridges; Macro-Prep High S and CM media; UNOsphere S media
125-0586	**Organic Acid Analysis Standard**, 6 vials	Sodium oxalate Sodium citrate Sodium malate Sodium succinate Sodium formate Sodium acetate	134 294 196 270 69 82		Aminex HPX-87H column; organic acid analysis kit
125-0585	**Carbohydrate Analysis Standard**, 6 vials	Melezitose Maltose Glucose Mannose Fructose Adonitol (ribitol)	504 360 180 180 180 152		Aminex HPX-87C column; carbohydrate analysis kit
151-1901	**Gel Filtration Standard**, 6 vials	Thyroglobulin Bovine γ-globulin Chicken ovalbumin Equine myoglobin Vitamin B_{12}	670,000 158,000 44,000 17,000 1,350	4.5 5.1 4.6 6.9 4.5	SEC columns; Bio-Gel P media

Chromatography Columns

A complete range of prepacked and empty columns and accessories are available for protein and peptide separations. Bio-Rad's many disposable spin and gravity chromatography columns are made of chemically compatible polypropylene, are autoclavable and can be washed with NaOH. Our low-pressure glass Econo-Column® chromatography columns offer an ideal combination of performance, reliability, and value. For high-resolution separations, Bio-Rad's Bio-Scale™ MT medium-pressure columns can be run on a variety of liquid chromatography systems and are provided prepacked with selected media.

Learn More about the Technology
Web: www.bio-rad.com/tech/chrom

Prepacked Chromatography Columns

Prepacked Cartridge Selection Guide by Application

Application	Media	Type of Separation	Chemical Form	Binding Capacity/ml*
Protein and Plasmid Purification	Macro-Prep High Q	Strong anion exchange	$-N^+(CH_3)_3$	≥37 mg BSA
	UNOsphere Q	Strong anion exchange	$-N^+(CH_3)_3$	180 mg BSA
	UNOsphere S	Strong cation exchange	$-SO_3^-$	60 mg human IgG
	Macro-Prep DEAE	Weak anion exchange	$-HN^+(C_2H_5)_2$	>35 mg protein
	UNOsphere Rapid S	Strong cation exchange	SO_3^-	Human IgG: 60 mg/ml*
	CHT ceramic hydroxyapatite	Hydroxyapatite	$(Ca_5(PO_4)_3OH)_2$	Human IgG: 25–60 mg/ml*
	CFT ceramic fluoroapatite	Fluoroapatite	$Ca_{10}(PO_4)_6F_2$	Lysozyme: 14–21.5 mg/g
Protein Purification	Nuvia™ Q	Strong anion exchange	$-N(CH_3)_3^+$	>170 mg/ml IgG at 300 cm/hr
	Nuvia™ cPrime	Hydrophobic cation exchange	$-N(CH_3)_3^+$	>60 mg/ml lactoferin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-SO_3^-$	110 mg/ml IgG
	Macro-Prep High S	Strong cation exchange	$-SO_3^-$	≥49 mg human IgG
	UNOsphere Rapid S	Strong cation exchange	SO_3^-	Human IgG: 60 mg/ml*
	CHT ceramic hydroxyapatite	Hydroxyapatite	$(Ca_5(PO_4)_3OH)_2$	Human IgG: 25–60 mg/ml*
	CFT ceramic fluoroapatite	Fluoroapatite	$Ca_{10}(PO_4)_6F_2$	Lysozyme: 14–21.5 mg/g
IgG Purification	DEAE Affi-Gel® Blue	Affinity	Cibacron Blue F3GA and DEAE	0.2–1.0 ml serum
Antibody Purification	Nuvia Q	Strong anion exchange	$-N(CH_3)_3^+$	>170 mg/ml IgG at 300 cm/hr
	Nuvia cPrime	Hydrophobic cation exchange	$-N(CH_3)_3^+$	>60 mg/ml lactoferin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-SO_3^-$	110 mg/ml IgG
	Affi-Prep® protein A	Affinity	Protein A	8–10 mg mouse monoclonal IgG_1 16–23 mg human IgG
	CHT Type I, 40 µm	Hydroxyapatite	$(Ca_5(PO_4)_3OH)_2$	25–60 mg human IgG
	CHT Type II, 40 µm	Hydroxyapatite	$(Ca_5(PO_4)_3OH)_2$	15–25 mg human IgG
	CFT	Fluoroapatite	$Ca_{10}(PO_4)_6F_2$	Lysozyme: 14–21.5 mg/g
	UNOsphere SUPrA™	Affinity	rProtein A	Human IgG: 30 mg/ml*
Affinity-Tagged Protein Purification	Profinity™ IMAC	Affinity	Iminodiacetic acid	≥15 mg recombinant Histidine-tagged protein
	Profinity GST	Affinity	Glutathione	≥10 mg/ml recombinant GST-tagged protein
	Profinity eXact™	Affinity tag	Modified subtilisin	>3 mg/ml tag-free maltose Binding protein/ml resin
Desalting, Buffer Exchange	Bio-Gel® P-6	Gel filtration	Polyacrylamide	10–22% CV
Purification of Serum Proteins, Enzymes	Affi-Gel Blue	Affinity	Cibacron Blue F3GA	0.2 ml serum 11 mg albumin
Monoclonal Antibody Purification	Nuvia Q	Strong anion exchange	$-N(CH_3)_3^+$	>170 mg/ml IgG at 300 cm/hr
	Nuvia cPrime	Hydrophobic cation exchange	$-N(CH_3)_3^+$	>60 mg/ml lactoferin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-SO_3^-$	110 mg/ml IgG
	UNOsphere SUPrA	Affinity	rProtein A	Human IgG: 30 mg/ml*
	CHT Type I, 40 µm	Hydroxyapatite	$(Ca_5(PO_4)_3OH)_2$	Human IgG: 25–60 mg/ml
	UNOsphere Q	Strong anion exchange	$-N^+(CH_3)_3$	BSA 180 mg/ml*

* Binding capacity based on bulk media; check individual instruction manuals for run conditions and specifications.

Coming Soon ENrich™ High-Resolution Ion Exchange Columns

ENrich ion exchange columns are designed for high-resolution separations at fast flow rates. ENrich columns run at low backpressures on the NGC chromatography system or any other medium- to high-pressure purification system. This allows more flow rate flexibility both in sample viscosities and temperature conditions. The 1 ml ENrich column can complete a high-resolution separation in about 10 minutes. ENrich columns are also available in 8 ml sizes.



The unique polymeric media features:

- High capacity even at high flow rates
- Superior quality, reproducible separations
- Lower backpressure than similar media
- Stability from pH 2–13
- Available for strong anion (Q) and strong cation (S) exchange

ENrich glass columns — provide high-resolution separation of biomolecules. The durable borosilicate glass tube and PEEK end fittings are compatible with all aqueous solvents.

For More Information
Visit www.bio-rad.com/ENrich

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Max. Protein Load, mg/column	Column Dimensions (W x L), mm	Max. Operating Pressure psi	MPa	bar
ENrich High Resolution Ion Exchange Columns							
780-0001	**ENrich Q 5 x 50 Column**	1	100	5 x 50	350	2.25	23
780-0003	**ENrich Q 10 x 100 Column**	8	800	10 x 100	350	2.25	23
780-0021	**ENrich S 5 x 50 Column**	1	100	5 x 50	350	2.25	23
780-0023	**ENrich S 10 x 100 Column**	8	800	10 x 100	350	2.25	23

Catalog #	Description
Fittings	
750-0564	**1/4-28 Female to 10-32 Male Fittings**, includes 2 ferrule-less fittings for attaching ENrich columns to the BioLogic DuoFlow
750-0568	**ENrich 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect ENrich column to an HPLC system

Coming Soon ENrich™ High-Resolution Size Exclusion Columns

ENrich size exclusion columns are designed for high resolution at fast flow rates. ENrich columns run at low backpressures on the NGC chromatography system or any other medium- to high-pressure purification system. This allows more flow rate flexibility both in sample viscosities and temperature conditions. The 24 ml ENrich column can complete a high-resolution separation in less than 30 minutes at a flow rate of 1 ml/min.



The unique polymeric media features:

- High resolution based on size
- Superior quality, reproducible separations
- Lower backpressure than similar media
- Stability from pH 2–13
- Separation ranges from 500–70,000 and 5,000–650,000 M_r

ENrich glass columns — provide high-resolution separation of biomolecules. The durable borosilicate glass tube and PEEK end fittings are compatible with all aqueous solvents.

For More Information
Web: www.bio-rad.com/ENrich

Ordering Information

Catalog #	Description	Column Volume, ml	Separation Range Globular Proteins, M_r	Column Dimensions (W x L), mm	Max. Operating Pressure psi	MPa	bar
ENrich High Resolution Size Exclusion Columns							
780-1070	**ENrich SEC 70 10 x 300 Column**	24	500–70,000	10 x 300	350	2.25	23
780-1650	**ENrich SEC 650 10 x 300 Column**	24	5,000–650,000	10 x 300	350	2.25	23

Catalog #	Description
Fittings	
750-0564	**1/4-28 Female to 10-32 Male Fittings**, includes 2 ferrule-less fittings for attaching ENrich columns to the BioLogic DuoFlow
750-0568	**ENrich 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect Enrich column to an HPLC system

New Foresight™ Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography media, offering process scientists convenience and reliability for their high-throughput experimentation needs. The products' robust design allows researchers to use the prepacked formats through the entire purification development cycle from high-throughput media screening to small-scale methods development and scale-up optimization.

Benefits include:

- Prepacked and ready-to-use formats designed to save process development time
- Ability to evaluate different experimental conditions to better define an operational window
- Ability to perform high-throughput experiments with minimum sample requirements
- Available in a variety of chromatography media modes that are designed for large-scale bioprocess
- Compatible with robotic liquid handling workstations



For More Information
Web: www.bio-rad.com/foresight
Request or download bulletins: 6297

Ordering Information

Catalog #	Description	200 µl	600 µl
Foresight Plates*			
732-4714	**Foresight UNOsphere Q**, 20 µl		
732-4710	**Foresight UNOsphere S**, 20 µl		
732-4712	**Foresight UNOsphere Rapid S**, 20 µl		
732-4703	**Foresight Nuvia Q**, 20 µl		
732-4701	**Foresight Nuvia S**, 20 µl		
732-4705	**Foresight Nuvia cPrime**, 20 µl		
732-4716	**Foresight CHT Type I**, 40 µm 20 µl		
732-4718	**Foresight CHT Type II**, 40 µm, 20 µl		
Description		**200 µl**	**600 µl**
Foresight RoboColumn Units,***			
Foresight UNOsphere Q RoboColumn Units		732-4819	732-4820
Foresight UNOsphere S RoboColumn Units		732-4813	732-4814
Foresight UNOsphere Rapid S RoboColumn Units		732-4816	732-4817
Foresight Nuvia Q RoboColumn Units		732-4804	732-4805
Foresight Nuvia S RoboColumn Units		732-4801	732-4802
Foresight Nuvia cPrime RoboColumn Units		732-4807	732-4808
Foresight CHT Type I RoboColumn Units, 40 µm		732-4822	732-4823
Foresight CHT Type II RoboColumn Units, 40 µm		732-4825	732-4826
Description		**1 ml**	**5 ml**
Foresight Columns			
Foresight UNOsphere Q		732-4732	732-4752
Foresight UNOsphere S		732-4730	732-4750
Foresight UNOsphere Rapid S		732-4731	732-4751
Foresight Nuvia Q		732-4721	732-4741
Foresight Nuvia S		732-4720	732-4740
Foresight Nuvia cPrime		732-4722	732-4742
Foresight CHT Type I, 40 µm		732-4735	732-4755
Foresight CHT Type II, 40 µm		732-4736	732-4756

* Package size: 2 x 96-well plates.
** Package size: 1 row of 8 columns.
*** Foresight RoboColumn Units are to be used with robotic liquid handling workstations.

For more information on prepacked columns and plates, please visit **www.bio-rad.com/foresight**.

See Also

Bottled media: pages 35–49, 53–63.

BioLogic systems: pages 115–117.

Econo pump: page 119.

Bio-Scale™ Mini Cartridges

Bio-Scale Mini cartridges have a double-wall cartridge design* that provides extra durability and allows easy, reliable runs at pressures up to 45 psi using the aqueous buffers most commonly employed for protein separation. The cartridges are prepacked with Bio-Rad's chromatography media for ion exchange, affinity, size exclusion, or hydroxyapatite technology and are available in 1, 5, 10, and 50 ml formats. Bio-Scale Mini cartridges are convenient and ready to use.

The cartridges can be used with any chromatography system and are ideal with the BioLogic™ systems or a peristaltic pump. For simple step elution, the cartridges can be used with a luer lock syringe. Fittings are available for connection to HPLC-, FPLC-, and ÄKTA systems.

For More Information
Web: www.bio-rad.com/cartridges
Request or download bulletins: 5444, 5574, and 5584



* U.S. patent 7,208,087.

Ordering Information

Description	1 x 1 ml	5 x 1 ml	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges				
UNOsphere Q Media	—	732-4100	732-4102	732-4104
UNOsphere S Media	—	732-4110	732-4112	732-4114
UNOsphere SUPrA rProtein A Media	732-4200	732-4201	732-4202	—
UNOsphere Rapid S Media	—	732-4400	732-4401	732-4402
Nuvia S Media	732-4420	732-4421	732-4422	732-4423
Macro-Prep High Q Media	—	732-4120	732-4122	732-4124
Macro-Prep High S Media	—	732-4130	732-4132	732-4134
Macro-Prep DEAE Media	—	732-4140	732-4142	732-4144
Affi-Prep Protein A Media	—	732-4600	732-4602	—
Profinity IMAC Ni-Charged Resin	—	732-4610	732-4612	732-4614
Profinity GST Resin	—	732-4620	732-4622	732-4624
DEAE Affi-Gel Blue Media	—	—	732-4632	732-4634
Affi-Gel Blue Media	—	—	732-4642	732-4644
CHT Type I, 40 µm Media	—	—	732-4322	732-4324
CHT Type II, 40 µm Media	—	—	732-4332	732-4334
CFT Type II Media	—	—	732-4405	732-4406

Description	Pack of 1	Pack of 5
Bio-Gel P-6 Media, 10 ml	—	732-5304
Bio-Gel P-6 Media, 50 ml	732-5312	732-5314

Catalog #	Description
Bio-Scale Mini Cartridge Kits	
732-4407	**Bio-Scale Mini Apatite Purification Cartridge Kit**, includes one each, 5 ml prepacked CFT ceramic fluoroapatite Type II, 40 µm, and CHT ceramic hydroxyapatite Type I, 40 µm, multimodal chromatography media cartridges
732-4408	**Bio-Scale Mini mAb Purification Kit**, UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I, 40 µm, cartridge, 1 x 5 ml each
Adaptor Fittings	
732-0111	**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
732-0112	**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
732-0113	**Luer to BioLogic System Fittings Kit**, includes 1/4-28 female-to-male luer and 1/4-28 female-to-female luer to connect 1 cartridge to a BioLogic DuoFlow system

Bio-Scale™ Mini Cartridge Protein Purification Sampler Packs

Protein purification sampler packs offer a quick way to experiment with separation techniques when the protein to be purified has not yet been characterized. The Bio-Scale Mini ion exchange sampler pack includes a 1 ml UNOsphere™ Q cartridge, 1 ml UNOsphere S cartridge, 1 ml Macro-Prep® Q cartridge, 1 ml Macro-Prep S cartridge, and 1 ml Macro-Prep DEAE cartridge.

The Bio-Scale Mini affinity sampler pack includes a 1 ml IMAC cartridge, 1 ml GST cartridge, 1 ml Affi-Prep® protein A cartridge, 5 ml DEAE Affi-Gel® Blue cartridge, and 5 ml Affi-Gel Blue cartridge. For a complete chart of all cartridges, see page 66.

For More Information
Web: www.bio-rad.com/mediasampling

Ordering Information

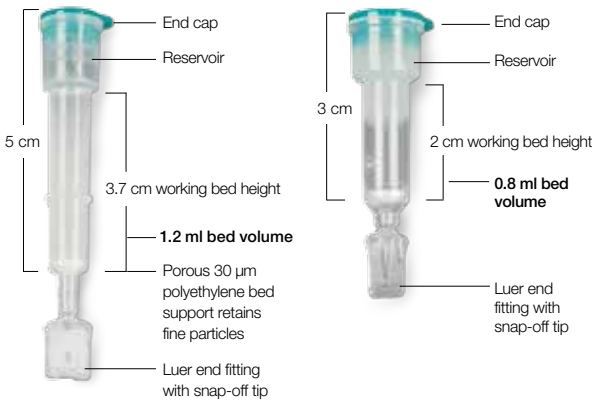
Catalog #	Description
732-4650	**Bio-Scale Mini Ion Exchange Sampler Pack**, includes one each UNOsphere Q, UNOsphere S, Macro-Prep Q, Macro-Prep S, Macro-Prep DEAE 1 ml cartridges
732-4651	**Bio-Scale Mini Affinity Sampler Pack**, includes one each IMAC, GST, Affi-Prep protein A 1 ml cartridges, and one each DEAE Affi-Gel Blue and Affi-Gel Blue 5 ml cartridges
Adaptor Fittings	
732-0111	**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
732-0112	**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system

Bio-Spin® and Micro Bio-Spin™ Columns

Bio-Spin 6 and Micro Bio-Spin 6 columns are ideal for desalting protein samples quickly using size exclusion chromatography. Filled with Bio-Gel® P-6 or P-30 media, these columns are shipped fully hydrated in Tris buffer and are ready to use. These products effectively clean up and remove salts, nucleotides, dye terminators, and small molecules from protein, RNA, and DNA samples in just 10 minutes. The columns are autoclavable.

- Provide fast salt and contaminant removal in an easy-to-use spin-column format
- Remove compounds <6 kD by size exclusion chromatography
- Accommodate up to 100 µl of sample

For More Information
Web: www.bio-rad.com/biospin



Bio-Spin Column Selection Guide

	Bio-Spin 6	Micro Bio-Spin 6	Bio-Spin 30	Micro Bio-Spin 30
Equilibration buffer	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*
Applications	Desalting and buffer exchange	Desalting and buffer exchange	Desalting; nucleotide and small molecule removal	DNA sequencing reaction mixtures (Tris) and small molecule removal
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs
MW exclusion limit, globular proteins	6,000	6,000	40,000	40,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0

Ordering Information

Catalog #	Description
732-6227	**Bio-Spin 6 Columns**, 25
732-6228	**Bio-Spin 6 Columns**, 100
732-6221	**Micro Bio-Spin 6 Columns**, 25
732-6222	**Micro Bio-Spin 6 Columns**, 100
732-6225	**Micro Bio-Spin 6 Columns**, 1,000
732-6006	**Bio-Spin 30 Columns**, 25
732-6216	**Bio-Spin 30 Columns**, 1,000
732-6202	**Micro Bio-Spin 30 Columns**, 25
732-6203	**Micro Bio-Spin 30 Columns**, 100
732-6206	**Micro Bio-Spin 30 Columns**, 1,000

Go to **www.bio-rad.com/cartridges** for current information on prepacked cartridges.

Mini Bio-Spin Columns

Mini Bio-Spin columns are available with 0.6 ml prepacked media for both affinity-tagged purification and protein enrichment applications and contain the following media:

- **Profinity eXact™ media** — for affinity-tagged purification and on-column cleavage; see page 48
- **ProteoMiner™ beads** — for protein enrichment of low-abundance proteins from biological samples; see pages 6–7



For More Information
Web: www.bio-rad.com/minibiospin
Request or download bulletins: Profinity eXact fusion-tag system — 5725, 5742, and 5766; ProteoMiner beads — 3096 and 5635

Ordering Information

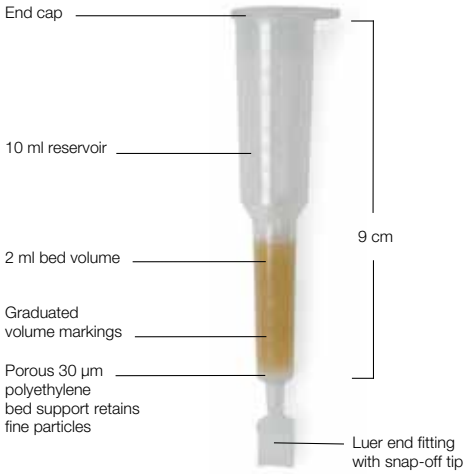
Catalog #	Description
156-3007*	**Profinity eXact Mini Spin Columns**, includes 10 (0.6 ml) spin columns, 2 ml capped tubes (10), and 2 ml capless tubes (10)

* For ProteoMiner mini spin columns, see page 7.

Poly-Prep® Ion Exchange Columns

Poly-Prep prepacked columns for gravity-flow chromatography provide convenience for sample preparation and other small-scale applications. The graduated polypropylene columns hold a standard bed volume of 2 ml of AG® ion exchange resin and include an integral 10 ml reservoir. A Poly-Prep stack cap, which allows connection to pumps, reservoirs, or columns in series, is also available.

For More Information
Web: www.bio-rad.com/polyprep



Ordering Information

Catalog #	Description	Particle Size, µm	Ionic Form	Application
731-6211	**Poly-Prep Columns**, AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
731-6212	**Poly-Prep Columns**, AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution random separations
731-6221	**Poly-Prep Columns**, AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as nucleotides, peptides, and carboxylic acids
731-6213	**Poly-Prep Columns**, AG 50W-X8 resin, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
731-6214	**Poly-Prep Columns**, AG 50W-X8 resin, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution random separations
731-1555	**Poly-Prep Column Stack Cap**, 50			Allows connection of pumps, reservoirs, or columns in series

Bio-Scale™ CHT™ Type I Columns

Bio-Scale CHT Type I columns are packed with CHT ceramic hydroxyapatite, Type I 10 µm media, which has high affinity for basic proteins and lower affinity for acidic proteins. These prepacked columns allow rapid, reproducible high-resolution separations for analytical to semipreparative medium-pressure applications. These columns are ideal for use with any medium- to high-pressure chromatography system. Available bed volumes are 2, 5, 10, and 20 ml.

Bio-Scale CHT Type I Column Top-Off Support Kit

If the top of the column bed becomes fouled and the usual hygiene steps do not restore performance, a few milliliters of the bed can be removed and replaced with fresh support. The Bio-Scale CHT Type I column top-off support kit contains 1 ml support, frits, and distribution screens for each column diameter.



For More Information
Web: www.bio-rad.com/bioscaleCHT

See Also

Bio-Scale replacement parts: page 83.
BioLogic DuoFlow systems: pages 95–105.
CHT ceramic hydroxyapatite: page 44.
Bio-Scale Mini cartridges: page 70.

See Also

UNOsphere ion exchange media: pages 35–36.

BioLogic DuoFlow systems: pages 95–105.

UNO® Monolith Ion Exchange Columns

UNO monolith ion exchange columns contain a patented* continuous-bed matrix, allowing biomolecule separations at high flow rates without sacrificing resolution or capacity.

UNO columns run at low backpressures on the BioLogic DuoFlow™ system or any other medium- to high-pressure chromatography system. A 1 ml UNO column can complete a high-resolution separation in about 3 minutes. UNO columns are also available in 6 and 12 ml sizes.

The unique homogeneous UNO matrix:

- Provides large pore diameters, especially suited for purifying larger proteins, DNA, and virus
- Has high capacity, even at high flow rates, due to the dense network of nodules that contain the ionic functional groups. These groups are completely accessible to biomolecules via the interconnecting channels
- Has the highest quality and batch-to-batch reproducibility
- Prevents fragmentation so columns last longer
- Is stable from pH 2–12
- Is available for strong anion (Q) and strong cation (S) exchange

UNO replacement columns — UNO replacement columns provide a simple bed replacement as an alternative to purchasing a new column.

* U.S. patent 6,423,666.



UNO glass columns — UNO glass columns provide high-resolution separation of biomolecules. The transparent glass tube allows easy bed inspection and column troubleshooting. Three column sizes provide flexibility for purification protocols.

UNO polishing PEEK columns — UNO polishing columns, 0.16 ml, are a late-stage purification tool to obtain the highest resolution and recovery from small sample loads. They allow you to purify and concentrate dilute samples in one step.

For More Information
Web: www.bio-rad.com/unomonolith

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Max. Protein Load, mg/column	Recommended Flow Rate, ml/min	Column Dimensions (W x L), mm	Max. Operating Pressure psi	MPa	bar
720-0001	**UNO Q1 Column**	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0003	**UNO Q6 Column**	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0005	**UNO Q12 Column**	12	180	0.5–8.0	15 x 68	700	4.5	48
720-0021	**UNO S1 Column**	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0023	**UNO S6 Column**	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0025	**UNO S12 Column**	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Replacement Columns								
720-0011	**UNO Q1R Column**	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0013	**UNO Q6R Column**	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0015	**UNO Q12R Column**	12	180	0.5–8.0	15 x 68	700	4.5	48
720-0031	**UNO SR1 Column**	1.3	20	0.5–5.0	7 x 35	700	4.5	48
720-0033	**UNO S6R Column**	6	90	0.5–8.0	12 x 53	700	4.5	48
720-0035	**UNO S12R Column**	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Polishing PEEK Column								
720-0009	**UNO Q Polishing Column**	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14
720-0029	**UNO S Polishing Column**	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14

Catalog #	Description
Fittings	
750-0554	**1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring, 10 sets
750-0568	**UNO 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system
750-0567	**UNO M6 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system

Aminex® HPLC Columns

Aminex HPLC columns are packed with a polystyrene divinylbenzene resin. Aminex media have high pressure stability, wide pH stability, and high column efficiency and selectivity. Aminex HPLC columns separate compounds using the ion-moderated partition chromatography technique. Aminex columns are often used in the food, beverage, and biofuel industries. Aminex columns are an industry standard for the analysis of carbohydrates, organic acids, organic bases, and other small organic molecules including peptides and nucleic acids.
To separate complex mixtures with Aminex columns, simple isocratic mobile phases (often just water) and precise temperature control are used.



For More Information
Web: www.bio-rad.com/aminex
Request or download bulletin: 1928

See Also
Organic acid standard: page 64.
Carbohydrate standard: page 64.

Ordering Information

Catalog #	Description	Guard Column*	Applications	Particle Size, µm	Ionic Form	Cross-linkage %	pH Range
Carbohydrate Analysis Columns							
125-0143	**Aminex HPX-87N Column**, 300 x 7.8 mm	125-0508	Beet sugars	9	Sodium	8	5–9
125-0142	**Aminex HPX-87K Column**, 300 x 7.8 mm	125-0507	Molasses, corn syrup	9	Potassium	8	5–9
125-0095	**Aminex HPX-87C Column**, 300 x 7.8 mm	125-0128 or 125-0503	High fructose corn syrup	9	Calcium	8	5–9
125-0094	**Aminex HPX-87C Column**, 250 x 4.0 mm	125-0128 or 125-0503	Sugar alcohols (USP)	9	Calcium	8	5–9
125-0098	**Aminex HPX-87P Column**, 300 x 7.8 mm	125-0119 or 125-0118	Pentose sugars, cellulose hydrolysates, biofuels	9	Lead	8	5–9
125-0140	**Aminex HPX-87H Column**, 300 x 7.8 mm	125-0129 or 125-0502	Sugars with organic acids, biofuels	9	Hydrogen	8	1–3
125-0096	**Aminex HPX-42C Column**, 300 x 7.8 mm	125-0128 or 125-0503	Oligosaccharides, thickening agents	25	Calcium	4	5–9
125-0097	**Aminex HPX-42A Column**, 300 x 7.8 mm	125-0118	Oligosaccharides to D-11, biofuels	25	Silver	4	6–8
125-0105	**Fast Carbohydrate Column**, 100 x 7.8 mm	125-0119 or 125-0118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9

Catalog #	Description	Guard Column*	Applications	Particle Size, µm	Ionic Form	Cross-linkage %	pH Range
Organic Acid and Alcohol Columns							
125-0140	**Aminex HPX-87H Column**, 300 x 7.8 mm	125-0129 or 125-0502	Sugars with organic acids, fermentation monitoring, biofuels	9	Hydrogen	8	1–3
125-0100	**Fast Acid Analysis Column**, 100 x 7.8 mm	125-0129 or 125-0502	Alcohol, glycol, organic acid analysis	9	Hydrogen	8	1–3
125-0115	**Fermentation Monitoring Column**, 150 x 7.8 mm	125-0129 or 125-0502	Sugar, acids, alcohols	9	Hydrogen	8	1–3
Application Kits for Food Analysis**							
125-0233	**Carbohydrate Analysis Kit**	Included	Carbohydrates	9	Calcium	8	5–9
125-0234	**Organic Acid Analysis Kit**	Included	Organic acids	9	Hydrogen	8	1–3

continues

Ordering Information

Catalog #	Description	Guard Column For	Ionic Form	pH Range
Micro-Guard Cartridges				
125-0118***	**De-Ashing Refill Cartridges**, 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	H^+ and CO_3^-	6–8
125-0119	**Carbo-P Refill Cartridges**, 30 x 4.6 mm, 2	Aminex HPX-87P column	Lead	5–9
125-0128	**Carbo-C Refill Cartridges**, 30 x 4.6 mm, 2	Aminex calcium-form columns	Calcium	5–9
125-0129	**Cation H Refill Cartridges**, 30 x 4.6 mm, 2	Aminex hydrogen-form columns	Hydrogen	1–3
125-0502†	**IG Cation H Cartridges**, 30 x 4.6 mm, 2	Aminex hydrogen-form columns	Hydrogen	1–3
125-0503†	**IG Carbo-C Cartridges**, 30 x 4.6 mm, 2	Aminex calcium-form columns	Calcium	5–9
125-0506	**Anion CO_3^- Cartridges**, 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	CO_3^-	—
125-0507	**Cation K^+ Cartridges**, 30 x 4.6 mm, 2	Aminex HPX-87K column	Potassium	5–9
125-0508	**Cation Na^+ Cartridges**, 30 x 4.6 mm, 2	Aminex HPX-87N column	Sodium	5–9
Cartridge Holders and Accessories				
125-0131	**Standard Cartridge Holder**, for one 30 x 4.6 mm cartridge			
125-0147	**Cartridge Holder Seal Replacement Kit**, for #125-0131			
125-0148	**Cartridge Holder Seals**, for #125-0131			
125-0139	**De-Ashing Cartridge Holder**, for #125-0118, holds two 3.0 x 4.6 mm cartridges in series			

* Supplied as 2 guard columns.

** Includes 1 column and 2 Micro-Guard cartridges; requires standard cartridge holder, catalog #125-0131.

*** Requires de-ashing cartridge holder, #125-0139.

† IG = industrial grade; larger particle size.

See Also

Affi-Gel protein A MAPS II kit: page 54.

Affi-Gel protein A media: page 54.

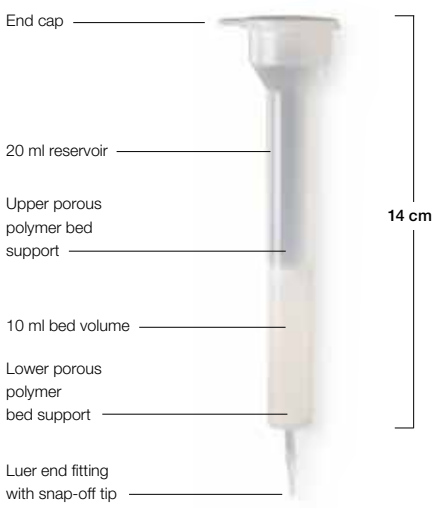
DEAE Affi-Gel Blue media: page 55.

Econo-Pac® Affinity and Desalting Columns

Econo-Pac prepacked columns for gravity-flow chromatography allow fast and easy desalting as well as simplified antibody purification.

Econo-Pac protein A columns are well suited for binding of IgGs, especially from mammalian species. Econo-Pac columns with DEAE Affi-Gel® Blue, an affinity/anion exchange chromatography media, are well suited for obtaining highly pure IgG from a variety of species from serum samples. The Econo-Pac 10DG media, with a molecular exclusion limit of 6,000, is recommended specifically for desalting and buffer exchange.

The prepacked Econo-Pac columns include an upper frit, a snap-off end tip, graduated column markings, a 10 ml bed, and 30 ml total column volume. To improve column performance, use a flow adaptor, see pages 81–82. For bottled size exclusion media, see pages 60–62; for bottled affinity media, see pages 47–57; and for activated affinity media, see pages 58–59.



Ordering Information

Catalog #	Description
732-2022	**Econo-Pac Protein A Columns**, prefilled with Affi-Gel protein A media, 5
732-2020	**Econo-Pac Protein A Kit**, 1 x 2 ml Affi-Gel protein A column, 1 x 10 ml 10DG column, buffers
732-2026	**Econo-Pac Serum IgG Purification Column**, prefilled with DEAE Affi-Gel Blue gel, 5
732-2027	**Econo-Pac Serum IgG Purification Kit**, 5 x 5 ml DEAE Affi-Gel Blue columns, 5 x 10 ml 10DG columns, buffers
732-2010	**Econo-Pac 10DG Desalting Columns**, 30
738-0019	**Econo-Pac Flow Adaptor**, 1.5 cm column ID

Empty Columns

Bio-Rad's empty columns accommodate a range of chromatography needs, including spin columns, low-pressure columns with optional flow adaptors and jackets for temperature control, and analytical columns for medium- or high-pressure systems.

Bio-Spin®, Micro Bio-Spin™, and Mini Bio-Spin Columns

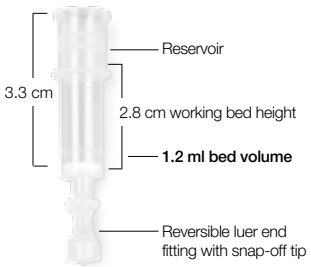
See Also
Prepacked Bio-Spin, Micro Bio-Spin, and Mini Bio-Spin columns: pages 71–72.

Empty Bio-Spin and Micro Bio-Spin chromatography columns are disposable polypropylene spin columns that can be packed with a variety of chromatographic media. Bio-Spin columns hold up to 1.2 ml of any media and fit in standard swinging bucket centrifuges; Micro Bio-Spin and Mini Bio-Spin columns hold up to 0.8 and 1.2 ml of media respectively, and fit in standard microfuges. All three columns fit standard collection tubes, have snap-off tips and polyethylene bed supports, and are autoclavable.

For More Information
Web: www.bio-rad.com/spincolumns
Request or download bulletin: 2289



Micro Bio-Spin Column



Mini Bio-Spin Column



Bio-Spin Column

Ordering Information

Catalog #	Description
732-6008	**Bio-Spin Chromatography Columns**, empty, 100
732-6025	**Bio-Spin Chromatography Columns**, empty, 1,000
732-6204	**Micro Bio-Spin Chromatography Columns**, empty, 100
732-6207	**Mini Bio-Spin Chromatography Columns**, empty, 100
731-1660	**End Caps**, for Micro Bio-Spin chromatography columns, 1,000

See Also
Prepacked Econo-Pac columns: page 76.

Econo-Pac® Columns

Econo-Pac columns are 14 cm high, 1.5 x 12 cm polypropylene columns that may be fitted with a flow adaptor (see pages 81–82) or used for gravity-flow chromatography. When used for open column work, a special upper bed support prevents the bed from running dry. Bed volumes from 1–20 ml are acceptable. These columns can be autoclaved and will retain fine particles. Columns can be easily stored in poly column racks.

For More Information
Web: www.bio-rad.com/econopaccolumns
Request or download bulletin: 2289





Ordering Information

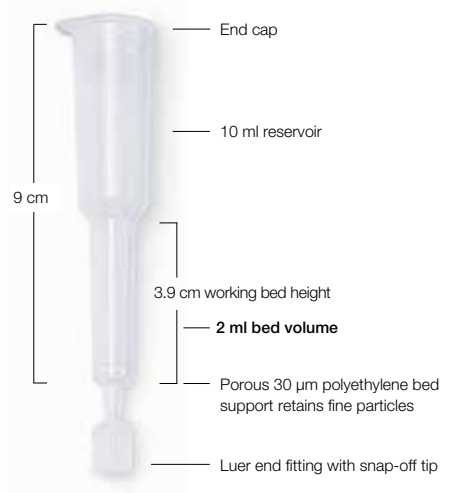
Catalog #	Description
732-1010	**Econo-Pac Chromatography Columns**, empty, includes upper bed supports, end caps, tip closures, 50
732-1011	**Econo-Pac Chromatography Columns**, empty, includes upper bed supports, end caps, tip closures, 500
Accessories	
738-0019	**Econo-Pac Flow Adaptor**, 1.5 cm column ID
731-7005	**Poly Column Rack**, 20-place, with removable tube rack
732-8102	**2-Way Stopcocks**, female-to-male luer, 10
731-8232	**Female Luer Plugs**, 25, polypropylene
731-1660	**End Caps**, for Econo-Pac columns, 1,000

See Also
Prepacked Poly-Prep columns: page 73.

Poly-Prep® Columns

Poly-Prep columns are 9 cm high, conical 0.8 x 4 cm polypropylene columns that hold up to 2 ml of chromatography media and 10 ml of eluent or sample in an integral reservoir. These columns are ideal for sample preparation and small-scale chromatography applications, including work with radioisotopes and other applications that require disposable products. Poly-Prep columns may be autoclaved and will retain fine particles.

For More Information
Web: www.bio-rad.com/polyprepcolumns
Request or download bulletin: 2289



Ordering Information

Catalog #	Description
731-1550	**Poly-Prep Chromatography Columns**, empty, includes end caps and tip closures, 50
731-1553	**Poly-Prep Chromatography Columns**, empty, includes end caps and tip closures, 1,000
Accessories	
731-1555	**Poly-Prep Column Stack Cap**, 50
731-7005	**Poly Column Rack**, 20-place, with removable tube rack
732-8102	**2-Way Stopcocks**, female-to-male luer, 10
731-8232	**Female Luer Plugs**, polypropylene, 25
731-1660	**End Caps**, for disposable plastic columns, 1,000

Glass Econo-Column® Columns

Econo-Column chromatography columns are the standard for high-quality, affordable low-pressure chromatography columns. Columns ranging from 5–170 cm in length and 0.5–5.0 cm in diameter are available. A porous polymer bed support at the bottom of the column retains fine particles and translucent polypropylene end fittings allow viewing of the entire column bed. Econo-Column chromatography columns can be autoclaved and are designed to operate at pressures <1 bar (14.7 psi). Econo-Column chromatography columns accept Econo-Column funnels as well as Econo-Column flow adaptors. Econo-Column chromatography columns are packaged in quantities of 1, 2, and 4, depending on column diameter and length. For convenience, all packaging sizes contain one stopcock per column ordered.





For More Information
Web: www.bio-rad.com/econocolumns
Request or download bulletin: 2289

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm^2	Maximum Volume, ml	Columns/ Pkg
737-0507	0.5	5	0.20	1	2
737-0512	0.5	10	0.20	2	2
737-0517	0.5	15	0.20	3	2
737-0522	0.5	20	0.20	4	2
737-0707	0.7	5	0.39	2	2
737-0712	0.7	10	0.39	4	2
737-0717	0.7	15	0.39	6	2
737-0722	0.7	20	0.39	8	2
737-0732	0.7	30	0.39	12	2
737-0752	0.7	50	0.39	20	2
737-4506	0.5	5	0.20	1	4
737-4511	0.5	10	0.20	2	4
737-4516	0.5	15	0.20	3	4
737-4521	0.5	20	0.20	4	4
737-4706	0.7	5	0.39	2	4
737-4711	0.7	10	0.39	4	4
737-4716	0.7	15	0.39	6	4
737-4721	0.7	20	0.39	8	4
737-4731	0.7	30	0.39	12	4
737-4751	0.7	50	0.39	20	4
737-4006	1.0	5	0.79	4	4
737-1007	1.0	5	0.79	4	2
737-4011	1.0	10	0.79	8	4
737-1012	1.0	10	0.79	8	2
737-4021	1.0	20	0.79	16	4
737-1022	1.0	20	0.79	16	2
737-4031	1.0	30	0.79	24	4
737-1032	1.0	30	0.79	24	2
737-4051	1.0	50	0.79	40	4
737-1052	1.0	50	0.79	40	2
737-1091	1.0	100	0.79	79	2
737-1093	1.0	120	0.79	103	2
737-4150	1.5	5	1.77	9	4
737-1507	1.5	5	1.77	9	2
737-4151	1.5	10	1.77	18	4
737-1512	1.5	10	1.77	18	2
737-4156	1.5	15	1.77	27	4
737-1517	1.5	15	1.77	27	2
737-4152	1.5	20	1.77	35	4
737-1522	1.5	20	1.77	35	2
737-4153	1.5	30	1.77	53	4
737-1532	1.5	30	1.77	53	2
737-4155	1.5	50	1.77	89	4
737-1552	1.5	50	1.77	89	2
737-1576	1.5	75	1.77	124	2
737-1591	1.5	100	1.77	177	2
737-1593	1.5	120	1.77	230	2
737-1598	1.5	170	1.77	301	2
737-4250	2.5	5	4.91	25	4
737-2507	2.5	5	4.91	25	2
737-4251	2.5	10	4.91	49	4
737-2512	2.5	10	4.91	49	2
737-4252	2.5	20	4.91	98	4
737-2522	2.5	20	4.91	98	2
737-4253	2.5	30	4.91	147	4
737-2532	2.5	30	4.91	147	2
737-2551	2.5	50	4.91	246	2
737-2576	2.5	75	4.91	344	2
737-2591	2.5	100	4.91	491	2

continues

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm^2	Maximum Volume, ml	Columns/ Pkg
737-2593	2.5	120	4.91	589	2
737-5011	5.0	10	19.63	196	1
737-5021	5.0	20	19.63	393	1
737-5031	5.0	30	19.63	589	1
737-5051	5.0	50	19.63	982	1
737-5071	5.0	70	19.63	1,374	1

Catalog #	Description
Econo-Column Selection Packs	
737-6601	**Econo-Column Selection Pack A**, includes 7 columns, 1 each of 0.7 x 10, 20, and 30 cm; 1.5 x 30 and 50 cm; 2.5 x 20 and 50 cm
737-6607	**Econo-Column Selection Pack B**, includes 6 columns, 1 each of 1.0 x 20, 30, and 50 cm; 1.5 x 20, 30, and 50 cm

For fittings, see low-pressure fittings on page 114.

Jacketed Econo-Column® Columns

Jacketed Econo-Column chromatography columns have an integral water jacket and are ideal for applications that require temperature control such as thermal chromatography of DNA using hydroxyapatite. A porous polymer bed support at the bottom of the column retains fine particles and translucent polypropylene end fittings allow viewing of the entire column bed. Jacketed Econo-Column chromatography columns accept Econo-Column funnels and flow adaptors.



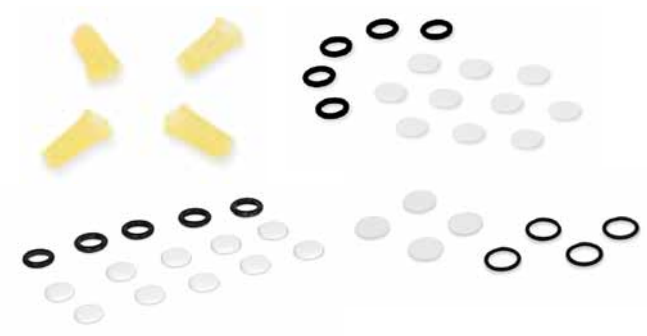
Ordering Information

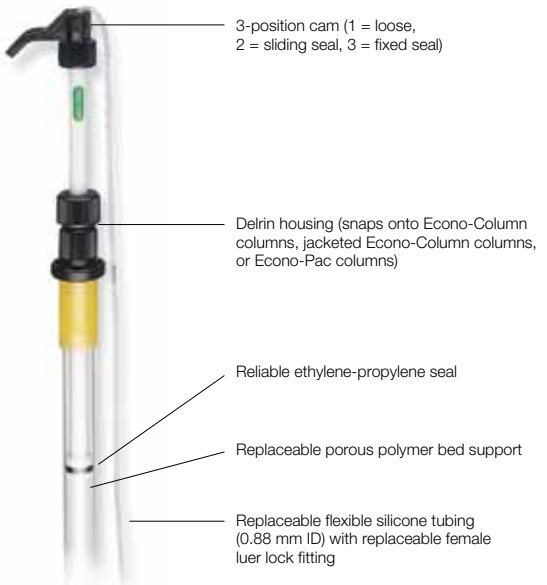
Catalog #	Description	ID, cm	Length, cm	Cross-Sectional Area, cm^2	Maximum Volume, ml	Columns/ Pkg
737-6108	**Econo-Column Jacketed Column**	0.7	15	0.37	6	1
737-6116	**Econo-Column Jacketed Column**	1.0	15	0.79	12	1
737-6131	**Econo-Column Jacketed Column**	1.0	30	0.79	25	1
737-6151	**Econo-Column Jacketed Column**	1.5	50	1.77	89	1
737-6201	**Econo-Column Open-Ended Jacketed Column**	1.0	30	0.79	25	1

Econo-Column® Flow Adaptors

Flow adaptors significantly improve column performance by eliminating head space above the gel bed and by protecting the column bed from disruption during sample loading. Flow adaptors improve resolution by delivering buffer and sample directly to the top of the column bed. Flow adaptors are recommended for use with any low-pressure column connected to pumps, the BioLogic™ LP system, or other low-pressure systems.

Econo-Column flow adaptors are available for 1.0, 1.5, 2.5, and 5.0 cm ID Econo-Column chromatography columns (pages 79–81), jacketed Econo-Column chromatography columns (above), and Econo-Pac® columns (page 78). Due to wear and tear of bed supports and O-rings, maintenance kits are available for standard upkeep of flow adaptors.





For More Information
Web: www.bio-rad.com/econocolumnaccessories
Request or download bulletin: 2289

Ordering Information

Catalog #	Description
Flow Adaptors	
738-0014	**Flow Adaptor**, 1.0 cm column ID, 1–7 cm functional length
738-0015	**Flow Adaptor**, 1.0 cm column ID, 1–14 cm functional length
738-0016	**Flow Adaptor**, 1.5 cm column ID, 1–14 cm functional length
738-0017	**Flow Adaptor**, 2.5 cm column ID, 1–14 cm functional length
738-0018	**Flow Adaptor**, 5.0 cm column ID, 1–14 cm functional length (does not include cam mechanism)
738-0019	**Econo-Pac Flow Adaptor**, 1.5 cm column ID
Flow Adaptor Maintenance Kits	
738-0022	**Flow Adaptor Maintenance Kit**, for 5.0 cm flow adaptor, includes 2 bed supports and 2 O-rings
738-0024	**Flow Adaptor Maintenance Kit**, for 1.0 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
738-0025	**Flow Adaptor Maintenance Kit**, for 1.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
738-0027	**Flow Adaptor Maintenance Kit**, for 2.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings

Econo-Column® Funnel

The Econo-Column funnel, constructed of durable polypropylene, is ideal for packing columns, loading diluted samples, or delivering large volumes of buffer. It forms a tight seal with Econo-Column chromatography columns up to 2.5 cm ID (pages 79–81), jacketed Econo-Column chromatography columns (page 81), Poly-Prep® columns (pages 78–79), and Econo-Pac® columns (page 78).



Ordering Information

Catalog #	Description
731-0003	**Econo-Column Funnels**, 250 ml, 5

Glass Econo-Column® Reservoirs

Reservoirs are available in 500 ml and 1 L capacities and will fit 0.5, 0.7, 1.0, or 1.5 cm ID Econo-Column chromatography columns. To make a constant-pressure reservoir, close the reservoir top with a stopper that contains a piece of glass tubing extending into the reservoir. The removable upper cap has a male luer lock fitting.



Glass Econo-Column Reservoir

Ordering Information

Catalog #	Description
737-9112	**Econo-Column Reservoir**, 500 ml
737-9113	**Econo-Column Reservoir**, 1 L

Bio-Scale™ MT High-Resolution Columns

Bio-Scale MT empty columns can be packed with the media of your choice. These columns provide extremely high resolution in most chromatography applications. Bio-Scale MT columns allow precise sample application and provide the low dead volume required for high-resolution separations. The four column sizes (2, 5, 10, and 20 ml) allow easy scale-up of separation and purification protocols. The optimized design allows easy packing, bed height adjustment, sample application, and equilibration. Bio-Scale MT columns are convenient for use with BioLogic™ systems or any medium- or high-pressure chromatography system.

For More Information
Web: www.bio-rad.com/MTcolumns
Request or download bulletin: 1970



Ordering Information

Catalog #	Description	Column Volume, ml	Pressure Limit, psi
Bio-Scale Columns*			
751-0081	**Bio-Scale MT2 Column**, 7 x 52 mm	1.9–2.3	1,000
751-0083	**Bio-Scale MT5 Column**, 10 x 64 mm	4.6–5.7	750
751-0085	**Bio-Scale MT10 Column**, 12 x 88 mm	9.5–11.3	600
751-0087	**Bio-Scale MT20 Column**, 15 x 113 mm	19.4–21.9	500

Catalog #	Description
Kits and Fittings	
751-0091	**Bio-Scale 2 Replacement Parts Kit**, includes 5 frits, 5 distribution screens, 2 O-rings, 1 frit remover
751-0093	**Bio-Scale 5 Replacement Parts Kit**
751-0095	**Bio-Scale 10 Replacement Parts Kit**
751-0097	**Bio-Scale 20 Replacement Parts Kit**
750-0554	**1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring, 10 sets
750-0567	**UNO M6 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system
750-0568	**UNO 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system

* Each Bio-Scale MT column comes with a Bio-Scale replacement parts kit.

See Also

Bio-Scale CHT columns: page 73.
UNO columns: page 74.
BioLogic DuoFlow systems: pages 94–105.
Bio-Scale Mini cartridges: page 70.

Medium-Pressure Chromatography Systems

New NGC™ Medium-Pressure Chromatography Systems

The NGC family of medium pressure preparative chromatography systems offers a single laboratory chromatography solution that aligns and scales to fit your purification, automation, and throughput requirements. NGC laboratory scale chromatography systems provide you with a fully customizable and truly modular platform that can be designed to your current purification needs and is upgradable to meet future throughput and automation requirements.

For More Information
Web: www.bio-rad.com/NGCsystems
Please contact your local Sales Representative for more details.

Learn More about the Technology
Web: www.bio-rad.com/tech/chrom



NGC Quest™ and NGC Scout™ Series

NGC Discover™ Series

NGC Discover Pro Series

NGC chromatography system platforms — modular, customizable, and upgradable systems that adapt and expand to your throughput and application needs. All NGC systems are compatible with the BioFrac™ fraction collector and the C-96 auto sampler.



BioFrac Fraction Collector
(see page 108)



C-96 Autosampler
(see page 106)

NGC Chromatography Systems Selection Guide

Product	Catalog #	NGC Quest 10 788-0001	NGC Quest 10 Plus 788-0003	NGC Quest 100 788-0002	NGC Quest 100 Plus 788-0004	NGC Scout 10 788-0005	NGC Scout 10 Plus 788-0007	NGC Scout 100 788-0006	NGC Scout 100 Plus 788-0008	NGC Discover 10 788-0009	NGC Discover 100 788-0010
NGC F10 pump module	788-4002	•	•			•	•			•	
NGC F100 pump module	788-4003			•	•			•	•		•
NGC mixer module	788-4018	•	•	•	•	•	•	•	•	•	•
NGC sample inject valve module	788-4007	•	•	•	•	•	•	•	•	•	•
NGC single wavelength detector module	788-4008	•		•		•		•			
NGC multi-wavelength detector module	788-4009		•		•		•		•	•	•
NGC buffer blending valve module	788-4010					•	•	•	•	•	•
NGC pH valve module (includes pH probe)	788-4011					•	•	•	•	•	•
NGC sample pump module	788-4004									•	•
NGC inlet valve module	788-4006									•	•
NGC column switching valve module, 10 ml	788-4012									•	
NGC column switching valve module, 100 ml	788-4026										•
ChromLab™ software	788-6000	•	•	•	•	•	•	•	•	•	•

Note: All NGC systems include a touch screen, conductivity detector, and are compatible with the BioFrac fraction collector and C-96 autosampler.

Features and Benefits

Flexible, customizable chromatography systems to suit both your application and research needs.

- Adjustable and scalable platform for individual application, workflow, and throughput requirements
- Plug-and-play modules enable a modular, customizable system that adapts to changing needs over time
- ChromLab™ software provides powerful, graphical instrument control, streamlined method development, and intuitive data analysis
- Graphical fluidics scheme selector matches the flow path to applications-based system setup
- Point-to-Plumb™ lighting provides step-by-step LED guided setup for easy system plumbing
- Real-time flow path display for direct control of buffer, sample and valve position, display of active flow path, and easy identification of system status
- Real-time module status displays for immediate system diagnostics
- Pre-plumbed systems with QC-validated performance for more reproducible results and sharper peaks (included with all preconfigured NGC Quest, NGC Scout, and NGC Discover systems)
- Tier-Rotate™ system design enables optimal placement of valves and detectors to minimize hold-up volume
- Open platform that is compatible with all medium pressure chromatography columns and media
- BioFrac fraction collector compatibility for fraction collection from analytical to preparative scale purifications
- Compact footprint — fits on lab bench, deli-fridge, or coldroom

For more information about these features and benefits, please contact your local sales representative. Take a tour of the system at **www.bio-rad.com/NGCsystems**.

Applications and Uses of Medium Pressure Chromatography Systems

Preparative to analytical scale isolation, purification, and analysis of multiple types of molecules, including:

- Recombinant protein purification and refolding
- Monoclonal antibody purification
- Virus removal preparations
- Analysis of plasma proteins for disease diagnosis
- Nucleic acid purifications

NGC™ Systems

Preconfigured NGC systems are designed with increasing automation and throughput in mind. All NGC systems include either a 10 or a 100 ml/min automated dual gradient pump, a mixer module, a sample injection valve module, and a detector with a conductivity monitor. Each preconfigured system can be further customized with additional modules to meet your specific purification needs.

NGC Quest™ and NGC Quest Plus

NGC Quest systems are designed for the all-purpose purification of proteins with automated pumps that provide accurate gradients for high-resolution separations. These systems support automated sample injection using fixed or dynamic sample loops.

NGC Quest 10 and Quest 100 systems feature:

- LED-based single-wavelength light source for the detection of proteins or nucleic acids (255 or 280 nm) with high accuracy and conductivity measurements

NGC Quest 10 Plus and Quest 100 Plus systems feature:

- Multi-wavelength (4) detector for simultaneous detection (190 or 800 nm) of proteins, peptides, nucleic acids, chromaphores, and other biomolecular complexes with high accuracy and conductivity measurements

NGC Scout™ and NGC Scout Plus

NGC Scout systems are designed for method optimization and medium-throughput needs with automated pumps that provide accurate gradients for high-resolution separations suitable for any application.

All NGC Scout systems include:

- All features of NGC Quest systems
- Buffer blending to automate buffer gradients for rapid scouting of purification parameters
- Gradient separations at different pH values for rapid method development

The NGC Scout 10 and 100 systems feature:

- Single-wavelength UV and conductivity detector

NGC Scout 10 Plus and Scout 100 Plus systems feature:

- Multi-wavelength (4) UV/Vis and conductivity detector

NGC Discover™

NGC Discover systems are designed for high-throughput needs and are highly automated. NGC Discover systems are optimal for method development, combining automated buffer blending with buffer inlets and sample pump for expanded scouting options and for the purification of proteins, peptides, and nucleic acids.

NGC Discover 10 and 100 systems include:

- All features of NGC Scout Plus systems
- Multi-wavelength (4) UV/Vis and conductivity detector
- Gradient separations at different pH values for rapid method development
- Automated buffer blending combined with buffer inlets and sample pumps for expanded scouting options
- Large sample volumes may be injected directly onto the column using the sample pump without having to replumb
- Column switching valve module connects up to 5 columns for convenient setup and switching between columns or for sequential column purifications
- Reverse flow capability (incorporated in the column switching valve module) for column cleaning and applications that require narrow band elution of fractions

Ordering Information

Catalog #	Description
NGC Medium-Pressure Chromatography Systems*	
788-0001	**NGC Quest 10 Chromatography System**, includes automated 10 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and automated sample injection
788-0003	**NGC Quest 10 Plus Chromatography System**, includes automated 10 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and automated sample injection
788-0002	**NGC Quest 100 Chromatography System**, includes automated 100 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and automated sample injection
788-0004	**NGC Quest 100 Plus Chromatography System**, includes automated 100 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and automated sample injection
788-0005	**NGC Scout 10 Chromatography System**, includes NGC Quest capability, 10 ml/min pumps, pH scouting, and automated gradient and buffer blending
788-0007	**NGC Scout 10 Plus Chromatography System**, includes NGC Quest capability, 10 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, pH scouting, and automated gradient and buffer blending
788-0006	**NGC Scout 100 Chromatography System**, includes NGC Quest capability, 100 ml/min pumps, pH scouting, and automated gradient and buffer blending
788-0008	**NGC Scout 100 Plus Chromatography System**, includes NGC Quest capability, 100 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, pH scouting, and automated gradient and buffer blending
788-0009	**NGC Discover 10 Chromatography System**, includes NGC Scout Plus capability, 10 ml/min pumps, large sample injection and column switching (up to 5 columns)
788-0010	**NGC Discover 100 Chromatography System**, includes NGC Scout Plus capability, 100 ml/min pumps, large sample injection, and column switching (up to 5 columns)

* All NGC systems include ChromLab Software.

Module Overview Description

The NGC family of medium-pressure chromatography systems offers flexible system configurations that enable upgrades and reconfiguration of the modules to fit multi-user needs, applications, and laboratory space requirements. All NGC systems can be individually customized using NGC Plug-and-Play modules that are user installable. Systems can be easily reconfigured and seamlessly upgraded with increased functionality such as higher flow rates (10 ml/min or 100 ml/min), sophisticated detection capabilities, pH monitoring, automated buffer selection, column scouting, and buffer blending.

NGC Buffer Blending Valve Module

The NGC buffer blending valve is used for automatic online buffer preparation and generation of pH gradients for quick pH scouting. When used in conjunction with the dual gradient pump system, the buffer blending valve enables automated elution gradients and highly accurate buffer blending for rapid scouting and method development. The valve can also double the flow rate of a salt gradient to 20 ml/min on an F10 pump and 200 ml/min on an F100 pump.



NGC Buffer Blending Valve Module

NGC Inlet Valve Module

The NGC inlet valve module allows for automatic buffer selection during method development and column regeneration. It speeds up method development by allowing for automatic selection of up to eight buffers and cleaning solution across multiple runs.



NGC Inlet Valve Module

NGC F10 and F100 System Pump Modules

The F10 and F100 pumps produce automated proportioned solutions. Flow rates on all pumps can be controlled to avoid overpressure. NGC instruments can have up to three high-precision pumps: two system gradient pumps (Pump A and Pump B) and one sample pump.

NGC Sample Pump 100 Module

The NGC sample pump 100 module enables both the injection of large sample volumes and accurate and consistent multiple loadings from a single sample stock. This dedicated pump eliminates the risk of contaminating system pumps, allowing for automated loading of large sample volumes directly to the column or through a sample loop. The sample pump also includes an integrated pressure sensor that protects the column and media from overpressure.

NGC Sample Inject Valve Module

The NGC sample inject valve enables the system to load a specific predetermined volume of sample onto a column with a maximum operating pressure of 3,650 psi. It is also compatible with capillary loops and sample pumps, eliminating the need to replumb.

NGC Single/Multi-Wavelength Detector Modules

The NGC single UV and multi-UV/Vis detector modules are combined with an integrated conductivity monitor to measure buffer conductivity and salt gradients.

The single-wavelength UV detector contains an LED UV lamp and monitors UV absorbance of proteins or nucleic acids at 255 or 280 nm, one wavelength at a time.

The multi-wavelength UV/Vis detector adds flexibility to the chromatography system, enabling the simultaneous monitoring of four wavelengths (UV and Vis) for greater sensitivity and detection of proteins, peptides, nucleic acids, and chromaphores such as hemoglobin.



NGC Sample Pump Module

Specifications for System and Sample Pump Modules

F10 Pump	
Flow rates	0.001–10 ml/min (normal range); 0.002–20 ml/min (column packing flow)
Pressure range	3,650 psi (252 bar, 25.2 MPa)
F100 Pump	
Flow rate setting	0.01–100 ml/min (normal range); 0.02–200 ml/min (column packing flow)
Pressure range	1,450 psi (100 bar, 10 MPa)
Sample Pump 100	
Flow rate	up to 100 ml/min
Pressure range	1,450 psi (10 MPa)



NGC Multi-Wavelength Detector Module

Specifications for Single/Multi-Wavelength Detector Modules

UV Monitor	
Single-wavelength range	255 or 280 nm
Multi-wavelength (up to 4) range	190–800 nm
Conductivity Monitor	
Conductivity range	0.01–999.99 mS/cm
Sensitivity	1 µS/cm–300 mS/cm (nominal volume 6 µl)

NGC pH Valve Module
The NGC pH valve module includes a pH electrode for accurate pH monitoring during the run (pH 0–14). The valve is capable of directing the flow to the pH electrode or bypassing the probe automatically. The valve includes an integrated calibration port, which can be used to calibrate the probe without disconnecting the probe from the system.

For sensitive applications, the software is capable of calculating and displaying temperature-compensated pH values for accuracy and ease of use.

NGC Mixer Module
The NGC mixer module homogenizes buffers from two system pumps (Pumps A and B). In addition to the mixer motor assembly, the module includes an integrated system pressure sensor. It can accommodate both F10 mixers (263 µl) and F100 mixers (750 µl). The mixer volume can be adjusted to achieve optimal buffer homogenization by inserting the appropriate size barrels.

NGC Air Sensor Module
The NGC air sensor module enables the detection of the end of buffer and sample, thereby protecting against air entering the system and damaging pumps or columns. The module supports up to four air sensors (large and small bore). The NGC air sensor extension module can be used in conjunction with the air sensor module (up to four) to enable four additional air sensors (totaling up to eight).

NGC Column Switching Valve Module
The NGC column switching valve allows connection of up to five columns, enabling quick and easy column scouting without replumbing. With an internal bypass mode this valve lets buffers bypass the connected columns when priming or cleaning the system. The valve can also reverse the flow, which is ideal for column cleaning and applications that require narrow band elution.

The column switching valve has integrated pressure sensors that measure pre-column and delta pressures. This protects the column and media from overpressure by triggering the pumps to stop or slow down.



NGC pH Valve Module



NGC Air Sensor Module

NGC Accessories
C-96 Autosampler
The C-96 autosampler enhances the NGC chromatography system by providing automated, accurate, and reproducible sample injections for optimal sample handling. Please refer to page 106 for detailed product information.

BioFrac Fraction Collector
The BioFrac fraction collector is compatible with all NGC chromatography systems. It is ideal for analytical to preparative scale chromatography applications. Please refer to page 108 for detailed product information.

Ordering Information

Catalog #	Description
NGC Medium-Pressure Chromatography System Modules and Accessories	
System Pumps	
788-4002	**NGC F10 Pump Module**, includes 10 ml/min system pump kit for creating buffer gradients; can be used in conjunction with buffer blending valve to generate flow rates up to 20 ml/min; kit includes necessary tubing and fittings
788-4003	**NGC F100 Pump Module**, includes 100 ml/min system pump kit for creating buffer gradients; can be used in conjunction with buffer blending valve to generate flow rates up to 200 ml/min; kit includes necessary tubing and fittings
Sample Pump	
788-4004	**NGC Sample Pump 100 Module**, includes 100 ml/min sample pump kit for automated large volume sample application via the sample inject valve; kit includes necessary tubing and fittings
Detectors	
788-4008	**NGC Single-Wavelength Detector Module**, for detection of nucleotides and proteins at 255 or 280 nm and generation of salt gradients; UV/conductivity detector kit includes necessary tubing and fittings
788-4009	**NGC Multi-Wavelength Detector Module**, for simultaneous (4) wavelength monitoring of elution fractions between 190–800 nm and generation of salt gradients; UV/Vis, conductivity detector kit includes necessary tubing, fittings
788-5024	**NGC UV Flow Cell, 5 mm**, UV flow cell, standard with all systems. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in both F10 and F100 systems
788-5023	**NGC UV Flow Cell, 10 mm**, analytical UV flow cell. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in F10 systems. Ideal for use at lower flow rates
788-5022	**NGC UV Flow Cell, 2 mm**, preparative UV flow cell. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in F100 systems. Ideal for use at high flow rates
750-0230	**Backpressure Regulator**, 40 psi, restricts flow and creates appropriate backpressure to prevent bubble spiking in UV detectors
Detector Lamp Replacements	
788-5000	**NGC LED Lamp Replacement**, includes 255/280 nm LED lamp replacement for single-wavelength detectors
788-5001	**NGC Deuterium Lamp Replacement**, includes lamp replacement (UV) for multi-wavelength detectors
788-5002	**NGC Tungsten Lamp Replacement**, includes lamp replacement (Vis) for multi-wavelength detectors
pH Valve	
788-4011	**NGC pH Valve Module**, for accurate online pH measurement; includes pH probe, tubing, and fittings
788-5026	**NGC pH Probe (Ag/AgCl)**, for use with the pH valve for accurate pH monitoring (pH 0–14) during purifications performed to 200 ml/min
788-5027	**NGC Blank pH Probe**, pH valve cap for use with the pH valve when the probe is removed
Mixer	
788-4018	**NGC Mixer Module**, for use with all NGC systems; additional mixer base or barrels (ordered separately) can be extended with 2, 5, and 12 ml barrels for efficient gradient mixing at higher flow rates
788-4019	**NGC F100 Mixer**, 750 µl base and top assembly, included with all 100 ml/min NGC systems
788-4020	**NGC F10 Mixer**, 263 µl base and top assembly, included with all 10 ml/min NGC systems
788-4021	**NGC F10 Mixer Barrel Kit**, 750 µl extension barrel for F10 263 µl mixer (part of Scout 10 and Discover 10 series)
788-4022	**NGC F10 Mixer Barrel Kit**, 2 ml extension barrel for F10 263 µl mixer (optional)
788-4028	**NGC F100 Mixer Barrel Kit**, 2 ml extension barrel for F100 750 µl mixer body, part of Scout 100, Discover 100 series
788-4024	**NGC F100 Mixer Barrel Kit**, 12 ml extension barrel for F100 750 µl mixer (optional)
788-4023	**NGC F100 Mixer Barrel Kit**, 5 ml extension barrel for F100 750 µl mixer (optional)
Valves	
788-4007	**NGC Sample Inject Valve Module**, for manual sample application of small volume samples via sample loops or large volume samples using a sample pump; kit includes necessary tubing, fittings, and sample injection port
788-4010	**NGC Buffer Blending Valve Module**, for online buffer preparation and generating pH gradients for quick pH scouting; kit includes the necessary tubing and fittings
788-4006	**NGC Inlet Valve Module**, for automated switching between multiple buffers and samples during method development, kit includes the necessary tubing and fittings
788-4012	**NGC Column Switching Valve Module, 10 ml**, for use with F10 systems and multiple columns for quick column scouting and reverse flow, holds 5 columns; kit includes the necessary tubing and fittings to accommodate the most common column types
788-4026	**NGC Column Switching Valve Module, 100 ml**, for use with F100 systems and multiple columns for quick column scouting and reverse flow, holds 5 columns; kit includes the necessary tubing and fittings to accommodate the most common column types

continues

Ordering Information

Catalog #	Description
Maintenance Kits	
788-5003	**Pump Maintenance Kit**, 10 ml, for regular maintenance of NGC F10 pumps, includes seals and check valves
788-5004	**Pump Maintenance Kit**, 100 ml, for regular maintenance of NGC F100 pumps, includes seals and check valves
788-5005	**F10 Pump Head Kit**, 10 ml, includes pumphead, pump pistons, pump seals; for replacement of NGC F10 pump heads
788-5006	**F100 Pump Head Kit**, 100 ml, includes pumphead, pump pistons, pump seals; for replacement of NGC F100 pump heads
Air Sensor	
788-5017	**NGC Air Sensor Module**, for detection of end of buffer and sample, protects against air entering pumps and columns, supports up to 4 air sensors (large and small bore); kit includes 2 large-bore air sensors
788-5018	**NGC Air Sensor Extension Module**, connects to the base air sensor module to support 4 additional air sensors (optional, does not include any air sensors)
788-5020	**NGC Air Sensor**, small, includes air sensor; enables exclusion of air from system and columns. Detects air in small-diameter PEEK tubing
788-5021	**NGC Air Sensor**, large, includes air sensor; enables exclusion of air from system and columns. Detects air in large-diameter PTFE tubing
788-5019	**NGC Air Sensor Extension Cable**, for placement of air sensors external to the air sensor module
Fraction Collector and Autosampler	
741-0002	**BioFrac Fraction Collector**, 100/240 V, fraction collector compatible with all NGC systems, includes power cord, rack set F1 (2 x flatpack, 13 mm), BioFrac diverter valve, fittings kit
788-4025	**NGC Communication Adaptor**, enables communication between Bio-Rad devices such as the BioFrac fraction collector and the NGC system
760-5011	**C-96 Autosampler**, 110/240 V, compatible with all NGC systems, includes standard 84+3 vial tray (1.5 and 10 ml), control cable set to connect with BioLogic DuoFlow system, 1 ml syringe, 2 ml sample loop; also includes #760-5014, #760-5026, and #760-0604
788-4016	**NGC Signal Import Module**, enables analog-to-digital signal conversion and connection to devices such as the C-96 autosampler, includes cable for connecting to NGC system (#788-5013)
NGC Accessories	
788-5038	**NGC Column Holder**, column holder for use with NGC systems, pkg of 1
788-5039	**NGC Cartridge Holder**, universal cartridge holder, holds 1–10 ml cartridges
788-5041	**NGC Sample/Wash Tube Holder**, holds two 50 ml falcon tubes, for use with NGC systems
788-5042	**NGC Tubing Retainers (small)**, holds small PEEK tubing in an organized manner, pkg of 3 magnetic retainers
788-5035	**NGC Tubing Retainers (large)**, holds larger PTFE tubing in an organized manner, pkg of 3 magnetic retainers
788-5031	**NGC Inline Filter Kit**, includes buffer inline filter kit, filters particulates from buffer and prevents clogging of columns
788-4017	**NGC Fittings Kit**, includes PEEK and Tefzel nuts, ferrules, unions, plugs, tubing cutter, fittings tightener and luer syringe, for use with NGC systems
Additional Options	
788-4000	**NGC Expansion Bay**, tier 3, expands base system to 3-tier system for use with additional modules
788-5014	**NGC Buffer Tray**, holds up to 8 buffer bottles. Includes drain port to prevent flooding in the event of a leak
788-5016	**NGC Drip Tray**, for use with NGC systems
788-5040	**NGC Touch Screen Stand**, used to mount touch screen outside of cold box or room while tethered to the system, enables convenient system operation from the outside
788-4015	**Computer**, for use with NGC systems, includes Intel Core i7 3.4 GHz (Quad-Core), 4 GB RAM, 1 x 250 GB hard drive, CD/DVD drive, Microsoft Windows 7 Professional 64-bit Edition
788-4027	**Monitor**, 22", for use with NGC system computer
788-7000	**NGC IQ/OQ**, IQ service verifies that the NGC chromatography system is properly installed. OQ service tests the performance of the installed system and provides a record that confirms critical functions and safety features

NGC™ ChromLab™ Software

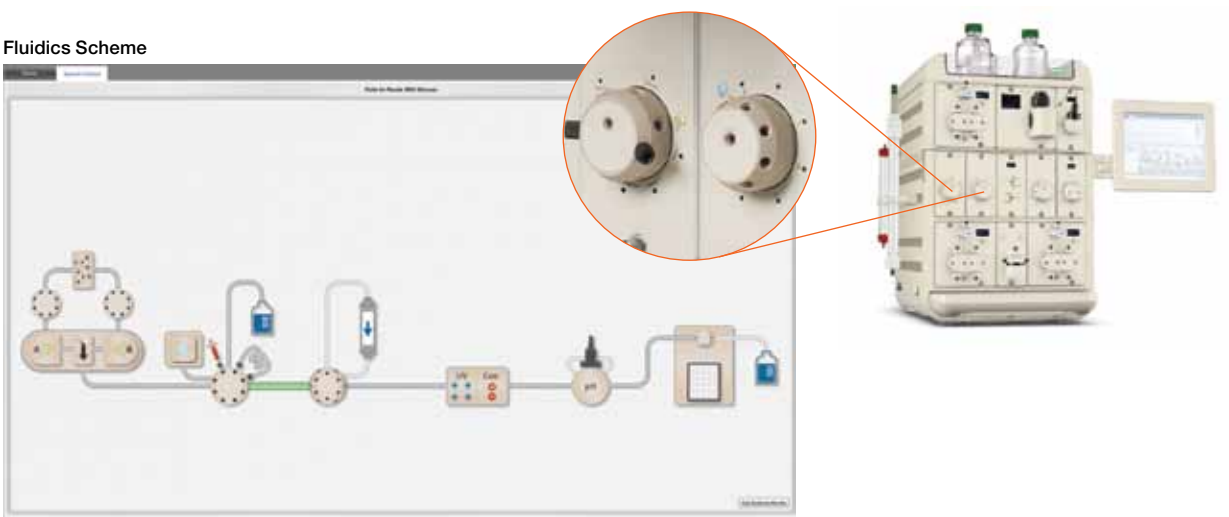
ChromLab chromatography software is the integrated method development, data acquisition, and analysis software package for all NGC chromatography systems. It controls all functions for lab-scale protein purification including instrument control, method development, real-time monitoring, chromatogram comparison, and peak analysis.

Graphical Instrument Setup and Control

ChromLab software instrument controls are designed around a novel fluidics scheme interface that can be customized to exact hardware configurations. ChromLab enables easy setup with its novel Point-to-Plumb™ feature. During manual data acquisition, each component of the fluidics scheme can be controlled to reach optimized conditions. In both manual and automated method-based runs, the software highlights the real-time fluidics path and module status to ensure accuracy.

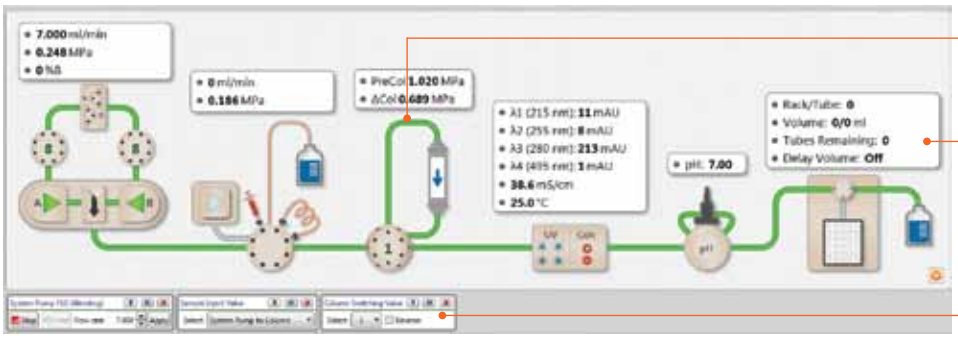
The instrument control interface is touch screen optimized, allowing flexibility without the need for a computer adjacent to the system, thus minimizing the total footprint.

Fluidics Scheme



Click on each step in flow path for guided Point-to-Plumb, LED system plumbing — instrument LEDs blink at the next plumbing location.

Manual Instrument Control



Active flow path (green) clearly highlighted

Real-time status display of flow path devices

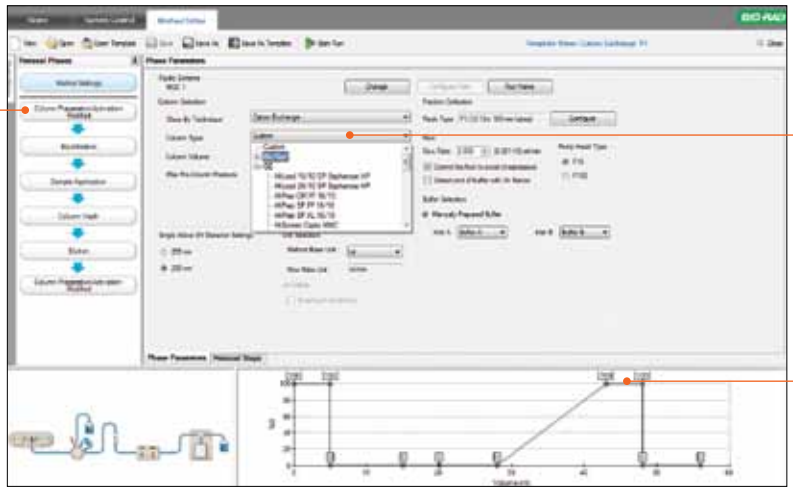
Graphical manual control panels allow complete, accessible manual control of the system

Complete system status and control via the graphical fluidics scheme.

Streamlined Method Development

ChromLab software includes templates for media and columns for maximum versatility. Select a column from the column database. The software automatically adjusts optimal flow rate and pressure parameters for the selected column.

Methods are created by drag and drop functional phases. Grouping parameters into intuitive phases puts the focus on separations instead of hardware controls. The interactive gradient graph enables visualization of the protocol and quick click-and-drag experimental adjustments.



Intuitive Data Evaluation

ChromLab software utilizes intuitive functions and advanced table controls that enable:

- Customized chromatogram layouts with a variety of viewing and data analysis options
- Rapid creation of trace comparisons between multiple chromatograms
- Single-click peak detection and integration
- Ability to overlay, zoom in, and peak integrate on multiple chromatograms
- Advanced integration parameters enable manual integration functions, peak addition, or removal for fine tuning data
- Organized data and easy navigation with intuitive grouped table layouts



Ordering Information

Catalog #	Description
788-6000	**ChromLab Software CD**, single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis

BioLogic DuoFlow™ Medium-Pressure Chromatography Systems

Bio-Rad offers a complete line of laboratory-scale chromatography instruments that are flexible, upgradable, and easy to use. These instruments are specifically designed for protein separations paying close attention to the selection of materials, fraction collection, and the programming flexibility required when working with biological samples.

Learn More about the Technology
Web: www.bio-rad.com/tech/chrom

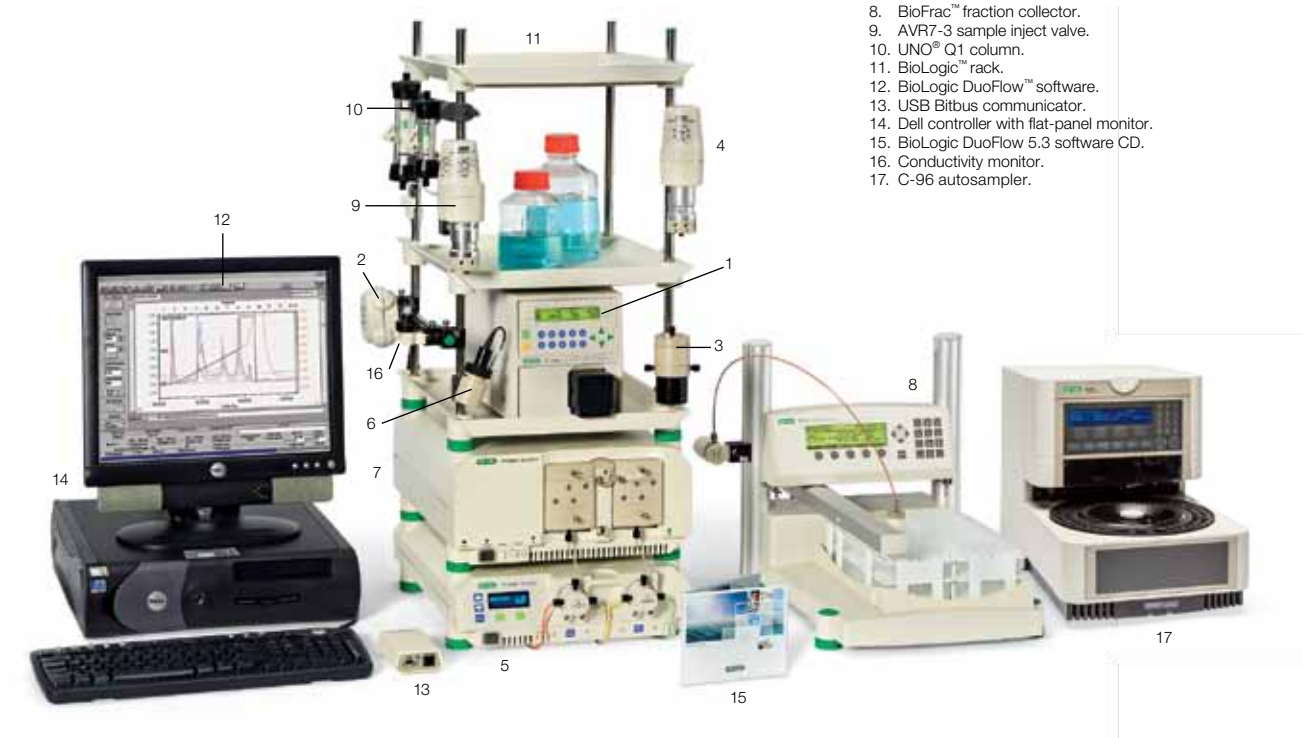
BioLogic DuoFlow Medium-Pressure Chromatography System Selection Guide

	Flow Rate	Pressure Limit	Techniques	UV Detection	Conductivity	pH Monitor	Sample Loading	Fraction Collection	Gradient
BioLogic DuoFlow 10	0.01–10 ml/min	3,500 psi/ 233 bar/ 23 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT™	254 and 280 nm	1–500 ms/cm	Optional	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac™ fraction collector	•
BioLogic DuoFlow 40	0.5–40 ml/min	1,000 psi/ 66 bar/ 6.6 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	254 and 280 nm	1–500 ms/cm	Optional	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow QuadTec™ 10	0.01–10 ml/min	3,500 psi/ 233 bar/ 23 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	190–740 nm	1–500 ms/cm	Optional	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow QuadTec 40	0.5–40 ml/min	1,000 psi/ 66 bar/ 6.6 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	190–740 nm	1–500 ms/cm	Optional	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow Maximizer™ 20	0.02–20 ml/min	3,500 psi/ 233 bar/ 23 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	254 and 280 nm	1–500 ms/cm	Included	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow Maximizer 80	1–80 ml/min	1,000 psi/ 66 bar/ 6.6 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	254 and 280 nm	1–500 ms/cm	Included	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow Pathfinder™ 20	0.02–20 ml/min	3,500 psi/ 233 bar/ 23 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	190–740 nm	1–500 ms/cm	Included	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•
BioLogic DuoFlow Pathfinder 80	1–80 ml/min	1,000 psi/ 66 bar/ 6.6 MPa	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	190–740 nm	1–500 ms/cm	Included	50 µl–90 ml loops and AVR7-3 automated sample inject valve	External; Model 2110 or BioFrac fraction collector	•

Note: refer to page 115 for low-pressure chromatography systems and components; and see pages 110–114 for chromatography accessories.

BioLogic DuoFlow Pathfinder™ system components:

1. BioLogic QuadTec™ UV/Vis detector.
2. SV5-4 select valve (optional).
3. BioLogic Maximizer™ mixer.
4. AVR9-8 stream-select valve (optional).
5. BioLogic Maximizer valve system.
6. pH monitor.
7. F10 or F40 workstation.
8. BioFrac™ fraction collector.
9. AVR7-3 sample inject valve.
10. UNO® Q1 column.
11. BioLogic™ rack.
12. BioLogic DuoFlow™ software.
13. USB Bitbus communicator.
14. Dell controller with flat-panel monitor.
15. BioLogic DuoFlow 5.3 software CD.
16. Conductivity monitor.
17. C-96 autosampler.



The BioLogic DuoFlow family of chromatography systems offers flexibility with multiple system configurations, many optional upgrades, and a common software platform that is intuitive and easy to follow. These systems can be used on the laboratory bench or in a coldroom and are suitable for analytical and preparative chromatography.

A Dell PC controller enables easy communication with the workstation and peripheral devices via an external USB Bitbus communicator. The controller includes the Windows 7 operating system, application software, keyboard, mouse, and high-resolution flat-panel monitor.

Upgradable Systems Add Capability As Research Needs Change

BioLogic DuoFlow modular components allow the system to meet both laboratory space and application requirements. As requirements change, systems may be easily reconfigured and seamlessly upgraded with increased functionality such as higher flow rates, sophisticated detection capabilities, pH monitoring, column scouting, and buffer blending. The BioLogic DuoFlow system selection guide on the next page lists the systems, their functions, and available options.

For More Information
Web: www.bio-rad.com/DFmediumpressure
Request or download bulletins: 2687 and 5369

BioLogic DuoFlow System Selection Guide		F10 Pump	F40 Pump	BioFrac Fraction Collector	BioLogic Maximizer Valve System	BioLogic QuadTec UV/Vis Detector	UV (254/280 nm) Detector	Conductivity Monitor	214 nm Conversion Kit	pH Monitor
Page numbers for components		98	98	108	99	100	100	101	101	101
	**BioLogic DuoFlow 10 system** 0.01–10 ml/min flow rate, 3,500 psi	•	○	○	○	○	•	•	○	○
	BioLogic DuoFlow 40 system 0.5–40 ml/min* flow rate, 1,000 psi	○	•	○	○	○	•	•	○	○
	**BioLogic DuoFlow QuadTec 10 system** 0.01–10 ml/min* flow rate, 3,500 psi	•	○	○	○	•	○	•	○	○
	BioLogic DuoFlow QuadTec 40 system 0.5–40 ml/min* flow rate, 1,000 psi	○	•	○	○	•	○	•	○	○
	**BioLogic DuoFlow Maximizer 20 system** 0.02–20 ml/min flow rate, 3,500 psi	•	○	•	•	○	•	•	○	•
	BioLogic DuoFlow Maximizer 80 system 1–80 ml/min flow rate, 1,000 psi	○	•	•	•	○	•	•	○	•
	**BioLogic DuoFlow Pathfinder™ 20 system** 0.02–20 ml/min flow rate, 3,500 psi	•	○	•	•	•	○	•	○	•
	BioLogic DuoFlow Pathfinder 80 system 1–80 ml/min flow rate, 1,000 psi	○	•	•	•	•	○	•	○	•

• Included as standard; ○ option or upgrade.
* To double the flow rate, use the BioLogic Maximizer valve system.

Ordering Information

Catalog #	Description
BioLogic DuoFlow Systems*	
760-0037	**BioLogic DuoFlow 10 System**, 100/120 V, includes Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, UV detector with 5 mm flow cell and 254/280 nm filters, conductivity monitor, starter kit
760-0036	**BioLogic DuoFlow 10 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-0038	**BioLogic DuoFlow 10 System**, 220/240 V, does not include monitor
760-4037	**BioLogic DuoFlow 40 System**, 100/120 V, same as #760-0037 with F40 workstation replacing F10 workstation
760-4036	**BioLogic DuoFlow 40 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-4038	**BioLogic DuoFlow 40 System**, 220/240 V, does not include monitor
760-0047	**BioLogic DuoFlow 10 System with BioFrac Fraction Collector**, 100/120 V, includes Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, UV detector with 5 mm flow cell and 254/280 nm filters, conductivity monitor, starter kit, diverter valve, two F1 racks
760-0046	**BioLogic DuoFlow 10 System with BioFrac Fraction Collector**, 100/120 V, for Japan and Korea only, does not include monitor
760-0048	**BioLogic DuoFlow 10 System with BioFrac Fraction Collector**, 220/240 V, does not include monitor

*The 10 and 20 systems include an F10 workstation. The 40 and 80 systems include an F40 workstation.

Note: Additional detectors, valves, and accessories are optional and available.

continues

Ordering Information

Catalog #	Description
BioLogic DuoFlow Systems* (cont.)	
760-4047	**BioLogic DuoFlow 40 System with BioFrac Fraction Collector**, 100/120 V, same as #760-0047 with F40 workstation replacing F10 workstation
760-4046	**BioLogic DuoFlow 40 System with BioFrac Fraction Collector**, 100/120 V, for Japan and Korea only, does not include monitor
760-4048	**BioLogic DuoFlow 40 System with BioFrac Fraction Collector**, 220/240 V, does not include monitor
761-0001	**BioLogic DuoFlow 10 Core with BioFrac Fraction Collector**, 100/120 V
761-0002	**BioLogic DuoFlow 10 Core with BioFrac Fraction Collector**, 220/240 V
BioLogic DuoFlow QuadTec Systems*	
760-1137	**BioLogic DuoFlow QuadTec 10 System**, 100/120 V, includes Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, BioLogic QuadTec UV/Vis detector with 3 mm PEEK flow cell, instrument control module (ICM), system cables 25 and 26 (RS-232 and ICM power), conductivity monitor, starter kit
760-1136	**BioLogic DuoFlow QuadTec 10 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-1138	**BioLogic DuoFlow QuadTec 10 System**, 220/240 V, does not include monitor
760-4137	**BioLogic DuoFlow QuadTec 40 System**, 100/120 V, same as #760-1137 with F40 workstation replacing F10 workstation
760-4136	**BioLogic DuoFlow QuadTec 40 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-4138	**BioLogic DuoFlow QuadTec 40 System**, 220/240 V, does not include monitor
760-1147	**BioLogic DuoFlow QuadTec 10 System with BioFrac Fraction Collector**, 100/120 V, includes Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, BioLogic QuadTec UV/Vis detector with 3 mm PEEK flow cell, instrument control module (ICM), system cables 25 and 26 (RS-232 and ICM power), conductivity monitor, starter kit, diverter valve, two F1 racks
760-1146	**BioLogic DuoFlow QuadTec 10 System with BioFrac Fraction Collector**, 100/120 V, for Japan and Korea only, does not include monitor
760-1148	**BioLogic DuoFlow QuadTec 10 System with BioFrac Fraction Collector**, 220/240 V, does not include monitor
760-4147	**BioLogic DuoFlow QuadTec 40 System with BioFrac Fraction Collector**, 100/120 V, same as #760-1147 with F40 workstation replacing F10 workstation
760-4146	**BioLogic DuoFlow QuadTec 40 System with BioFrac Fraction Collector**, 100/120 V, for Japan and Korea only, does not include monitor
760-4148	**BioLogic DuoFlow QuadTec 40 System with BioFrac Fraction Collector**, 220/240 V, does not include monitor
BioLogic DuoFlow Maximizer Systems*	
760-2237	**BioLogic DuoFlow Maximizer 20 System**, 100/120 V, includes BioLogic Maximizer base unit, BioLogic Maximizer mixer, pH monitor, Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, UV detector with 5 mm flow cell and 254/280 nm filters, conductivity monitor, starter kit, BioFrac fraction collector, diverter valve, two F1 racks
760-2236	**BioLogic DuoFlow Maximizer 20 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-2238	**BioLogic DuoFlow Maximizer 20 System**, 220/240 V, does not include monitor
760-2247	**BioLogic DuoFlow Maximizer 80 System**, 100/120 V, same as #760-2237 with F40 workstation replacing F10 workstation
760-2246	**BioLogic DuoFlow Maximizer 80 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-2248	**BioLogic DuoFlow Maximizer 80 System**, 220/240 V, does not include monitor
BioLogic DuoFlow Pathfinder Systems*	
760-2257	**BioLogic DuoFlow Pathfinder 20 System**, 100/120 V, includes BioLogic Maximizer base unit, BioLogic Maximizer mixer, pH monitor, Dell controller and monitor, USB Bitbus communicator, F10 workstation, MX-1 mixer, 3-tray rack, AVR7-3 sample inject valve, fittings kit, BioLogic QuadTec UV/Vis detector with 3 mm PEEK flow cell, system cable 25 (RS-232), conductivity monitor, starter kit, BioFrac fraction collector, diverter valve, two F1 racks
760-2256	**BioLogic DuoFlow Pathfinder 20 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-2258	**BioLogic DuoFlow Pathfinder 20 System**, 220/240 V, does not include computer monitor
760-2267	**BioLogic DuoFlow Pathfinder 80 System**, 100/120 V, same as #760-2257 with F40 workstation replacing F10 workstation
760-2266	**BioLogic DuoFlow Pathfinder 80 System**, 100/120 V, for Japan and Korea only, does not include monitor
760-2268	**BioLogic DuoFlow Pathfinder 80 System**, 220/240 V, does not include monitor

*The 10 and 20 systems include an F10 workstation. The 40 and 80 systems include an F40 workstation.

BioLogic DuoFlow™ Workstations and Accessories

BioLogic DuoFlow Workstations

The BioLogic DuoFlow workstations, with options of F10 or F40 pumps to accommodate different flow rates, include mixer barrel extenders that provide reproducible separations across the entire range of flow rates. The workstation integrates stream-select, sample loading, and diverter valves. The pumphead can be removed easily from the workstation for routine maintenance.

The BioLogic DuoFlow F10 workstation is a component of all BioLogic DuoFlow 10 and 20 systems. The BioLogic DuoFlow 40 workstation is a component of all BioLogic DuoFlow 40 and 80 systems.

F10 and F40 Pump Kits

The pump kits used in the BioLogic DuoFlow workstation are interchangeable. The F10 pump enables a flow rate of 0.01–10 ml/min at 3,500 psi (233 bar, 23 MPa) and the F40 pump enables up to 40 ml/min at 1,000 psi (66 bar, 6.6 MPa). Flow rates for each pumphead can be doubled with the addition of the BioLogic Maximizer™ valve system. The kits contain fully assembled pumpheads with seals and check valves installed for fast, easy pumphead changes.



Mixers

The Model MX-1 and BioLogic Maximizer mixers ensure improved gradient quality for more accurate separations.

Ordering Information

Catalog #	Description
BioLogic DuoFlow Workstations	
760-0150	**BioLogic DuoFlow F10 Workstation**
760-0140	**BioLogic DuoFlow F40 Workstation**
Pump Kits	
760-0110	**F10 Pump Kit**, converts F40 workstation to F10 pumps to enable flow rates as low as 0.01 ml/min; includes 2 fully assembled pumpheads, 4 piston assemblies, F10 tubing kit, tools
760-0180	**F40 Pump Kit**, expands pumping capabilities to 40 ml/min; includes 2 fully assembled pumpheads, 4 piston assemblies, mixer barrel extender, 2 mm UV flow cell, F40 tubing kit, tools
Mixers	
760-0170	**MX-1 Mixer**, includes mixer body (263 µl) and standard mixer barrel for total volume of 750 µl
760-0171	**Mixer Barrel Extender**, for total volume of 2 ml; one included in the F40 pump kit (#760-0180)
760-2010	**BioLogic Maximizer Mixer**, includes 750 µl mixer body, 5 ml and 12 ml mixer barrel extenders, 5 O-rings, stirbar, installation screws
760-2005	**BioLogic Maximizer Mixer Barrel Extender**, 5 ml
760-2012	**BioLogic Maximizer Mixer Barrel Extender**, 12 ml
BioLogic DuoFlow Workstation Accessories	
760-0164	**F10 Pump Maintenance Kit**, to service one F10 pump, includes 2 piston seals, 4 check valves, seal removal tool, 2 O-rings
760-0161	**F10 Piston Seals**, 2, includes seal tool, to service one F10 pump
760-0162	**F10 Piston Kit**, 2 pistons, to service one F10 pump
760-0184	**F40 Pump Maintenance Kit**, to service one F40 pump, includes 2 piston seals, 4 check valves, seal removal tool, 2 O-rings
760-0172	**F40 Piston Seals**, 2, includes seal tool, to service one F40 pump
760-0173	**F40 Piston Kit**, 2 pistons, to service one F40 pump
750-0162	**Check Valve**, 1 (4 required per pump)
750-0703	**Inline Filter Kit**, includes 1 filter unit, 2 replacement frits
750-0230	**40 psi Backpressure Regulator**
760-0135	**BioLogic System Starter Kit**

BioLogic Maximizer™ Valve System

This valve system expands the capabilities of BioLogic DuoFlow™ systems. It enables buffer blending, doubled flow rates, and twice the valve capacity of the standard BioLogic DuoFlow system, and is compatible with any existing BioLogic DuoFlow system. The BioLogic Maximizer allows:

- Buffer blending of up to 4 stock solutions
- More versatility in sample-handling with 6 low-pressure and 6 high-pressure control valves
- 80 ml/min flow rates with a 12 ml mixer barrel extender for the large dynamic mixer
- Automation of runs using multiple protocols
- Higher flow rates for pilot scale-up studies



For More Information
Web: www.bio-rad.com/DFmedpressurecomponents
Request or download bulletin: 2700

Ordering Information

Catalog #	Description
760-2200*	**BioLogic Maximizer Kit**, 100/120 V, for U.S., Japan, Korea; includes BioLogic Maximizer base unit, pH monitor, BioLogic Maximizer mixer, starter kit, tubing kit, system cable 30, U.S. power cord
760-2204*	**BioLogic Maximizer Kit**, 220/240 V, includes BioLogic Maximizer base unit, pH monitor, BioLogic Maximizer mixer, starter kit, tubing kit, system cable 30
760-2000	**BioLogic Maximizer Base Unit**
Mixer and Mixer Barrel Extenders	
760-2010	**BioLogic Maximizer Mixer**, includes 750 µl mixer body, 5 and 12 ml mixer barrel extenders, 5 O-rings, stirbar, installation screws
760-2005	**BioLogic Maximizer Mixer Barrel Extender**, 5 ml
760-2012	**BioLogic Maximizer Mixer Barrel Extender**, 12 ml
BioLogic Maximizer Accessories	
760-2002	**BioLogic Maximizer Tubing Kit**, includes 4 FEP prefitted tubing lengths for connection of solvent vials to the BioLogic Maximizer mixer; color coding indicates buffer solution
760-2003	**BioLogic Maximizer Interconnect Tubing**, includes 2 PEEK prefitted tubing lengths for connection of BioLogic DuoFlow pumps to the BioLogic Maximizer valve system

* BioLogic Maximizer upgrades require BioLogic DuoFlow version 4.0 (or higher) software. The BioLogic DuoFlow workstation may require a firmware upgrade; for information, contact your local Bio-Rad sales representative.

BioLogic DuoFlow™ Detectors

BioLogic DuoFlow UV Detector with Conductivity Monitor

- Standard 254 and 280 nm filters
- Replaceable lamp with 365, 405, and 436 nm expansion filters
- 214 nm conversion kit with zinc lamp
- Standard analytical 5 mm flow cell or optional preparative 2 mm flow cell
- UV absorbance range from 0.0001–2.0 OD
- Conductivity detection range from 1–500 mS/cm



UV Detector with Conductivity Monitor

BioLogic QuadTec™ UV/Vis Detector

The detector enables the simultaneous monitoring of four wavelengths for greater sensitivity without background interference. It is available as a stand-alone unit or as an upgrade to existing BioLogic DuoFlow systems.

- Individual scaling and colored onscreen chromatogram trace for each wavelength in BioLogic DuoFlow 5.3 software
- Wavelength range of 190–740 nm (with deuterium lamp at 190–370 nm and optional halogen lamp at 370–740 nm)
- ICM to digitally communicate signal to BioLogic DuoFlow workstation

For More Information
Web: www.bio-rad.com/DFmedpressurecomponents
Request or download bulletin: 2845



BioLogic QuadTec UV/Vis Detector

Signal Import Module (SIM)

The optional SIM allows import of an analog signal (up to 2.5 V) from a pH electrode or other external detector (for example, UV, refractive index, or fluorescence monitor). BioLogic DuoFlow system software accommodates two SIMs and can display up to four data signals simultaneously.



Signal Import Module

BioLogic DuoFlow pH Monitor

This inline monitor enables real-time monitoring of pH during a sample run. It is included with all BioLogic DuoFlow Maximizer™ and BioLogic DuoFlow Pathfinder™ systems and is also available as an option for the BioLogic DuoFlow system that connects via a SIM. It is supplied with a tubing kit that includes installed 1/4–28 fittings.

- High-precision calomel electrodes, which ensure full compatibility with buffers that are incompatible with Ag/AgCl electrodes
- Flow rates to 80 ml/min
- A biocompatible PEEK flow cell with a swept volume of approximately 80 µl to yield high precision and accuracy



BioLogic DuoFlow pH Monitor

Ordering Information

Catalog #	Description
750-0200	**BioLogic DuoFlow Detector Kit**, includes UV optics module and conductivity monitor, 5 mm analytical flow cell
750-0202	**UV Optics Module**, 5 mm analytical flow cell
750-0240	**Conductivity Monitor**
750-0210	**Flow Cell**, preparative, 2 mm (30 ml) pathlength
750-0212	**Flow Cell**, analytical, 5 mm (16 ml) pathlength
750-0216	**Mercury Lamp**, for use at all wavelengths except 214 nm
750-0220	**Detector Filters**, 254 and 280 nm
750-0223	**Detector Filter**, 365 nm
750-0224	**Detector Filter**, 405 nm
750-0225	**Detector Filter**, 436 nm
750-0214	**214 nm Conversion Kit**, for detectors with serial #362BRXXXX, includes zinc lamp, housing, and 214 nm filter for peptide detection
750-0217	**Zinc Lamp**, for 214 nm detection
750-0221	**Detector Filter**, 214 nm, requires zinc lamp
760-1300	**BioLogic QuadTec Detector Kit**, includes BioLogic QuadTec detector with 3 mm PEEK flow cell, instrument control module (ICM), system cables 25, 26, and 17 (BioLogic QuadTec RS-232, ICM power, and bus communication), U.S. power cord, 40 psi backpressure regulator
760-1330	**Deuterium Lamp**, replacement
760-1332	**Halogen Lamp**, replacement
760-1331	**Halogen Lamp**, with holder for first-time halogen lamp change
760-1306	**Standard Flow Cell**, 3 mm pathlength (2 µl)
760-1406	**High-Speed Flow Cell**, 2 mm pathlength, flow rate to 80 ml/min with fittings
760-1311	**Long Fingertight Fittings**, 10-32 x 1.03", 4
760-1320	**Instrument Control Module (ICM) Kit**, includes ICM power cable and cable 17
750-0650	**System Cable 17**, bus communication cable, 1.2 m (4')
760-1309	**System Cable 24 (BioLogic QuadTec Analog)**, includes 2 cables, connects BioLogic QuadTec detector to SIM
760-1307	**System Cable 25 (BioLogic QuadTec RS-232)**, connects BioLogic QuadTec detector to ICM
760-1321	**System Cable 26 (ICM Power)**, connects to 12 V power on BioLogic DuoFlow workstation
750-0230	**40 psi Backpressure Regulator**
760-1301	**BioLogic QuadTec Instruction Manual**
BioLogic DuoFlow pH Monitor	
760-2040	**BioLogic DuoFlow pH Monitor**, includes SIM module, pH electrode, flow cell, and tubing
760-2042	**pH Electrode**
760-2044	**Flow Cell**
760-2046	**pH Tubing Kit**, includes orange and green PEEK 1/4–28 prefitted tubing lengths for connecting the pH flow cell to the chromatography system
Signal Import Module (SIM)	
750-0502	**Signal Import Module**, includes 4' communication cable (system cable 17)
760-2034	**Universal AC/DC Inline Adaptor for USB Bitbus Device**, required when connecting pH monitor or other external detector through SIM module on BioLogic DuoFlow systems

BioLogic DuoFlow™ Valves and Accessories

BioLogic DuoFlow Valves

The high-pressure sample injection and stream-select valves, AVR7-3 and AVR9-8, prevent pressure spikes when the valve rotates from one port to another. This feature eliminates baseline interference and is beneficial when using fragile low-pressure columns or flow-sensitive detectors. It also prevents pump shutdowns due to transient overpressure conditions. These valves can be used alone or in combinations. A valve rebuild kit is available for four of the following valve types.

Sample Loading Options

- **Single-injection loops for the AVR7-3 sample inject valve** — for 25 µl to 5 ml samples
- **DynaLoop™ sample loops** — dynamic (sliding piston) 25 and 90 ml sample loops allow large-volume sample loading or repetitive injection of smaller volumes
- **Econo™ gradient pump or Model EP-1 Econo pump** — can load large sample volumes directly onto the column
- **SV5-4 select valve** — can be used to automate large sample loading or as a buffer selector in chromatography protocols
- **SVT3-2 diverter valve** — can be used as a buffer selector, for large sample loading, and for diverting buffer flow

BioLogic DuoFlow Valves

AVR7-3 Valve

- Automation of single sample injections using single-injection loops (from 25 µl to 5 ml)
- Reverse-flow chromatography for affinity purifications
- 2-column switching
- Sequential binding and elution

AVR9-8 Valve

- Multiple buffer selection
- 8-column switching
- Large-volume fraction collection
- Tandem chromatography

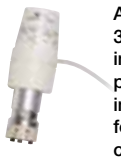
SV5-4 Select Valve

- Automation of large-sample loading
- Buffer selection in chromatography protocols

SVT3-2 Diverter Valve

- Buffer selection
- Loading of large samples
- Diverting buffer flow

For More Information
Web: www.bio-rad.com/DFmedpressurecomponents



AVR7-3, a 7-port, 3-position (load, inject, purge) high-pressure sample inject valve also used for reverse-flow chromatography and two-column switching.



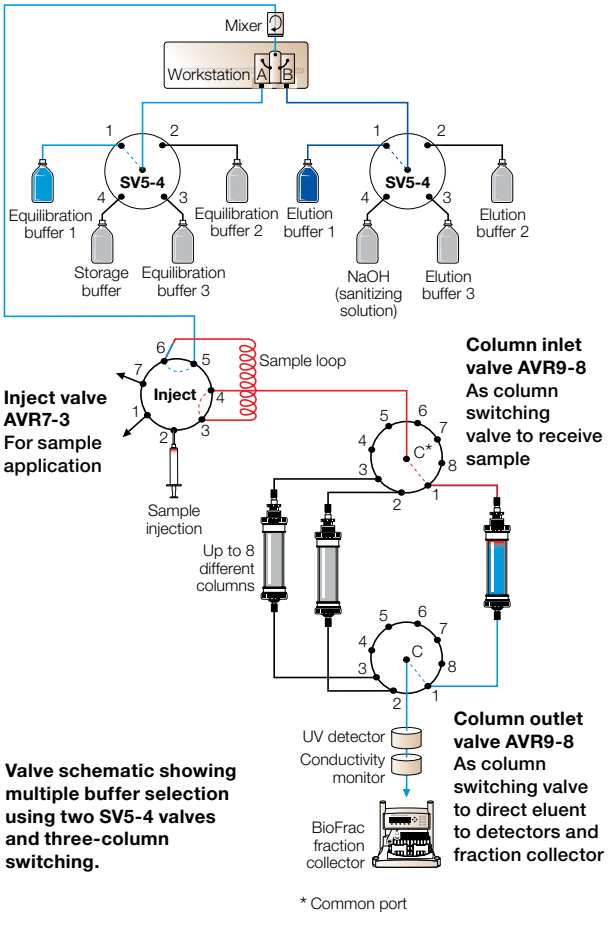
SVT3-2, a 3-way solenoid valve for sample loading, or a fraction collector diverter valve.



AVR9-8, a 9-port, 8-position high-pressure valve for stream selection, column switching, and large-volume fraction collection.



SV5-4, a 5-port, 4-position solenoid valve for multiple buffer selection.



Valve schematic showing multiple buffer selection using two SV5-4 valves and three-column switching.

Ordering Information

Catalog #	Description
BioLogic DuoFlow Valves and Rebuild Kits	
760-0406	**AVR7-3 Automated Sample Injection Valve**, 7-port, 3-position high-pressure valve, 3,500 psi (233 bar) limit
760-0401	**AVR7-3 Valve Rebuild Kit**
760-0408	**AVR9-8 Stream-Select Valve**, 9-port, 8-position high-pressure valve, 3,500 psi (233 bar) limit
760-0403	**AVR9-8 Valve Rebuild Kit**
760-0410	**SVT3-2 Diverter Valve**, 3-port, 2-position solenoid valve, 30 psi (2 bar) limit
760-0411	**SVT3-2 Valve Rebuild Kit**
750-0415	**SV5-4 Select Valve**, 5-port, 4-position solenoid valve, 30 psi (2 bar) limit
BioLogic DuoFlow Fittings Kit	
760-0550	**BioLogic DuoFlow Fittings Kit**
BioLogic Single-Injection Sample Loops, Kits, and Accessories	
750-0471	**Sample Injection Port**, for use with AVR7-3 automated sample injection valve
125-0224	**Injection Needle**, 22 gauge, blunt
750-0490	**Small-Volume Sample Loop Kit**, includes 100, 250, and 500 µl PEEK loops
750-0491	**Large-Volume Sample Loop Kit**, includes 1, 2, and 5 ml PEEK loops
750-0482	**25 µl Tefzel Sample Loop**
750-0483	**50 µl Tefzel Sample Loop**
BioLogic Single-Injection Sample Loops, Kits, and Accessories	
750-0492	**100 µl PEEK Sample Loop**
750-0493	**250 µl PEEK Sample Loop**
750-0494	**500 µl PEEK Sample Loop**
750-0495	**1 ml PEEK Sample Loop**
750-0496	**2 ml PEEK Sample Loop**
750-0497	**5 ml PEEK Sample Loop**
BioLogic Dynamic (Sliding Piston) Sample Loops, Kits, and Seal Replacement	
750-0451	**DynaLoop 25 Kit**, includes 25 ml DynaLoop sliding piston loop, DynaLoop parts kit
750-0452	**DynaLoop 90 Kit**, includes 90 ml DynaLoop sliding piston loop, DynaLoop parts kit
750-0450	**DynaLoop Parts Kit**, includes 4 end cap O-rings, 1 sliding seal O-ring, 1 filter, 4 nut fittings, four 1/8" ferrules, five 1/4–28 nuts and ferrules, 10' of 1/8" tubing
750-0475	**DynaLoop 25 Sample Loop**, 25 ml, replacement
750-0476	**DynaLoop 90 Sample Loop**, 90 ml, replacement
750-0455	**DynaLoop Sliding Seal Replacement**

BioLogic DuoFlow™ Software, Version 5.3

BioLogic DuoFlow software is easy and intuitive. It walks you through simple step-by-step protocols to create and run methods and analyze the results. The software offers functions such as:

- **Scouting wizard** — provides simplified setup of scouting experiments
- **Method templates** — allow easy method creation with predefined chromatography method templates for all commonly used chromatography experiments
- **Buffer blending** — controls automatic buffer pH blending of up to four stock solutions when used in combination with the BioLogic Maximizer™ valve system

BioLogic DuoFlow software provides peak recovery control and data review with the following features:

- **Trace Compare function** — permits overlay of different chromatograms for comparison of runs
- **Fraction identification** — provides BioFrac™ fraction collector numbering schemes that number tubes by collection order or by rack grid number
- **Threshold collection** — allows collection of fractions when a detector signal is above or below a defined threshold
- **Tagging of peaks** — labels peaks with name, retention time, absorbance units (UV trace), pH, or conductivity
- **Selection of an activity trace** — permits data collected by an offline method to be included with the BioLogic DuoFlow run data; a histogram of the offline data can overlay the chromatogram peaks

System Requirements

Operating system	Windows XP or Windows 7
Processor	Pentium 4 at 2 GHz
RAM	512 MB
Screen resolution	1,024 x 768
Hard drive space	40 GB
Drive	CD-ROM
USB port	2.0 Hi-Speed

For More Information
Web: www.bio-rad.com/duoflowsoftware

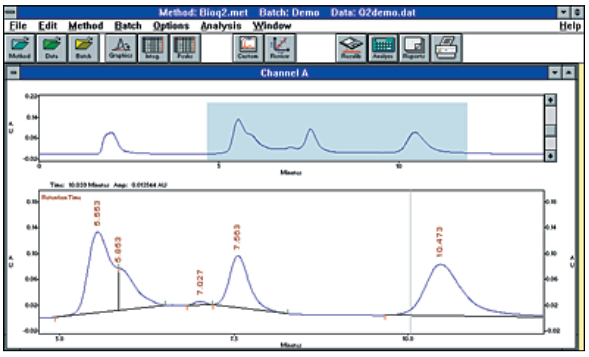
Ordering Information

Catalog #	Description
760-2050	**BioLogic DuoFlow Software Version 5.3 Upgrade**, upgrades existing BioLogic DuoFlow version 5.0 systems, includes version 5.3 software CD

EZLogic™ Integration Software

This powerful software package provides all the tools necessary to quantitate samples, integrate and overlay chromatograms, determine retention times, view the results, and generate customized reports. Graphical capabilities include split-screen chromatogram views, zooming, multiple parameter annotation, and color selection.

For More Information
Web: www.bio-rad.com/EZlogic



EZLogic integration software screen.

Ordering Information

Catalog #	Description
750-0111	**EZLogic Integration Software Package**

BioLogic DuoFlow™ IQ/OQ Protocols

Bio-Rad offers qualification protocols and services for the BioLogic DuoFlow chromatography systems and their peripheral components including the BioLogic Maximizer™ valve system for buffer blending, the BioLogic QuadTec™ UV/Vis detector, and the BioFrac™ fraction collector. Bio-Rad's IQ/OQ protocols are designed to help comply with U.S. FDA regulatory requirements. Procedures are performed by factory-trained and certified technicians using instruments and reagents traceable to NIST standards.

IQ service verifies that the BioLogic DuoFlow chromatography system is properly installed. OQ service tests the performance of the installed system and provides a record that confirms critical functions and safety features.

For more information on IQ/OQ for the BioLogic DuoFlow chromatography system, contact your local Bio-Rad sales representative.

BioLogic™ Rack

The BioLogic rack is an adaptable racking system made of durable solvent-resistant polypropylene, stainless steel, and glass-filled nylon. In addition to supporting a range of chromatography systems it supports a range of columns and cartridges, valves, detection modules, buffer bottles, and peripheral equipment such as the Model 2110 fraction collector. A BioLogic rack expansion kit and optional rack components are available for custom racking applications.

For More Information
Web: www.bio-rad.com/medpressurecomponents





BioLogic rack with optional expansion kit. Dimensions are 34 x 41 x 64 cm (W x D x H).

Ordering Information

Catalog #	Description
750-0251	**BioLogic Rack**, includes rack tray, 8 sleeves, 2 short vertical bars, 2 long vertical bars, column clamp set, 5 bar clamps, 4 cable organizers
750-0268	**BioLogic Rack Expansion Kit**, includes 2 rack trays, 2 long vertical bars, 16 sleeves
Accessories	
750-0261	**BioLogic Rack Tray**, includes 1 rack tray, 8 bar sleeves
750-0262	**Vertical Bars**, long, 64 cm, 2
750-0263	**Vertical Bars**, short, 10 cm, 2
750-0264	**Horizontal Bar Kit**, includes 2 tie bars, 4 bar clamps
750-0260	**Column Clamp Set**, includes 1 column clamp assembly
750-0265	**Bar Clamps**, 5

C-96 Autosampler

The C-96 autosampler, with optional Peltier cooling, connects with the NGC™ and the BioLogic DuoFlow™ chromatography systems to provide automated sample injections. Easy-to-install accessories allow injection volumes from 5 µl to 5 ml. Three injection modes with programmable sample and reagent mixing make the C-96 a versatile autosampler.

- Easy to connect to the NGC system and the BioLogic DuoFlow chromatography systems
- Simple programming via front panel user interface
- Automated, highly reproducible injection of sample volumes from 5 µl to 5 ml



For More Information
Web: www.bio-rad.com/c96

Ordering Information

Catalog #	Description
760-5010	**C-96 Autosampler with Cooling**, 110–240 V, includes standard 84+3 vial tray (1.5 and 10 ml), control cable set to connect with BioLogic DuoFlow system, 1 ml syringe, 2 ml sample loop; also includes #760-5014, #760-5026, and #760-0604
760-5011	**C-96 Autosampler**, 110–240 V, includes standard 84+3 vial tray (1.5 and 10 ml), control cable set to connect with BioLogic DuoFlow system, 1 ml syringe, 2 ml sample loop; also includes #760-5014, #760-5026, and #760-0604
760-5012	**Prep Bio Kit**, contains 24-position tray for 10 ml vials (22 mm OD), 2.5 ml syringe, 10 ml PEEK loop, 0.75 mm ID PEEK injection valve, prep needle, 6 mm fitting wrench, for use with C-96 autosamplers
760-5013	**Syringe**, pkg of 1, 1 ml syringe, for use with C-96 autosamplers
760-5014	**Connector Kit**, contains nuts and ferrules to plumb the syringe valve, for use with C-96 autosamplers
760-5024	**Sample Tray**, pkg of 1, large-capacity 96-position tray for 1.5 ml vials (12 mm OD), for use with C-96 autosamplers
760-0604	**PEEK Tubing**, pkg of 1, 1/16" OD x 0.020" ID x 30' high-pressure tubing, rated to 5,000 psi, orange
760-5026	**Fittings Kit**, contains 10-32 short nuts and ferrules to plumb the injection valve, for use with C-96 autosamplers
760-5027	**Needle**, pkg of 1, 45 µl needle, for use with C-96 autosamplers
760-5028	**Prep Kit Needle**, pkg of 1, needle for large sample volume, for use with C-96 autosamplers
760-5017	**Analytical Bio Kit**, includes 250 µl syringe, 500 µl buffer tubing, 100 and 200 µl PEEK sample loops, standard sample needle, 6 mm fitting wrench, for use with C-96 autosamplers

For NGC system–compatible products see pages 67, 68, and 90–91 for ordering information.

Fraction Collectors

Model 2110 Fraction Collector

This easy-to-use fraction collector provides multiple collection modes for chromatographic separations. Key features include:

- Time or drop collection modes (or volume collection mode when connected to the Model EP-1 Econo™ pump, BioLogic™ LP system, or BioLogic DuoFlow™ system)
- Collection of 1 drop (~50 µl) to 9 ml fractions in 80 test tubes or microtubes (with optional adaptor)
- Small (Econo-Column®) chromatography columns can be mounted to drop-forming arm to minimize dead volume
- Manual-advance tube changes
- Coldroom compatibility
- Small footprint of 24 x 33 cm
- Meets IEC 61010 and CSA 22.2 certification



For More Information
Web: www.bio-rad.com/model2110

Ordering Information

Catalog #	Description
731-8122	**Model 2110 Fraction Collector**, 100/120 V
731-8120	**Model 2110 Fraction Collector**, 220/240 V
Accessories	
731-8130	**Carousel**, 80-tube capacity
731-8135	**Micro Tube Adaptor**, 80 microtube capacity
731-8136	**Instrument Dust Cover**
731-8131	**Replacement Drop Formers**, 2
731-8261*	**System Cable 1**, 8-pin mini-DIN to DB-9 connector
731-8265*	**System Cable 5**, DB-9 connector to bare wires
731-9010*	**System Cable 22**, Y-cable connecting Econo gradient pump to Model 2110 fraction collector
Tubes	
223-9750	**Clear Polystyrene Tubes**, 13 x 100 mm, 9 ml nominal capacity, 1,000
223-9751	**Natural Polypropylene Tubes**, 13 x 100 mm, 9 ml nominal capacity, 1,000
223-9500	**Micro Test Tubes**, capless, 1.5 ml, polypropylene, natural, graduated, 500

* For more information, refer to the Cable Guide on page 110.

BioFrac™ Fraction Collector

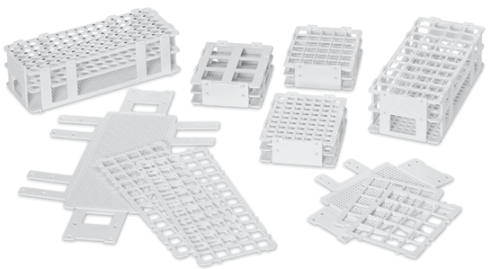
The easy-to-program BioFrac fraction collector can be used for basic or complex fraction collection schemes at flow rates ≤100 ml/min. Off-the-shelf racks extend the versatility of collection schemes and provide cost-effective storage of samples. Off-the-shelf racks are autoclavable, easy to assemble, and lie flat, using little storage space. Key features include:

- Collection in time or drop mode (or volume mode when connected to an NGC™, BioLogic DuoFlow™, or BioLogic™ LP chromatography system, or Model EP-1 Econo™ pump)
- Collection of peaks by peak detection, time windows (up to 20), or a combination of both
- Drop arm movement in column, row, or serpentine pattern movements for microplates or Titertube® tubes
- A dispenser arm that is manually adjustable to tube heights ≤150 mm
- Numerous off-the-shelf racks to accommodate tubes (12–20 mm diameter), Eppendorf or other microtubes (0.5, 1.5, or 2.0 ml), or scintillation vials
- Multirun feature that allows overlay of fractions
- IEC 6101A 22.2 certification

Optional Components

- BioFrac ice bath/microplate rack with tube grips that can hold 13 mm tubes
- BioFrac prep-20 preparative rack with up to 20 collection ports for collection from bottles to carboys
- Microplate drophead kit for precise collection of small volumes into microplates

For More Information
Web: www.bio-rad.com/biofrac
Request or download bulletin: 2711



A



B



C



D



Flexible rack options. The ice bath/microplate rack is used to collect fractions in chilled test tubes (**A**) or up to four microplates (**B**) (shown using the optional 25 µl drophead). The prep adaptor rack (**C**) is used for preparative fractionation into 1–20 collection vessels of any size. The BioFrac fraction collector holds up to four H4-high racks (**D**). The BioFrac fraction collector accepts a variety of off-the-shelf racks.

Ordering Information

Catalog #	Description
741-0002	**BioFrac Fraction Collector**, input voltage 100/240 V, includes power cord, rack set F1 (2 x flatpack, 13 mm), BioFrac diverter valve, fittings kit
Accessories	
741-0010	**Rack Set F1**, 2 x flatpack, with numbered tube positions, each holds 90 tubes, 12–13 mm diameter, for total of up to 180-tube collection
741-0011	**Rack Set F2**, 2 x flatpack, each holds 60 tubes, 15–16 mm diameter, for total of up to 120-tube collection
741-0012	**Rack Set F3**, 2 x flatpack, each holds 40 tubes, 18–20 mm diameter, for total of up to 80-tube collection
741-0013	**Rack Set H1**, 4 x flatpack, each holds 42 capless 1.5 ml Eppendorf/microtubes for total of up to 168-microtube collection
741-0014	**Rack Set H2**, 4 x flatpack, each holds 63 capless 0.5 ml Eppendorf/microtubes for total of up to 252-microtube collection
741-0015	**Rack Set H3**, 4 x flatpack, each holds 30 reduced-volume scintillation vials, 16 mm diameter, for total of up to 120-vial collection
741-0016	**Rack Set H4**, 4 x flatpack, each holds 6 scintillation vials, 30 mm diameter, for total of up to 24-vial collection
741-0020	**BioFrac H4-High Rack Set**, 4 x flatpack, each holds 6 centrifuge tubes, 30 mm diameter, for total of up to 24-vial collection
741-0017	**BioFrac Ice Bath/Microplate Rack**, holds 120 tubes, 12–13 mm diameter; with the following capabilities: up to 4 SBS-format microplates in 96-, 48-, 24-, or 12-well configurations; Titertube micro test tube collection, 8 x 12, 96-tube configuration
741-0018	**BioFrac Prep-20 Preparative Rack**, for fractionation into 1–20 collection vessels of any size
741-0007	**BioFrac Fraction Collector Fittings Kit**, includes replacement fittings and tubing for setup of the fraction collector to the BioLogic LP or BioLogic DuoFlow chromotography systems
741-0088	**BioFrac Microplate Drophead Kit**, includes preassembled drophead nut with 0.020" ID Tefzel tubing; delivers approximately 25 µl per drop
731-8263*	**System Cable 3**, 8-pin mini-DIN to 8-pin mini-DIN
731-8286*	**System Cable 15**, 15-pin D to mini-DIN
731-8287*	**System Cable 16**, 8-pin mini-DIN to 8-pin standard DIN
731-8290	**BioFrac Accessory Cable**, 15-pin D to bare wires, for connecting BioFrac fraction collector to other equipment; for input or output signals
731-9009*	**System Cable 23**, Y-cable connecting Econo gradient pump to BioFrac fraction collector
Tubes	
223-9750	**Clear Polystyrene Tubes**, 13 x 100 mm, 9 ml nominal capacity, 1,000
223-9751	**Natural Polypropylene Tubes**, 13 x 100 mm, 9 ml nominal capacity, 1,000
223-9500	**Micro Test Tubes**, capless, 1.5 ml, polypropylene, natural, graduated, 500

* For more information, refer to the Cable Guide on page 110.

For NGC compatible products, see pages 67, 68, and 90–91 for ordering information.

Chromatography Accessories

Cables

Refer to the guide to select cables to link chromatography system components together or to link components from other manufacturers to a Bio-Rad chromatography system. Numbers in the table are cable numbers.

For More Information
Web: www.bio-rad.com/chromaccessories

Cable Guide

	Connection to										
Connection From	*BioLogic DuoFlow Workstation*	*BioLogic LP System*	*BioLogic DuoFlow Controller*	*BioLogic QuadTec™ UV/Vis Detector*	*Non-BioLogic System Components*	*Non-BioLogic System Detectors*	*Model 2110 Fraction Collector*	*BioFrac Fraction Collector*	*Model EM-1 Econo UV Monitor*	*Model EP-1 Econo Pump*	*Econo Gradient Pump*
BioLogic DuoFlow workstation			17, 18, 19, or 21	17, 18, 25, or 26			5	17, 18, 19, or 21		7	17, 18, 19, or 21
Model 2110 fraction collector	5	1			5				1	1	22
BioFrac fraction collector	17, 18, 19, or 21	3, 15			*	*				3, 15	23
Isco Retriever II collector	12								12		
Gilson FC 203 fraction collector		14								14	
GE Healthcare FRAC-100 fraction collector		9								9	
Model EG-1 Econo gradient monitor					7						
Model EM-1 Econo* UV monitor						4			3		
Model EP-1 Econo pump	7				7		1	3, 15	3		
Econo gradient pump	17, 18, 19, or 21						22	23			

* For replacement of the Model 2128 accessory cable, order the BioFrac accessory cable.

Ordering Information

Catalog #	Description
731-8261	**System Cable 1**, 8-pin mini-DIN to DB-9 connector
731-8262	**System Cable 2**, 8-pin mini-DIN to 8-pin standard DIN
731-8263	**System Cable 3**, 8-pin mini-DIN to 8-pin mini-DIN
731-8264	**System Cable 4**, 8-pin mini-DIN to banana plug cable
731-8265	**System Cable 5**, DB-9 connector to bare wires
731-8266	**System Cable 6**, 8-pin standard DIN to bare wires
731-8267	**System Cable 7**, 8-pin mini-DIN to bare wires
731-8268	**System Cable 8**, 8-pin standard DIN to DB-9 connector
731-8269	**System Cable 9**, 8-pin mini-DIN to GE Healthcare FRAC-100
731-8283	**System Cable 12**, 8-pin mini-DIN to Isco DB-15 connector
731-8285	**System Cable 14**, 8-pin mini-DIN to Gilson connector
731-8286	**System Cable 15**, 15-pin D to mini-DIN
731-8287	**System Cable 16**, 8-pin mini-DIN to 8-pin standard DIN
750-0650	**System Cable 17**, bus communication cable, 1.2 m (4')
750-0651	**System Cable 18**, bus communication cable, 3.7 m (12')
750-0652	**System Cable 19**, bus communication cable, 9.2 m (30')
750-0655	**System Cable 21**, BioLogic HR system communication cable, 30 m (100')

continues

Ordering Information

Catalog #	Description
731-9010	**System Cable 22**, Y-cable for connecting Econo gradient pump to Model 2110 fraction collector
731-9009	**System Cable 23**, Y-cable for connecting Econo gradient pump to BioFrac fraction collector
760-1309	**System Cable 24 (BioLogic QuadTec Analog)**, includes 2 cables, connects BioLogic QuadTec to SIM
760-1307	**System Cable 25 (BioLogic QuadTec RS-232)**, connects BioLogic QuadTec to ICM
760-1321	**System Cable 26 (ICM Power)**, connects to 12 V power on BioLogic DuoFlow workstation
760-2004	**System Cable 30**, bus communication cable, 0.3 m (1')
760-2032	**System Cable 31**, USB cable
731-8290	**BioFrac Accessory Cable**, 15-pin D to bare wires, for connecting BioFrac fraction collector to other equipment; for input or output signals

For NGC systems, order information see pages 90–91.

For BioLogic DuoFlow systems, order information see page 101.

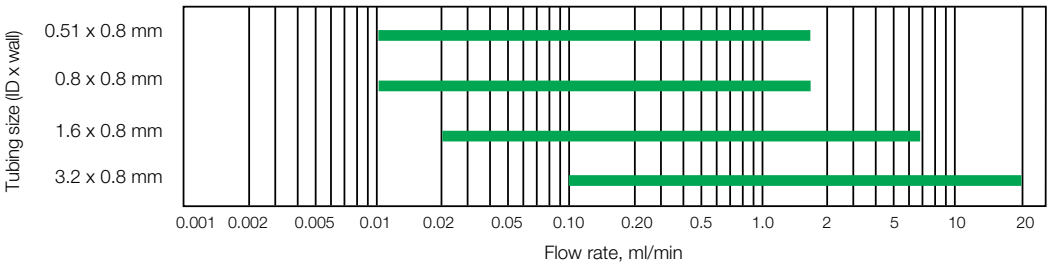
Low-Pressure Tubing

- **Silicone tubing** — contains no cytotoxic extractables and has excellent wetting properties. Autoclavable and heatable for pyrogen removal. May be damaged by concentrated acids and bases
- **Tygon tubing** — clear and tough, tolerates greater pressures than silicone; transparent; should not be autoclaved; may be damaged by high concentrations of alcohol
- **PharMed tubing** — has a wider range of chemical compatibility than silicone or Tygon and is ideal for use in pumpheads of the Model EP-1 Econo™ pump, Econo gradient pump, and BioLogic™ LP system; lasts ten times longer than Tygon or silicone
- **PTFE tubing** — chemically inert; can be used with virtually any reagent, stable up to 400°C

Pump Tubing Kits

Precut tubing for the Model EP-1 Econo pump, Econo gradient pump, and BioLogic LP system is available in PharMed and silicone with a choice of 0.8, 1.6, or 3.2 mm ID. Each kit contains 20 pieces of precut pump tubing and four sets of luer lock fittings and tubing retainers.

Tubing Size Selection Chart



Tubing size selection. Comparison of flow rate ranges of various tubing sizes (ID) when used in the Econo gradient pump, the Model EP-1 Econo pump, and the BioLogic LP system.

Tubing Material Comparison

	Silicone	Tygon	PharMed	PTFE
Appearance	Translucent	Clear	Off-white	Translucent
Flexibility	Excellent	Excellent	Excellent	Fair
Autoclavability	Yes	No	Yes	Yes
Chemical compatibility	Fair	Fair	Good	Excellent
Performance in peristaltic pumps	Good	Fair	Excellent	Not acceptable

Ordering Information

Catalog #	Description
Silicone Tubing	
731-8210	**Silicone Tubing**, 0.8 mm ID/0.8 mm wall, 10 m
731-8211	**Silicone Tubing**, 1.6 mm ID/0.8 mm wall, 10 m
731-8212	**Silicone Tubing**, 3.2 mm ID/0.8 mm wall, 10 m
Tygon Tubing	
731-8213	**Tygon Tubing**, 0.51 mm ID/0.8 mm wall, 10 m
731-8214	**Tygon Tubing**, 0.8 mm ID/0.8 mm wall, 10 m
731-8215	**Tygon Tubing**, 1.6 mm ID/0.8 mm wall, 10 m
PharMed Tubing	
731-8207	**PharMed Tubing**, 0.8 mm ID/1.0 mm wall, 10 m
731-8208	**PharMed Tubing**, 1.6 mm ID/1.0 mm wall, 10 m
731-8209	**PharMed Tubing**, 3.2 mm ID/1.0 mm wall, 10 m
Pump Tubing Kits	
731-8240	**Pump Tubing Kit**, 0.8 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
731-8241	**Pump Tubing Kit**, 1.6 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
731-8242	**Pump Tubing Kit**, 3.2 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
731-8247	**Pump Tubing Kit**, 0.8 mm ID PharMed, 20 precut lengths and 4 sets of fittings
731-8248	**Pump Tubing Kit**, 1.6 mm ID PharMed, 20 precut lengths and 4 sets of fittings
731-8249	**Pump Tubing Kit**, 3.2 mm ID PharMed, 20 precut lengths and 4 sets of fittings
731-9007	**Econo Gradient Pump Tubing Kit**, includes 2 each of 0.8, 1.6, and 3.2 mm PharMed tubing, for use with Econo gradient pump

High-Pressure Tubing and Tubing Kits

- **PTFE FEP tubing** — recommended for pre-pump connections; can withstand medium pressure; translucent, semiflexible, chemically inert, and autoclavable
- **Tefzel or PEEK tubing** — recommended for post-pump connections; both withstand high pressure and are chemically inert and autoclavable. Tefzel is translucent and slightly flexible. PEEK is opaque; the color indicates the inside diameter
- **Tubing kits** — set of premade tubing with fittings to simplify setup of the BioLogic DuoFLow™ system

Ordering Information

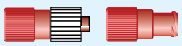
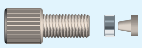
Catalog #	Description
750-0603	**PTFE FEP Tubing**, 1/8" (0.125", 3.2 mm) OD x 0.062" (1.6 mm) ID, 15' (4.6 m), for pre-pump buffer inlet lines to the pumpheads
750-0602	**Tefzel Tubing**, 1/16" (0.062", 1.6 mm) OD x 0.020" (0.5 mm) ID, 30' (9.1 m), for system connections post-pump
760-0604	**PEEK Tubing**, orange, 1/16" OD x 0.020" ID x 30', rated to 5,000 psi
760-0605	**PEEK Tubing**, green, 1/16" OD x 0.030" ID x 30', rated to 3,000 psi
760-0650	**F10 Tubing Kit**, includes precut and fitted PTFE, Tefzel, and orange PEEK tubing for installation of BioLogic DuoFlow basic chromatography system running at flow rates <40 ml/min
760-0652	**F40 Tubing Kit**, includes precut and fitted PTFE, Tefzel, and green PEEK tubing for installation of BioLogic DuoFlow basic chromatography system running at flow rates ≥40 ml/min
760-2046	**pH Tubing Kit**, includes orange and green PEEK 1/4–28 prefitted tubing lengths for connection of the pH flow cell to the chromatography system
760-2002	**BioLogic Maximizer Tubing Kit**, includes 4 PTFE FEP prefitted tubing lengths for connection of solvent vials to the BioLogic Maximizer mixer; color coding indicates buffer solution
760-2003	**BioLogic Maximizer Interconnect Tubing**, includes 2 PEEK prefitted tubing lengths for connection of BioLogic DuoFlow pumps to the BioLogic Maximizer valve system

Medium- and High-Pressure Fittings

The BioLogic DuoFlow™ fittings kit includes all parts necessary to connect medium- and high-pressure columns to medium-pressure chromatography systems.

For More Information
Request or download bulletin: column connection instructions — 5326

Ordering Information

Catalog #	Diagram	Description	Quantity
Medium- and High-Pressure Fittings Kit			
760-0550		**BioLogic System Fittings Kit**, includes PEEK and Tefzel nuts, ferrules, unions, plugs, and luer syringe	1
Individual Medium- and High-Pressure Fittings			
732-0113		**Luer to BioLogic System Fittings Kit**, includes 1/4–28 female to male luer, 1/4–28 female to female luer, to connect 1 cartridge to a BioLogic DuoFlow system	1
750-0556		**Ferrule and Lock Ring**, for 1/16" OD (1.6 mm) tubing	10
750-0559		**Tefzel Cap**, 1/4–28 female connection, to plug unused tubing	5
750-0560		**BioLogic Fittings Tool**	1
750-0561		**Tefzel Union Adaptor**, 1/4–28 to M6, to connect 1 M6 column to a BioLogic DuoFlow system	2
750-0562		**Tefzel Union**, 1/4–28 to 1/4–28 to extend tubing	5
750-0563		**Tefzel Plug**, 1/4–28 male connection, to plug unused ports on valves and columns	5
750-0564		**HPLC Column to BioLogic System Adaptors**, 2 fittings to connect 1 HPLC column (10-32) to a BioLogic DuoFlow system	2
750-0565		**Econo-Column to BioLogic System Fittings Kit**, 2 fittings to connect 1 Econo-Column (luer) column to a BioLogic DuoFlow system	1 set
750-0566		**Bottle Cap Kit**, includes 2 bottle caps, 2 plugs	1 set
750-0567		**UNO M6 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system	1 set
750-0568		**UNO 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system	1 set
750-0569		**Delrin Nut**, for 1/16" OD (1.6 mm) tubing	10
750-0570		**Delrin Nut**, for 1/8" OD (3.2 mm) tubing	5
750-0571		**Ferrule and Lock Ring**, for 1/8" OD (3.2 mm) tubing	5
750-0703		**Inline Filter Kit**, includes 1 inline filter and 2 replacement frits	1
750-0704		**Replacement Frits**, for inline filter kit	5
750-0553		**1/8" OD (3.2 mm) Pre-Pump Fittings**, includes Delrin nut, ferrules, lock ring	5
750-0554		**1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring	10
760-1308		**Long Fingertight Fittings**, 10-32 x 0.82", for PEEK and Tefzel tubing	4
760-1311		**Long Fingertight Fittings**, 10-32 x 1.03", for PEEK and Tefzel tubing	4

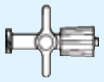
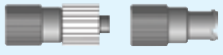
Low-Pressure Fittings

The low-pressure system fittings kit is useful to adapt various tubing sizes, to make liquid connections, and to direct and stop liquid flow.

For More Information
Request or download bulletin: column connection instructions — 5326

Ordering Information

Catalog #	Description
Low-Pressure System Fittings Kits	
731-8220	**Low-Pressure System Fittings Kit**, polycarbonate/polypropylene, 250 pieces
731-9006	**Econo Gradient Pump Fittings Kit**, includes 32 fittings, 12 tubing retainers

Catalog #	Diagram	Description	Quantity	Material
Individual Low-Pressure Fittings				
731-8221*		**0.8 mm Barb to Female Luer**	25	Polypropylene
731-8222*		**1.6 mm Barb to Female Luer**	25	Polypropylene
731-8223*		**3.2 mm Barb to Female Luer**	25	Polypropylene
731-8224		**0.8 mm Barb to Male Luer**	25	Polypropylene
731-8225		**1.6 mm Barb to Male Luer**	25	Polypropylene
731-8226		**3.2 mm Barb to Male Luer**	25	Polypropylene
731-8228		**Female Luer to Female Luer**	10	Polypropylene
731-8230		**Male Luer to Male Luer**	10	Polypropylene
731-8232		**Female Luer Plug**	25	Polypropylene
731-8233		**Male Luer Plug**	25	Polypropylene
731-8229		**Female Luer T-Connector**	10	Polypropylene
732-8302		**0.8 mm Barb T-Connector**, recommended for minimal dead-volume connection	25	Polypropylene
732-8300		**0.8 mm Barb to Barb Connector**, recommended for minimal dead-volume connection	25	Polypropylene
732-8103		**3-Way Stopcock**, 2 female luer to male luer	10	Polycarbonate/ polypropylene
732-8107		**3-Way Stopcock**, nylon, solvent resistant	10	Nylon/polypropylene
732-8102		**2-Way Stopcock**, female luer to male luer	10	Polycarbonate/ polypropylene
732-3245		**Luer Tubing Adaptor**, with 5' of 0.8 mm ID PTFE tubing	5	Polypropylene/PTFE
732-8202		**Double Luer Tubing Adaptor**, with 5' of 0.8 mm ID PTFE tubing	1	Polypropylene/PTFE
732-0111		**Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system	1	PEEK/Tefzel
732-0112		**Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system	1	Polypropylene/PTFE
732-0113		**Luer to BioLogic System Fittings Kit**, includes 1/4–28 female to male luer, 1/4–28 female to female luer to connect 1 cartridge to a BioLogic DuoFlow system	1	Polypropylene/PTFE

* Fits inlet and outlet of Econo-Column chromatography columns and low-pressure tubing.

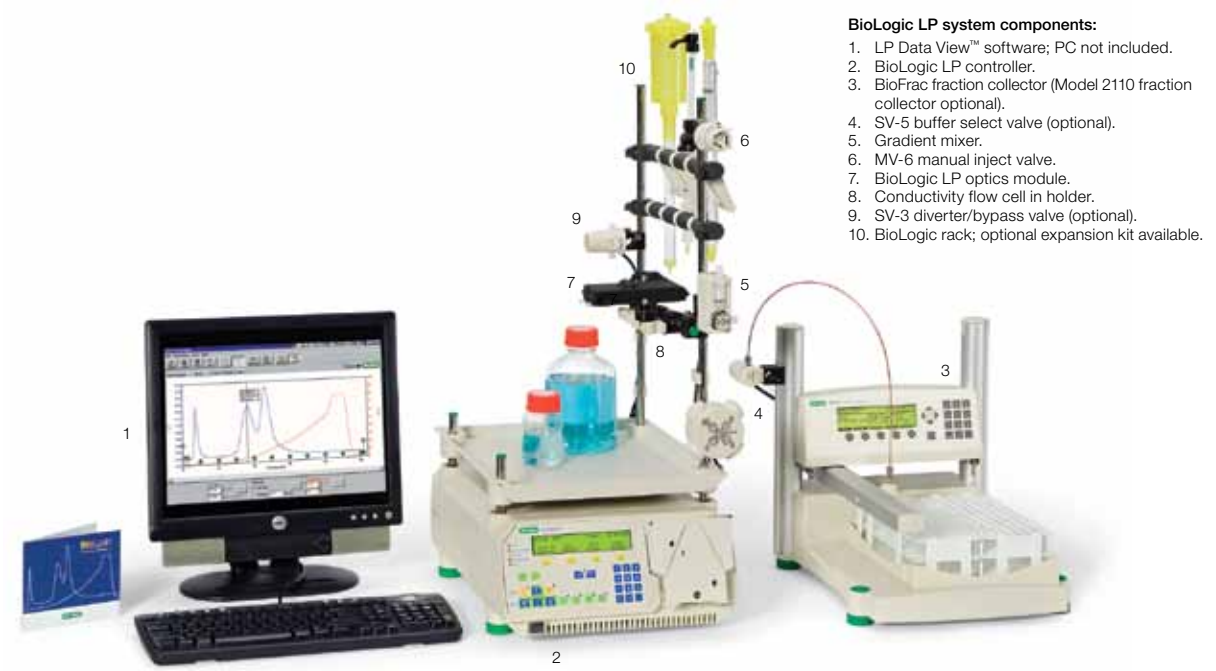
Low-Pressure Chromatography Systems

Bio-Rad offers a range of low pressure systems and components for protein purification. All are capable of operating from 30–45 psi (2–3.4 bar) with flow rates ranging from 0.002–40 ml/min.

Low-Pressure Chromatography System Selection Guide

	Flow Rate	Pressure Limit	Techniques	UV Detection	Conductivity	pH Monitor	Sample Loading	Fraction Collection	Gradient
Profinia™	0.2–20 ml/min	45 psi/ 3.4 bar	Affinity, desalting (automated sequence)	280 nm	0–500 ms/cm	Optional	15–50 ml conical tubes	Internal; 15–50 ml conical tubes	—
BioLogic™ LP dual peristaltic pump	0.04–40 ml/min	30 psi/ 2 bar	Affinity, ion-exchange, size exclusion/desalting, HIC, CHT	254 and 280 nm	0–500 ms/cm	—	Custom-sized loops and MV6 manual sample inject valve	External; Model 2110 or BioFrac fraction collector	•
Econo™ pump	0.01–20 ml/min	30 psi/ 2 bar	Affinity, size exclusion/ desalting, HIC, CHT	254 and 280 nm	—	—	—	External; Model 2110 or BioFrac fraction collector	—
Econo gradient pump	0.002–40 ml/min	30 psi/ 2 bar	Affinity, ion exchange, size exclusion/desalting, HIC, CHT	254 and 280 nm	0–500 ms/cm with EG monitor	—	Custom-sized loops and MV6 manual sample inject valve	External; Model 2110 or BioFrac fraction collector	•

BioLogic™ LP Systems



BioLogic LP system components:

1. LP Data View™ software; PC not included.
2. BioLogic LP controller.
3. BioFrac fraction collector (Model 2110 fraction collector optional).
4. SV-5 buffer select valve (optional).
5. Gradient mixer.
6. MV-6 manual inject valve.
7. BioLogic LP optics module.
8. Conductivity flow cell in holder.
9. SV-3 diverter/bypass valve (optional).
10. BioLogic rack; optional expansion kit available.

The BioLogic LP low-pressure chromatography system offers high performance, versatility, ease of use, and affordability. Its compact design minimizes the workspace required in the coldroom or on the laboratory bench. The BioLogic LP system includes features such as:

- **LP Data View™ software** — easy-to-use software designed for the BioLogic LP system. The software captures data, multitasks, and prints data from any computer that runs Windows XP or Windows 7 operating systems; requires use of one serial port

- **Methods storage** — the system stores up to 50 methods; each method can include up to 50 pump steps and 50 fraction collection steps
- **Buffer selection** — select up to four buffers and completely automate sample separation with the addition of an SV-5 buffer select valve; the valve can also be used to automatically load large sample volumes
- **Detection capabilities** — the system includes both 254 and 280 nm filters for nucleic acid and protein detection and a conductivity cell to monitor gradient progress
- **A high-flow pump** — the system houses a peristaltic pump with a flow rate range of 0.05–40 ml/min (20 ml/min per channel; dual-channel peristaltic pump) and maximum backpressure of 30 psi (0.2 MPa). The system is compatible with Econo-Column® low-pressure chromatography columns, Bio-Rad chomatography media, GE Healthcare HiTrap cartridges, SOURCE media, and all other low-pressure chromatography media
- **Fraction collection** — the system offers both simple and sophisticated fraction collection choices. Collect into eighty 13 x 100 mm tubes or micro tubes using the Model 2110 fraction collector (page 107), or collect into virtually any size container, from microplates to carboys, using the BioFrac™ fraction collector (pages 108–109); in addition, the BioLogic LP system supports the use of other fraction collectors
- **IEC 61010 safety certification**

For More Information
Web: www.bio-rad.com/biologiclp
Request or download bulletins: system information — 2038 and 2327; column connection instructions — 5326

Ordering Information

Catalog #	Description
731-8300	**Standard BioLogic LP System**, 100/120 V, includes BioLogic LP controller, BioLogic rack, accessory kit with MV-6 manual inject valve, proportioning valve/mixer, UV optics, conductivity cell, tubing and fittings kit, column and conductivity cell holder, starter kit
731-8301	**Standard BioLogic LP System**, 220/240 V, includes same as #731-8300
731-8302	**BioLogic LP System with Model 2110 Fraction Collector**, 110/120 V, includes standard BioLogic LP system, SV-3 diverter/bypass valve, system cable 1
731-8303	**BioLogic LP System with Model 2110 Fraction Collector**, 220/240 V
731-8304	**BioLogic LP System with BioFrac Fraction Collector**, 110/120 V, includes standard BioLogic LP system, system cables 3 and 15
731-8305	**BioLogic LP System with BioFrac Fraction Collector**, 220/240 V
731-8336	**BioLogic LP System with Model 2110 Fraction Collector and LP Data View Software**, 110/120 V, includes SV-3 diverter/bypass valve, system cable 1, 25' serial cable
731-8337	**BioLogic LP System with Model 2110 Fraction Collector and LP Data View Software**, 220/240 V
731-8338	**BioLogic LP System with BioFrac Fraction Collector and LP Data View Software**, 110/120 V, includes system cables 3 and 15, 25' serial cable
731-8339	**BioLogic LP System with BioFrac Fraction Collector and LP Data View Software**, 220/240 V
BioLogic LP Accessories and Replacement Parts	
731-8320*	**MV-6 Manual Inject Valve**, 6 ports
731-8321*	**SV-5 Buffer Select Valve**, 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
731-8322*	**SV-3 Diverter/Bypass Valve**, 3-way valve
731-8323	**Gradient Mixer**
731-8324	**BioLogic LP Optics Module**
731-8165	**UV Flow Cell**, replacement
731-8166	**Lamp**, replacement
731-8167	**Filter Assembly**, 254 and 280 nm
731-8155	**Conductivity Flow Cell**
731-8350	**BioLogic LP Starter Kit**, includes buffers, standard, anion exchange cartridge

*For more information, see page 115.

BioLogic™ LP Data View™ Software

BioLogic LP Data View software allows complete freedom to rescale chromatogram axes both during and after a run, to multitask during chromatogram data capture, and to print using any dedicated or networked printer.

LP Data View software:

- Runs on Windows XP or Windows 7 operating systems; requires use of one serial or USB port
- Automatically records method information for each run and allows notes to be recorded with data
- Automatically records run events such as Start, End, Fraction Advance, Hold, Pause, and Continue
- Prints customized reports
- Exports data to other applications

For More Information
Web: www.bio-rad.com/biologicLPcomponents
Request or download bulletin: 2038

Ordering Information

Catalog #	Description
731-8365	**LP Data View Software for the BioLogic LP System**, includes software CD, cable adaptor

BioLogic™ LP Valves

Bio-Rad offers three valve options for the BioLogic LP system.

Buffer Selection and Automated Sample Loading Valve

The optional SV-5 buffer select valve expands the preparative purification capabilities of the BioLogic LP system, allowing it to control up to four buffers and to automatically inject large-volume samples. The SV-5 valve attaches directly to the BioLogic rack and is controlled by the BioLogic LP system.

Manual Sample Injection Valve

The MV-6 injection valve has six ports with female luer fittings. It accommodates user-made loops of any volume. The MV-6 valve mounts directly on the BioLogic system rack and the Econo™ gradient pump rack.

Fraction Collection/Column Bypass Valve

The optional SV-3 diverter/bypass valve is a two-position solenoid valve controlled through the Econo™ gradient pump, the Model EP-1 Econo pump, or the BioLogic LP system. When connected to the BioLogic LP system, the SV-3 valve directs effluent flow from the column to a bypass position, or from the fraction collector to a waste



position. The function of the valve is determined by the mini-DIN connection on the rear of the instrument and by the plumbing of the valve. When connected to either the Model EP-1 Econo pump or the Econo gradient pump, the SV-3 valve functions only as a fraction collector diverter valve. The SV-3 valve connects directly to the BioLogic system rack and the Econo gradient pump rack.

Ordering Information

Catalog #	Description
731-8321	**SV-5 Buffer Select Valve**, 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
731-8320	**MV-6 Manual Inject Valve**, 6 ports
731-8322	**SV-3 Diverter/Bypass Valve**, 3-way valve

Econo™ Gradient Pump

The Econo gradient pump is suited for any low-pressure protein purification application. It is the only stand-alone peristaltic pump capable of both isocratic and gradient elution. The Econo gradient pump works seamlessly with other Bio-Rad instruments such as the Model 2110 and BioFrac™ fraction collectors, the EM-1 UV monitor, and the EG-1 gradient monitor. Configure the system according to your needs and budget using the Econo gradient pump as a starting point.

The Econo gradient pump is a two-channel bidirectional pump that is ideal for preparative applications and for purification of recombinant proteins.

- Simple setup and programming
- Flow rates of 0.1– 40 ml/min
- Control of a gradient mixer for binary gradient formation
- Control of an optional fraction collector and diverter valve
- Automated calibration procedures for a variety of tubing sizes
- Maximum pressure of 30 psi
- Compatible with the BioLogic DuoFlow™ chromatography systems

For More Information
Web: www.bio-rad.com/econogradient
Request or download bulletin: 2438



Econo gradient pump and Model 2110 fraction collector:
1. Econo gradient pump.
2. Gradient mixer.
3. MV-6 manual sample inject valve.
4. Econo-Column® column with flow adaptor.
5. SV-3 diverter/bypass valve.
6. Model 2110 fraction collector.

Ordering Information

Catalog #	Description
731-9001	**Econo Gradient Pump**, 100/120 V, includes tubing and fittings kits
731-9002	**Econo Gradient Pump**, 220/240 V
Combination Systems	
731-9030	**Econo Gradient Pump Combo 1**, 100/120 V, includes Econo gradient pump, gradient mixer valve
731-9032	**Econo Gradient Pump Combo 1**, 220/240 V
731-9034	**Econo Gradient Pump Combo 2**, 100/120 V, includes Econo gradient pump, gradient mixer valve, MV-6 manual inject valve, rack with column clamps
731-9036	**Econo Gradient Pump Combo 2**, 220/240 V
731-9038	**Econo Gradient Pump Combo 3**, 100/120 V, includes Econo gradient pump, gradient mixer valve, rack with column clamps
731-9040	**Econo Gradient Pump Combo 3**, 220/240 V
Valves	
731-8322	**SV-3 Diverter/Bypass Valve**, 3-way valve
731-8323	**Gradient Mixer**
731-8320	**MV-6 Manual Inject Valve**, 6 ports
Cables*	
731-9009	**System Cable 23**, Y-cable for connecting Econo gradient pump to BioFrac fraction collector
731-9010	**System Cable 22**, Y-cable for connecting Econo gradient pump to Model 2110 fraction collector
Accessories	
731-9004	**Econo Gradient Pump Rack**, preassembled
731-9006	**Econo Gradient Pump Fittings Kit**, includes 32 fittings, 12 tubing retainers
731-9007	**Econo Gradient Pump Tubing Kit**, includes 2 each of 0.8, 1.6, and 3.2 mm PharMed tubing

* For more information, refer to the Cable Guide on page 110.

Model EP-1 Econo™ Pump

The Model EP-1 Econo pump is a two-channel, bidirectional, variable speed peristaltic pump for low-pressure chromatography or for general laboratory delivery of liquids. The pump works in conjunction with the Model 2110 fraction collector to make your isocratic purification needs simple.

- Simple setup and programming
- Flow rates of 0.1–40 ml/min
- Control of an optional fraction collector and diverter valve
- Maximum pressure of 30 psi
- Compatible with the BioLogic DuoFlow™ chromatography systems



For More Information
Web: www.bio-rad.com/modelep1

Ordering Information

Catalog #	Description
731-8140	**Model EP-1 Econo Pump**, 100/120 V
731-8142	**Model EP-1 Econo Pump**, 220/240 V
Accessories	
731-8261*	**System Cable 1**, 8-pin mini-DIN to DB-9 connector
731-8263*	**System Cable 3**, 8-pin mini-DIN to 8-pin mini-DIN
731-8267*	**System Cable 7**, 8-pin mini-DIN to bare wires
731-8286*	**System Cable 15**, 15-pin D to mini-DIN

* For more information, refer to the Cable Guide on page 110.

Model EM-1 Econo™ UV Monitor

The Model EM-1 Econo UV monitor is a single-wavelength detector for flowthrough monitoring of effluents from chromatographic columns, centrifugation gradients, and other devices. The monitor consists of a control unit and an optics module that includes both 254 and 280 nm filters and a 2 mm pathlength flow cell.

- Portable optics module with detection close to the column outlet to maximize resolution
- Autozero functionality
- Coldroom compatibility
- LED display of absorbance



Specifications

Wavelength	254 and 280 nm	Noise	1.0 x 10^{-4} OD max. peak-to-peak (dry cell); 2.0 x 10^{-4} OD max. peak-to-peak (flowing liquid)
Sensitivity ranges	2.0, 1.0, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 AUFS		
Detection limit	7 µg/ml (BSA in H_2O)	Safety	Meets IEC 61010 and CSA 22.2 certification
Lamp	Low-pressure mercury with phosphor screen		
Filters	254 and 280 nm	Dimensions (W x D x H)	Base unit: 14.6 x 18.6 x 20.2 cm Optics unit: 13.2 x 15.2 x 3.8 cm
Output signal	0–1 V analog (impedance 150 Ω)		
Operating temperature	4–40°C		
Flow cell	Optical path 2 mm, internal volume 80 µl, illuminated volume 3 µl		

For More Information
Web: www.bio-rad.com/modelem1

Ordering Information

Catalog #	Description
731-8160	**Model EM-1 Econo UV Monitor**, 100/120 V, includes control module, optics module, filters for 254 and 280 nm wavelengths, system cable 4, fittings kit
731-8162	**Model EM-1 Econo UV Monitor**, 220/240 V
Accessories	
731-8168	**Model EM-1 Optics Module Assembly**
731-8165	**UV Flow Cell**, replacement
731-8166	**Lamp**, replacement
731-8167	**Filter Assembly**, 254 and 280 nm

Model EG-1 Econo™ Gradient Monitor

Conductivity monitoring is essential in optimizing protein purification methods and confirming the efficiency of chromatographic separations.



Specifications

Operating mode	Conductivity, in Siemens
Sensitivity ranges (full scale)	0–10 µS, 0–100 µS, 0–10 mS
Dimensions	
Control unit (W x L x H)	15.60 x 22.86 x 8.89 cm
Flow cell	3.1 cm diameter by 3.8 cm length
Flow Cell	
Type	Flowthrough, externally mounted
Temperature compensation	0–60 µC
Internal volume	8 µl, swept volume
Maximum operating pressure	60 psi, 4 bar, or 0.41 mPa
Fittings	Removable luer (will also accept 1/4–28 flat bottom fittings)

For More Information
Web: www.bio-rad.com/modeleg1

Ordering Information

Catalog #	Description
731-8154	**Model EG-1 Econo Gradient Monitor**, includes 100/120 V (U.S.) power adaptor, flow cell, system cable 4
731-8150	**Model EG-1 Econo Gradient Monitor**, includes flow cell, system cable 4; does not include power adaptor
Accessories	
731-8270	**Power Adaptor**, 100/120 V, for U.S., Canada, Japan, Mexico, Taiwan, and Latin America
731-8271	**Power Adaptor**, 220/240 V, for Europe (except UK) and other countries not specifically listed
731-8272	**Power Adaptor**, 220/240 V, for UK, Australia, and New Zealand
731-8155	**Conductivity Flow Cell**

*The Model EG-1 Econo gradient monitor requires a power adaptor; see options listed under Accessories.

Profinia™ Automated Protein Purification System

The Profinia protein purification system is a compact, easy-to-use, automated liquid chromatography system for the purification and desalting of affinity-tagged proteins and antibodies. The design allows you to set up quickly, walk away, and come back to results in as little as 30 minutes.

- Optimized preprogrammed methods, cartridges, and buffer kits eliminate time spent on method development, troubleshooting, and reagent preparation
- Built-in reproducibility is achieved with automated system pumps, UV and conductivity detectors, and programmed cleaning methods
- Histidine-tagged, GST-tagged, affinity, and desalting/buffer exchange methods deliver purity and yield in a fraction of the time required for other techniques
- Automatic UV peak detection diverts eluted target protein from cartridges to a fraction collection tube for unattended operation
- Fraction collection and sample compartments hold 15 or 50 ml conical collection tubes
- Benchtop or coldroom compatible. Optional cooling accessory keeps samples and fractions cold for benchtop operation
- Optional pH monitor

For More Information
Web: www.bio-rad.com/profinia
Request or download bulletins: 5541; for specific methods — 5513, 5514, 5712, 5741, 5744, 5766, and 5770



Profinia instrument components:
1. Buffer compartment.
2. Sample compartment.
3. Diluent bottle.
4. Fraction collection compartment.
5. Stylus and USB flash drive slots.
6. Waste collection bottle.
7. Cartridge compartment.
8. Touch screen user interface.

Summary of Methods and Materials Available for Profinia™ System Preprogrammed Purifications

Bio-Rad Method	Bio-Scale™ Mini Prepacked Cartridge	Profinia Buffer Kit
Native IMAC	Profinity™ IMAC	Native IMAC purification or buffer kit
Native IMAC with desalting	Profinity IMAC and Bio-Gel® P-6 desalting	Native IMAC purification or buffer kit
Denaturing IMAC	Profinity IMAC	Native IMAC purification or buffer kit plus urea
GST	Profinity GST	GST purification or buffer kit
GST with desalting	Profinity GST and Bio-Gel P-6 desalting	GST purification or buffer kit
Desalting	Bio-Gel P-6 desalting	Desalting and cartridge cleaning buffer kit
Proteins A and G	Affi-Prep® protein A or UNOsphere SUPrA™	See bulletin 5701 for buffer recommendations
Proteins A and G with desalting	Affi-Prep protein A and Bio-Gel P-6 desalting	See bulletin 5701 for buffer recommendations
Profinity eXact™	Profinity eXact	See bulletin 5725 for buffer recommendations
Profinity eXact with desalting	Profinity eXact and Bio-Gel P-6 desalting	See bulletin 5725 for buffer recommendations

Ordering Information

Catalog #	Description
Profinia Systems with Accessory Kit	
620-1005	**Profinia System with Native IMAC Starter Kit**, 100–240 V, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set, Profinia native IMAC buffer kit, 1 x 1 ml IMAC and 1 x 10 ml desalting cartridge, *E. coli* lysate
620-1006	**Profinia System with GST Starter Kit**, 100–240 V, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set, Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, *E. coli* lysate, glutathione reagent
Profinia Systems with Software and Accessory Kit	
620-1010	**Profinia System with Native IMAC Starter Kit**, 100–240 V, includes same as #620-1005 with Profinia software
620-1011	**Profinia System with GST Starter Kit**, 100–240 V, includes same as #620-1006 with Profinia software
Profinia Systems with Computers, Software, and Accessory Kit	
620-1015	**Profinia System with Native IMAC Starter Kit**, 100–240 V, includes same as #620-1010 with computer
620-1016	**Profinia System with GST Starter Kit**, 100–240 V, includes same as #620-1011 with computer

Profinia™ Software, Version 2.0

Profinia software, compatible with Windows XP, Windows Vista, and Windows 7, offers a convenient way to review purification results. Features include:*

- **Stand-alone data evaluation** — transfer data via a USB flash drive or USB cable connection to any stand-alone PC loaded with Profinia software; evaluate the run results, samples, run logs, and lot and method information in a convenient format
- **Real-time data acquisition** — monitor and record real-time data simply by connecting the Profinia instrument to a computer with a USB cable
- **Customizable chromatograms** — choose traces to analyze or to monitor; customize trace color and width as well as chromatogram size, view UV traces on separate or merged axes, and zoom in to regions of interest
- **Standard reports** — preview and print Profinia standard reports, which include summary information such as run information (start of run, duration, versions, username), result information, sample-specific results (total protein, concentration, loaded volumes), and corresponding chromatogram images
- **Custom reports** — select from a range of report elements, place them in any order, add comments, and preview before printing; in addition, custom reports can be saved to “Favorites” and viewed and printed directly from the toolbar
- **Trace compare** — with automatic layout suggestions, compare up to 10 runs at a time
- **Trace overlay** — overlay traces of different runs

For More Information
Web: www.bio-rad.com/profinia
Request or download bulletin: 5544

* Profinia software does not run or control the Profinia instrument.

Ordering Information

Catalog #	Description
620-0010	**Profinia Software**, version 2.0, includes USB cable

Profinia™ Accessories

- **Profinia instrument accessory kit** — plasticware to operate and complete purification runs; includes buffer bottles (125 and 250 ml) with lids, waste and diluent bottles, a cleaning tray, an inline filter pack, and 15 and 50 ml sample tube lids
- **Profinia pH monitor kit** — enables real-time monitoring of pH conditions during a sample run; connected via a standard pH probe connector, the kit includes the pH probe, flow cell, and all tubing and accessories required to connect to the Profinia system. pH monitoring is fully supported by the Profinia system and optional Profinia software
- **Profinia instrument cooling accessory** — allows you to work with temperature-sensitive proteins for sample loading and collection without having to work in a coldroom or use a refrigeration unit. Just fill the accessory with water and freeze until ready to use. The accessory can maintain precooled samples and fractions at 2–8°C for 5–6 hrs at 20°C room temperature with the instrument powered up and operating
- **Profinia desalting sample loops** — desalting methods are designed for rapid desalting or buffer exchange applications and require that a desalting loop accessory be used in conjunction with a desalting cartridge. A syringe and three-way stopcock combination is used to fill the desalting loop, which is available in 2 and 10 ml sizes. Luer fittings allow easy installation onto the Profinia instrument



Profinia Instrument Accessory Kit

- **Profinia sipper tube replacement kit** — sipper tubes are used in the buffer and sample inlet compartments. The replacement kit includes ten pieces of precut, 13.5 cm (5.3") long chemically compatible polypropylene tubing
- **Profinia instrument inline filter pack** — consists of 12 filters and is a necessary part of the Profinia system's general maintenance regimen. The instrument inline filter should be replaced at regular intervals to keep the system running at its optimal level
- **Bottle starter pack** — includes 4 x 125 ml buffer bottles, 4 x 250 ml buffer bottles, and 8 buffer bottle lids

Ordering Information

Catalog #	Description
620-0401	**Profinia Instrument Cooling Accessory**, includes 2 cooling units
620-0411	**Profinia pH Monitor Kit**, includes pH electrode, flow cell, mounting accessories
620-0402	**Profinia Desalting Sample Loop**, 2 ml loop, 10 ml syringe, fittings
620-0403	**Profinia Desalting Sample Loop**, 10 ml loop, 10 ml syringe, fittings
620-0404	**Profinia Instrument Inline Filter Pack**, includes 12 filters
620-0405	**Profinia Sipper Tube Replacement Kit**, includes 10 pieces of precut tubing
620-0410	**Profinia Instrument Accessory Kit**, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set
620-0231	**Bottle Starter Pack**, includes 4 x 125 ml buffer bottles, 4 x 250 ml buffer bottles, 8 buffer bottle lids

Process-Scale Separations

Bio-Rad has extensive experience serving the separation technology community, supplying process media and process-scale chromatography equipment that offer optimal solutions to your separation needs. To order Bio-Rad process-scale columns and accessories, contact your local Bio-Rad sales representative.

Process Media Selection Guide

Media	Available in Process-Scale Page #	Foresight™ Prepacked Columns and Plates Page #	Bottled Media Sampling Kit Page #	Other Prepacked Columns Page #
Affinity				
Profinity™ IMAC	47			70
UNOsphere SUPrA™ rProtein A	53		63	70
Affi-Prep® protein A	54			70
Affi-Gel® 10/15	58			
Affi-Gel Blue	55			70
DEAE Affi-Gel Blue	55			70
CM Affi-Gel Blue	56			
Affi-Prep polymyxin	57			
Affi-Gel boronate	56			
Affi-Gel HZ	59			
Affi-Gel 102	59			
Analytical Grade Resins				
AG® 1, 4	39			
AG 50W	39			
AG 501	39			
Chelex®	39			
Hydrophobic Interaction				
Macro-Prep® methyl HIC	62			
Macro-Prep t-butyl HIC	62			
Ion Exchange				
Nuvia™ S	35	69		
Nuvia Q	35	69		
UNOsphere™ Q	35	69	63	70
UNOsphere S, Rapid S	35	69	63	70
Macro-Prep High Q	37		63	70
Macro-Prep 25 Q	37			
Macro-Prep DEAE	37		63	70
Macro-Prep High S	37		63	70
Macro-Prep 25 S	37			
Macro-Prep CM	37			
Mixed-Mode				
Nuvia™ cPrime™	43	69	43	69
CHT™ Type I	44	69	63	70
CHT Type II	44	69	63	70
Bio-Gel® HT/HTP	46			
CFT™ Type II	45		63	70
Size Exclusion				
Bio-Gel P	60			70
Bio-Gel A	61			
Bio-Beads™ S-X	61			

For product applications and descriptions, please refer to the chromatography media selection guide on pages 33–34.

Process-Scale Chromatography Media

Nuvia S and Q media — the Nuvia family of chromatography media consists of next generation ion-exchange products built on a proven rigid polymeric base matrix. The media offer superior flow properties and low nonspecific binding while delivering high capacity and unique selectivity. Nuvia media bring together a unique set of properties specifically designed to meet the demands of current and future downstream processes. Nuvia media are flexible and robust with a large operational window making them an alternative to costly capture steps for IgG and other therapeutic proteins. The media can also be used as an effective intermediate and final polish step for the removal of common downstream impurities.

For More Information
Web: www.bio-rad.com/nuvia
Request or download bulletins: 5984, 5987, 6128, and 6129

UNOsphere media — specialized for fast mass transfer, UNOsphere media deliver high binding capacity at high flow rates while maintaining low backpressure. These robust polymeric media formed by single-step polymerization carry either ionic (UNOsphere Q, S, and Rapid S) or affinity (UNOsphere SUPrA) functionality, making them ideal for the efficient purification of biopharmaceutical molecules from feedstream at any stage of the downstream process.

For More Information
Web: www.bio-rad.com/processIEX

Macro-Prep media — polymeric methacrylate media are available with strong or weak ion exchange functionalities. These rigid macroporous hydrophilic media provide excellent dynamic binding capacity, resolution, and throughput at high flow rates for the purification of biomolecules. Macro-Prep media are an excellent choice for process-scale applications such as blood fractionation purification.

For More Information
Web: www.bio-rad.com/processIEX

CHT ceramic hydroxyapatite media — CHT is a robust mixed-mode media with unique separation properties that delivers exceptional selectivity for purification of biomolecules. As a proven scalable polishing step in mAb and vaccine purification, CHT effectively eliminates common feedstream contaminants, such as aggregates, leached protein A, DNA, and host cell proteins, in a single step. This provides you the flexibility to maximize your process economics. Use CFT ceramic fluoroapatite for protein separations requiring acidic-buffered conditions.

For More Information
Web: www.bio-rad.com/processCHT

NEW **Nuvia cPrime media** — these media are designed for process-scale purification of a wide variety of therapeutic proteins. The unique selectivity allows method developers to use hydrophobic and cation exchange interaction modes to achieve effective purification. The media has a large design space for binding and elution, allowing for the development of highly robust methods in a commercial manufacturing setting. Nuvia cPrime is built on a rigid, mechanically and chemically stable macroporous base matrix with a particle size optimized to deliver exceptional flow properties, fast mass transfer, and stability.

For More Information
Web: www.bio-rad.com/nuvia

CFT ceramic fluoroapatite media — this chemically pure form of fluoroapatite is a rigid, spherical, and macroporous media used in the purification of biologically significant compounds. It is ideally suited for the bioprocessing industry. CFT can be used under stringent conditions to separate acidic proteins requiring buffered conditions as low as pH 5.6. CFT has high binding capacity and may be used reproducibly over an extended number of chromatography runs. When CFT is used, process engineers can perform purifications across a range of lower pH values to obtain optimal and reproducible results for the targeted biomolecule.

For More Information
Web: www.bio-rad.com/processCFT

AG media — AG resins are a highly referenced and extensively used line of chromatography media for the separation of low molecular weight molecules, such as inorganic ions, organic acids, peptides, and carbohydrates, from biopharmaceutical preparations and ancillary buffers used in biomanufacturing. They are highly processed to remove impurities. Biotechnology-grade AG resins are further treated to reduce bioburden to extremely low levels, making them suitable for process-scale purification of biopharmaceuticals.

For More Information
Web: www.bio-rad.com/processAG

Chelex media — these unique chelating resins bind polyvalent cations with high selectivity and are used to remove metal ions from samples and buffers. They are extensively used in environmental applications, such as glyphosate isolation. Chelex resins are made from a styrene divinylbenzene support coupled to paired iminodiacetate ions.

For More Information
Web: www.bio-rad.com/processAG

Bio-Beads SM-2 media — nonpolar polystyrene-based media for hydrophobic interaction chromatography, Bio-Beads are used extensively for the removal of nonpolar detergents from biological preparations for manufacturing at both laboratory- and process-scale. The media are reusable and can be easily cleaned with alcohol solutions followed by a distilled water rinse.

For More Information
Web: www.bio-rad.com/processHIC

New Foresight™ Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography media, offering process scientists convenience and reliability for their high-throughput experimentation needs. Their robust design allows process scientists to use the prepacked formats through the entire purification development cycle from high-throughput media screening and small-scale methods development to scale-up optimization.

- Prepacked and ready-to-use formats designed to save process development time
- Different experimental conditions can be evaluated to better define an operational window
- High-throughput experiments with minimal sample requirements can be performed
- Available in a variety of chromatography media modes designed for large-scale bioprocess
- Compatible with robotic liquid handling workstations

For More Information
Web: www.bio-rad.com/foresight



Chromatography Media Available in Foresight Formats

Chromatography Media	Mode
UNOsphere Q	Strong anion
UNOsphere S	Strong cation
UNOsphere Rapid S	Strong cation
Nuvia Q	Strong anion
Nuvia S	Strong cation
Nuvia cPrime	Mixed-mode hydrophobic: cationic
CHT Type I — 40 µm particle size	Mixed-mode metal affinity: cationic
CHT Type II — 40 µm particle size	Mixed-mode metal affinity: cationic

Ordering Information

Catalog #	Description
Foresight Plates*	
732-4714	**Foresight UNOsphere Q**, 20 µl
732-4710	**Foresight UNOsphere S**, 20 µl
732-4712	**Foresight UNOsphere Rapid S**, 20 µl
732-4703	**Foresight Nuvia Q**, 20 µl
732-4701	**Foresight Nuvia S**, 20 µl
732-4705	**Foresight Nuvia cPrime**, 20 µl
732-4716	**Foresight CHT Type I**, 40 µm, 20 µl
732-4718	**Foresight CHT Type II**, 40 µm, 20 µl

Description	1 ml	5 ml
Foresight Columns		
Foresight UNOsphere Q	732-4732	732-4752
Foresight UNOsphere S	732-4730	732-4750
Foresight UNOsphere Rapid S	732-4731	732-4751
Foresight Nuvia Q	732-4721	732-4741
Foresight Nuvia S	732-4720	732-4740
Foresight Nuvia cPrime	732-4722	732-4742
Foresight CHT Type I, 40 µm	732-4735	732-4755
Foresight CHT Type II, 40 µm	732-4736	732-4756

Description	200 µl	600 µl
Foresight RoboColumn Units,***		
Foresight UNOsphere Q RoboColumn Unit	732-4819	732-4820
Foresight UNOsphere S RoboColumn Unit	732-4813	732-4814

continues

Ordering Information

Description	200 µl	600 µl
Foresight RoboColumn Units,*** (cont.)**		
Foresight UNOsphere Rapid S RoboColumn Unit	732-4816	732-4817
Foresight Nuvia Q RoboColumn Unit	732-4804	732-4805
Foresight Nuvia S RoboColumn Unit	732-4801	732-4802
Foresight Nuvia cPrime RoboColumn Unit	732-4807	732-4808
Foresight CHT Type-I, 40 µm RoboColumn Unit	732-4822	732-4823
Foresight CHT Type-II, 40 µm RoboColumn Unit	732-4825	732-4826

* Package size: 2 x 96-well plates.
** Package size: 1 row of 8 columns.
*** Foresight RoboColumn Units are to be used with robotic liquid handling workstations.

For more information on prepacked columns and plates please visit **www.bio-rad.com/foresight**.

Bio-Rad Process Columns

Bio-Rad offers two different types of columns to meet the needs of process separations:

- Bio-Rad® EasyPack™ column, which is an open column design
- Bio-Rad® InPlace™ column, which can be operated in a contained system to allow all operations (for example, filling, packing, unpacking, and cleaning) in place

The columns are designed for industrial applications and are chemically resistant to solvents and reagents. All Bio-Rad process columns have the same basic design, using axial compression, flow packing, or a combination of both, and are directly scalable from internal diameters of 100/180–1,400 mm. Special designs up to 2,000 mm are available on request.

For More Information
Web: www.bio-rad.com/processcolumns
Request or download bulletins: 5663, 5665, 5739, 6042, 6061, and 6091



Bio-Rad EasyPack Column



Bio-Rad InPlace Column

Bio-Rad Process Systems

Bio-Rad Process Skid 00

This versatile skid is a benchtop system for small-scale manufacturing processes. Possessing the dimensions of a pilot system, the skid 00 has a flow rate of 5–120 L/hr and is recommended for columns 70–300 mm in diameter.

Bio-Rad Process Skids 01–05

Bio-Rad skids integrate different components required for process chromatography into a core platform; skids 01–05 are available with upgrades according to customer requirements.

For More Information
Web: www.bio-rad.com/processskid
Request or download bulletins: 5488, 5657, 5662, 5997, 6043, and 6108



Bio-Rad Process Chromatography Skid 00



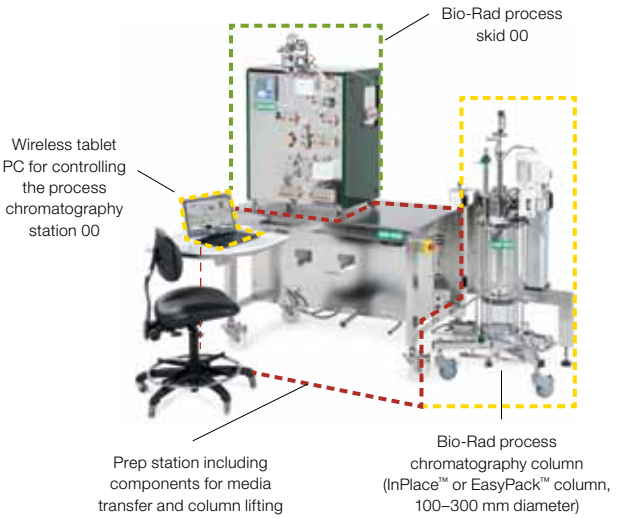
Bio-Rad Process Chromatography Skid

Bio-Rad Process Chromatography Stations 00–02

The Bio-Rad Process Chromatography Station 00 is an all-in-one instrument that includes the process skid 00, a process column with column ID between 100–300 mm, and a prep station with pivoting table. The prep station integrates components for media transfer and resuspension as well as for column lifting. A wireless tablet PC and software are included to fully control the chromatography station in manual and automatic modes. The equipment is scale-up enabled to the Bio-Rad Process Chromatography Stations 01 and 02.

For more information on Bio-Rad process chromatography hardware, please visit **www.bio-rad.com/process** to download the following items:

Bio-Rad Process Chromatography Station 00 Components



Process Chromatography Columns

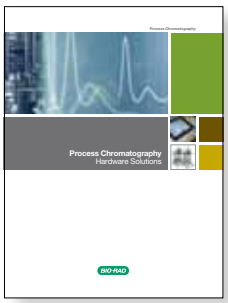
Bulletin	Description
5663	Bio-Rad® InPlace™ Columns Product Information Sheet
5665	Bio-Rad® EasyPack™ Columns Product Information Sheet
6042	Bio-Rad InPlace Control Console Product Information
6091	Innovative Features of Bio-Rad InPlace Chromatography Columns Simplify Packing Procedures for Any Media
5739	Packing and Slurry-in-Place Procedures for CHT™ Ceramic Hydroxyapatite Using a Bio-Rad InPlace Process-Scale Chromatography Column
6061	Sanitization of a Packed Bed in the Bio-Rad InPlace Process Chromatography Column

Process Chromatography Skids

Bulletin	Description
6043	Bio-Rad Chromatography Station 00 Product Information
5997	Bio-Rad Process Chromatography Skid 00 Product Information Sheet
6108	Sanitization of the Bio-Rad Process Chromatography Skid 00
5657	Bio-Rad Process Chromatography Skid Product Information Sheet
5662	Process Chromatography Applications Laboratory Brochure
5488	State-of-the-Art Solutions for Process-Scale Chromatography

Process Chromatography Hardware Accessories

Bulletin	Description
5661	Bio-Rad Media Transfer Device
5659	Bio-Rad MainFrame™ Lifting Accessory Product Information Sheet
5614	Bio-Rad Bubble Trap Product Information Sheet
5618	Pressure Gauge Product Information Sheet
5620	Bio-Rad Media Slurry Tank Product Information Sheet
5619	Pressure Relief Valve Product Information Sheet
5616	Liquid Pump for Inflatable Seals Product Information Sheet



For more information, view the Bio-Rad Process Hardware Chromatography Solutions ebook at **www.bio-rad.com/processhardwarebook**.

Electrophoresis and Blotting

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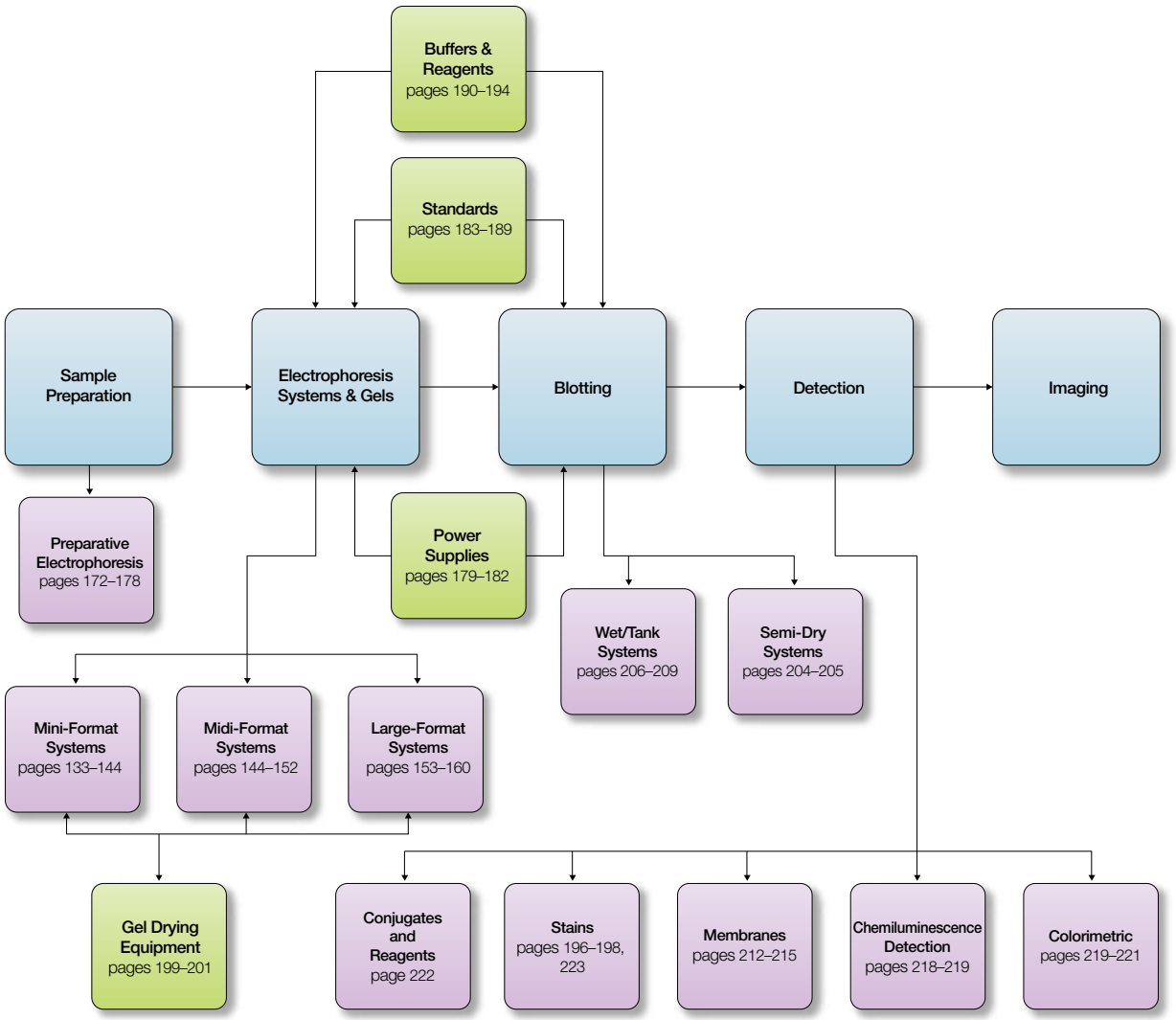
Electrophoresis and Blotting Solutions

Bio-Rad offers a complete solution for all of your electrophoresis and blotting needs, from sample preparation to imaging. Built on over 50 years of pioneering expertise, our innovative products offer reliable, reproducible results for all of your applications.

Protein Electrophoresis

A complete suite of electrophoresis products, from cells and precast gels to buffers and reagents, is available for the separation of proteins.

Learn More About the Technology
Web: www.bio-rad.com/tech/proteinelectro



Overview of Vertical Gel Electrophoresis Systems

The Mini-PROTEAN®, Criterion™, PROTEAN® II, and PROTEAN® Plus systems all consist of electrophoresis cells and blotting equipment. These systems provide:

- A choice of four size formats with options to meet your specific needs for resolution, capacity, and processing speed
- Cell designs that eliminate current leakage to provide the most reproducible gels and consistent run times
- Dodeca™ cells for high-throughput 2-D separations in mini-, midi-, and large-format gel sizes

Vertical Electrophoresis System Selection Guide

	Mini-PROTEAN System	Criterion System (Midi)	PROTEAN II System (Large)	PROTEAN Plus System (Large)
				
Advantages	Run 1–4 precast or handcast gels in mini format Wing clamp assembly allows easy, fast setup and leak-free operation Minimize reagent cost and waste Fastest turnaround of 2-D data for 2-D-in-a-day capability Useful for discovery projects and for evaluating sample preparation conditions	Fast setup with drop-in gel and cell design (precast or handcast) Run 1–2 precast Criterion or handcast gels Integrated upper buffer chamber ensures leak-free operation Optimal combination of pI separation and fast run times Capability for <1 hr 2-D runs for 2-D-in-a-day results	Large format gel system offers greater resolution over smaller formats and can be used with handcast gels Versatility to perform 1-D or 2-D gel electrophoresis Can accommodate up to 4 gels and is available in xi or XL format for running a variety of gel sizes Multi-cell is available for running up to 6 gels	Offers maximum resolution in a single gel and the longest range of MW separation The PROTEAN Plus Dodeca cell offers a high level of throughput (with the ability to run up to 12 gels)
Compatible Gel Formats				
Precast	Mini-PROTEAN precast gels (pages 137–139) Ready Gel® precast gels (pages 140–142)	Criterion, Criterion TGX, and Criterion XT precast gels (pages 146–150)		
Handcast	Mini-PROTEAN empty cassettes (pages 142–143) Mini-PROTEAN casting plates (page 144)	Criterion empty cassettes (pages 150–151)	PROTEAN II casting plates (page 156)	PROTEAN Plus casting equipment (page 159–160)
Electrophoresis Cells	Mini-PROTEAN Tetra (pages 133–134) Mini-PROTEAN 3 Dodeca (page 136)	Criterion (pages 144–145) Criterion Dodeca (page 145)	PROTEAN II xi/XL (pages 153–154) PROTEAN II xi/XL multi-cells (pages 155, 157)	PROTEAN Plus Dodeca (page 158)

continues

Vertical Electrophoresis System Selection Guide (cont.)

	Mini-PROTEAN System	Criterion System	PROTEAN II System	PROTEAN Plus System
Gel Dimensions (W x L x thickness)	Mini-PROTEAN precast gels: 8.6 x 7.2 x 0.1 cm Ready Gel precast gels: 8.3 x 6.4 x 0.1 cm	Criterion precast gels: 13.3 x 8.7 x 0.1 cm		
Gel Cassette Dimensions (W x L)	10.0 x 8.0 cm	15.0 x 10.6 cm	20.0 x 18.3 cm	18.5 x 20.5 cm 20.0 x 20.5 cm 25.0 x 20.5 cm
Compatible Transfer Systems				
Wet/tank transfer	Mini Trans-Blot® cell (page 206) Criterion blotter (page 207) Trans-Blot® cell (page 208)	Criterion wire blotter (page 207) Criterion plate blotter (page 207) Trans-Blot cell (page 208) Trans-Blot Plus cell (page 209)	Trans-Blot cell (page 208) Trans-Blot Plus cell (page 209)	Trans-Blot Plus cell (page 209)
Semi-dry transfer	Trans-Blot SD cell (page 205) Trans-Blot Turbo (page 204)	Trans-Blot SD cell (page 205) Trans-Blot Turbo (page 204)	Trans-Blot SD cell (page 205)	

Precast Gels

Bio-Rad offers a broad range of precast gels including two size formats of polyacrylamide gels for a number of vertical protein and nucleic acid electrophoresis applications, and one set of agarose gels for horizontal nucleic acid electrophoresis. These gels are part of complete systems of compatible electrophoresis and blotting cells. Refer to the following table to select the appropriate gel type and buffers for your polyacrylamide gel–based applications.

Availability of Precast Gel Types Based on Application

Gel Type	Mini-PROTEAN	Ready Gel	Criterion	Application	Sample Buffer	Running Buffer
TGX™	•		•	SDS-PAGE Native PAGE	Laemmli Native	Tris/glycine/SDS Tris/glycine
Tris-HCl		•	•	SDS-PAGE Native PAGE	Laemmli Native	Tris/glycine/SDS Tris/glycine
Stain-Free™	•		•	SDS-PAGE Native PAGE	Laemmli Native	Tris/glycine/SDS Tris/glycine
Bis-Tris			•	SDS-PAGE for small to large proteins	XT	XT MOPS or XT MES
Tris-acetate	•		•	SDS-PAGE for large proteins Native PAGE	XT Native	XT Tricine Tris/glycine
Tris-Tricine	•		•	SDS-PAGE for peptides, small proteins	Tricine	Tris/Tricine/SDS
IEF		•	•	IEF	IEF	Anode and cathode buffer
TBE	•		•	dsDNA separation	Nucleic acid	Tris/boric acid/EDTA
TBE-urea	•	•	•	ssDNA and RNA separation	TBE-urea	Tris/boric acid/EDTA
Zymogram		•	•	Protease detection	Zymogram	Tris/glycine/SDS

In general, single-percentage gels will best separate bands that are close in MW. If your sample contains a broad range of MWs, a gradient gel allows both high- and low-MW bands to be resolved on the same gel. Molecules with a range of sizes can be separated on linear gradient gels because the larger pore sizes allow resolution of larger molecules, while pore sizes that decrease towards the bottom of the gel restrict excessive separations of small molecules.

Mini-Format 1-D Electrophoresis Systems

The Mini-PROTEAN® system includes the four-gel Mini-PROTEAN Tetra cell and the high-throughput Mini-PROTEAN® 3 Dodeca™ cell (for running up to 12 gels). The systems are compatible with handcast or precast gels.

Mini-PROTEAN® Tetra Cell

The Mini-PROTEAN Tetra cell is ideal for vertical mini gel electrophoresis. This electrophoresis cell accommodates 1–4 precast or handcast gels. Easy to assemble, the Mini-PROTEAN Tetra cell has a patented sealing mechanism* that prevents assembly errors. The Mini-PROTEAN Tetra cell offers the following advantages:

Loading and Running

- Patented sample loading guides** prevent skipped or repeated loading lanes
- Cell runs up to four gels (10.0 x 8.3 cm) using two running modules

Modular Cells for Many Applications

- Interchangeable modules convert a Mini-PROTEAN Tetra cell into a Mini Trans-Blot® electrophoresis transfer cell for western blotting

Gel Casting

- Ground glass plates with permanently bonded spacers and improved casting gaskets guarantee perfect alignment and leakproof casting
- Casting frames*** with simple cam closure provide precision alignment on any flat surface
- Side-by-side casting stand*** allows access to both gels simultaneously and the spring-loaded lever creates a tight seal against the silicon rubber gasket
- Plastic combs*** do not inhibit polymerization and have built-in ridges to eliminate air contact during gel casting for uniform gel polymerization
- Glass plates and combs are labeled with thickness and number of wells for instant identification
- Thick glass spacer plates reduce breakage

Configuring Your Own Electrophoresis Cell

You can choose one of the preset configurations by ordering #165-8000 (10-well, 0.75 mm) or #165-8001 (10-well, 1.0 mm). To configure your own electrophoresis cell, order the Mini-PROTEAN Tetra cell (#165-8004) and select a casting module from the ordering information (see page 135).

For More Information
Web: www.bio-rad.com/tetra
Request or download bulletin: 5535

Mini-PROTEAN Tetra cell components:
1. Lid and tank.
2. Combs.
3. Ready Gel® precast gels.
4. Mini-PROTEAN® TGX™ precast gels.
5. Gel releasers.
6. Spacer plates.
7. Short plates.
8. Sample loading guides.
9. Casting frame.
10. Casting stand.



Mini Trans-Blot electrophoresis transfer cell components:
1. Lid.
2. Tank.
3. Electrode assembly.
4. Companion running module.
5. Mini Trans-Blot module.



See Also

PowerPac Basic and PowerPac HC power supplies: page 181.

Premixed buffers and buffer reagents: pages 190–191.

Mini-PROTEAN precast gels: pages 137–139.

*U.S. patents 6,436,262, **5,656,145, and ***6,162,342.

Maximum Sample Volume per Well for Mini-PROTEAN Tetra Combs

Number or Type of Wells	Well Width (mm)	Comb Thickness 0.75 mm	1.0 mm	1.5 mm
5	12.70	70 µl	105 µl	160 µl
9	5.08	33 µl	44 µl	66 µl
10	5.08	33 µl	44 µl	66 µl
15	3.35	20 µl	26 µl	40 µl
IPG	6.20	—	420 µl	730 µl
Prep/2-D				
Reference well	3.10	13 µl	17 µl	30 µl
Sample well	67.44	310 µl	400 µl	680 µl

Specifications

Number of gels	1–4	Total buffer volume for 2 gels	700 ml
Precast gels	Mini-PROTEAN and Ready Gel	Total buffer volume for 4 gels	1,000 ml
Handcast gels	Cast using Mini-PROTEAN spacer plates	Typical run times for SDS-PAGE	35–45 min (at 200 V constant)
Cassette size (W x L)	Precast: 10.0 x 8.3 cm	Recommended power supply	See Power Supplies Selection Guide, p. 179
Glass plate size (W x L)	Short plate: 10.1 x 7.3 cm Spacer plate: 10.1 x 8.2 cm	Dimensions (W x L x H)	12.0 x 16.0 x 18.0 cm
		Weight	1 kg (2.2 lb)

Ordering Information

Catalog #	Description
165-8000	**Mini-PROTEAN Tetra Cell**, 10-well, 0.75 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
165-8001	**Mini-PROTEAN Tetra Cell**, 10-well, 1.0 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
165-8002*	**Mini-PROTEAN Tetra Cell**, 10-well, 0.75 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam
165-8003*	**Mini-PROTEAN Tetra Cell**, 10-well, 1.0 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam
165-8004	**Mini-PROTEAN Tetra Cell for Mini Precast Gels**, 4-gel system includes electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
165-8005*	**Mini-PROTEAN Tetra Cell for Mini Precast Gels**, 2-gel system includes electrode assembly, tank, lid with power cables, mini cell buffer dam
165-8006	**Mini-PROTEAN Tetra Cell**, 10-well, 1.5 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
165-8007*	**Mini-PROTEAN Tetra Cell**, 10-well, 1.5 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam
Mini-PROTEAN Tetra Systems	
165-8025	**Mini-PROTEAN Tetra Cell and PowerPac Basic Power Supply**, includes #165-8001 and #164-5050
165-8026	**Mini-PROTEAN Tetra Cell and PowerPac Universal Power Supply**, includes #165-8001 and #164-5070
165-8027	**Mini-PROTEAN Tetra Cell and PowerPac HC Power Supply**, includes #165-8001 and #164-5052
165-8028	**Mini-PROTEAN Tetra Cell and PowerPac HV Power Supply**, includes #165-8001 and #164-5056
165-8029	**Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module**, includes #165-8001 and #170-3935
165-8030	**Mini-PROTEAN Tetra Cell for Mini Precast Gels and Mini Trans-Blot Module**, includes #165-8004 and #170-3935
165-8033	**Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply**, includes #165-8001, #170-3935, and #164-5050
165-8034	**Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply**, includes #165-8004, #170-3935, and #164-5050
165-8035	**Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply**, includes #165-8001, #170-3935, and #164-5052
165-8036	**Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply**, includes #165-8004, #170-3935, and #164-5052

continues

Ordering Information

Description	0.75 mm	1.0 mm	1.5 mm
Casting Modules**			
5-Well	165-8008	165-8013	165-8019
9-Well	165-8009	165-8014	165-8020
10-Well	165-8010	165-8015	165-8021
15-Well	165-8011	165-8016	165-8022
Prep/2-D Well	165-8012	165-8017	165-8023
IPG Well	—	165-8018	165-8024
Mini-PROTEAN Combs (5) for Hand Casting with Glass Plates			
5-Well	165-3352	165-3357	165-3363
9-Well	165-3353	165-3358	165-3364
10-Well	165-3354	165-3359	165-3365
15-Well	165-3355	165-3360	165-3366
Prep/2-D + 1 Reference Well	165-3356	165-3361	165-3367
IPG Well	—	165-3362	165-3368

Catalog #	Description
Hand Cast Gel Accessories and Replacement Parts	
165-8051	**Mini-PROTEAN Tetra Cell Casting Stand**, 2 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
165-8052	**Mini-PROTEAN Tetra Cell Casting Stand**, 1 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
165-3303	**Mini-PROTEAN Casting Stand with Gaskets**
165-3304	**Mini-PROTEAN Casting Frame**
165-3305	**Mini-PROTEAN Casting Stand Gaskets**, replacement, 2
165-3308	**Short Plates**, 5
165-3149	**Replacement Gaskets**, for electrophoresis clamping frame, green, 2
165-3310	**Spacer Plates with 0.75 mm Integrated Spacers**, 5
165-3311	**Spacer Plates with 1.0 mm Integrated Spacers**, 5
165-3312	**Spacer Plates with 1.5 mm Integrated Spacers**, 5
Other Replacement Parts and Accessories	
165-8037	**Mini-PROTEAN Tetra Electrode Assembly**
165-8038	**Mini-PROTEAN Tetra Companion Running Module**
165-8039	**Buffer Tank**, replacement
165-8040	**Buffer Tank and Lid**, replacement
165-8041	**Cell Lid with Power Cables**
165-3201	**Sample Loading Guide**, 9-well (red)
165-3146	**Sample Loading Guide**, 10-well (yellow)
165-3203	**Sample Loading Guide**, 12-well (green)
165-3132	**Sample Loading Guide**, 15-well (blue)
165-3130	**Mini Cell Buffer Dams**, 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
165-3320	**Gel Releasers**, 5

* The 2-gel systems do not include the companion running module.

** Each casting module includes 2 casting stands, 4 casting frames, 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), and the appropriate sample loading guide.

See Also

PowerPac HC power supply: page 181.

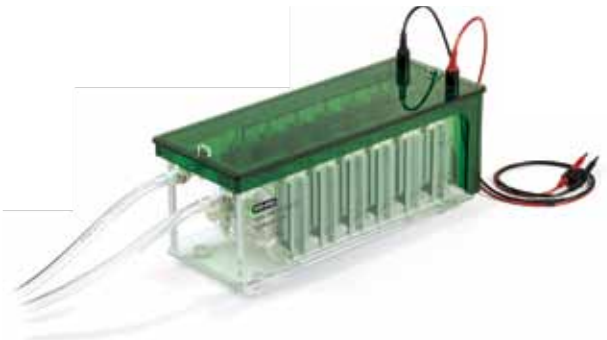
Mini-PROTEAN precast gels: pages 137–139.

AnyGel stands: pages 142–143.

Mini-PROTEAN® 3 Dodeca™ Cell

The Mini-PROTEAN 3 Dodeca cell runs up to 12 mini gels under identical conditions in just 35 minutes. Eliminate gel-to-gel variation by hand casting gels 12 at a time using the Mini-PROTEAN 3 multi-casting chamber (see pages 143–144) and Model 485 gradient former (see pages 143–144). Alternatively, use precast gels. Features of the Mini-PROTEAN 3 Dodeca cell include:

- Built-in cooling coil to prevent overheating
- Stirbar capability helps maintain uniform buffer tank temperatures for run reproducibility
- Easy assembly facilitated by a patented* electrophoresis clamping frame
- Convenient buffer draining via the built-in quick-connect drain port



For More Information
Web: www.bio-rad.com/dodeca
Request or download bulletin: 2571

Specifications

Number of gels	1–12
Precast gels	Mini-PROTEAN and Ready Gel®
Handcast gels	Cast using Mini-PROTEAN 3 spacer plates and the Mini-PROTEAN 3 multi-casting chamber
Cassette size (W x L)	10.0 x 8.3 cm
Gel thickness	0.5, 0.75, 1.0, or 1.5 mm (precast gels are available only in 1.0 mm)
Total buffer volume	3.4–4.4 L
Typical running conditions	200 V constant, 600 mA, 120 W maximum
Cooling	Built-in cooling coil attaches easily to external refrigerated circulator (circulator must be purchased separately; recommended flow rate 10–15 L/min, recommended cooling capacity ≥250 W at 20°C)
Recommended power supply	PowerPac™ HC
Dimensions (W x L x H)	16.2 x 41.5 x 15.0 cm
Weight	5 kg (11 lb)

* U.S. patent 6,436,262.

Ordering Information

Catalog #	Description
165-4100	**Mini-PROTEAN 3 Dodeca Cell**, includes electrophoresis tank with built-in cooling coil, lid with power cables, 6 electrophoresis clamping frames, 2 buffer dams, drain line, 2 gel releasers
165-4101	**Mini-PROTEAN 3 Dodeca Cell with Multi-Casting Chamber**, same as #165-4100 with multi-casting chamber, 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve
165-5132	**Mini-PROTEAN 3 Dodeca Cell and 6-Row AnyGel Stand**, includes #165-4100 and #165-5131
Replacement Parts and Accessories	
165-4102	**Replacement Electrophoresis Clamping Frame**
165-3149	**Replacement Gaskets**, for electrophoresis clamping frame, green, 2
165-4103	**Lower Electrode Assembly with Platinum Wire**
165-4104	**Replacement Drain Line**
165-4105	**Replacement Cooling Coil**, includes connector tubing
165-2948	**Replacement Power Cables**, for lid
165-3320	**Gel Releasers**, 5
165-3130	**Mini Cell Buffer Dams**, 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
165-5131	**AnyGel Stand**, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Ready Gel mini gels

Mini-PROTEAN® Precast Gels

Mini-PROTEAN® TGX™ Precast Gels

Long shelf life Mini-PROTEAN TGX precast gels for PAGE accelerate electrophoresis and blotting while delivering superior performance. TGX gels maintain cooler temperatures at high voltages, allowing run times as short as 15 minutes. The gels are designed to provide Laemmli-like separation patterns using the standard Tris/glycine/SDS running buffer system. Mini-PROTEAN gels are compatible with the Mini-PROTEAN Tetra (1–4 gels) and Dodeca (1–12 gels) cells. These gels can also be used in the earlier Mini-PROTEAN 3 cell model.

Mini-PROTEAN TGX gels provide:

- Run times as short as 15 min
- Transfer times as short as 3 min with the Trans Blot® Turbo™ transfer system
- 12-month shelf life
- Laemmli format
- Inexpensive buffer system, low running costs
- Bottom-open cassette design for simple gel handling and blotting

Mini-PROTEAN® TGX Stain-Free™ Precast Gels

Mini-PROTEAN TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using the Gel Doc™ EZ or ChemiDoc™ MP imaging systems (see pages 259–260).

Mini-PROTEAN TGX Stain-Free precast gels eliminate the need for staining, reducing the time to results and improving the ease of downstream processing. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Mini-PROTEAN TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 20 min
- Sensitivity comparable to that of Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Capability of using the same gel for downstream western blotting, standard staining methods, and mass spectrometry analysis

Empty Cassettes for Hand Casting

Single-use empty Mini-PROTEAN cassettes are available to hand cast gels. For added convenience, cast your gels using AnyGel™ stands or the Mini-PROTEAN casting stand.

For More Information
Web: www.bio-rad.com/tgx
Request or download bulletins: 5535 and 5871



Mini-PROTEAN Gels

Mini-PROTEAN Tris-Acetate Precast Gels

- Formulated to provide superior separation of large MW proteins when run with Tricine running buffer
- The gels are made without SDS so they can also be used for native PAGE

Mini-PROTEAN Tris-Tricine Precast Gels

- Designed for separation of peptides and small proteins with MWs <10,000

Mini-PROTEAN IEF Precast Gels

- For the separation of proteins based on their net charge (pI) rather than MW
- IEF gels contain no denaturing agents, allowing one-dimensional separation under native conditions

Mini-PROTEAN TBE and TBE-Urea Precast Gels

- Ideal for the separation of DNA and RNA
- TBE gels are suitable for electrophoresis of nucleic acids from 50–2,000 bp
- TBE-urea gels are best suited for the separation of ssDNA and ssRNA between 60–200 bp

Mini-PROTEAN Zymogram Precast Gels

- Used for protease detection, the gels contain either casein, which is a substrate for various proteases, or gelatin
- Samples with proteolytic activity can be visualized as clear bands against a blue background after using Coomassie Brilliant Blue R-250 stain

For More Information
Web: www.bio-rad.com/mpgels

Gel Cassette Specifications

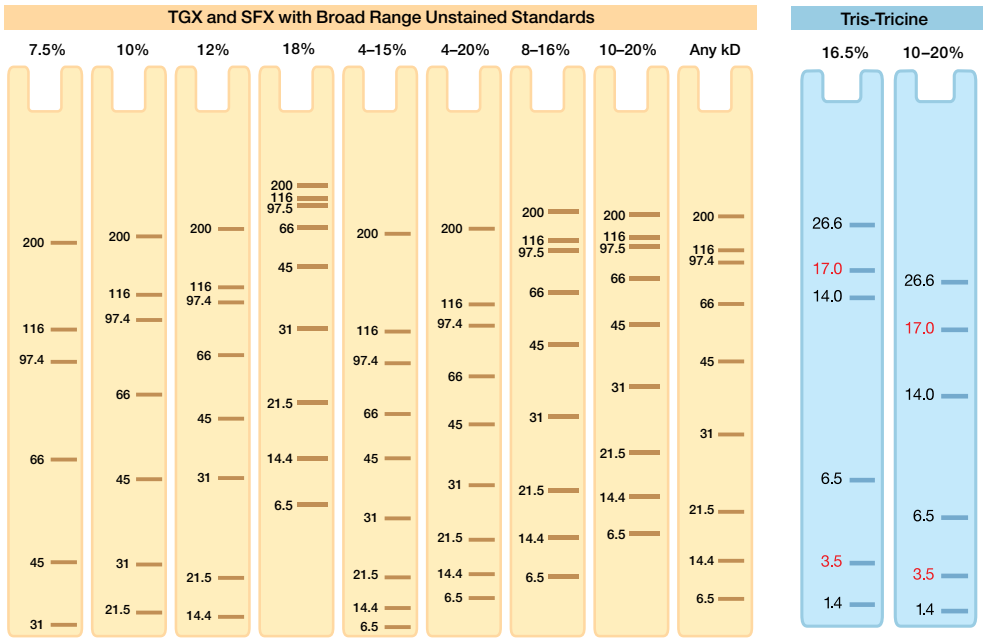
Gel dimensions (W x L x thickness)	86.0 x 72.0 x 1.0 mm
Gel cassette dimensions (W x L x thickness)	101.0 x 89.0 x 4.6 mm
Cassete material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze

Mini-PROTEAN Precast Gel Selection Guide

	TGX, TGX Stain-Free	Tris-Acetate	Tris-Tricine	IEF	TBE, TBE-Urea	Zymogram
Shelf Life at Recommended Temperature*	12 months	8 months	8–12 weeks	8–12 weeks	8–12 weeks	8–12 weeks
Recommended Buffers						
Sample (dilute 1:1 with sample)	Laemmli	Tricine	Tricine	IEF	Nucleic acid, TBE-urea	Zymogram
Running	Tris/glycine/SDS	Tris/Tricine/SDS	Tris/Tricine/SDS	IEF anode, IEF cathode	Tris/boric acid/EDTA (TBE)	Tris/glycine/SDS

* From date of manufacture.

Mini-PROTEAN Precast Gel Migration Charts



Ordering Information



Description	8+1-Well* 30 µl	10-Well 30 µl	10-Well 50 µl	12-Well 20 µl	15-Well 15 µl	IPG Well† 7 cm IPG Strip
Mini-PROTEAN TGX Precast Gels**						
7.5% Resolving Gel	456-1029	456-1023	456-1024	456-1025	456-1026	456-1021
10% Resolving Gel	456-1039	456-1033	456-1034	456-1035	456-1036	456-1031
12% Resolving Gel	456-1049	456-1043	456-1044	456-1045	456-1046	456-1041
18% Resolving Gel	456-1079	456-1073	456-1074	456-1075	456-1076	456-1071
4–15% Resolving Gel	456-1089	456-1083	456-1084	456-1085	456-1086	456-1081
4–20% Resolving Gel	456-1099	456-1093	456-1094	456-1095	456-1096	456-1091
8–16% Resolving Gel	456-1109	456-1103	456-1104	456-1105	456-1106	456-1101
10–20% Resolving Gel	456-1119	456-1113	456-1114	456-1115	456-1116	456-1111
Any kD Resolving Gel	456-9039	456-9033	456-9034	456-9035	456-9036	456-9031
Mini-PROTEAN TGX Stain-Free Precast Gels**						
7.5% Resolving Gel	456-8029	456-8023	456-8024	456-8025	456-8026	456-8021
10% Resolving Gel	456-8039	456-8033	456-8034	456-8035	456-8036	456-8031
12% Resolving Gel	456-8049	456-8043	456-8044	456-8045	456-8046	456-8041
4–15% Resolving Gel	456-8089	456-8083	456-8084	456-8085	456-8086	456-8081
4–20% Resolving Gel	456-8099	456-8093	456-8094	456-8095	456-8096	456-8091
8–16% Resolving Gel	456-8109	456-8103	456-8104	456-8105	456-8106	456-8101
Any kD Resolving Gel	456-8129	456-8123	456-8124	456-8125	456-8126	456-8121
Empty Cassettes and Combs						
Mini-PROTEAN Empty Cassette***	—	456-0003	—	456-0005	456-0006	456-0001
Combs (for Mini-PROTEAN empty cassettes)	—	456-0013	—	456-0015	456-0016	456-0011

* Multichannel-pipet compatible.

** Mini-PROTEAN TGX and TGX Stain-Free gels are available in 10-packs (catalog numbers listed) or 2-packs (add an "S" to the end of the catalog number listed).

*** Includes 50 empty cassettes. Combs sold separately in 50 pack.

† IPG well only, no reference well. If a protein standard is needed on gel, order Precision Plus Protein Standard plugs, #161-0378.

Catalog #	Description
Premixed Buffers for Mini-PROTEAN TGX Gels*	
161-0737	**2x Laemmli Sample Buffer**, 30 ml
161-0747	**4x Laemmli Sample Buffer**, 10 ml
161-0738	**2x Native Sample Buffer**, 30 ml
161-0732	**10x Tris/Glycine/SDS**, 1 L
161-0734	**10x Tris/Glycine**, 1 L

* For 5 L volume of the running buffers, see page 191.

Applications Guide

165-8100 **Mini-PROTEAN Gel Instruction Manual and Application Guide**, online



Description	10-Well 30 µl	10-Well 50 µl	12-Well* 20 µl	15-Well 15 µl	IPG Well** 7 cm IPG Strip
Mini-PROTEAN Precast Gels (2 per package)					
5% TBE	456-5013	456-5014*	456-5015*	456-5016	—
10% TBE	456-5033	456-5034*	456-5035	456-5036	—
15% TBE	456-5053*	456-5054	456-5055*	456-5056	—
4–20% TBE	456-5093*	456-5094*	456-5095*	456-5096*	—
10% TBE-Urea	456-6033*	—	—	456-6036*	—
15% TBE-Urea	456-6053*	—	456-6055*	456-6056*	—
16.5% Tris-Tricine	456-3063	456-3064	456-3065*	456-3066	—
10–20% Tris-Tricine	456-3113	456-3114	456-3115*	456-3116*	—
7% Tris-Acetate	456-9023	456-9024	—	456-9026	—
3–8% Tris-Acetate	456-9133	456-9134	—	456-9136	456-9131

* Please allow up to 2 weeks for delivery.

** IPG well only, no reference well. If a protein standard is needed on gel, order Precision Plus Protein Standard plugs, #161-0378.

See Also

ReadyStrip IPG strips: pages 164–165.

Standards: pages 183–189.

Electrophoresis stains: pages 196–198.

Mini Trans-Blot cell: page 206.

Blot detection: pages 217–223.

PowerPac Basic and PowerPac HC power supplies: page 181.

Imaging systems: pages 258–266.

Premixed buffers: pages 190–191.

Ready Gel® Precast Gels

Proteins and nucleic acids can be separated by Ready Gel precast gels using the Mini-PROTEAN Tetra electrophoresis cell (1–4 gels; pages 133–134) or, for high-throughput applications, the Mini-PROTEAN® 3 Dodeca™ cell (1–12 gels; page 136). Ready Gel precast gels are available in six buffer formulations for a variety of applications. Refer to the Bio-Rad website for migration charts.

For More Information
Web: www.bio-rad.com/readygel
Download bulletin: Ready Gel Application Guide (LIT188)

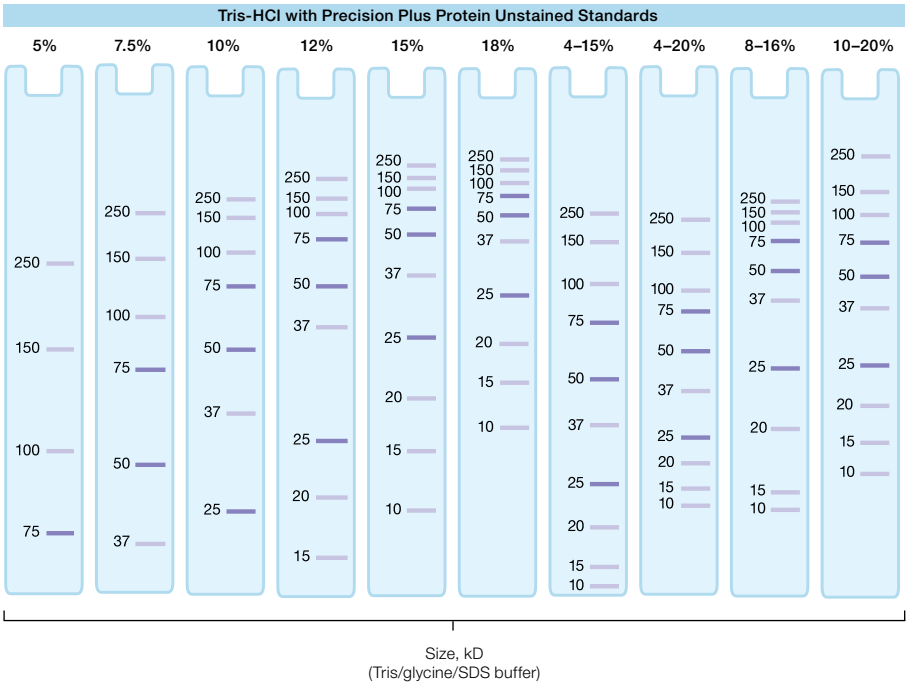


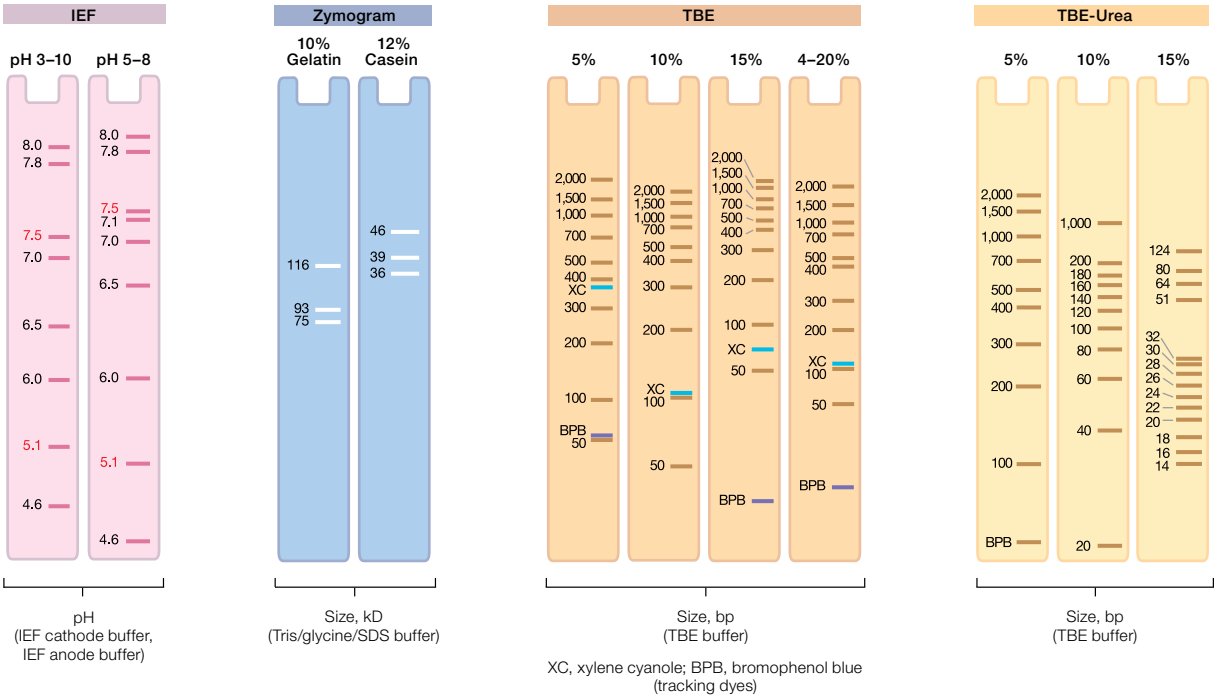
Specifications

Gel dimensions (W x L x thickness)	8.3 x 6.4 x 0.1 cm
Cassette dimensions (W x L x thickness)	10.0 x 8.0 x 0.4 cm
Gel storage conditions	Store flat at 4°C; do not freeze
Gel shelf life*	8–12 weeks for Tris-HCl, Tris-Tricine, zymogram, TBE, TBE-urea; ~26 weeks for IEF

* From date of manufacture.

Ready Gel Migration Charts





Ordering Information

Description	10-Well 30 µl	15-Well 15 µl	Prep+1-Well 450 µl	10-Well 50 µl	12-Well* 20 µl	9-Well* 30 µl	IPG Well 7 cm IPG Strip
Ready Gel Tris-HCl Gels							
5% Resolving Gel	161-1210	161-1211**	—	161-1213	161-1214**	—	—
7.5% Resolving Gel	161-1100	161-1118	161-1136**	161-1154	161-1172	—	—
10% Resolving Gel	161-1101	161-1119	161-1137	161-1155	161-1173	161-1191**	161-1390**
12% Resolving Gel	161-1102	161-1120	161-1138	161-1156	161-1174	—	161-1391
15% Resolving Gel	161-1103	161-1121	161-1139**	161-1157	161-1175	—	—
18% Resolving Gel	161-1216	161-1217**	—	161-1219	161-1220**	—	—
4–15% Linear Gradient	161-1104	161-1122	161-1140	161-1158	161-1176	161-1194**	161-1392**
4–20% Linear Gradient	161-1105	161-1123	161-1141	161-1159	161-1177	—	161-1393**
8–16% Linear Gradient	161-1222	161-1223	—	161-1225	161-1226	—	161-1394
10–20% Linear Gradient	161-1106	161-1124	161-1142**	161-1160	161-1178	—	161-1395**
Ready Gel IEF Gels							
pH 3–10	161-1111	161-1129**	—	161-1165**	—	—	—
pH 5–8	161-1112**	—	—	—	—	—	—
Ready Gel Zymogram Gels							
10% Zymogram Gel with Gelatin	161-1113	161-1131**	—	161-1167	161-1185**	—	—
12% Zymogram Gel with Casein	161-1114**	—	—	161-1168**	—	—	—
Ready Gel TBE-Urea Gels							
5% TBE-Urea Gel	161-1115**	161-1133**	—	—	—	—	—

* Multichannel-pipet compatible.

** Please allow up to 2 weeks for delivery.

continues

Ordering Information

Catalog #	Description
Premixed Buffers for Tris-HCl Gels	
161-0737	**2x Laemmli Sample Buffer**, 30 ml
161-0747	**4x Laemmli Sample Buffer**, 10 ml
161-0738	**2x Native Sample Buffer**, 30 ml
161-0732	**10x Tris/Glycine/SDS**, 1 L
161-0734	**10x Tris/Glycine**, 1 L
161-0772	**10x Tris/Glycine/SDS**, 5 L cube
161-0771	**10x Tris/Glycine**, 5 L cube
Premixed Buffers for Tris-Tricine Gels for Peptides	
161-0739	**2x Tricine Sample Buffer**, 30 ml
161-0744	**10x Tris/Tricine/SDS**, 1 L
Premixed Buffers for IEF Gels	
161-0763	**IEF Sample Buffer**, 30 ml
161-0761	**10x IEF Anode Buffer**, 250 ml
161-0762	**10x IEF Cathode Buffer**, 250 ml
Premixed Buffers for Zymogram Gels	
161-0764	**Zymogram Sample Buffer**, 30 ml
161-0765	**10x Zymogram Renaturation Buffer**, 125 ml
161-0766	**10x Zymogram Development Buffer**, 125 ml
Premixed Buffers for TBE and TBE-Urea Gels	
161-0767	**5x Nucleic Acid Sample Loading Buffer**, 10 ml
161-0768	**2x TBE-Urea Sample Buffer**, 30 ml
161-0770	**10x Tris/Boric Acid/EDTA (TBE)**, 5 L cube
Accessories	
161-0992	**Ready Gel Key Knife**, free upon request with Ready Gel purchase

See Also
Acrylamide gel-casting reagents: pages 192–193.
Buffers: page 191.

Mini-PROTEAN® Hand Casting Accessories

Empty Cassettes

Single-use empty Mini-PROTEAN cassettes are available for hand casting a mini gel.

AnyGel™ Stands

AnyGel stands are convenient for storing glass plates of any size gel. They are available as single row or six-row stands.

Features of the six-row stand:

- Perfect for high-volume, 2-D proteomics studies — accommodates up to 6 PROTEAN®, 12 Criterion™, or 18 Mini-PROTEAN mini gels
- Facilitates loading IPG strips on both large format gels and Criterion gel sizes using a front clamp that slants the gel to an ideal angle (can also be used to load tube gels)
- Features a stair-step design and clear clamps so gels are clearly visible while casting and loading

The single-row AnyGel stand is ideal for processing a few gels at a time. It accommodates one PROTEAN gel, two Criterion gels, or three Mini-PROTEAN mini gels.



AnyGel Six-Row Stand



AnyGel Single-Row Stand with Mini-PROTEAN Cassettes

Mini-PROTEAN 3 Multi-Casting Chamber

Use the Mini-PROTEAN 3 multi-casting chamber to cast up to 12 gels of 0.75, 1.0, or 1.5 mm thickness simultaneously. Acrylic blocks act as space fillers when fewer than 12 gels are cast. You can cast gradient gels through a bottom filling port with the Model 485 gradient former (see below) to ensure reproducibility. Gels cast in the multi-casting chamber can be run on any of the Mini-PROTEAN electrophoresis systems including the Mini-PROTEAN Tetra cell and the Mini-PROTEAN 3 Dodeca cell.



Mini-PROTEAN 3 Multi-Casting Chamber

Model 485 Gradient Former

The Model 485 gradient former allows you to pour linear, concave, or convex exponential acrylamide gradients for PAGE. Its 40–175 ml capacity is designed to pour up to 12 gradient gels in the Mini-PROTEAN 3 multi-casting chamber. The optional exponential piston is required to form concave or convex exponential acrylamide gradients.

For More Information
Web: www.bio-rad.com/mphandcast



Model 485 Gradient Former

Ordering Information

Catalog #	Description
Mini-PROTEAN Empty Cassettes and Combs	
456-0003	**Mini-PROTEAN Empty Cassettes**, 10-well, 50 each
456-0005	**Mini-PROTEAN Empty Cassettes**, 12-well, 50 each
456-0006	**Mini-PROTEAN Empty Cassettes**, 15-well, 50 each
456-0001	**Mini-PROTEAN Empty Cassettes**, IPG-well, 7 cm IPG strip, 50 each
456-0013	**Mini-PROTEAN Combs**, 10-well, 50 combs
456-0015	**Mini-PROTEAN Combs**, 12-well, 50 combs
456-0016	**Mini-PROTEAN Combs**, 15-well, 50 combs
456-0011*	**Mini-PROTEAN Combs**, IPG, 50 combs
AnyGel Stands and Accessories	
165-4131	**AnyGel Stand**, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels
165-5131	**AnyGel Stand**, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN or Ready Gel mini gels
165-4132	**Replacement Clamps**, 2
AnyGel Stands and Electrophoresis Cells	
165-5134	**PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands**, includes #165-4150 and two #165-5131
165-5135	**PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands**, includes #165-4151 and two #165-5131
165-5133	**Criterion Dodeca Cell and 6-Row AnyGel Stand**, includes #165-4130 and #165-5131
165-6020	**Criterion Cell and Single-Row AnyGel Stand**, includes #165-6001 and #165-4131
Mini-PROTEAN 3 Multi-Casting Chambers	
165-4110**	**Mini-PROTEAN 3 Multi-Casting Chamber**, includes 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve (order glass plates and combs separately)
165-4111**	**Mini-PROTEAN 3 Multi-Casting Chamber**, 0.75 mm, includes 15 sets of glass plates
165-4112**	**Mini-PROTEAN 3 Multi-Casting Chamber**, 1.0 mm, includes 15 sets of glass plates
165-4113**	**Mini-PROTEAN 3 Multi-Casting Chamber**, 1.5 mm, includes 15 sets of glass plates
165-4116**	**Mini-PROTEAN 3 Multi-Casting Chamber**, 0.5 mm, includes 15 sets of glass plates

* Catalog #456-0011 is an IPG well only, no reference well. If a protein standard is needed on gel, order Precision Plus Protein Standard Plugs #161-0378.

** Order combs separately (see combs for use with glass plates on page 135) in the Mini-PROTEAN Tetra cell section.

continues

Ordering Information

Catalog #	Description
Mini-PROTEAN 3 Multi-Casting Chamber Accessories	
165-4114	**Acrylic Blocks**, 6.0 mm, 8
165-4115	**Separation Sheets**, 15
165-3320	**Gel Releasers**, 5
165-2913	**Replacement Gaskets**, for Mini-PROTEAN 3 multi-casting chamber, includes 3' of tubing
Combs and Glass Plates for 2-D Electrophoresis**	
165-3308	**Short Plates**, 5
165-3310	**Spacer Plates with 0.75 mm Integrated Spacers**, 5
165-3311	**Spacer Plates with 1.0 mm Integrated Spacers**, 5
165-3312	**Spacer Plates with 1.5 mm Integrated Spacers**, 5
165-3362	**Mini-PROTEAN Comb**, IPG well, 1.0 mm
165-3368	**Mini-PROTEAN Comb**, IPG well, 1.5 mm
165-3356	**Mini-PROTEAN Comb**, prep/2-D well, 0.75 mm
165-3361	**Mini-PROTEAN Comb**, prep/2-D well, 1.0 mm
165-3367	**Mini-PROTEAN Comb**, prep/2-D well, 1.5 mm
Model 485 Gradient Former	
165-4120	**Model 485 Gradient Former**, 40–175 ml, includes body with valve stem and tubing connection kit
165-4122	**Model 485 Gradient Former and Mini-PROTEAN 3 Multi-Casting Chamber**, includes #165-4120 and #165-4110
Model 485 Gradient Former Accessories	
165-2006	**Exponential Piston**, for Model 385 and Model 485 gradient formers
165-2007	**Gradient Pouring Needles**, 2
165-2008	**Tubing Connection Kit**, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector

* Order combs separately.
** For multi-well comb configurations, refer to page 135.

Midi-Format 1-D Electrophoresis Systems

The Criterion™ and the Criterion™ Dodeca™ electrophoresis cells accommodate precast or handcast Criterion gels that are wider and longer than traditional mini gels for increased throughput and separation.

See Also
Criterion precast gels and empty cassettes: pages 146–151.
Criterion blotter: page 207.
PowerPac Basic and PowerPac HC power supplies: page 181.
Dodeca stainers: pages 151–152.
AnyGel stands: pages 151–152.

Criterion™ Cell and Criterion™ Dodeca™ Cell

Criterion Cell

The Criterion electrophoresis cell is dedicated to running one or two midi gels* (13.3 x 8.7 cm), which are wider and longer than traditional mini gels (8.6 x 7.2 cm). With a single Criterion gel, you can run up to 26 samples in less than 1 hour or accommodate 11 cm ReadyStrip™ IPG strips for 2-D applications.

- Compact size that requires only 1 L of running buffer
- Built-in wedge on the lid to open gel cassettes in a single step
- Locator slots built into the tank walls to easily and quickly slide cassettes into position



For More Information
Web: www.bio-rad.com/criterioncell
Request or download bulletin: 2710

* U.S. patent 6,093,301.

Criterion™ Dodeca™ Cell

The Criterion Dodeca cell has the capacity to run up to 12 handcast or Criterion precast gels* simultaneously. Criterion gels accommodate 11 cm ReadyStrip™ IPG strips.

- Locator slots to slide cassettes into place without alignment hassles or bulky clamps
- Built-in cooling coil to prevent overheating and ensure the highest resolution
- Stirbar capability that maintains uniform buffer tank temperatures for reproducible runs
- A cassette opener built into the cell for easy gel access
- Convenient buffer draining via the built-in quick-connect drain port



For More Information
Web: www.bio-rad.com/criteriondodeca
Request or download bulletin: 2622

See Also

PowerPac Basic and PowerPac HC power supplies: page 181.
Criterion precast gels and accessories: pages 146–152.
Trans-Blot Plus cell: page 209.
Dodeca stainers: pages 151–152.
Imaging systems: pages 258–266.
Imaging software: pages 268–272.

* U.S. patent 6,093,301.

Specifications	Criterion Cell	Criterion Dodeca Cell
Number of gels	1–2	1–12
Precast gels	Criterion precast gels	Criterion precast gels
Handcast gels	Gels prepared in Criterion empty cassettes	Gels prepared in Criterion empty cassettes
Gel size (W x L)	13.3 x 8.7 cm	13.3 x 8.7 cm
Gel thickness	1.0 mm	1.0 mm
Total buffer volume	1 L	6 L
Typical running conditions	200 V constant	200 V constant; 1 A maximum; 200 W maximum
Recommended power supply	PowerPac™ Basic or PowerPac HC	PowerPac HC or PowerPac Universal
Dimensions (W x L x H)	14.4 x 22.3 x 19.5 cm	18.8 x 49.0 x 19.2 cm
Weight	0.86 kg (1.9 lb)	4.8 kg (11 lb)

Ordering Information

Catalog #	Description
Criterion Cell and Systems	
165-6001	**Criterion Cell**, includes electrophoresis buffer tank, lid with power cables, 3 sample loading guides (12+2 well, 18-well, 26-well)
165-6019	**Criterion Cell and PowerPac Basic Power Supply**, 100–120/220–240 V, includes #165-6001 and #164-5050
165-6020	**Criterion Cell and Single-Row AnyGel Stand**, includes #165-6001 and #165-4131
Criterion Cell and Blotter Systems	
165-6024	**Criterion Cell/Plate Blotter System**, includes #165-6001 and #170-4070
165-6025	**Criterion Cell/Wire Blotter System**, includes #165-6001 and #170-4071
Replacement Parts	
165-6002	**Criterion Replacement Electrophoresis Buffer Tank**, with lower electrodes
165-6003	**Criterion Replacement Lid**, with upper electrodes
165-6004	**Criterion Replacement Upper Electrode**, includes prestrung platinum wire
165-6005	**Criterion Replacement Lower Electrode**, includes prestrung platinum wire
165-2948	**Replacement Power Cables**, for lid
165-4131	**AnyGel Stand**, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels
Criterion Dodeca Cell	
165-4130	**Criterion Dodeca Cell**, includes electrophoresis buffer tank with built-in cooling coil, lid with power cables
165-4138	**Criterion Dodeca Cell and PowerPac HC Power Supply**, includes #165-4130 and #164-5052
165-4139	**Criterion Dodeca Cell and PowerPac Universal Power Supply**, includes #165-4130 and #164-5070
165-5133	**Criterion Dodeca Cell and 6-Row AnyGel Stand**, includes #165-4130 and #165-5131
Replacement Parts	
165-4104	**Replacement Drain Line**
165-4135	**Lower Electrode with Platinum Wire**
165-4136	**Replacement Cooling Coil**, includes connector tubing
165-4137	**Replacement Lid**
165-2948	**Replacement Power Cables**, for lid

See Also

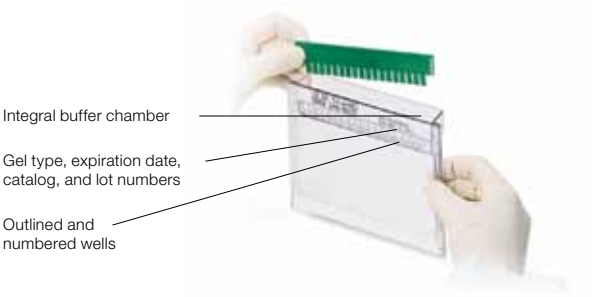
Premixed buffers: pages 190–191.
ReadyStrip IPG strips: pages 164–165.
Criterion blotter: page 207.
PowerPac power supplies: pages 181–182.
Dodeca stainers: pages 151–152.
Criterion staining trays: pages 151–152.
Standards: pages 183–189.
Electrophoresis stains: pages 196–198.

Criterion™ Precast Gels

Criterion precast gels include a broad selection of 13.3 x 8.7 cm polyacrylamide gels in single-use cassettes. This gel size provides reproducible, high-resolution results with fast setup, loading, and run times. The gels are wider and longer than traditional mini gels for high-throughput electrophoresis. Criterion gels are packaged and sold in individual units: 1–2 gels can be run in the Criterion cell (page 144) and 1–12 gels can be run in the high-throughput Criterion Dodeca cell (page 145).

- Fast run times and 12-month shelf life for Criterion™ TGX™ gels
- Room temperature storage and 12-month shelf life for Criterion XT Bis-Tris gels
- Formats that run up to 26 samples on a single gel without reducing sample volume or sacrificing speed
- A patented* cassette design including an integral upper buffer chamber that never leaks and requires no tools to open
- Sample wells that are outlined and numbered for easy loading
- Multichannel pipet-compatible combs





Criterion TGX Precast Gels

These precast gels use the Laemmli buffer system and have a 12-month shelf life, and they maintain cooler temperatures at elevated voltages allowing for reduced run times.

- Run times as short as 20 min
- Transfer times as short as 7 min with the Trans-Blot® Turbo™ system
- 12-month shelf life
- Laemmli format, no special buffers required
- Integrated upper buffer chamber

Criterion TGX Precast Gel Specifications

Gel dimensions (W x L)	13.3 x 8.7 cm; 1.0 mm thick
Cassette dimensions (W x L)	15.0 x 10.6 cm; 5.3 mm thick
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze
Shelf life at recommended temperature*	12 months
Recommended sample buffer (dilute 1:1 with sample)	Laemmli sample buffer: 62.5 mM Tris-HCl, pH 6.8, 2% SDS, 25% glycerol, 0.01% bromophenol blue
Recommended running buffer (Tris/glycine/SDS)	25 mM Tris, 192 mM glycine, 0.1% SDS, pH 8.3
Run times	42–50 min at 200 V 20–26 min at 300 V

* From date of manufacture.

Available Chemistries

IEF	pH 3–10, 5–8
Stain-Free	10%, 4–20%, 8–16% Tris-HCl
TBE	5%, 10%, 15%, 4–20%
TBE-urea	5%, 10%, 15%
TGX™	7.5%, 10%, 12%, 18% resolving 4–15%, 4–20%, 8–16%, 10–20% linear gradient Any kD™
TGX Stain-Free™	7.5%, 10%, 12%, 18%, 4–15%, 4–20% 8–16%, 10–20% linear gradient Any kD
Tris-acetate	7%, 3–8% resolving
Tris-HCl	5%, 7.5%, 10%, 12.5%, 15%, 18% resolving 4–15%, 4–20%, 8–16%, 10–20%, 10.5–14% linear gradient
Tris-Tricine	16.5%, 10–20%
XT (Bis-Tris)	10%, 12%, 4–12% resolving
Zymogram	10% with gelatin, 12.5% with casein

* U.S. patents 5,073,246 and 6,093,301.

Criterion™ TGX Stain-Free™ Precast Gels

Criterion TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using the ChemiDoc™ MP or Gel Doc™ EZ imaging systems (see pages 259 and 260).

Criterion TGX Stain-Free precast gels eliminate the need for staining. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Criterion TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 25 min
- Comparable sensitivity to Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Use of the same gel for downstream western blotting, standard staining methods, and mass spectrometry analysis

For More Information
Web: www.bio-rad.com/criteriontgx
Request or download bulletin: 5974

Extended Shelf-Life Criterion XT Gels for SDS-PAGE and Native PAGE

Criterion XT gels are formulated at near-neutral pH to ensure longer shelf life (12 months for Bis-Tris gels, 8 months for Tris-acetate gels) and improved protein stability. Criterion XT gels are run using optimized sample and running buffers — without the need for antioxidant addition — for sharp bands and minimal preparation time. Like traditional Laemmli systems, Criterion XT gels use discontinuous buffer that forms moving boundaries to stack and then separate proteins.

Criterion XT Bis-Tris gels are formulated by using a Bis-Tris buffer system (pH 6.4) for separation of proteins by MW. By selecting from two running buffers (MOPS or MES) you can expand the separation capability of a single Bis-Tris gel type.

Criterion Stain Free™ Precast Gels

Criterion Stain Free gels have Tris-HCl formulation for PAGE applications and a proprietary compound that facilitates protein visualization using a stain-free enabled imager (Gel Doc EZ or ChemiDoc MP imaging system). The stain-free technology allows direct visualization, analysis, and documentation of protein samples in PAGE gels without staining, destaining, and gel drying procedures.

For More Information
Web: www.bio-rad.com/criteriongels

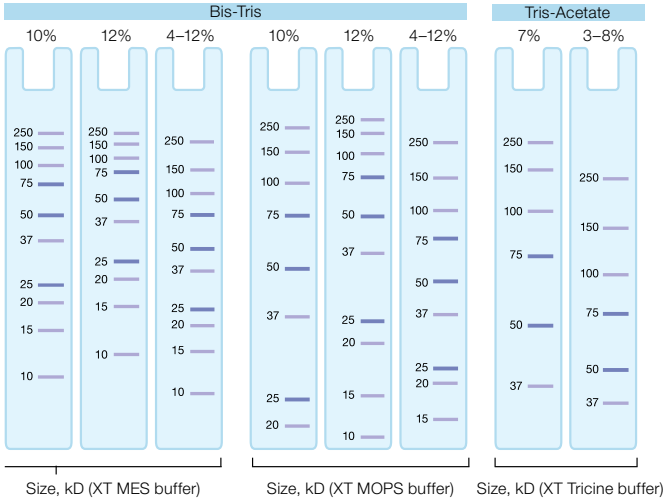


Specifications

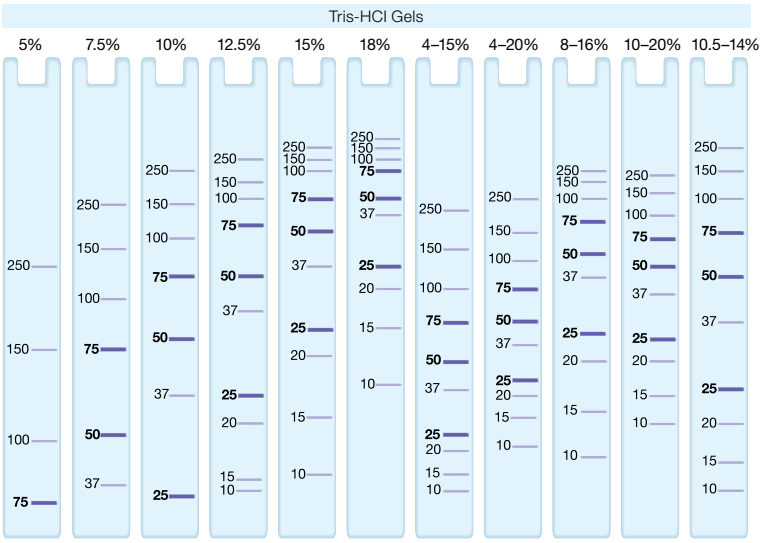
Gel dimensions	13.3 x 8.7 cm (W x L); 1.0 mm thick
Cassette dimensions	15.0 x 10.6 cm (W x L); 5.3 mm thick
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Storage tray material	PET
Gel storage conditions	Store flat; do not freeze Room temperature for Bis-Tris gels 4°C for all other gel types
Gel shelf life*	12 months for TGX and Bis-Tris gels 8 months for Tris-acetate gels 12 weeks for Tris-HCl, Tris-Tricine, zymogram, TBE, TBE-urea gels 26 weeks for IEF gels
Buffer volume	Upper, 60 ml; lower, 400 ml

* From date of manufacture.

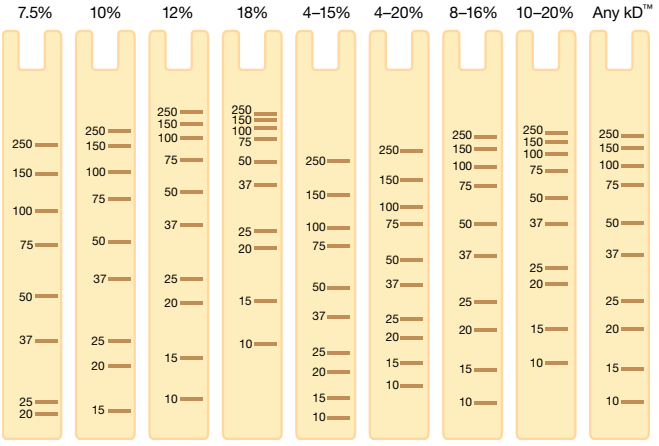
Criterion™ XT Migration Charts
(with Precision Plus Protein™ Unstained Standards)



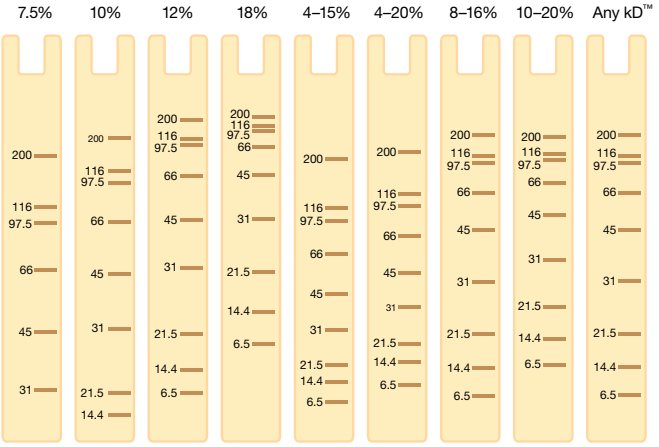
Criterion™ Migration Charts
(with Precision Plus Protein Unstained Standards)

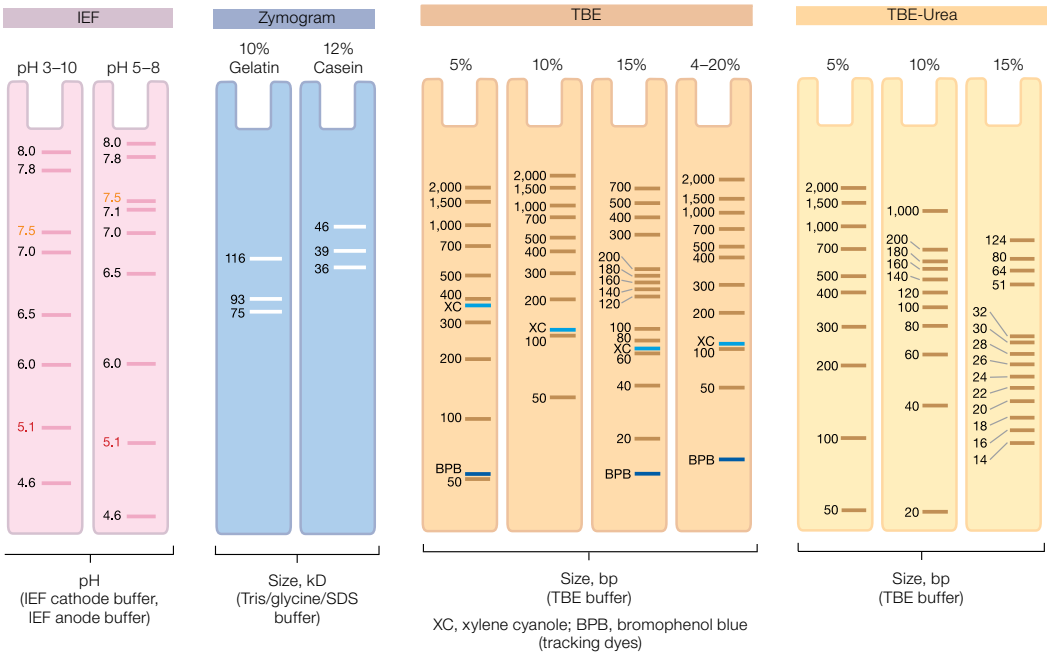


Criterion™ TGX™ Migration Charts
(with Precision Plus Protein Unstained Standards)



Criterion™ TGX™ and TGX Stain-Free Migration Charts
(with Broad Range Unstained Protein Standards)





Ordering Information



Description	12+2-Well*, ** 45 µl	18-Well 30 µl	26-Well* 15 µl	Prep+2-Well** 800 µl	IPG+1-Well** 11 cm IPG Strip
Criterion TGX Precast Gels					
7.5% Resolving Gel	567-1023	567-1024	567-1025	—	—
10% Resolving Gel	567-1033	567-1034	567-1035	—	—
12% Resolving Gel	567-1043	567-1044	567-1045	—	—
18% Resolving Gel	567-1073	567-1074	567-1075	567-1072	567-1071
4–15% Linear Gradient	567-1083	567-1084	567-1085	567-1082	567-1081
4–20% Linear Gradient	567-1093	567-1094	567-1095	567-1092	567-1091
8–16% Linear Gradient	567-1103	567-1104	567-1105	567-1102	567-1101
10–20% Linear Gradient	567-1113	567-1114	567-1115	567-1112	567-1111
Any kD Gel	567-1123	567-1124	567-1125	567-1122	567-1121
Criterion TGX Stain-Free Precast Gels					
7.5% Gel	567-8023	567-8024	567-8025	—	—
10% Gel	567-8033	567-8034	567-8035	—	—
12% Gel	567-8043	567-8044	567-8045	—	—
18% Gel	567-8073	567-8074	567-8075	567-8072	567-8071
4–15% Gel	567-8083	567-8084	567-8085	567-8082	567-8081
4–20% Gel	567-8093	567-8094	567-8095	567-8092	567-8091
8–16% Linear Gradient	567-8103	567-8104	567-8105	567-8102	567-8101
10–20% Linear Gradient	567-8113	567-8114	567-8115	567-8112	567-8111
Any kD Gel	567-8123	567-8124	567-8125	567-8122	567-8121

* Multichannel pipet compatible.
** Includes reference well(s).

Criterion XT Bis-Tris Gels* **					
10% Resolving Gel	345-0111	345-0112	345-0113	—	345-0115
12% Resolving Gel	345-0117	345-0118	345-0119	345-0120†	345-0121
4–12% Resolving Gel	345-0123	345-0124	345-0125	345-0126†	345-0127

continues

Ordering Information

Description	12+2-Well*, ** 45 µl	18-Well 30 µl	26-Well* 15 µl	Prep+2-Well** 800 µl	IPG+1-Well** 11 cm IPG Strip
Criterion XT Tris-Acetate Gels					
7% Resolving Gel	345-0135	345-0136†	345-0137†	—	—
3–8% Resolving Gel	345-0129	345-0130	345-0131	—	345-0133†
Criterion Tris-HCl Gels					
5% Resolving Gel	345-0001	345-0002	345-0003†	—	—
7.5% Resolving Gel	345-0005	345-0006	345-0007	345-0008	—
10% Resolving Gel	345-0009	345-0010	345-0011	345-0012†	345-0101
12.5% Resolving Gel	345-0014	345-0015	345-0016	345-0017†	345-0102
15% Resolving Gel	345-0019	345-0020	345-0021	345-0022†	—
18% Resolving Gel	345-0023	345-0024	345-0025	345-0026†	—
4–15% Linear Gradient	345-0027	345-0028	345-0029	345-0030†	345-0103
4–20% Linear Gradient	345-0032	345-0033	345-0034	345-0035	345-0104
8–16% Linear Gradient	345-0037	345-0038	345-0039	345-0040†	345-0105
10–20% Linear Gradient	345-0042	345-0043	345-0044	345-0045†	345-0107
10.5–14% Linear Gradient	345-9949	345-9950	345-9951	—	345-0106
Criterion Stain Free Gels					
10% Tris-HCl Gel	345-1012	345-1018	—	—	—
4–20% Tris-HCl Gel	345-0412	345-0418	345-0426	—	—
8–16% Tris-HCl Gel	345-8162	—	345-8166	—	345-8161
Criterion Tris-Tricine Gels					
16.5% Tris-Tricine	345-0063	345-0064	345-0065†	345-0066†	—
10–20% Tris-Tricine	345-0067	345-0068	345-0069	—	—
Criterion IEF Gels					
pH 3–10	345-0071†	345-0072†	345-0073†	—	—
pH 5–8	—	345-0076†	—	—	—
Criterion Zymogram Gels					
10% Zymogram Gel with Gelatin	345-0079†	345-0080†	345-0081†	—	—
12.5% Zymogram Gel with Casein	345-0082†	345-0083†	345-0084†	—	—
Criterion TBE Gels					
5% TBE Gel	345-0047	345-0048	345-0049	—	—
10% TBE Gel	345-0051	345-0052	345-0053	—	—
15% TBE Gel	345-0055†	345-0056	345-0057	—	—
4–20% TBE Gel	345-0059†	345-0060†	345-0061†	—	—
Criterion TBE-Urea Gels					
5% TBE-Urea Gel	—	345-0086†	—	—	—
10% TBE-Urea Gel	345-0088†	345-0089†	345-0090†	—	—
15% TBE-Urea Gel	345-0091	345-0092	345-0093†	—	—
Criterion Empty Cassettes					
1.0 mm thick, 10 sets	345-9901	345-9902	345-9903	345-9904	345-9906
Loading Guides					
Criterion Sample Loading Guide††	165-6006	165-6007	165-6008	—	—

Catalog #	Description
Criterion XT Buffers and Reagents	
161-0788***	**XT MOPS Running Buffer**, 20x, 500 ml
161-0789***	**XT MES Running Buffer**, 20x, 500 ml
161-0790	**XT Tricine Running Buffer**, 20x, 500 ml
161-0791	**XT Sample Buffer**, 4x, 10 ml
161-0792	**XT Reducing Agent**, 20x, 1 ml
161-0793***	**XT MOPS Buffer Kit**, includes 500 ml of 20x XT MOPS running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent
161-0796***	**XT MES Buffer Kit**, includes 500 ml of 20x XT MES running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent
161-0797	**XT Tricine Buffer Kit**, includes 500 ml of 20x XT Tricine running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent
Application Guide	
411-0001	**Criterion Precast Gel Application Guide**, available online

* Multichannel pipet compatible. ** Includes reference well(s). *** Purchase of this product is accompanied by a limited license under U.S. Patent Numbers 6,143,154; 6,096,182; 6,059,948; 5,578,180; 5,922,185;6,162,338; and 6,783,651 and corresponding foreign patents. † Please allow up to 2 weeks for delivery. †† U.S. patent 5,656,145.

Criterion™ Accessories

Empty Cassettes

Single-use empty Criterion cassettes are available for hand casting gels. For added convenience, cast your gels using AnyGel™ stands.

For More Information
Request or download bulletins: 2710, 2911, and 2912

AnyGel Stands

AnyGel stands are convenient for storing glass plates of any size gel. They are available as single row or six-row stands. See the Mini-PROTEAN® precast gel section, page 137.

Criterion Staining Trays

Criterion staining/blotting trays are plastic trays specifically designed for staining one or two Criterion gels or performing western blot detectio n. Tray dimensions are optimized for Criterion gel staining and for blot detection. These dimensions provide a working volume of up to 500 ml.

Dodeca™ High-Throughput Stainers

Dodeca stainers are high-throughput gel staining devices available in two sizes: the small size accommodates up to 24 Criterion gels while the large size can accommodate up to 12 large-format gels. The stainers eliminate risk of gel breakage from excess handling. Features of the stainers include:

- A patented* shaking rack designed to hold the staining trays at an angle to allow air bubbles to escape, ensure uniform gel staining, and protect gels from breaking
- Compatibility with Bio-Safe™ Coomassie, Coomassie, Oriole™, SYPRO Ruby, Flamingo™, and silver stains
- A white development tray that allows easy monitoring of the final development step during the staining process
- A reagent access door integrated into the lid to add staining solutions without disturbing the gels
- Boxes for convenient storage of gels (optional)



Dodeca stainer components:
1. Shaker motor.
2. Lid with shaker control unit and integrated reagent access door.
3. Tray attachments.
4. Stack of staining trays (including white development tray).
5. Shaking rack designed with built-in handles for easy placement into the solution tank.
6. Gel clip.
7. Solution tank with incorporated drain ports.

Stainer Compatibility with Different Gel Sizes

	Gel Size (W x L)	Gel Format
Large Dodeca stainer	25.6 x 23.0 cm	PROTEAN® Plus precast
	25.0 x 20.5 cm	PROTEAN Plus handcast (requires one attachment per tray)
Small Dodeca stainer	20.0 x 20.5 cm	PROTEAN Plus handcast
	18.5 x 20.0 cm	PROTEAN II XL handcast
	18.3 x 19.3 cm	PROTEAN II XL precast
	16.0 x 20.0 cm	PROTEAN II xi handcast
	16.0 x 16.0 cm	PROTEAN II xi handcast and precast
	13.3 x 8.7 cm	Criterion (up to 24 gels, requires one attachment per tray)

Specifications

Number of gels	1–12 large format gels in the large Dodeca stainer; 1–24 Criterion gels in the small Dodeca stainer (minimum of 4 gels recommended for silver staining)
Shaker device	Built-in shaker motor
Maximum staining solution volume	10 L for the large Dodeca stainer, 7 L for the small Dodeca stainer
Compatible stains	Bio-Safe colloidal Coomassie Brilliant Blue G-250 stain, Coomassie Brilliant Blue R-250 stain, Oriole, SYPRO Ruby protein gel stain, Flamingo fluorescent gel stain, Dodeca silver stain kit
Dimensions (W x L x H)	41.3 x 46.2 x 38.9 cm for both the large and small Dodeca stainers
Weight (empty)	9.1 kg (20 lb) for the large Dodeca stainer 7.5 kg (17 lb) for the small Dodeca stainer

* U.S. patent 6,843,593.

Ordering Information

Catalog #	Description
AnyGel Stands and Accessories	
165-4131	**AnyGel Stand**, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels
165-5131	**AnyGel Stand**, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN or Ready Gel mini gels
165-4132	**Replacement Clamps**, 2
Criterion Staining Trays	
345-9921	**Criterion Staining/Blotting Trays**, with lids, 2
345-9920	**Criterion Staining/Blotting Trays**, with lids, 12
Dodeca Stainers, Accessories, and Replacement Parts	
165-3400	**Dodeca Stainer**, large, 100–240 V, includes 13 trays (12 clear, 1 white), 12 tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
165-3401	**Dodeca Stainer**, small, 100–240 V, includes 13 trays (12 clear, 1 white), 12 Criterion tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
165-3403	**Dodeca Stainer and Dodeca Silver Stain Kit**, large, 100–240 V, includes large Dodeca stainer (#165-3400), Dodeca silver stain kit for the large tank (#161-0480)
165-3404	**Dodeca Stainer and Dodeca Silver Stain Kit**, small, 100–240 V, includes small Dodeca stainer (#165-3401), Dodeca silver stain kit for the small tank (#161-0481)
165-3405	**Dodeca Stainer and Bio-Safe Coomassie Stain Kit**, large, 100–240 V, includes large Dodeca stainer (#165-3400) and staining solution for a large tank, sufficient for up to 12 large format gels
165-3406	**Dodeca Stainer and Bio-Safe Coomassie Stain Kit**, small, 100–240 V, includes small Dodeca stainer (#165-3401) and staining solution for a small tank, sufficient for up to 12 large format gels
165-3407	**Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit**, large, 100–240 V, includes large Dodeca stainer (#165-3400) and SYPRO staining solution for a large tank, sufficient for up to 12 large format gels
165-3408	**Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit**, small, 100–240 V, includes small Dodeca stainer (#165-3401) and SYPRO staining solution for a small tank, sufficient for up to 12 large format gels
165-3414	**Gel Clip**, holds any gel size
165-3429	**Storage Box**, large, holds up to 4 gels on large staining trays
165-3430	**Storage Box**, small, holds up to 4 gels on small staining trays
165-3415	**Dodeca Stainer Tray**, large, replacement, 2
165-3416	**Dodeca Stainer Tray**, small, replacement, 2
165-3417	**Dodeca Stainer Tray Attachment**, large, fits on large trays, required for PROTEAN Plus 25 cm handcast gels, 2
165-3418	**Dodeca Stainer Criterion Tray Attachment**, fits on small trays, required for Criterion gels, 2
165-3419	**Dodeca Stainer White Development Tray**, large
165-3420	**Dodeca Stainer White Development Tray**, small
165-3421	**Dodeca Stainer Shaking Rack**, large, replacement
165-3422	**Dodeca Stainer Shaking Rack**, small, replacement
165-3423	**Dodeca Stainer Solution Tank**, large, replacement
165-3424	**Dodeca Stainer Solution Tank**, small, replacement
165-3425	**Dodeca Stainer Lid with Shaker Motor**, 100–240 V, replacement, fits both tank sizes
165-3426	**Dodeca Stainer Lid without Shaker Motor**, replacement, fits both tank sizes
165-3427	**Dodeca Stainer Shaker Motor**, 100–240 V, replacement
165-3428	**Dodeca Stainer Shaker Control Unit**, replacement

Large-Format Vertical Electrophoresis Systems

PROTEAN® II xi and XL Cells

Large format cells for protein and nucleic acid electrophoresis applications.

1-D Separations

For the first dimension of separation, choose the PROTEAN II xi cell, available in two sizes (16 x 20 or 20 x 20 cm). Up to four* gels can be run at once using the optional notched inner plate and additional spacers. High-resolution vertical agarose electrophoresis of nucleic acids can be done with the optional frosted glass plates. Conversion screws are available to convert the standard 25 mm well depth to 10 mm.

2-D Separations

For the second dimension of 2-D electrophoresis, choose the PROTEAN II XL cell. This cell is designed to run up to two* (18.3 x 20 cm) gels at once with 17 and 18 cm ReadyStrip™ IPG strips. Key features include:

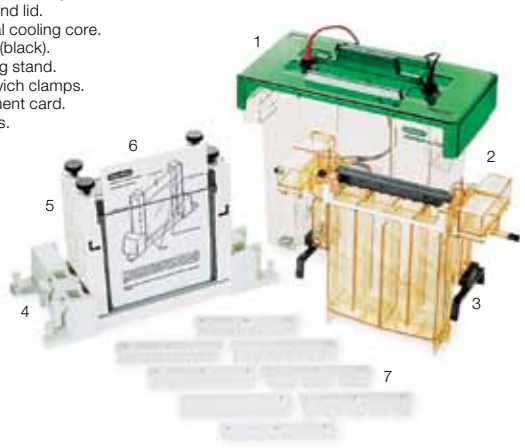
- **Leak proof** — innovative clamps exert uniform pressure along the length of the plates to prevent leaking without the use of grease or agarose plugs
- **Sharp bands and spots** — central cooling core can provide smile-free patterns with as little as 1.5 L of buffer
- **Multiple ways to customize** — choose different combs, spacers, clamps, and glass plates to tailor the system to your needs

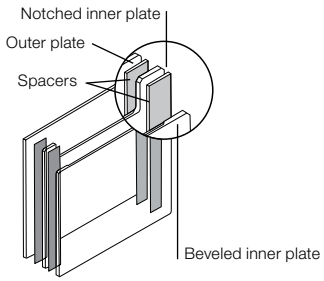
For More Information
Web: www.bio-rad.com/largeelectro
Request or download bulletin: 1760

PROTEAN II Conversion Kits for 2-D Applications

Conversion kits allow you to expand the capabilities of the PROTEAN II xi cell. Choose the PROTEAN II xi Cell IPG conversion kit for running 17 and 18 cm ReadyStrip IPG strips. Three options are available to accommodate different gel thicknesses. The PROTEAN II xi Cell 2-D conversion kit can modify the cell to function as a system for running IEF tube gels.

PROTEAN II xi system components:
1. Tank and lid.
2. Central cooling core.
3. Latch (black).
4. Casting stand.
5. Sandwich clamps.
6. Alignment card.
7. Combs.





Optional notched inner plate and additional spacers allow up to four gels to be run in the PROTEAN II xi cell.

See Also

PowerPac Universal and PowerPac HV power supplies: pages 181–182.
PROTEAN i12 IEF cell: page 161.
Protein stains: pages 196–198.
Buffers and reagents for protein electrophoresis: pages 190–195.
Gel clip: pages 159–160.
Dodeca stainers: pages 151–152.

* For higher throughput, the PROTEAN II multi-cell provides six-gel capacity.

Specifications

	PROTEAN II xi (16 cm)	PROTEAN II xi (20 cm)	PROTEAN II XL (20 cm)
Number of gels	1–4	1–4	2
Gel size (W x L)	16 x 16 cm (handcast)	16 x 20 cm (handcast)	18.3 x 20 cm (handcast)
Glass plate size (W x L)			
Inner plate	20 x 16 cm	20 x 20 cm	20 x 20 cm
Outer plate	20 x 18.3 cm	20 x 22.3 cm	20 x 22.3 cm
Spacer length	18.3 cm	22.3 cm	22.3 cm
Typical upper buffer volume	350 ml	350 ml	350 ml
Typical lower buffer volume	1.8 L	1.2 L	1.2 L
Typical run times for SDS-PAGE*			
Without cooling	4 hr	5 hr	5 hr
With cooling	2.5 hr	3.5 hr	3.5 hr
Recommended power supply	PowerPac™ HV or PowerPac Universal	PowerPac HV or PowerPac Universal	PowerPac HV or PowerPac Universal

* For voltage and current settings for electrophoresis applications, see pages 179–180.

Ordering Information

Catalog #	Description
PROTEAN II xi Cells, for 16 x 16 cm* Gels	
165-1801	**PROTEAN II xi Cell**, without spacers and combs**
165-1802	**PROTEAN II xi Cell**, 1.5 mm spacers (4), 15-well combs (2)
165-1803	**PROTEAN II xi Cell**, 1.0 mm spacers (4), 15-well combs (2)
165-1804	**PROTEAN II xi Cell**, 0.75 mm spacers (4), 15-well combs (2)
PROTEAN II xi Cells, for 16 x 20 cm Gels	
165-1811	**PROTEAN II xi Cell**, without spacers and combs**
165-1812	**PROTEAN II xi Cell**, 1.5 mm spacers (4), 15-well combs (2)
165-1813	**PROTEAN II xi Cell**, 1.0 mm spacers (4), 15-well combs (2)
165-1814	**PROTEAN II xi Cell**, 0.75 mm spacers (4), 15-well combs (2)
PROTEAN II XL Cells, for 18.3 x 20 cm Gels*, Compatible with ReadyStrip IPG Strips	
165-3188	**PROTEAN II XL Cell**, wide-format, 1.0 mm, spacers (4), IPG 2-D combs (2)
165-3189	**PROTEAN II XL Cell**, wide-format, 1.5 mm, spacers (4), IPG 2-D combs (2)
165-3190	**PROTEAN II XL Cell**, wide-format, 2.0 mm, spacers (4), IPG 2-D combs (2)
PROTEAN II IPG Conversion Kits, for 2-D (to Convert xi to XL)***	
165-1815	**PROTEAN II xi Cell 2-D Conversion Kit**, converts PROTEAN II xi cell into a tube gel IEF 2-D system, 2 tube gel adaptors, 24 glass tubes (1.5 mm diameter, 180 mm length), gaskets, grommets, stoppers
165-3183	**PROTEAN II xi Cell IPG Conversion Kit**, 1.0 mm spacers
165-3186	**PROTEAN II xi Cell IPG Conversion Kit**, 1.5 mm spacers
165-3184	**PROTEAN II xi Cell IPG Conversion Kit**, 2.0 mm spacers
165-1834	**PROTEAN II xi Basic Unit with Casting Stand**, includes central cooling core, lower buffer chamber, lid with cables, leveling bubble; combine with an IPG conversion kit for a complete 18.3 cm wide format system

* All cells include central cooling core with gaskets, lower buffer chamber, lid with cables, 2 sets of glass plates, sandwich clamps (4), upper buffer dam, casting stand with gaskets, leveling bubble, instructions, and alignment card.

** Select spacers and combs from page 155.

*** All PROTEAN II xi cell IPG conversion kits include 2 sets of IPG clamps, 2 sets of 20 x 20 cm glass plates, IPG spacers (4), IPG 2-D combs (2), IPG central cooling core gaskets (2), casting stand gaskets (2), and alignment card.

PROTEAN® II xi and XL Multi-Cells

The PROTEAN xi and XL multi-cells, which can run up to six gels at once, offer efficient cooling with a combination of two cooling coils and three cooling cores*. Effective cooling enables high-power runs for rapid separation with minimal protein diffusion for sharper bands and spots.



See Also

PowerPac Universal power supply: page 182.

Premixed buffers and buffer reagents: pages 190–191.

Dodeca stainers: pages 151–152.

PROTEAN® II xi and XL Accessories

Accessories and replacement parts are available for the PROTEAN II xi and XL systems. There are a wide variety of glass plates, spacers, and combs to choose from. Components can be purchased separately for a truly customized system. Replacement parts are also available to keep your system up and running.

For More Information
Web: www.bio-rad.com/largeelectro
Request or download bulletin: 1760



PROTEAN II xi and XL (IPG) component comparison:
1. The 4 mm xi and 13 mm XL clamp notches.
2. The 181 mm xi and 198 mm XL central cooling core gaskets.
3. The 153 mm xi and 184 mm XL combs.
4. The 19 mm xi and 8 mm XL spacers.

Maximum Sample Volume per Well for PROTEAN II xi and XL Combs*

		Comb Thickness				
Number or Type of Wells	**Well Width**	**0.5 mm**	**0.75 mm**	**1.0 mm**	**1.5 mm**	**3.0 mm**
25	3.5 mm	—	60 µl	80 µl	120 µl	—
20	5.0 mm	54 µl	82 µl	110 µl	164 µl	328 µl
15	6.5 mm	74 µl	110 µl	147 µl	221 µl	442 µl
10	1.0 cm	114 µl	172 µl	229 µl	343 µl	687 µl
5	2.3 cm	—	—	522 µl	783 µl	1.57 ml
3	4.0 cm	—	—	—	1.37 ml	—
Blank	14.5 cm	—	2.44 ml	3.26 ml	4.88 ml	9.76 ml
2-D (IPG well)						
Reference well	3.5 mm	—	—	28 µl	42 µl	84 µl
Sample well	17.8–17.9 cm	—	—	—	—	—

* At standard 25 mm well depth.

* Requires a refrigerated circulating bath and operation at 4°C for optimal results.

Ordering Information

Catalog #	Description
PROTEAN II xi Accessories for Running Gels	
165-1901	**PROTEAN II xi Sandwich Clamps**, 16 cm set (1 left, 1 right)
165-1902	**PROTEAN II xi Sandwich Clamps**, 20 cm set (1 left, 1 right)
165-1913	**PROTEAN II xi Replacement Gaskets**, for central cooling core, 2
PROTEAN II XL Accessories for Running Gels	
165-1835	**PROTEAN II XL Sandwich Clamps**, IPG set (1 left, 1 right)
165-3182	**PROTEAN II XL Replacement Gaskets**, for central cooling core, 2
PROTEAN II xi and XL Accessories for Running Gels	
165-1806	**Central Cooling Core**, includes 2 gaskets
165-1807	**Buffer Tank**
165-1808	**Cell Lid**, with power cables
165-1909	**Upper Buffer Dam**
100-5430	**PROTEAN II Latch Assembly Kit**, for central cooling core
900-7680-18	**Replacement Platinum Wire**, cathode, 18"
900-7680-24	**Replacement Platinum Wire**, anode, 24"
PROTEAN II xi and XL Casting Apparatus	
165-1911	**Slab Gel Casting Stand**, with gaskets
165-1912	**Replacement Gaskets**, for casting stand, 2
PROTEAN II xi Glass Plates*	
165-1821	**Inner Plates**, for 16 x 16 cm gels, 16 x 20 cm, 2, for PROTEAN II xi cell only
165-1822	**Outer Plates**, for 16 x 16 cm gels, 18.3 x 20 cm, 2, for PROTEAN II xi cell only
PROTEAN II xi Specialty Glass Plates	
165-1825**	**Frosted Inner Plates**, for agarose gels, 16 x 20 cm, 2, for PROTEAN II xi cell only
165-1826**	**Frosted Inner Plates**, for agarose gels, 20 x 20 cm, 2, for PROTEAN II xi cell only
165-1832***	**Notched Inner Plate**, for double-up procedures, 16 x 16 cm gel, 16 cm bevel length, for PROTEAN II xi cell only
165-1833***	**Notched Inner Plate**, for double-up procedures, 16 x 20 cm gel, 16 cm bevel length, for PROTEAN II xi cell only
PROTEAN II xi and XL Glass Plates, for 16 x 20 or 18.3 x 20 cm gels*	
165-1823	**Inner Plates**, 20 x 20 cm, 2
165-1824	**Outer Plates**, 22.3 x 20 cm, 2

Spacer Width	0.5 mm	0.75 mm	1.0 mm	1.5 mm	3.0 mm
PROTEAN II xi Spacers (Set of 4)					
16 x 20 cm gels	165-1841	165-1842	165-1843	165-1844	165-1845
20 x 20 cm gels	165-1846	165-1847	165-1848	165-1849	165-1850
PROTEAN II xi Combs**					
Blank	—	165-1891	165-1892	165-1893	165-1894
2-D IPG	—	—	165-1897	165-1898	165-1899
3-Well	—	—	—	165-1888	—
5-Well	—	—	165-1882	165-1883	165-1884
10-Well	165-1875	165-1876	165-1877	165-1878	165-1879
15-Well	165-1870	165-1871	165-1872	165-1873	165-1874
20-Well	165-1865	165-1866	165-1867	165-1868	165-1869
25-Well	—	165-1861	165-1862	165-1863	—

Spacer Width	1.0 mm	1.5 mm	2.0 mm
PROTEAN II XL Combs, IPG Strip Format			
2-D IPG (with reference well)	165-1838	165-3187	165-1839

Catalog #	Description
PROTEAN II XL Spacers, IPG Strip Format (Set of 4)	
165-1836	**20 cm Spacers**, 1.0 mm
165-3181	**20 cm Spacers**, 1.5 mm
165-1837	**20 cm Spacers**, 2.0 mm

* One gel sandwich consists of 1 outer plate, 1 inner plate, and 2 spacers.

** Each comb is 15.2 cm long. All combs except the 2-D combs produce sample wells that are 25 mm deep. The well depth of the 2-D comb is 8 mm. The well depth of all standard combs can be converted from 25 mm to 10 mm with comb conversion screws (#165-1859).

continues

Ordering Information

Catalog #	Description
PROTEAN II xi Multi-Cell*	
165-1951	**PROTEAN II xi Multi-Cell**, includes 3 central cooling cores with gaskets, buffer tank, lid with power cables, 1 upper buffer dam, PROTEAN II xi multi-casting chamber with accessories, leveling bubble
165-1956	**PROTEAN II xi Multi-Cell 2-D Conversion Kit**, for proper cooling, includes 2 cooling coils and manifold (required for 2-D electrophoresis applications)
PROTEAN II XL Multi-Cell, Wide Format, Compatible with ReadyStrip IPG Strips*,**	
165-3176	**PROTEAN II XL Multi-Cell**, wide format, 1.0 mm
165-3177	**PROTEAN II XL Multi-Cell**, wide format, 1.5 mm
165-3178	**PROTEAN II XL Multi-Cell**, wide format, 2.0 mm

* The PROTEAN i12 IEF system is required for first-dimension IEF with the PROTEAN II xi or XL multi-cell; see pages 161–162.

** Includes catalog #165-1951, #165-1956, and 3 PROTEAN II xi cell IPG conversion kits of desired thickness. Order appropriate spacers, plates, clamps, combs, and accessories for your application (pages 154–156).

PROTEAN® II Multi-Gel Casting Chamber

- Up to twelve 1.5 mm thick gels can be cast simultaneously
- Top filling for uniform single percentage gels
- Bottom filling for reproducible gradient gels using the Model 495 gradient former (see page 159)
- Accommodation of 16 or 20 cm gels
- Acrylic blocks can be used as space fillers when fewer than 10 gels are cast and reusable separation sheets offer easy separation of gel sandwiches after casting



For More Information
Web: www.bio-rad.com/proteanii

Ordering Information

Catalog #	Description
165-2025	**PROTEAN II xi Multi-Gel Casting Chamber**, includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 xi alignment cards, tapered luer connector, leveling bubble
165-2024	**PROTEAN II XL Multi-Gel Casting Chamber**, includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 XL alignment cards, tapered luer connector, leveling bubble
Accessories	
165-1957	**Acrylic Blocks**, 4
165-1958	**Separation Sheets**, 15
165-2026	**Sealing Gaskets**, 3
165-2029	**PROTEAN II xi Alignment Cards**, 2
165-1840	**PROTEAN II XL Alignment Cards**, 2

See Also
Acrylamide gel-casting reagents: page 192.
Buffers: page 191.

See Also
PowerPac HC and PowerPac Universal power supplies: page 181.
Dodeca stainers: pages 151–152.
Gel clip: pages 159–160.

PROTEAN® Plus Dodeca™ Cell

The PROTEAN Plus Dodeca cell* accommodates up to 12 large slab gels, matching the capacity of 1-D runs in the PROTEAN IEF system for high-throughput 2-D applications. Features include:

- Capacity to run 1–12 gels
- Ceramic cooling core, buffer recirculation pump**, and refrigerated circulator that provide efficient cooling — temperature of buffer surrounding gels varies by ≤1°C
- Plate electrodes** that create an optimally uniform electrical field to give straight horizontal run results
- Differential plate heights that facilitate easy IPG strip or tube gel loading; the AnyGel™ stand (page 159) can be used to stabilize and position gels while loading



For More Information
Request or download bulletin: 2621
Web www.bio-rad/proteandodeca

* Designed to run IPG and tube gel samples; not recommended for 1-D applications.
** U.S. patent 6,451,193.

Ordering Information

Catalog #	Description
PROTEAN Plus Dodeca Cells and Systems	
165-4150	**PROTEAN Plus Dodeca Cell**, 100/120 V, includes electrophoresis buffer tank with built-in ceramic cooling core, lid, buffer recirculation pump with tubing, 2 gel releasers
165-4140	**PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac HC Power Supply**, includes #165-4150 and #164-5052
165-4142	**PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac Universal Power Supply**, includes #165-4150 and #164-5070
165-4144	**PROTEAN Plus Dodeca Cell (100/120 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply**, includes #165-4150, #170-3990, and #164-5070
165-5134	**PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands**, includes #165-4150 and two #165-5131
165-4151	**PROTEAN Plus Dodeca Cell**, 220/240 V, includes electrophoresis buffer tank with built-in ceramic cooling core, lid, buffer recirculation pump with tubing, 2 gel releasers
165-4141	**PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac HC Power Supply**, includes #165-4151 and #164-5052
165-4143	**PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac Universal Power Supply**, includes #165-4151 and #164-5070
165-4145	**PROTEAN Plus Dodeca Cell (220/240 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply**, includes #165-4151, #170-3990, and #164-5070
165-5135	**PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands**, includes #165-4151 and two #165-5131
Accessories and Replacement Parts	
165-4158	**Recirculation Pump**, 100/120 V
165-4159	**Recirculation Pump**, 220/240 V
165-4153	**Replacement Tubing Kit**, for tank with stopcock drain port installed at base of tank
165-4152	**Replacement Old Tubing Kit**, for tank without stopcock drain port installed at base of tank
165-4154	**Replacement Gasket Assembly**
165-4155	**Replacement Electrode Card**, anode
165-4156	**Replacement Electrode Card**, cathode
165-4157	**Replacement Lid**
165-4166	**Manifold Tubing**, required for precast gels and PROTEAN II plates, 11 pieces
165-4167	**Buffer Exhaust Tubing**
165-3320	**Gel Releasers**, 5
165-2948	**Replacement Power Cables**, for lid

Large-Format Electrophoresis Accessories

See Also
Acrylamide gel-casting reagents: page 192.
Buffers: page 191.

PROTEAN® Plus Combs and Hinged Spacer Plates

PROTEAN Plus hinged spacer plates are two glass plates joined together by a silicone hinge with integrated spacers bonded onto the long plate to guarantee perfect alignment during casting and eliminate potential current leaks. The differential plate heights facilitate easy IPG strip or tube gel loading. The hinged spacer plate sizes are the same for both gel sizes (20 and 25 cm wide). Combs are available for both 20 and 25 cm wide gel sizes and 1.0, 1.5, or 2.0 mm thick gels.



Hinged Spacer Plates

PROTEAN Plus Multi-Casting Chamber

Use the PROTEAN Plus multi-casting chamber to cast up to 12 gels of 1.0, 1.5, or 2.0 mm thickness simultaneously. The chamber accommodates the PROTEAN Plus hinged spacer plates for both 20 and 25 cm wide gel sizes. Acrylic blocks act as space fillers when fewer than 12 gels are cast, and a leveling bubble ensures level interfaces. Gradient gels are cast through a bottom port using the Model 495 gradient former (below).



PROTEAN Plus Multi-Casting Chamber

Dodeca High-Throughput Stainers

Dodeca stainers are available in two sizes: the small size accommodates up to 24 Criterion™ gels while the large size can accommodate up to 12 large format gels. The stainers ensure consistent results and eliminate gel breakage from excess handling.



Large Dodeca Stainer

Model 556 Gel Destainer

This destainer uses clear, stackable trays to destain up to four 16 x 20 cm slab gels, forty 6 x 170 mm tube gels, or a combination of gel sizes in one hour.

- Flow pattern of destaining solution ensures uniform destaining of every gel
- Stirbar controls flow rate of destaining solution
- Reduced destaining time with no need to change destaining solution



Model 556 Gel Destainer

Model 495 Gradient Former

This gradient former allows you to pour linear or convex exponential acrylamide gradients. Its 100–1,500 ml capacity is designed to pour up to 12 gradient slab gels in the PROTEAN Plus multi-casting chamber. The optional exponential piston is required to form convex exponential acrylamide gradients.

PROTEAN II xi Plate Washer/Holder

The PROTEAN II xi plate washer/holder takes the tedium out of washing glass plates while greatly reducing the potential for plate damage. Each rack holds up to eight PROTEAN II xi plates or 18 Mini-PROTEAN® II plates. The plate washing tank is ideal for soaking plates and for long-term dust-free storage. Hooks suspend the rack above the washing tank for complete plate drainage.



PROTEAN II xi Plate Washer/Holder



Using the gel clip to clamp onto a gel (PROTEAN Plus precast gel shown).

AnyGel Stands

AnyGel stands provide stabilization and access to virtually any size gel. The clamping mechanism secures gel cassettes vertically without excess pressure.

Gel Clip

The gel clip facilitates the handling of large format gels and eliminates gel breakage by minimizing direct hands-on gel manipulation. The gel clip gently but securely clamps along one edge of a gel, distributing the weight evenly so that the gel can be easily lifted without tearing.

Ordering Information

Catalog #	Description
PROTEAN Plus Combs	
165-4176	**2-D Comb with 1 Reference Well**, 20 cm, 1.0 mm
165-4177	**2-D Comb with 1 Reference Well**, 20 cm, 1.5 mm
165-4178	**2-D Comb with 1 Reference Well**, 20 cm, 2.0 mm
165-4179	**2-D Comb with 1 Reference Well**, 25 cm, 1.0 mm
165-4180	**2-D Comb with 1 Reference Well**, 25 cm, 1.5 mm
165-4181	**2-D Comb with 1 Reference Well**, 25 cm, 2.0 mm
PROTEAN Plus Hinged Spacer Plates	
165-4170	**Hinged Spacer Plates**, for 20 x 20.5 cm gels, 1.0 mm, 1 set
165-4171	**Hinged Spacer Plates**, for 20 x 20.5 cm gels, 1.5 mm, 1 set
165-4172	**Hinged Spacer Plates**, for 20 x 20.5 cm gels, 2.0 mm, 1 set
165-4173	**Hinged Spacer Plates**, for 25 x 20.5 cm gels, 1.0 mm, 1 set
165-4174	**Hinged Spacer Plates**, for 25 x 20.5 cm gels, 1.5 mm, 1 set
165-4175	**Hinged Spacer Plates**, for 25 x 20.5 cm gels, 2.0 mm, 1 set
PROTEAN Plus Multi-Casting Chamber	
165-4160	**PROTEAN Plus Multi-Casting Chamber**, includes casting chamber, sealing plate, silicone gasket, tapered luer connector, leveling bubble, 15 separation sheets, 8 acrylic blocks (order glass hinged spacer plates and combs separately)
Accessories for PROTEAN Plus Multi-Casting Chamber	
165-4165	**Separation Sheets**, for PROTEAN Plus multi-casting chamber, 15
165-4161	**Acrylic Block**, 1.5 mm
165-4162	**Acrylic Block**, 3 mm
165-4163	**Acrylic Block**, 6 mm
165-4164	**Acrylic Block**, 12 mm
165-3320	**Gel Releasers**, 5
Gel Clip	
165-3414	**Gel Clip**, holds any gel size
Model 495 Gradient Former	
165-4121	**Model 495 Gradient Former**, 100–1,500 ml, includes body with valve stem and tubing connection kit
165-4123	**Model 495 Gradient Former and PROTEAN Plus Multi-Casting Chamber**, includes #165-4121 and #165-4160
Accessories for Model 495 Gradient Former	
165-2005	**Exponential Piston**, for Model 395 and Model 495 gradient formers
165-2008	**Tubing Connection Kit**, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector
PROTEAN II xi Plate Washer/Holder	
165-1991*	**PROTEAN II xi Plate Washer System**, includes 2 plate holders, washing tank, lid, 1 bottle of Bio-Rad cleaning concentrate
165-1992*	**PROTEAN II xi Plate Holder**
161-0722	**Bio-Rad Cleaning Concentrate**, 50x, 1 kg
Model 556 Gel Destainer	
165-2010	**Model 556 Gel Destainer**, includes outer chamber and lid, 3 slab gel trays, stirbar/sponge support, charcoal sponge
Accessories for Model 556 Gel Destainer	
165-2011	**Slab Gel Tray**
165-2012	**Tube Gel Tray**
165-2013	**Charcoal Sponges**, 2

* Not compatible with Mini-PROTEAN 3 short plates and spacer plates or with PROTEAN Plus hinged spacer plates.

2-D Electrophoresis

IEF is primarily used as the first dimension of separation in 2-D analysis; 2-D electrophoresis is used to separate complex protein samples based on pI and MW. IEF separations can be performed using two techniques: either with an IPG strip with ampholytes covalently bound to the gel or with carrier ampholytes that move through the gel to generate a pH gradient. Bio-Rad offers products for both techniques. Bio-Rad's first-dimension products are compatible with second-dimension SDS-PAGE systems in mini, midi, and large formats. For more information, see pages 131–160. For preparative IEF products see pages 172–175.

Learn More about the Technology
Web: www.bio-rad.com/tech/2delectro

PROTEAN® i12™ IEF System

The PROTEAN i12 IEF system offers individual lane control — a novel feature that allows multiple lanes to be run simultaneously, each with a different sample, pH gradient, and protocol, resulting in time savings and improved reliability. The flexible system works with ReadyStrip™ IPG strips to provide many separation range options. The PROTEAN i12 IEF system provides a unique solution for first-dimension separations with the following features:

Individual Lane Control

- Optimize experiments in fewer runs
- Run multiple experiments at once
- Obtain better quality data with less experimental risk — one irregular sample cannot compromise the entire run

Touch-Screen User Interface

- Easily run programs and edit and create protocols

Flexible Electrode and Tray Design

- Run IPG strips gel-side down or gel-side up or load sample with cups, all within the same tray
- Durable polycarbonate trays supply sufficient heat transfer for accurate and reproducible pI determination

Web Application

- Export focusing data via USB port to Excel or upload to the PROTEAN i12 Reporter (**www.i12reporter.com**), a free web-based application that easily graphs data, compares lanes, and creates reports

For More Information
Web: www.bio-rad.com/proteani12
Request or download bulletins: 2651, 6097, 6138, 6139, and 6140



PROTEAN i12 IEF system components:

1. PROTEAN i12 IEF cell.
2. Focusing trays with strip retainers.
3. Cleaning brushes.
4. Pair of electrodes.
5. ReadyStrip IPG Strips.
6. Leveling bubble.
7. Forceps.
8. Styluses.
9. USB flash drives.
10. Electrode wicks.
11. Rehydration trays.
12. ReadyPrep 2-D starter kit, rehydration/sample buffer.
13. Cleaning concentrate.
14. Mineral oil.



PROTEAN i12 IEF system touch-screen user interface.

PROTEAN i12 IEF System Specifications

Input power	100–240 VAC, 50/60 Hz	Available focusing tray lengths	7, 11, 13, 17, 18, 24 cm
Voltage per lane	0, 50–10,000 V, 1 V increments	Focusing tray capacity	1–12 IPG strips per tray
Current per lane	0–100 µA, 1 µA intervals	Dimensions (W x D x H)	46 x 34.5 x 18.5 cm
Power per lane	0–1 W	Weight	8.6 kg (19 lbs)
Peltier platform temperature	10–25°C	Display	QVGA resolution (320 x 240) touch screen or mouse control

See Also

ReadyStrip IPG strips: pages 164–165.
Protein sample preparation products: pages 2–9.
Vertical electrophoresis: pages 133–160.

PROTEAN i12 IEF System Accessories

Accessories for the PROTEAN i12 system can also be purchased individually. Six sizes of focusing and rehydration/equilibration trays are available as well as replacement electrodes, cleaning supplies, and other system-related items.

Cup loading is an option for improving your 2-D results, especially for proteins with extreme pIs. The PROTEAN i12 sample cup holder can be used with all of the PROTEAN i12 focusing trays. It effortlessly clips onto the tray and forms a secure seal that prevents leaking but won't damage the IPG strip. The disposable sample cups prevent sample contamination.

For More Information
Web: www.bio-rad.com/proteani12
Request or download bulletins: 2651, 6097, 6138, 6139, and 6140


Focusing Trays


Rehydration Trays


i12 Sample Cup Holder

Ordering Information

Catalog #	Description
164-6000	**PROTEAN i12 IEF system**, includes basic unit, 90–240 VAC positive and negative electrode assemblies, 7, 11, and 17 cm focusing trays, 1 pack each of 7, 11, and 17 cm rehydration/equilibration trays, 2 pairs of forceps, 2 packs of electrode wicks for gel-side down and gel-side up applications, mineral oil, 2 cleaning brushes, cleaning concentrate, 2 USB flash drives, 3 styluses, pH 3–10 ReadyStrip IPG strips (7, 11, and 17 cm lengths), rehydration/sample buffer, leveling bubble, and instruction manual. All 13, 18, and 24 cm trays and cup loading accessories can be purchased separately
164-6001	**PROTEAN i12 IEF Cell**, includes PROTEAN i12 IEF cell, 90–240 VAC basic unit, positive and negative electrode assemblies and 3 styluses. Focusing trays and other accessories sold separately
PROTEAN i12 IEF System Accessories	
164-6107	**i12 7 cm Focusing Tray**, includes 2 IPG strip retainers
164-6111	**i12 11 cm Focusing Tray**, includes 2 IPG strip retainers
164-6113	**i12 13 cm Focusing Tray**, includes 2 IPG strip retainers
164-6117	**i12 17 cm Focusing Tray**, includes 2 IPG strip retainers
164-6118	**i12 18 cm Focusing Tray**, includes 2 IPG strip retainers
164-6124	**i12 24 cm Focusing Tray**, includes 2 IPG strip retainers
165-4035	**i12 7 cm Rehydration/Equilibration Tray**, includes lids, 25
165-4025	**i12 11 cm Rehydration/Equilibration Tray**, includes lids, 25
164-6313	**i12 13 cm Rehydration/Equilibration Tray**, includes lids, 25
165-4015	**i12 17 cm Rehydration/Equilibration Tray**, includes lids, 25
165-4041	**i12 18 cm Rehydration/Equilibration Tray**, includes lids, 25
165-4043	**i12 24 cm Rehydration/Equilibration Tray**, includes lids, 25
164-6040	**IPG Strip Retainers**, 2
164-6020	**i12 Sample Cup Holder**, includes 25 sample cups
164-6021	**i12 Sample Cups**, 25
164-6030	**Gel-Side Up Electrode Wicks**, 100
164-6031	**Gel-Side Down Electrode Wicks**, 500
164-6012	**Negative Electrode Assembly**
164-6011	**Positive Electrode Assembly**
164-6010	**Electrode Assembly Pair**, includes 1 positive and 1 negative electrode assembly
165-4072	**Cleaning Brushes**, 2
161-0722	**Cleaning Concentrate**, 1 L
164-6060	**USB Flash Drive**, 2
164-6050	**Stylus**, 3
163-2129	**Mineral Oil**, 500 ml
165-4070	**Forceps**, 1

PROTEAN® IEF Accessories

Accessories for the discontinued PROTEAN IEF cell (#165-4000 and #165-4001) are still available and include focusing trays, electrode wicks, cup loading accessories, and thermal printers. Rehydration/equilibration trays, cleaning supplies, forceps, and reagents are interchangeable with the PROTEAN i12 IEF system (see page 162 for part numbers).



Thermal Printer for the PROTEAN IEF System

Focusing Trays

- Focusing trays hold 1–12 ReadyStrip IPG strips for flexibility and streamlined handling
- Platinum electrode is physically embedded into the running tray to ensure the integrity of each well and sample
- Durable polycarbonate trays ensure sufficient heat transfer for accurate and reproducible pI determination
- Numbered channels aid in strip identification and sample tracking



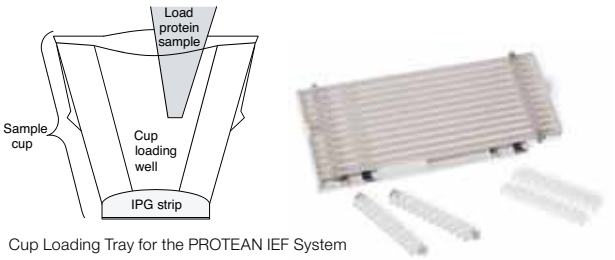
Focusing Tray for the PROTEAN IEF System

Tray Specifications

	IPG Strip Length				
	7 cm	**11 cm**	**17 cm**	**18 cm**	**24 cm**
Focusing Trays					
Electrode distance	6.5 cm	10.2 cm	16.2 cm	17.1 cm	22.7 cm
Total strip length accommodated	8.2 cm	12.1 cm	18.1 cm	20.1 cm	25.3 cm
ReadyStrip IPG strip length	7.9 cm	11.8 cm	17.8 cm	19.0 cm	24.7 cm
Rehydration/Equilibration Trays					
Total strip length accommodated	8.0 cm	12.7 cm	18.6 cm	20.4 cm	25.3 cm
Maximum volume	6.8 ml	9.6 ml	14.2 ml	16.0 ml	19.0 ml

Cup Loading Tray for the PROTEAN IEF System

Cup loading expands the versatility and range of applications for first-dimension IEF using the PROTEAN IEF cell. This loading method can improve focusing results, especially for proteins with pIs in the extreme pH ranges. Load up to 150 µl of sample with easy-to-use disposable sample cups. Moveable electrodes provide the flexibility to run IPG strips from 7 to 24 cm in length.



Cup Loading Tray for the PROTEAN IEF System

Ordering Information

Catalog #	Description
Trays	
165-4030	**7 cm Focusing Tray with Lid**
165-4020	**11 cm Focusing Tray with Lid**
165-4010	**17 cm Focusing Tray with Lid**
165-4040	**18 cm Focusing Tray with Lid**
165-4042	**24 cm Focusing Tray with Lid**
Cup Loading Tray*	
165-4050	**Cup Loading Tray**, includes 1 tray base, 1 pair movable electrodes, 1 pack each of large and small replacement cups
165-4055	**Cup Loading Tray with Forceps**

*The cup loading tray is not intended or designed for active or passive rehydration of IPG strips. Use the appropriate rehydration/equilibration tray that matches your IPG strip's length.

continues

Ordering Information (continued)

Catalog #	Description
Accessories	
165-4071	**Electrode Wicks**, precut, 500
165-4080	**Thermal Printer**, 100 V, includes cable and power adaptor
165-4082	**Thermal Printer**, 120 V, includes cable and power adaptor
165-4085	**Thermal Printer**, 220 V, includes cable and power adaptor
170-2412	**Thermal Printer Paper**, 10 rolls
165-4051	**Large Replacement Cups**, 150 µl, 120
165-4052	**Small Replacement Cups**, 100 µl, 120
165-4053	**Replacement Movable Electrodes**, 1 pair
165-4054	**Replacement Cup Loading Tray Base**

See Also
PROTEAN i12 IEF system: pages 161–162.
ReadyPrep 2-D starter kit: page 166.

ReadyStrip™ IPG Strips

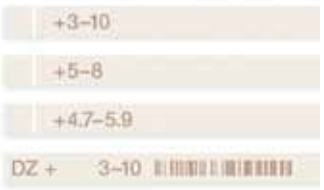
ReadyStrip IPG strips are available in five different strip lengths and in a wide selection of pH gradients, with 1, 3, or 7 pH units per strip. Shorter strips are useful for method development, while longer strips provide the best separation possible with higher protein loads. ReadyStrip IPG strips are thoroughly tested for quality and performance to deliver 2-D gel-to-gel reproducibility.

Design Features

- Stringent gel length tolerances of ±2 mm
- Anode and pH range clearly printed on each strip, with bar coding on 24 cm strips
- Consistent backing lengths for self-centering on 2-D gels

Gradient Selection

- Standard broad-range pH gradients for maximum separation on a single gel
- Narrow-range gradients for greater resolution (more cm of gel per pH unit)
- Micro-range gradients for maximum resolution
- Comprehensive offering that increases resolving power in the first dimension with overlapping pH ranges



ReadyStrip IPG strips are preprinted to indicate anode end (+) and pH range; in addition, a bar code is printed on the 24 cm strip.

Relative Focusing Power

The 7 cm pH 3–10 strip is arbitrarily assigned a baseline focusing power of 1.0 in order to calculate the relative focusing power of the other strips.

- **Strips with the same pH range but different length** — calculate the ratio of the strip lengths. Compared to a 7 cm strip, an 11 cm strip has a relative focusing power of 11/7 cm = 1.6
- **Strips with the same length but different pH range** — calculate the ratio of the pH ranges. Compared to a pH 3–10 strip (7 pH units), a pH 5–8 strip (3 pH units) has a relative focusing power of 7/3 = 2.3

For More Information
Web: www.bio-rad.com/readystripIPG
Request or download bulletin: 2442

Relative Focusing Power of IPG Strips

Strip Range*	pH	7 cm	11 cm	17 cm	18 cm	24 cm	ReadyStrip IEF Buffer
	3 4 5 6 7 8 9 10	Relative Focusing Power					3–10 7–10 3.9–5.1 4.7–5.9 5.5–6.7 6.3–8.3
Broad Range							
3–10		1x	1.6x	2.4x	2.6x	3.4x	•
3–10 nonlinear (NL)		1x	1.6x	2.4x	2.6x	3.4x	•
Narrow Range							
3–6		2.3x	3.7x	5.7x	6.0x	8.0x	•
5–8		2.3x	3.7x	5.7x	6.0x	8.0x	•
7–10		2.3x	3.7x	5.7x	6.0x	8.0x	•
4–7		2.3x	3.7x	5.7x	6.0x	8.0x	•
Micro Range							
3.9–5.1		5.8x	9.2x	14.2x	15.0x	20.0x	•
4.7–5.9		5.8x	9.2x	14.2x	15.0x	20.0x	•
5.5–6.7		5.8x	9.2x	14.2x	15.0x	20.0x	•
6.3–8.3		3.5x	5.5x	8.5x	9.0x	12.0x	•

* Strips are designed with sufficient overlap to allow spot matching while limiting the extent of redundant data.

Ordering Information

pH Range	7 cm	11 cm	17 cm	18 cm	24 cm
ReadyStrip IPG Strips, 12 per Package					
pH 3–10	163-2000	163-2014	163-2007	163-2032	163-2042
pH 3–10 NL*	163-2002	163-2016	163-2009	163-2033	163-2043
pH 3–6	163-2003	163-2017	163-2010	163-2035	163-2045
pH 4–7	163-2001	163-2015	163-2008	163-2034	163-2044
pH 5–8	163-2004	163-2018	163-2011	163-2036	163-2046
pH 7–10	163-2005	163-2019	163-2012	163-2037	163-2047
pH 3.9–5.1	163-2028	163-2024	163-2020	163-2038	163-2048
pH 4.7–5.9	163-2029	163-2025	163-2021	163-2039	163-2049
pH 5.5–6.7	163-2030	163-2026	163-2022	163-2040	163-2050
pH 6.3–8.3	163-2031	163-2027	163-2023	163-2041	163-2051

Catalog #	Description
ReadyStrip IEF Buffers and Accessories**	
163-2094	**Bio-Lyte 3/10 Ampholyte**, 100x, 1 ml
163-2093	**ReadyStrip 100x pH 7–10 Buffer, includes only ampholytes**, 1 ml
163-2098	**ReadyStrip 100x pH 3.9–5.1 Buffer, includes only ampholytes**, 1 ml
163-2097	**ReadyStrip 100x pH 4.7–5.9 Buffer, includes only ampholytes**, 1 ml
163-2096	**ReadyStrip 100x pH 5.5–6.7 Buffer, includes only ampholytes**, 1 ml
163-2095	**ReadyStrip 100x pH 6.3–8.3 Buffer, includes only ampholytes**, 1 ml
163-2099	**ReadyStrip Instruction Manual**, free upon request with ReadyStrip purchase

* NL, nonlinear gradient.

** Dilute ReadyStrip buffers to 1x in each sample to obtain a final concentration of 0.2% ampholyte.

ReadyPrep™ Reagents for IEF

ReadyPrep reagents ensure success with first- and second-dimension separations. The 2-D starter kit is the ideal tool for learning to use the PROTEAN i12 IEF system and for perfecting technique. Premixed buffers and individual reagents are available for each step of the 2-D process. For preparation of protein samples for 2-D electrophoresis, see pages 3–4.

See Also

ReadyStrip IPG strips and IEF buffers: pages 164–165.

PROTEAN i12 IEF system: pages 161–162.

Criterion system: pages 144–145.

ReadyPrep™ 2-D Starter Kit

The ReadyPrep 2-D starter kit is intended for first-time users of the PROTEAN i12 IEF cell and ReadyStrip IPG strips. The kit contains tested premixed reagents required for first and second dimension separations, a reference manual with technical tips, and a known protein sample. The ReadyPrep 2-D starter kit includes all reagents needed to:

- Prepare an *E. coli* protein sample
- Rehydrate IPG strips with sample
- Equilibrate IPG strips for SDS-PAGE
- Overlay IPG strips with agarose on SDS-PAGE gels

For More Information
Web: www.bio-rad.com/readyprep2d



2-D Starter Kit Contents

	Vials/Kit
E. coli protein sample, 2.7 mg	1
ReadyPrep 2-D starter kit rehydration/sample buffer, 10 ml	1
ReadyPrep equilibration buffer I, 20 ml	2
ReadyPrep equilibration buffer II, 20 ml	2
30% glycerol solution, 70 ml	1
ReadyPrep overlay agarose, 50 ml	1
Iodoacetamide, 0.5 g	2
Nanopure water, 15 ml	1

Ordering Information

Catalog #	Description
163-2105	**ReadyPrep 2-D Starter Kit**, includes *E. coli* protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels (six 17 cm, ten 11 cm, or sixteen 7 cm ReadyStrip IPG strips), ReadyStrip IPG strips, precast SDS-PAGE gels, and gel stains not included
163-2110	***E. coli* Protein Sample**, lyophilized, 2.7 mg

2-D Premixed Buffers and Individual Reagents

Streamline 2-D experiments and reduce variables with Bio-Rad's convenient premixed buffers and protein sample, tested for consistent 2-D performance with IPG strips:

- **ReadyPrep 2-D starter kit rehydration/sample buffer** — a standard formulation appropriate for many protein samples
- **ReadyPrep 2-D starter kit equilibration buffer I** — premixed with DTT for the first equilibration step in the DTT/iodoacetamide alkylation method
- **ReadyPrep 2-D starter kit equilibration buffer II** — add iodoacetamide and use for the second equilibration step in the DTT/iodoacetamide alkylation method; this buffer can also be used for single-step alkylation by adding TBP and acrylamide
- ***E. coli* protein sample** — this complex protein sample is performance tested to give a consistent pattern when used with ReadyPrep 2-D starter kit rehydration/sample buffer; use this sample as a control to validate your 2-D system and protocol before running more difficult experimental samples

Reducing and Alkylating Agents

Either DTT or TBP can be used for IEF and during equilibration prior to SDS-PAGE. Alkylation with iodoacetamide is the standard method to prevent reoxidation during second-dimension SDS-PAGE. Reduction and alkylation can also occur at the sample preparation stage. See the ReadyPrep reduction-alkylation kit, page 3.

Overlay Agaroses

Bromophenol blue tracking dye is incorporated into this solution to allow monitoring of electrophoresis runs. Use ReadyPrep overlay agarose, a low melting point agarose, to secure IPG strips in place for most applications. For second-dimension runs in the PROTEAN Plus cell, in which the IPG strip is oriented perpendicularly to the laboratory bench, firmer PROTEAN Plus overlay agarose is recommended to secure the IPG strip.

Individual Reagents and Detergent

Urea and Tris as well as CHAPS detergent are available.

For More Information
Web: www.bio-rad.com/2dreagents

See Also

Protein sample preparation products: pages 3–4.
ReadyPrep reduction-alkylation kit: pages 3–4.

Ordering Information

Catalog #	Description
163-2106	**ReadyPrep 2-D Starter Kit Rehydration/Sample Buffer**, 10 ml, 8 M urea, 2% CHAPS, 50 mM DTT, 0.2% Bio-Lyte 3/10 ampholyte, 0.001% bromophenol blue
163-2107	**ReadyPrep 2-D Starter Kit Equilibration Buffer I**, with DTT, 10 ml, 375 mM Tris-HCl, pH 8.8, 6 M urea, 2% SDS, 2% DTT
163-2108	**ReadyPrep 2-D Starter Kit Equilibration Buffer II**, without DTT or iodoacetamide, 20 ml, 375 mM Tris-HCl, pH 8.8, 6 M urea, 2% SDS
163-2091	**ReadyPrep Proteomics Grade Water**, 500 ml
161-0610	**Dithiothreitol (DTT)**, 1 g
161-0611	**Dithiothreitol (DTT)**, 5 g
163-2101	**Tributylphosphine (TBP)**, 200 mM, 0.6 ml
163-2109	**Iodoacetamide**, 30 g
161-0731	**Urea**, 1 kg
161-0719	**Tris**, 1 kg
Control Sample	
163-2110	***E. coli* Protein Sample**, lyophilized, 2.7 mg
Overlay Agaroses	
163-2111	**ReadyPrep Proteomics Grade Overlay Agarose**, 50 ml, 0.5% low melting point agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue
163-2092	**PROTEAN Plus Proteomics Grade Overlay Agarose**, 125 ml, 0.75% agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue
Detergent for IEF	
161-0460	**CHAPS**, 1 g

Tube Gel IEF 2-D Systems

Bio-Rad offers several options for first-dimension tube gel separations using ampholytes.

See Also

AnyGel stands: pages 142–143.

PowerPac HV and PowerPac Universal power supplies: pages 181–182.

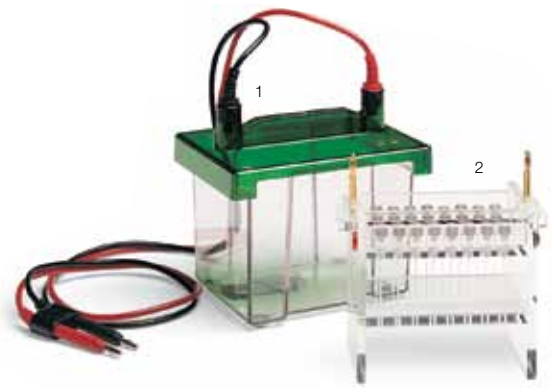
Acrylamide gel-casting reagents: page 192.

Mini-PROTEAN® 2-D Electrophoresis Cell

The Mini-PROTEAN tube cell module transforms the Mini-PROTEAN 3 cell into a miniature 2-D electrophoresis cell. The Mini-PROTEAN 2-D electrophoresis cell runs both tube gel IEF and vertical electrophoresis applications. First-dimension IEF typically takes 3.5 hours, and second-dimension SDS-PAGE takes 45 minutes. The entire 2-D procedure, including silver staining, can be completed in less than a day.

- Up to 16 tube gels can be cast in the glass tubes, then attached to molded sample reservoirs for the IEF run
- Following first-dimension IEF, the gels are easily removed using the mini 2-D tube gel ejector and are ready to slide between the plates of the slab gel for the second-dimension run
- The cell is IEC 1010 safety certified

For More Information
Web: www.bio-rad.com/tubegelIEF



Mini-PROTEAN 2-D electrophoresis cell components:
1. Buffer tank and lid with cables.
2. Tube cell module.

Ordering Information

Catalog #	Description
165-2960	**Mini-PROTEAN 2-D Cell**, includes tube adaptor, 16 sample reservoirs and stoppers, 50 sample reservoir/capillary tube connectors, 200 capillary tubes with casting tube, tube gel ejector, Mini-PROTEAN II slab cell with electrode assembly and gaskets, lower buffer chamber, lid with cables, 10 sets of glass plates, 2 clamp assemblies, two 2-D combs with 1 standard well, four 1.0 mm thick spacers, casting stand with gaskets, leveling bubble
165-2961	**Mini-PROTEAN Tube Cell**, includes tube adaptor, 16 sample reservoirs and stoppers, 50 sample reservoir/capillary tube connectors, 200 capillary tubes with casting tube, lower buffer chamber, lid with cables, tube gel ejector
165-2965*	**Mini-PROTEAN Tube Cell Module**, same as #165-2961, without lower buffer chamber and lid
Accessories	
165-2966	**Capillary Tubes with Casting Tube**, 200
165-2967	**Mini 2-D Tube Gel Ejector**
165-2968	**Mini-PROTEAN Tube Gel Sample Reservoirs**, 8
165-2969	**Mini-PROTEAN Tube Module Stoppers**, 8
165-2970	**Mini-PROTEAN Tube Module Tube Connectors**, 50
164-5056**	**PowerPac HV Power Supply**, 100–120/220–240 V

* The Mini-PROTEAN tube cell module may be used with the tank and lid of the Mini Trans-Blot cells of older Mini-PROTEAN II or Mini-PROTEAN 3 systems; the tube cell module is not compatible with the Mini-PROTEAN Tetra system. The Mini-PROTEAN tube cell (for casting tube gels and performing first-dimension IEF) and the tube cell module (for casting tube gels) are also available separately.

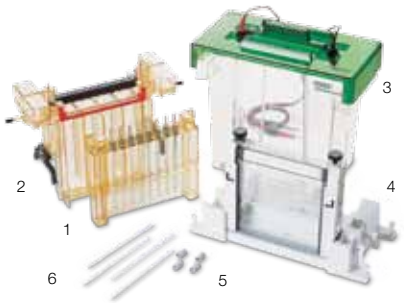
** Recommended for use with the Mini-PROTEAN 2-D electrophoresis cell.

PROTEAN® II xi 2-D Tube Gel Cell

The PROTEAN II xi 2-D cell provides all the components required for 2-D electrophoresis using polyacrylamide tube gels. The PROTEAN II xi 2-D cell:

- Runs both tube gels for first-dimension IEF and slab gels for second-dimension SDS-PAGE in the same cell
- Can focus up to 16 first-dimension IEF tube gels in a single run using the tube gel adaptors
- Can run up to four* 16 x 16 cm or 16 x 20 cm slab gels (use the 20 cm length for greater resolution)
- Makes it easy to position tube gels on the slab gel without an agarose overlay due to the beveled plates and the accessibility of the slab gel surface

For More Information
Web: www.bio-rad.com/tubegelIEF



PROTEAN II xi 2-D cell components:
1. Tube gel central cooling core.
2. Electrophoresis central cooling core with gaskets.
3. Buffer tank and lid with cables.
4. Slab gel casting stand, glass plates, and sandwich clamps.
5. Grommets and stoppers.
6. Glass tubes.

* For higher throughput, the PROTEAN II xi multi-cell provides six-gel capacity for second-dimension runs.

Ordering Information

Catalog #	Description
PROTEAN II xi 2-D Tube Gel Cell*	
165-1931	**PROTEAN II xi 2-D Cell**, 1.0 mm, 16 cm
165-1932	**PROTEAN II xi 2-D Cell**, 1.5 mm, 16 cm
165-1933	**PROTEAN II xi 2-D Cell**, 1.0 mm, 20 cm
165-1934	**PROTEAN II xi 2-D Cell**, 1.5 mm, 20 cm
Accessories and Replacement Parts	
165-1940	**Tube Gel Adaptor**, with gasket, grommets (4–8 mm OD tubes), stoppers
165-1943	**Tube Gel Loading Needles**, 18 cm, 22 gauge, blunt tip, luer hub (for casting monomer in small-diameter tubes), 2
165-1944	**Tube Gel Extrusion Needles**, 9 cm, 26 gauge, beveled tip, luer hub (for removing gels from tubes), 2
165-1947	**Replacement Gaskets**, for tube gel adaptor, 2
165-1859	**PROTEAN II Comb Conversion Screws****, includes 10 comb conversion screws, 10 standard comb screws
165-1827	**Beveled Inner Glass Plates**, for 2-D tube gel procedures, 16 cm bevel length, 16 x 20 cm, 2, for PROTEAN II xi 2-D cells only
165-1828	**Beveled Inner Glass Plates**, for 2-D tube gel procedures, 16 cm bevel length, 20 x 20 cm, 2, for PROTEAN II xi 2-D cells only

* Each PROTEAN II xi 2-D cell includes a central cooling core with gaskets, lower buffer chamber, lid with cables, 2 sets of glass plates (with beveled inner plates), 4 sandwich clamps, twenty-four 180 mm long glass tubes (tube diameter = spacer thickness), 2 tube gel adaptors, 16 grommets, 16 stoppers, two 2-D combs, 4 spacers, upper buffer dam, casting stand with gaskets, leveling bubble, and instructions. Sandwich clamps are sized to fit the gel length appropriate for the cell (16 cm or 20 cm). 1.0 mm and 1.5 mm indicate the thickness of spacers and combs included with the cell.

** For use with agarose gels. Comb conversion screws convert two PROTEAN II xi combs with standard 25 mm well depth to combs with a 10 mm well depth. Double-up stacking gels (4 gels/run) cannot be cast simultaneously when comb conversion screws are used.

See Also

PowerPac HV and PowerPac Universal power supplies: pages 181–182.
Acrylamide gel-casting reagents: page 192.
PROTEAN II second-dimension systems: pages 153–160.

See Also

PowerPac HV and PowerPac Universal power supplies: pages 181–182.

PROTEAN II xi multi-cell: page 155.

Bio-Lyte Ampholytes: page 195.

Acrylamide gel-casting reagents: page 192.

Model 175 Tube Gel Accessories

Glass Tubes for IEF

Bio-Rad's hand cut and polished borosilicate glass tubes may be used for any tube gel electrophoresis application.

Model 225 Tube Gel Casting Stand

The Model 225 tube gel casting stand aids casting of 4–8 mm OD tube gels and features leveling legs and stainless-steel fingers to hold 24 tubes.

Grommet and Stopper Sets

Grommets and stoppers are available in two sizes; they work with both the Model 175 tube cell and the tube gel adaptors for the PROTEAN® II xi cells.



Glass Tubes



Model 225 Tube Gel Casting Stand

For More Information
Web: www.bio-rad.com/model175

Ordering Information

Catalog #	Description
Glass Tubes	
165-3136	**1.0 mm ID Glass Tubes**, 6.0 mm OD, 180 mm length, 24
165-3137	**1.5 mm ID Glass Tubes**, 7.5 mm OD, 150 mm length, 24
165-3138	**1.5 mm ID Glass Tubes**, 7.5 mm OD, 180 mm length, 24
165-3155	**2.4 mm ID Glass Tubes**, 4.0 mm OD, 160 mm length, 24
165-3150	**3.4 mm ID Glass Tubes**, 5.0 mm OD, 125 mm length, 24
165-3122	**5.0 mm ID Glass Tubes**, 7.0 mm OD, 125 mm length, 24
Model 225 Tube Gel Casting Stand	
165-2020	**Model 225 Tube Gel Casting Stand**
Grommet and Stopper Sets*	
165-1984	**Grommets and Stoppers**, for 4–5 mm OD tubes, 12 each
165-1985	**Grommets and Stoppers**, for 6–7.5 mm OD tubes, 12 each

* Grommet and stopper sets work with both the Model 175 and Model 225 tube gels and the tube gel adaptors for the PROTEAN II xi cells.

Mini-Format Analytical IEF

Model 111 Mini IEF Cell

This compact cell performs analytical IEF including isoenzyme separation, forensic applications, and clinical determinations. Use it to screen large numbers of samples or for quickly running a few samples to determine the pI of a protein of interest. It only requires a 500 V power supply. Please note that this unit does not use IPG strips. Features include:

- Unique inverted format — condensation cannot disrupt electrophoresis results
- No external cooling required
- Bufferless operation — no wicks required
- Casting tray suitable for both agarose and polyacrylamide gels
- Easy-to-clean, removable graphite electrodes
- Small footprint of 21 x 11.5 x 4.2 cm



For More Information
Web: www.bio-rad.com/model111
Request or download bulletin: M1702975

Ordering Information

Catalog #	Description
170-2975	**Model 111 Mini IEF Cell**, includes chamber and lid, graphite electrodes, casting tray, 5 glass plates, 50 sheets of gel support film for polyacrylamide, 5 sample templates
Accessories	
170-2980	**Graphite Electrodes**, 2
170-2981	**Mini Casting Tray**
170-2982	**Glass Plates**, 12.5 cm x 6.5 cm x 1.5 mm, 5
170-2983	**Gel Support Film for Polyacrylamide**, 12.5 x 6.5 cm, 50 sheets
170-2984	**Gel Support Film for Agarose**, 12.5 x 6.5 cm, 50 sheets
170-2985	**Sample Templates**, 5

See Also

PowerPac HV and PowerPac Universal power supplies: pages 181–182.
IEF standards: page 189.
Bio-Lyte Ampholytes: page 195.
Acrylamide gel-casting reagents: page 192.
Agarose: pages 193–194.

Preparative Electrophoresis

See Also
Protein sample preparation kits: pages 2–7.

Preparative electrophoresis devices fractionate and purify nanogram to gram quantities of proteins or nucleic acids via liquid phase IEF electrophoresis or continuous electroelution from gels. These devices separate and purify molecules according to their molecular mass (using SDS-PAGE or agarose gel electrophoresis), pI (using liquid-phase IEF), or a combination of both molecular mass and pI (using native PAGE or preparative 2-D electrophoresis). These devices include:

- **Rotofor® cell, mini Rotofor cell, and MicroRotofor™ cell** — separate and concentrate proteins into discrete liquid fractions according to their pI by preparative liquid-phase IEF
- **Model 491 prep cell and mini prep cell** — perform high-resolution separations of proteins and nucleic acids by continuous-elution gel electrophoresis (PAGE)
- **Whole gel eluter and mini whole gel eluter** — simultaneously elute and collect protein or nucleic acid fractions from preparative slab gels
- **Model 422 electro-eluter** — elutes macromolecules from gel slices

Preparative Electrophoresis Product Selection Guide

Product	Page	Method of Purification	Molecules Purified	Run Time	Bulletin
Rotofor cell	174	IEF	Protein (mg to g)	2–3 hr	1903
Mini Rotofor cell	174	IEF	Protein (µg to mg)	2–3 hr	1903
MicroRotofor cell	173	IEF	Protein (µg to mg)	2–3 hr	5294
Model 491 prep cell	175	SDS-PAGE or native PAGE	Protein (1–500 mg) DNA (50–300 µg) RNA (≤1 mg)	4–10 hr	1964
Mini prep cell	175	SDS-PAGE or native PAGE	Protein (0.5–1,000 µg) DNA (≤10 µg) RNA (≤20 µg)	4–10 hr	1964
Whole gel eluter	177	Electroelution from intact slab gel	Protein (0.5–1,000 µg); RNA (≤100 µg)	10–30 min	2108
Mini whole gel eluter	177	Electroelution from intact slab gel	Protein (≤50 µg)	10–30 min	2108
Model 422 electro-eluter	178	Electroelution from excised gel pieces	Protein (gel load limits) DNA (≤3 mm thick gels)	3–5 hr	—

Preparative IEF Cells

Liquid-phase IEF devices fractionate proteins in free solution according to their pI. This powerful technique offers rapid, simple, and effective purification of even low-abundance proteins from complex protein mixtures. Fractions from a run can be easily collected, pooled, and even refractionated for further purification. Fractionation by liquid-phase IEF is particularly useful for insoluble proteins or those that do not separate well in gel-based IEF media. The pH gradient used for separation is generated by ampholytes, allowing a continuous and customizable pH gradient to be formed. A unique membrane core stabilizes proteins in focused zones and allows collection of protein solutions in each zone without mixing.

Preparative IEF Cell Selection Guide

	MicroRotofor Cell	Mini Rotofor Cell	Standard Rotofor Cell
Number of fractions	10	20	20
Focusing chamber inner diameter	13 mm	19 mm	30 mm
Sample volume	2.3–2.5 ml	18 ml	35–60 ml
Fraction volume	200–250 µl	0.7 ml	1.75–3 ml
Sample load	Microgram to milligram	Microgram to milligram	Milligram to gram
Power conditions required	1,000 V with 1 W constant	3,000 V with 12 W constant	3,000 V with 15 W constant
Cooling (2 temperature settings and off position)	Integrated Peltier	Cooling finger (requires external recirculating water chiller); temperature flexible	Cooling finger (requires external recirculating water chiller); temperature flexible
Dimensions (W x D x H)	29.5 x 18.8 x 16 cm	16.5 x 45.7 x 22.8 cm	16.5 x 45.7 x 22.8 cm
Weight	4.7 kg (10 lb)	9 kg (20 lb)	9 kg (20 lb)

MicroRotofor™ Cell

The MicroRotofor cell is a preparative IEF device that enables fractionation of small volumes (2.5 ml) of proteins in free solution by their pI. The cell is easy to set up and offers:

- Up to tenfold concentration of proteins of interest
- Customizable pH gradients — wide or narrow linear pH gradients can be generated using Bio-Lyte® ampholytes
- Rapid recovery of proteins focused into ten liquid fractions
- Integrated temperature regulation to preserve protein structure and function for native separations
- Preassembled disposable focusing chambers

Required Accessory Equipment

Accessory equipment required to run the MicroRotofor cell includes a 1,000 V power supply such as the PowerPac™ HV power supply (which is capable of running at 1 W constant power) and house vacuum. Bio-Lyte ampholytes (page 195) are required to form the internal pH gradient.



For More Information
Web: www.bio-rad.com/microrotofor
Request or download bulletins: 5294, 5344, 5349, and 5451

See Also

PowerPac HV power supply: page 181.
MicroRotofor lysis kits: pages 2–3.

Ordering Information

Catalog #	Description
170-2800	**MicroRotofor Cell Kit**, 100/120 V, includes chassis and lid, 2 harvesting trays, 2 focusing chambers, cathode and anode assemblies, 5 cathode (anion exchange) and 5 anode (cation exchange) membranes, sealing tape, assembly tool, cleaning brush, forceps, 3 ml syringe, two 10 ml syringes
170-2801	**MicroRotofor Cell Kit**, 220/240 V
170-2802	**MicroRotofor System with PowerPac HV Power Supply**, 100/120 V, includes #170-2800 and #164-5056
170-2803	**MicroRotofor System with PowerPac HV Power Supply**, 220/240 V, includes #170-2801 and #164-5056
Accessories and Replacement Parts	
170-2804	**MicroRotofor Starter Kit**, includes Bio-Lyte ampholytes, control protein sample, focusing chamber, ion exchange membranes, harvesting tray, syringes
170-2810	**MicroRotofor Harvesting Trays**, 3
170-2820	**MicroRotofor Sealing Film**, 10 sheets
170-2960	**Sealing Tape**, 1 roll, 1 in x 36 yards
170-2821	**MicroRotofor Focusing Chambers**, 3
170-2822	**MicroRotofor Cathode Assembly**
170-2829	**MicroRotofor Anode Assembly**
170-2832	**MicroRotofor Assembly Tool**
170-2833	**MicroRotofor Ion Exchange Membrane Assemblies**
170-2835	**MicroRotofor Cleaning Brush**
170-2836	**MicroRotofor Syringes**, 3 and 10 ml, 3 each
170-2850	**MicroRotofor Harvesting Station**, includes alignment station, needle assembly, needle holder
170-2851	**MicroRotofor Needle Assembly**
170-2852	**MicroRotofor Vacuum Block O-Ring**
170-2855	**MicroRotofor Lid**
170-2826	**MicroRotofor Electrode Assembly O-Ring/Gasket Kit**, electrolyte buffer chamber O-ring and gaskets

See Also
PowerPac HV power supply: page 181.
Protein sample preparation kits: pages 2–7.

Rotofor® Cell and Mini Rotofor Cell

Rotofor and mini Rotofor cells use liquid-phase IEF to separate proteins into 20 fractions in free solution. The Rotofor cell can process up to gram quantities of protein and effectively concentrate them into discrete zones based on pI. In a single run, the Rotofor cell concentrates samples up to 20-fold. Fractions from an initial run can be pooled and refractionated on either the mini Rotofor or MicroRotofor cell, resulting in up to 1,000-fold purification. Each focusing step is complete in ≤3 hours. Choose from two sizes: the standard Rotofor chamber purifies milligram to gram quantities of protein in 35–58 ml; the mini Rotofor chamber purifies microgram to milligram quantities in 18 ml. Features of both include:

- Interchangeable cylindrical focusing chambers — enable refractionation of selected fractions for greater purification
- Maintenance of biological activity — a ceramic cooling finger runs through the center of the focusing chamber to dissipate heat
- A customizable pH gradient — wide or narrow linear pH gradients can be generated for specific applications
- Rapid recovery of proteins into 20 focused fractions
- Focusing and enrichment of a protein of interest in one or two fractions in a single step

Required Accessory Equipment

Accessory equipment required to run the Rotofor cell includes a 3,000 V power supply such as the PowerPac HV power supply, a recirculating water chiller, and house vacuum. Bio-Lyte ampholytes (page 195) are required to form the internal pH gradient.



Rotofor system. The system includes both 18 ml (mini) and 60 ml (standard) focusing chambers, harvesting box, and accessories. It purifies biologically active proteins for sequence analysis, crystallography, and characterization studies.

For More Information
Web: www.bio-rad.com/rotofor
Request or download bulletins: 1903, 3131, 3152, and 3160

Ordering Information

Catalog #	Description
170-2986	**Rotofor Purification System**, 100/120 V, includes 60 ml focusing chamber, 18 ml focusing chamber, starter kit
170-2987	**Rotofor Purification System**, 220/240 V
170-2914	**Rotofor Purification System with PowerPac HV Power Supply**, 100/120 V, includes #170-2986 and #164-5056
170-2906	**Rotofor Purification System with PowerPac HV Power Supply**, 220/240 V, includes #170-2987 and #164-5056
170-2950	**Standard Rotofor Cell**, 100/120 V, includes 60 ml focusing chamber, starter kit
170-2951	**Standard Rotofor Cell**, 220/240 V
170-2988	**Mini Rotofor Cell**, 100/120 V, includes 18 ml focusing chamber, starter kit
170-2989	**Mini Rotofor Cell**, 220/240 V
170-2910	**Rotofor Starter Kit**, includes 10 ml Bio-Lyte ampholytes (pH 3–10), 60 ml syringe, colored protein sample, 2 vent buttons, one each of the ion exchange membranes, hydrated
170-2919	**Colored Protein Sample**, 1 ml (included in Rotofor starter kit)
Rotofor Adaptor Kits	
170-2990	**Adaptor Kit**, to convert Rotofor cell to mini Rotofor cell, includes mini focusing chamber, mini membrane core, 18 ml
170-2959	**Adaptor Kit**, to convert mini Rotofor cell to Rotofor cell, includes focusing chamber, membrane core, 60 ml

continues

Ordering Information

Catalog #	Description
Accessories and Replacement Parts	
170-2991	**Mini Membrane Cores,** for 18 ml focusing chamber, 2
170-2952	**Membrane Cores**, for 60 ml focusing chamber, 2
170-2953	**Repair Kit**, includes O-ring kit, 4 ion exchange gaskets, 4 port cover screws, 4 electrolyte chamber screws, 2 gray port gaskets
170-2954	**Cooling Finger O-Ring Kit**, with 4 O-rings
170-2956	**Ion Exchange Membranes**, 5 pair
170-2957	**Vent Buttons**, 8
170-2958	**Cooling Finger**
170-2960	**Sealing Tape**, 1 roll, 1 in x 36 yards
170-2961	**Test Tube Rack**
170-2963	**Harvest Box**
170-2964	**Harvest Tubing**
170-2965	**Harvest Box Lid**
170-2966	**Harvesting Needle Array**
170-2967	**Anode Electrolyte Chamber**, for Rotofor and mini Rotofor cells
170-2968	**Cathode Electrolyte Chamber**, for Rotofor and mini Rotofor cells

* The Rotofor and mini Rotofor cells come with all the necessary parts for initial setup and operation. A repair kit, extra membrane cores, ion exchange membranes, and vent buttons are recommended replacement parts.

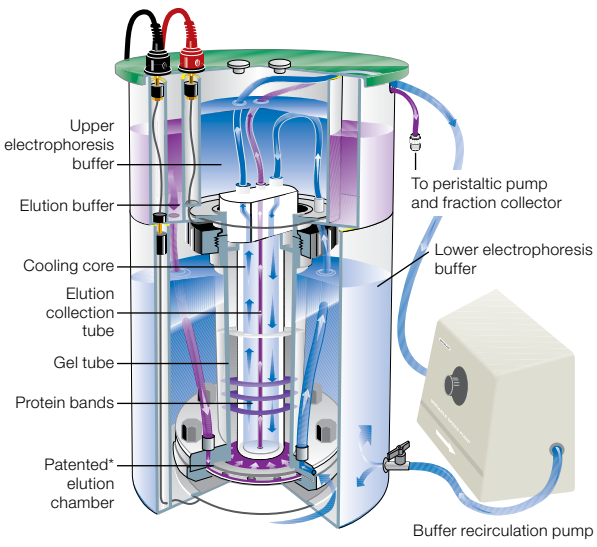
Preparative PAGE Cells

Model 491 Prep Cell and Mini Prep Cell

The Model 491 prep cell and mini prep cells separate biomolecules (protein or nucleic acids) by continuous-elution electrophoresis. Samples are electrophoresed through a cylindrical gel matrix, where they are separated into ring-shaped bands. As individual bands migrate off the bottom of the gel, they are collected in discrete liquid fractions. The Model 491 prep cell and the mini prep cell allow resolution of proteins differing in MW by as little as 2%. With these prep cell systems, you can:

- Purify nanogram to milligram quantities of target protein
- Separate proteins that differ in MW by as little as 1 kDa by using SDS-PAGE
- Separate proteins by mass and charge with pI differences as little as 0.1 pH units by using native PAGE
- Separate large proteins or DNA fragments (up to 18 kb) by using agarose gel electrophoresis

For More Information
Web: www.bio-rad.com/prepPAGE
Request or download bulletins: 1964, 3153, and 3161



Continuous-elution electrophoresis in the Model 491 prep cell. Samples are electrophoresed through the cylindrical gel matrix where they are separated into ring-shaped bands. Individual bands migrate off the bottom of the gel and are collected in discrete liquid fractions available for assay and characterization.

See Also
PowerPac Universal and PowerPac HV power supplies: pages 181–182.

* U.S. patent 4,877,510.

Specifications

	Model 491 Prep Cell	Mini Prep Cell
Sample capacity (mass/volume)	1–500 mg/0.5–15 ml	0.5–1.0 mg/50–500 µl
Gel tube dimensions	28 and 37 mm ID, 14 cm length	7 mm ID, 13 cm length
Cooling	Glazed alumina-ceramic tube	Not necessary
Electrical limits	500 V, 40 mA, 20 W (PowerPac HV or PowerPac Universal recommended)	500 V, 10 mA, 5 W (PowerPac HV or PowerPac Universal recommended)
Elution buffer flow rate	1 ml/min	0.1 ml/min
Auxiliary equipment required	Fraction collector, power supply, peristaltic pump	Fraction collector, power supply

Ordering Information

Catalog #	Description
Model 491 Prep Cells	
170-2926	**Model 491 Prep Cell**, 100/120 V, includes buffer recirculation pump, prep cell starter kit with protein standard
170-2927	**Model 491 Prep Cell**, 220/240 V
170-2928	**Model 491 Prep Cell without Buffer Recirculation Pump**
Replacement Parts and Accessories for the Model 491 Prep Cell	
170-2944	**Prep Cell Casting Stand**
170-2929	**Buffer Recirculation Pump**, 100/120 V
170-2930	**Buffer Recirculation Pump**, 220/240 V
170-2932	**Small Gel Tube Assembly**, 28 mm ID
170-2933	**Large Gel Tube Assembly**, 37 mm ID
170-2934	**Cooling Finger Assembly**, includes feedline connectors
170-2935	**Buffer Circulation Tubing Kit**, includes stopcock with tubing and connectors, 3 elution buffer circulation lines and connectors, and electrophoresis/cooling buffer circulation lines and connectors
170-2936	**O-Ring Kits**, 2
170-2937	**Dialysis Membranes**, precut, 5
170-2938	**Frit Kit**, includes support frit and elution frit
170-2939	**Sample Application/Overlay Buffer Kit**, includes sample loading guide, syringe with tubing
170-2940	**Thumbscrews**, 4
170-2969	**Lid with Power Cables**
161-5101	**Prep Cell Starter Kit**
161-0323	**Prep Cell Starter Kit Protein Standard**, 1 ml
170-2941	**Elution Manifold Base**
Mini Prep Cells	
170-2915	**Mini Prep Cell with Reagent Starter Kit**
170-2908	**Mini Prep Cell without Reagent Starter Kit**
Replacement Parts and Accessories for the Mini Prep Cell	
170-2909	**Gel Tubes**, 2
170-2913	**Sample Application/Purge Kit**
170-2947	**Peristaltic Pump Adaptor Kit**, for 0.8 mm tubing
170-2948	**Elution Frit Kit**, with 5 dialysis membranes, MW cutoff 3,500
170-2911	**Elution Frit Kit**, with 5 dialysis membranes, MW cutoff 6,000
170-2912	**Harvest Ring Assembly**, includes elution collection tubing
170-2917	**Mini Prep Cell Elution Chamber Top**
170-2918	**Mini Prep Cell Casting Stand**
170-2916	**Elution Manifold Base**
800-7533	**Lid with Cables**, for mini prep cell

Preparative Electroelution Cells

Whole Gel Eluter and Mini Whole Gel Eluter

The whole gel eluter and patented* mini whole gel eluter are unique electroelution tools that simultaneously elute and collect multiple bands of biomolecules from whole preparative slab gels. Benefits include:

- Rapid, reproducible elutions in 15–20 min
- Elution of native, SDS, or IEF polyacrylamide gels
- Accommodation of gels up to 3.0 mm thick
- Recoveries averaging ≥70%



For More Information
Web: www.bio-rad.com/electroelution
Request or download bulletins: 2108, 3162, and 3163

Specifications

	Whole Gel Eluter	Mini Whole Gel Eluter
Number of fractions	30	14
Gel size	≥14 x 16 cm	≥6.5 x 5.5 cm
Minimum gel width	14 cm	5.5 cm
Gel thickness	0.75–3 mm	0.75–3 mm
Total elution buffer	1 L	500 ml
Preparative protein load	≤10 mg	Microgram to low milligram
Fraction volumes	3.0 ml	0.5 ml
Run time	15–20 min	15–20 min
Power limit	300 V, 15 W	200 V, 10 W
Recommended power supply	PowerPac™ Basic	PowerPac Basic
Dimensions (W x D x H)	26.7 x 26.7 x 12.7 cm	15.2 x 15.2 x 12.7 cm
Weight	4.2 kg (9.3 lb)	2.2 kg (4.8 lb)

* U.S. patent 5,840,169.

Ordering Information

Catalog #	Description
Whole Gel Eluter	
165-1251	**Whole Gel Eluter with Harvesting Box**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 75 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing strips, 25 pieces of cellophane, application note; requires a vacuum source pulling 5" Hg for the harvesting box
165-1250	**Whole Gel Eluter**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 75 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing strips, 25 pieces of cellophane, application note
Whole Gel Eluter Accessories	
165-1260	**Harvesting Box**
165-1270	**Whole Gel Eluter Template**
165-1275	**Cellophane**, 25 precut sheets
165-1277	**Sealing Tabs**, 50
165-1280	**Lower Chamber Filter Paper**, 21 x 21 cm, 75 precut sheets
165-1281	**Upper Chamber Filter Paper**, 21 x 21 cm, 50 precut sheets
170-2940	**Thumbscrews**, 4
Mini Whole Gel Eluter	
165-1256	**Mini Whole Gel Eluter with Harvesting Box**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 50 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing tabs, 25 pieces of cellophane, application note; requires a vacuum source pulling 5" Hg for the harvesting box
165-1255	**Mini Whole Gel Eluter**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 50 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing tabs, 25 pieces of cellophane, application note

continues

Ordering Information (continued)

Catalog #	Description
Mini Whole Gel Eluter Accessories	
165-1261	**Mini Harvesting Box**
165-1271	**Mini Whole Gel Eluter Template**
165-1276	**Cellophane**, 25 precut sheets
165-1278	**Sealing Tabs**, 50
165-1282	**Lower Chamber Filter Paper**, 9 x 10 cm, 50 precut sheets
165-1283	**Upper Chamber Filter Paper**, 5 x 6 cm, 50 precut sheets

Model 422 Electro-Eluter

The Model 422 electro-eluter is an electroelution cell for preparative recovery of biomolecules from agarose and acrylamide gels. Easy to assemble, the electro-eluter has six vertical glass tubes connecting the upper and lower buffer chambers. A frit at the bottom of each tube retains the gel slice but permits macromolecules to migrate through when current is applied. When the macromolecules have passed through the frit, they are collected (in the membrane cap) for further analysis or testing.

Depending on the buffer system, the Model 422 electro-eluter can be used for protein elution or dialysis. In all cases, setup is quick and easy and the sample is collected in 400–600 µl. The Model 422 electro-eluter can be used for one to six samples without increasing the run time (3–5 hours) or decreasing sample yield.

For More Information
Web: www.bio-rad.com/electroelution



Specifications

Elution capacity	1–6 samples
Collection volume	400–600 µl
Buffer volume	700 ml
Glass tube dimensions	1 cm (ID) x 6 cm (long)
Recommended power supply	PowerPac Universal
Dimensions (W x D x H)	12 x 16 x 18 cm
Weight	1.1 kg (2.4 lb)

Ordering Information

Catalog #	Description
165-2976	**Model 422 Electro-Eluter**, includes electro-eluter module, membrane caps (MW cutoff 12,000–15,000), glass tubes, frits, silicone adaptors, grommets and stoppers, buffer tank, lid with power cables
165-2977*	**Model 422 Electro-Eluter Module**, without buffer tank and lid
Accessories	
165-2985	**Membrane Caps**, clear, MW cutoff 12,000–15,000, 12
165-2986	**Membrane Caps**, green, MW cutoff 3,500, 12
165-2987	**Frits**, 12
165-2978	**Glass Tubes**, 6
165-2981	**Silicone Adaptors**, 6
165-1988	**Grommets and Stoppers**, 8

* Module can be used with the discontinued Mini-PROTEAN® 3 cell. If you do not own a Mini-PROTEAN 3 cell, order Model 422 electro-eluter #165-2976.

Power Supplies

Bio-Rad offers a complete line of power supplies that are certified to IEC 1010-1, EN 61010 — the most rigorous international safety standard — to ensure the highest personal and environmental protection.

Power Supply Selection Guide

Technique and Recommended Apparatus	Gel or Tube Size (W x L x Thickness)*, Qty	Typical Conditions** (Initial) W	V	mA	Typical Conditions** (Final) W	V	mA	Typical Run Time	PowerPac™ Power Supply
Laemmli (SDS), O'Farrell Second Dimension (SDS)									
PROTEAN® II xi cell	160.0 x 160.0 x 1.5 mm, 2 gels	—	100	35(C)	—	350	35(C)	5 hr	HV or Universal
PROTEAN II XL cell	183.0 x 200.0 x 1.5 mm, 2 gels	—	100	35(C)	—	350	35(C)	5 hr	HV or Universal
Criterion™ cell	133.0 x 87.0 x 1.0 mm, 2 gels	—	200(C)	200	—	200(C)	80	55 min	Basic or HC
Criterion cell	133.0 x 87.0 x 1.0 mm, 2 gels	—	300(C)	224	—	300(C)	164	20–26 min	Basic, HV, or Universal
Mini-PROTEAN® Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	200(C)	240	—	200(C)	120	35–45 min	Basic or HC
Mini-PROTEAN Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	300(C)	360	—	300(C)	228	15 min	Basic, HV, or Universal
Mini-PROTEAN Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	400(C)	456	—	400(C)	416	10 min	HV or Universal
High-Throughput Electrophoresis									
PROTEAN Plus Dodeca™ cell	200.0 x 205.0 x 1.0 mm, 12 gels	—	200(C)	1,000	—	200(C)	350	6 hr	HC or Universal
	250.0 x 205.0 x 1.0 mm, 12 gels	—	200(C)	1,000	—	200(C)	350	6 hr	HC or Universal
	256.0 x 230.0 x 1.0 mm, 12 gels	—	150(C)	1,200	—	150(C)	300	18–20 hr	HC or Universal
PROTEAN II xi/XL multi-cell	160.0 x 200.0 x 1.5 mm, 6 gels	—	150	480(C)	—	500	480(C)	5 hr	Universal
Criterion™ Dodeca™ cell	133.0 x 87.0 x 1.0 mm, 12 gels	—	200(C)	1,000–1,400	—	200(C)	400–500	55 min	HC or Universal
Mini-PROTEAN 3 Dodeca cell	83.0 x 73.0 x 1.0 mm, 12 gels	—	200(C)	600	—	200(C)	360	45 min	HC or Universal
IEF, O'Farrell First Dimension									
PROTEAN II xi cell	150.0 x 1.5 mm tubes, 4 (minimum)	—	800(C)	3.5	—	800(C)	<1	16 hr	HV or Universal
Mini-PROTEAN II tube cell	75.0 x 1.0 mm tubes, 8 (minimum)	—	750(C)	1	—	750(C)	<1	3–4 hr	HV or Universal
Preparative Electrofocusing									
Rotofor® cell	60 ml focusing chamber	15(C)	500	24	15(C)	1,200	10	4 hr	HV
Mini Rotofor cell	18 ml focusing chamber	12(C)	500	24	12(C)	1,200	10	4 hr	HV
MicroRotofor™ cell	2.5 ml focusing chamber	1(C)	100	10	1(C)	500	2	<3 hr	HV or Universal
Preparative PAGE									
Model 491 prep cell	—	10(C)	300	40	10(C)	400	30	3–8 hr	HV or Universal
Mini prep cell	—	1(C)	200	5	1(C)	300	3	3–8 hr	HV or Universal
Protein Electroelution									
Model 422 electro-eluter	6 samples	—	200	60(C)	—	150	60(C)	3–4 hr	Basic, HV, or Universal
Whole gel eluter	160.0 x 140.0 mm or larger	—	15	200(C)	—	15	200(C)	20 min	Basic
Mini whole gel eluter	55.0 x 65.0 mm or larger	—	10	100(C)	—	10	100(C)	20 min	Basic
Polyacrylamide Analytical Electrofocusing									
Model 111 mini IEF cell	125.0 x 65.0 x 0.4 mm	—	100(C)	6	—	100(C)	4	15 min	HV or Universal
		—	200(C)	6	—	200(C)	4	15 min	
		—	450(C)	4	—	450(C)	1	1 hr	
DNA Restriction Analysis (Horizontal Mode)									
Sub-Cell® GT cell	150.0 x 200.0 x 5.0 mm	—	80(C)	55	—	80(C)	60	4 hr	Basic or HC
Mini-Sub® cell GT cell	70.0 x 100.0 x 5.0 mm	—	50(C)	25	—	50(C)	30	2 hr	Basic
Wide Mini-Sub cell GT cell	150.0 x 100.0 x 5.0 mm	—	50(C)	35	—	50(C)	40	2 hr	Basic
DNA Sequencing									
Sequi-Gen® GT system	380.0 x 500.0 x 0.4 mm	80(C)	1,850	30	80(C)	1,850	30	2–4 hr	HV
SSCP									
Sequi-Gen GT system	210.0 x 400.0 x 0.4 mm	40(C)	1,800	20	40(C)	1,800	20	2–3 hr	HV
Microsatellite Mapping									
Sequi-Gen GT system	210.0 x 400.0 x 0.4 mm	50(C)	2,100	25	50(C)	2,100	25	2–3 hr	HV
Mutation Detection									
DCode™ system	100.0 x 75.0 x 1.0 mm, 2 gels	—	130(C)	—	—	130(C)	—	2.5 hr	Basic or HV

continues

Power Supply Selection Guide (cont.)

Technique and Recommended Apparatus	Gel or Tube Size (W x L x Thickness)*, Qty	Typical Conditions** (Initial) W	V	mA	Typical Conditions** (Final) W	V	mA	Typical Run Time	PowerPac Power Supply
Western Blotting									
Mini Trans-Blot® cell	83.0 x 73.0 x 0.75 mm, 2 gels	—	100(C)	250	—	100(C)	450	1 hr	HC
Criterion blotter									
Wire electrodes	133.0 x 87.0 x 1.0 mm, 2 gels	—	100(C)	250	—	100(C)	450	1 hr	HC
Plate electrodes	133.0 x 87.0 x 1.0 mm, 2 gels	—	100(C)	650	—	100(C)	1,600	30 min	HC
Trans-Blot® cell									
Wire electrodes	200.0 x 160.0 x 1.5 mm, 1 gel	—	60(C)	210–250	—	60(C)	210–250	5 hr	HC
Plate electrodes	200.0 x 160.0 x 1.5 mm, 1 gel	—	100–150(C)	1,000–1,600	—	100–150(C)	1,000–1,600	1–5 hr	HC
High-intensity transfer	200.0 x 160.0 x 1.5 mm, 1 gel	—	50–100(C)	1,600	—	50–100(C)	1,600	30 min	HC
Trans-Blot Plus cell	265.0 x 280.0 x 1.5 mm, 3 gels	—	100(C)	3,000	—	100(C)	3,000	30 min–1 hr	HC
Semi-Dry Blotting									
Trans-Blot SD cell									
Protein	250.0 x 180.0 x 1.5 mm	—	15(C)	500	—	15(C)	200	15–30 min	HC
DNA/RNA	150.0 x 150.0 x 6.0 mm	—	15	650(C)	—	25	650(C)	10–30 min	HC

* Sizes shown are typical for the corresponding apparatus. For running conditions for additional sizes, see the product instruction manuals.
** (C) = constant; typical conditions are listed as guidelines only and can vary based on sample, buffers, etc.

PowerPac Power Supply Specifications

	PowerPac Basic	PowerPac HC	PowerPac HV	PowerPac Universal
Output range (programmable) Volts Current Power	 10–300 V 4–400 mA 75 W (maximum)	 5–250 V 0.01–3.0 A 1–300 W	 20–5,000 V 0.01–500 mA 1–400 W	 10–500 V 0.01–2.5 A 1–500 W
Type of output (with automatic crossover)	Constant voltage or constant current	Constant voltage, constant current, or constant power	Constant voltage, constant current, constant power, or constant temperature	Constant voltage, constant current, or constant power
Timer	1–999 min	1 min–99 hr, 59 min	1 min–99 hr, 59 min	1 min–99 hr, 59 min
Volt-hour control	—	—	• (99,000 V-hr)	• (99,000 V-hr)
Pause/resume function	•	•	•	•
Display	3-digit LED	16-character x 2-line LCD	128 x 64 pixel, backlit graphics LCD	128 x 64 pixel, backlit graphics LCD
Programmable methods	—	1 method up to 3 steps, no storage capability	Stores 9 methods, each with up to 9 steps	Stores 9 methods, each with up to 9 steps
Real-time clock	—	—	•	•
Automatic recovery after power failure	•	•	•	•
Data transfer/archiving	—	—	•	• (optional)
Temperature control	—	—	Via temperature probe; 30–90°C ± 2°C	—
Microampere readout	—	—	•	—
Safety features	No-load detection; sudden load change detection; overload/ short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; overload/short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; arc detection; overload/short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; overload/short-circuit detection; overvoltage protection
Operating conditions	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity
Stackable	•	•	•	•
Number of output jacks	4 sets in parallel	4 sets in parallel	4 sets in parallel	4 sets in parallel
Regulatory	EN-61010, CE	EN-61010, CE	EN-61010, CE	EN-61010, CE
IQ/OQ protocols	—	—	• (optional)	• (optional)
Input power (actual)	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching
Dimensions (W x D x H)	21.0 x 24.5 x 6.5 cm	25.0 x 28.5 x 8.0 cm	27.5 x 34.0 x 10.0 cm	27.5 x 34.0 x 10.0 cm
Weight	1.1 kg (2.4 lb)	2.0 kg (4.4 lb)	2.85 kg (6.3 lb)	2.5 kg (5.5 lb)

PowerPac™ Basic Power Supply



- Recommended for basic applications
- Compact, stackable
- Constant voltage or constant current output

For More Information
Request or download bulletin: 2881

Ordering Information

Catalog #	Description
164-5050	**PowerPac Basic Power Supply**, 100–120/220–240 V

See Also

Mini-PROTEAN Tetra cell: pages 133–134.
Criterion cell: pages 144–145.
Sub-Cell systems: pages 224–231.

PowerPac™ HC High-Current Power Supply



- Recommended for high-current applications
- Output of 250 V, 3.0 A, 300 W
- 2-line, 16-character LCD for programming
- Constant voltage, constant power, or constant current output

For More Information
Request or download bulletin: 2882

Ordering Information

Catalog #	Description
164-5052	**PowerPac HC Power Supply**, 100–120/220–240 V

See Also

Criterion blotter: page 207.
Mini Trans-Blot cell: page 206.
Trans-Blot cell: page 208.
Trans-Blot Plus cell: page 209.
Dodeca cells: pages 136, 144, 158.

PowerPac™ HV High-Voltage Power Supply



- Ideal for IEF and DNA sequencing
- Output of 5,000 V, 500 mA, and 400 W
- Protocol binder and text box to support IQ/OQ within GLP- and FDA-regulated environments

Optional temperature probe monitors gel temperature between 30–90°C during electrophoresis. The probe attaches to the glass plate and sends temperarture data to the power supply, which adjusts the power output to maintain a constant temperature during electrophoresis.

For More Information
Request or download bulletin: 3189

Ordering Information

Catalog #	Description
164-5056	**PowerPac HV Power Supply**, 100–120/220–240 V
164-5059	**PowerPac HV Power Supply with Temperature Probe**, 100–120/220–240 V
164-5097	**PowerPac Data Transfer Software**, version 2.0
164-5099	**PowerPac HV IQ/OQ Protocol Binder**
164-5098	**PowerPac HV IQ/OQ Protocol Binder and Test Box**
165-5058	**PowerPac Temperature Probe**

See Also

DNA sequencing systems: page 248.
MicroRotofor cell: page 173.
Rotofor cell and mini Rotofor cell: page 174.
Model 491 prep cell and mini prep cell: page 175.

See Also

High-throughput electrophoresis systems: pages 136, 144, 158.

Western blotting: pages 202–211.

Northern and Southern blotting: pages 244–245.

PowerPac™ Universal Power Supply



- For all applications from mini vertical and high-throughput electrophoresis to blotting
- Protocol binder and text box to support IQ/OQ within GLP- and FDA-regulated environments

Wireless run data transfer software organizes, displays, prints, analyzes, exports, and annotates run data from the power supply. Data can be sent directly to a PC with a peripheral IR receiving device.

For More Information
Request or download bulletin: 2885

Ordering Information

Catalog #	Description
164-5070	**PowerPac Universal Power Supply**, 100–120/220–240 V
164-5097	**PowerPac Data Transfer Software**, version 2.0
164-5069	**PowerPac Universal IQ/OQ Protocol Binder and Test Box**

PowerPac™ Adaptor



- Convert non–IEC-certified electrophoresis cells to fit output terminals of PowerPac power supplies
- Available in two sizes that fit most 2 and 4 mm banana plugs
- Compatible with the discontinued PowerPac 200, 300, 1000, and 3000 power supplies

Ordering Information

Catalog #	Description
164-5062	**PowerPac Adaptor**, 2 mm
164-5064	**PowerPac Adaptor**, 4 mm

Protein Standards

Standards are an integral part of every electrophoresis experiment because they help identify and characterize the molecules separated in a gel. Prestained and unstained MW standards are available for SDS-PAGE, IEF, 2-D PAGE, and western blotting. For migration charts with different types of gels, see pages 138 (Mini-PROTEAN® TGX™ gels), 140 (Ready Gel® gels), and 146–147 (Criterion™ gels).

For More Information
Request or download bulletins: 2414, 2998, and 3118

Protein Standards Selection Guide

	Precision Plus Protein™ Standards						Prestained Natural Standards				Unstained Natural Standards				Specialty Standards		
	WesternC™	Kaleidoscope™	Dual Xtra	Dual Color	All Blue	Unstained	Broad Range	Low Range	High Range	Natural Kaleidoscope	Broad Range	Low Range	High Range	Polypeptide	IEF	2-D	Standard Plugs***
Molecular weight (MW)/pI range, kD	10–250 kD	10–250 kD	2–250 kD	10–250 kD	10–250 kD	10–250 kD	6.9–210 kD	14–97 kD	45–200 kD	7.6–216 kD	6.5–200 kD	14–97 kD	45–200 kD	1.4–26.6 kD	4.45–9.6 pI	17.5–76 kD 4.5–8.5 pI	10–250 kD
Number of proteins	10	10	12	10	10	10	8	6	4	7	9	6	5	6	9	7	10
Electrophoresis																	
SDS-PAGE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	–	–	•
Accurate MW estimation	•	•	•	•	•	•	–	–	–	–	•	•	•	•	–	–	•
Multicolored	•	•	•	•	–	–	–	–	–	•	–	–	–	–	–	–	–
Coomassie staining	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Fluorescent staining	–	–	–	–	–	•	–	–	–	–	•	•	•	•	–	•	•
2-D electrophoresis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	•	–
IEF	–	–	–	–	–	–	–	–	–	–	–	–	–	–	•	–	–
Plug format for use in gels with no reference well	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	•
Blotting																	
Monitoring transfer efficiency	•	•	•	•	•	–	•	•	•	•	–	–	–	–	–	–	–
Coomassie staining	•	•	•	•	•	•	•	•	•	•	•	•	•	•	–	•	•
Fluorescent staining	–	–	–	–	–	•	–	–	–	–	•	•	•	•	–	•	•
Fluorescent blotting*	•	•	•	•	•	–	–	–	–	–	–	–	–	–	–	–	–
Immunodetection**	•	–	–	–	–	•	–	–	–	–	–	–	–	–	–	–	•
Catalog Numbers																	
Single unit	161-0385	161-0375	161-0377	161-0374	161-0373	161-0363	161-0318	161-0305	161-0309	161-0324	161-0317	161-0304	161-0303	161-0326	161-0310	161-0320	161-0378
Value pack of 5 units	161-0398	161-0395	161-0397	161-0394	161-0393	161-0396	–	–	–	–	–	–	–	–	–	–	–

* These standards have fluorescent properties and can be used for fluorescent blotting applications. See bulletin 5723 for details on using Precision Plus Protein™ WesternC™ standards for fluorescent multiplexing. Precision Plus Protein Dual Xtra standards (#161-0377) are recommended for fluorescent blot analysis of proteins between 5–250 kD.

** Immunodetection via addition of a Precision Protein™ StrepTactin and horseradish peroxidase (HRP) or StrepTactin and alkaline phosphatase (AP) conjugate, which will bind to the internal *Strep*-tags on the proteins.

*** 24 unstained plugs for 2-D gels.

Recombinant Prestained and Unstained Standards

Precision Plus Protein™ standards offer accurate and consistent recombinant protein standards for electrophoresis and western blotting experiments. These protein standards offer a good balance between band sharpness and brightness, accurate MW estimation, reproducible migration patterns, and excellent blotting results.

See Also

Vertical electrophoresis systems: pages 133–160.

Horizontal electrophoresis systems: pages 224–232.

Electrophoresis and blotting buffers: pages 190–191, 216.

Protein electrophoresis stains: pages 196–198.

Protein blotting stains: page 223.

Gel Doc EZ imaging system: page 260.

ChemiDoc MP imaging system: page 259.

Precision Plus Protein™ Standards

Precision Plus Protein standards contain up to 12 recombinant bands that exhibit reproducible and consistent migration regardless of staining. This family of standards includes six unique options – one unstained, four prestained (All Blue, Dual Color, Dual Xtra, Kaleidoscope™), and one multi-application standard, WesternC™. Features include:

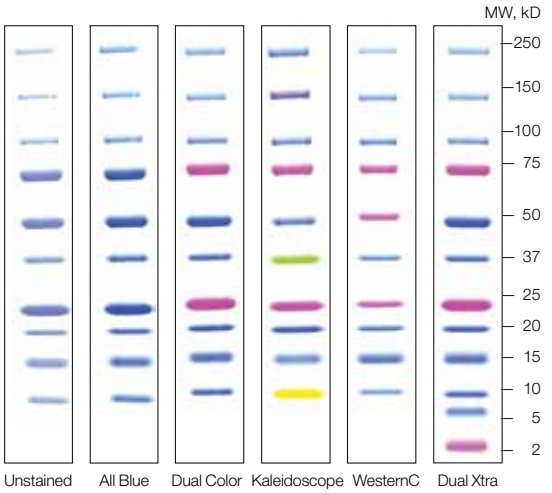
- Reproducible and accurate migration pattern, allowing MW estimation
- Exceptional band sharpness, providing clear confirmation of electrophoretic separation
- *Strep*-tag affinity sequence, allowing detection and MW determination on western blots
- Natural fluorescence properties, allowing fluorescent and multiplex fluorescent detection
- Superior compatibility with TGX Stain-Free™ precast gels (Unstained and All Blue)

Precision Plus Protein WesternC Standards

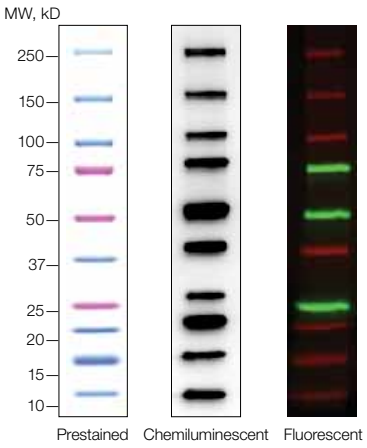
Precision Plus Protein WesternC is a versatile, multi-application protein standard offering colorimetric, chemiluminescent, and fluorescent properties all in one. WesternC contains ten prestained bands from 10–250 kD that provide electrophoretic confirmation on a gel, verification of transfer efficiency on a blot, and detection and MW estimation on fluorescent western blots. Features include:

- Reproducible and accurate migration pattern, allowing MW estimation
- Exceptional band sharpness, providing clear confirmation of electrophoretic separation
- Chemiluminescent detection and MW determination on western blots when probed with StrepTactin conjugates
- Fluorescent and multiplex fluorescent detection when excited with red (~635 nm) or green (~532 nm) channels
- Prestained blue standards, with three pink high-intensity reference bands at 25, 50, and 75 kD
- Ready-to-use formulation

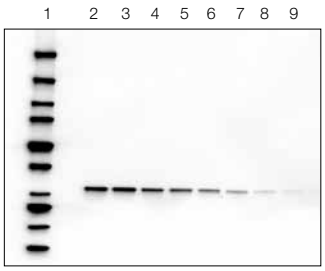
For More Information
Request or download bulletins: 2847, 5561, 5575, and 5576; multiplex fluorescence detection — 5685 and 5723



The Precision Plus Protein standards family.



Precision Plus Protein WesternC standards and its multiple applications offer many detection options.



Western blot detection of 27 kD protein and Precision Plus Protein WesternC standards using the Immun-Star™ WesternC™ chemiluminescence detection kit. Maximum sensitivity achievable with the Immun-Star WesternC kit is in the mid-femtogram range. A gel run with 5 µl of Precision Plus Protein WesternC standards (lane 1) and a dilution series of *E. coli* lysate containing an overexpressed 27 kD protein (lanes 2–9) was transferred to a nitrocellulose membrane. The dilutions were: 200, 150, 100, 75, 50, 25, 12, and 6 ng. The blot was probed with a primary antibody specific for the 27 kD protein, then incubated with StrepTactin-horseradish peroxidase (HRP) and a secondary antibody conjugated to HRP. After incubation in the Immun-Star WesternC detection solution for 5 min, the blot was imaged using the ChemiDoc™ XRS system.

For More Information
Web: www.bio-rad.com/pppstandards

Precision Plus Protein Standard Plugs for 2-D Gels

Precision Plus Protein standard plugs allow easy, quick, and clean loading of MW standards on any gel. The plugs are especially useful for vertical 2-D gels with no reference well. Precision Plus Protein unstained standards are cast in 1 mm thick agarose plugs for easy storage, handling, and loading. Load concentrations have been optimized for SYPRO Ruby, Silver Stain Plus™, and Bio-Safe™ Coomassie stains.

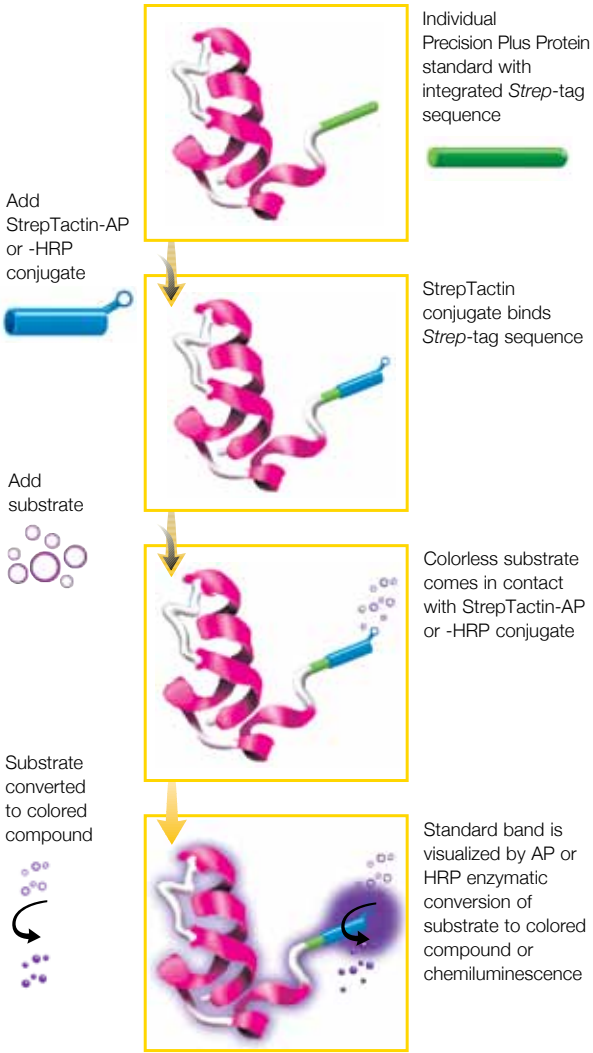
Precision Plus Protein standard plugs come in easy-to-use snap-off molds in packs of 24 (one application per plug). Advantages include:

- Unchanging MWs, so band sizes are easy to remember
- A ready-to-use, load-and-go format — just snap, twist, and load the plug onto a gel
- *Strep*-tag amino acid sequence for detection and MW estimation on western blots



Precision Plus Protein Standard Plugs

For More Information
Web: www.bio-rad.com/standardplugs
Request or download bulletin: 3036



Overview of the StrepTactin detection system.

Precision Plus Protein Standards Specifications

Product	Volume	Number of Applications	Shelf Life
Unstained	1 ml	100	1 year at –20°C
All Blue	500 µl	50	1 year at –20°C
Dual Color	500 µl	50	1 year at –20°C
Kaleidoscope™	500 µl	50	1 year at –20°C
Dual Xtra	500 µl	50	1 year at –20°C
WesternC	250 µl	50	1 year at –20°C
WesternC pack*	250 µl standard 125 µl HRP conjugate	50	1 year at –20°C
Unstained plugs	24 plugs	24	3 months at 4°C (once opened)

* WesternC pack comes with WesternC protein standard and StrepTactin-HRP conjugate, needed for colorimetric or chemiluminescent blot detection. StrepTactin-AP conjugate also available (#161-0382).

Ordering Information

Catalog #	Description
161-0363	**Precision Plus Protein Unstained Standards**, 1,000 µl, 100 applications
161-0396	**Precision Plus Protein Unstained Standards Value Pack**, 5 x 1,000 µl, 500 applications
161-0373	**Precision Plus Protein All Blue Standards**, 500 µl, 50 applications
161-0393	**Precision Plus Protein All Blue Standards Value Pack**, 5 x 500 µl, 250 applications
161-0374	**Precision Plus Protein Dual Color Standards**, 500 µl, 50 applications
161-0394	**Precision Plus Protein Dual Color Standards Value Pack**, 5 x 500 µl, 250 applications
161-0375	**Precision Plus Protein Kaleidoscope Standards**, 500 µl, 50 applications
161-0395	**Precision Plus Protein Kaleidescope Standards Value Pack**, 5 x 500 µl, 250 applications
161-0385*	**Precision Plus Protein WesternC Pack**, 250 µl WesternC standard, 125 µl HRP conjugate, 50 applications
161-0398*	**Precision Plus Protein WesternC Pack**, **HRP Value Pack**, 5 x 250 µl WesternC standard, 5 x 125 µl HRP conjugate, 250 applications
161-0376*	**Precision Plus Protein WesternC Standards**, 250 µl, 50 applications
161-0399*	**Precision Plus Protein WesternC Standards Value Pack**, 5 x 250 µl, 250 applications
161-0377	**Precision Plus Protein Dual Xtra Standards**, 500 µl, 50 applications
161-0397	**Precision Plus Protein Dual Xtra Standards Value Pack**, 5 x 500 µl, 250 applications
StrepTactin Conjugates for Precision Plus Protein Standards	
161-0380	**Precision Protein StrepTactin-HRP Conjugate**, 300 µl, 150 applications
161-0381	**Precision Protein StrepTactin-HRP Conjugate**, 125 µl, 50 applications
161-0382	**Precision Protein StrepTactin-AP Conjugate**, 300 µl, 150 applications
Precision Plus Protein Standard Plugs	
161-0378	**Precision Plus Protein Standard Plugs**, unstained, 24 applications
Clarity Western ECL Substrate	
170-5060	**Clarity Western ECL Substrate**, 200 ml
170-5061	**Clarity Western ECL Substrate**, 500 ml

* Note that StrepTactin (-HRP or -AP) conjugate is needed for colorimetric or chemiluminescence blots.

Natural Prestained Standards

Prestained standards for SDS-PAGE and western blotting provide a quick and easy way to monitor protein separation during electrophoresis and to assess transfer efficiency on blots. Each lot of Kaleidoscope and SDS-PAGE prestained standards is individually calibrated for estimating the MW of sample proteins. For optimal results with TGX™ precast gels, Precision Plus Protein standards (see page 184) will provide increased accuracy and consistency.

For More Information
Web: www.bio-rad.com/proteinstandards

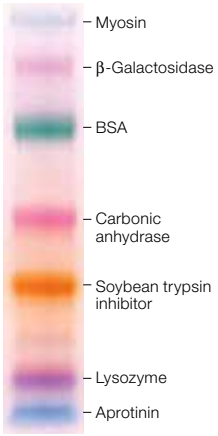
Kaleidoscope™ Standards

Kaleidoscope prestained broad range standards have individually colored proteins to allow instant orientation on SDS-PAGE gels and western blots.

Calibrated MWs of Kaleidoscope Standards

Protein	Color	MW Prestained
Myosin	Blue	216,000
β-Galactosidase	Magenta	132,000
BSA	Green	78,000
Carbonic anhydrase	Violet	45,700
Soybean trypsin inhibitor	Orange	32,500
Lysozyme	Purple	18,400
Aprotinin	Blue	7,600

MWs are of representative lots; actual weights may vary. Lot-specific MWs are included with each vial.



Kaleidoscope Prestained Standards

Ordering Information

Catalog #	Description
161-0324	**Kaleidoscope Prestained Standards**, broad range, 500 µl

Standards have a shelf life of 1 year at –20°C; shipped at room temperature.

Prestained SDS-PAGE Standards

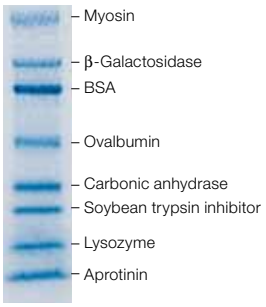
Bio-Rad's original prestained SDS-PAGE standards are available in broad, low, and high ranges.

Calibrated MWs of Prestained SDS-PAGE Standards

Protein	Broad Range	Low Range	High Range
Myosin	209,000	—	204,000
β-Galactosidase	124,000	—	123,000
Phosphorylase b	—	103,000	—
BSA	80,000	77,000	80,000
Ovalbumin	49,100	50,000	48,000
Carbonic anhydrase	34,800	34,300	—
Soybean trypsin inhibitor	28,900	28,800	—
Lysozyme	20,600	20,700	—
Aprotinin	7,100	—	—

MWs are of representative lots; actual weights may vary. Lot-specific MWs are included with each vial.

Use prestained SDS-PAGE standards to assess transfer efficiency on western blots. Broad range prestained SDS-PAGE standards, 5 µl, were run on a 4–20% Ready Gel® precast gel and transferred to nitrocellulose using the Mini Trans-Blot® cell.



Ordering Information

Catalog #	Description
161-0318	**Prestained SDS-PAGE Standards**, broad range, 500 µl
161-0305	**Prestained SDS-PAGE Standards**, low range, 500 µl
161-0309	**Prestained SDS-PAGE Standards**, high range, 500 µl

Standards have a shelf life of 1 year at –20°C; shipped at room temperature.

See Also

Protein electrophoresis stains: pages 196–198.
Protein blotting stains: page 223.
Electrophoresis and blotting buffers: pages 190–191, 216.
Gel Doc EZ imaging system: page 260.

Natural Unstained Standards

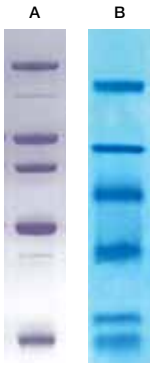
Unstained standards allow accurate MW determination on SDS-PAGE gels. Every batch is tested for proper mobility, providing a reliable control for gel-to-gel variability.

Specifications

	Volume, µl	Applications* (Number of Mini Gels)
SDS-PAGE standards	200	800–1,600
Polypeptide standards	200	800

* Number of applications depends on staining method.

For More Information
Web: www.bio-rad.com/proteinstandards



SDS-PAGE standards provide accurate MW determinations. A, high range SDS-PAGE standards stained with Coomassie Brilliant Blue R-250 stain; **B,** polypeptide SDS-PAGE standards stained with Coomassie Brilliant Blue G-250 stain.

Constituent Proteins of Unstained SDS-PAGE Standards

			Ranges Available*			
Protein	Source	MW (kD)	Broad	Low	High	Polypeptide
Myosin	Rabbit skeletal muscle	200.0	•		•	
β-Galactosidase	*E. coli*	116.3	•		•	
Phosphorylase b	Rabbit muscle	97.4	•	•	•	
Serum albumin	Bovine	66.2	•	•	•	
Ovalbumin	Hen egg white	45.0	•	•	•	
Carbonic anhydrase	Bovine	31.0	•	•		
Triosephosphate isomerase	Rabbit	26.6				•
Trypsin inhibitor	Soybean	21.5	•	•		
Myoglobin	Equine	17.0				•
α-Lactalbumin	Bovine	14.5				•
Lysozyme	Hen egg white	14.4	•	•		
Aprotinin	Bovine pancreas	6.5	•			•
Insulin B chain, oxidized	Bovine	3.5				•
Bacitracin	*Bacillus licheniformis*	1.4				•

* SDS-PAGE — broad, low, high, and polypeptide.

See Also
Vertical electrophoresis systems: pages 133–160.
Electrophoresis and blotting buffers: pages 190–191, 216.
Protein electrophoresis stains: pages 196–198.
Protein blotting stains: page 223.

Unstained SDS-PAGE Standards

SDS-PAGE Standards

SDS-PAGE standards are blended to give uniform band intensities when stained with Coomassie Brilliant Blue R-250 or zinc stains. SDS-PAGE standards are available in broad, low, high, and polypeptide MW ranges, allowing calibration in almost any percentage gel.

Polypeptide SDS-PAGE Standards

Polypeptide SDS-PAGE standards are for MW determination of peptides and small proteins resolved on Tricine gels. Consisting of six polypeptides with molecular masses ranging from ~1.4 to ~26.6 kD, polypeptide SDS-PAGE standards stain uniformly with Coomassie Brilliant Blue G-250 stain.

Ordering Information

Catalog #	Description
161-0317	**SDS-PAGE Standards**, broad range, 200 µl
161-0304	**SDS-PAGE Standards**, low range, 200 µl
161-0303	**SDS-PAGE Standards**, high range, 200 µl
161-0326	**Polypeptide SDS-PAGE Standards**, 200 µl

Specialty Standards (IEF and 2-D SDS-PAGE)

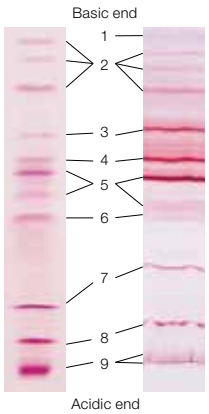
IEF Standards

IEF standards allow dependable and reproducible pI calibration in native polyacrylamide or agarose IEF gels. IEF standards are a mixture of nine native proteins with pIs ranging from 4.45–9.6. To monitor focusing, five of the nine proteins are naturally colored. The standards are provided in a stable aqueous solution and require no reconstitution or dilution prior to use.

Constituent Proteins of IEF Standards*

Protein	Color	pI
1. Cytochrome c	Red	9.6
2. Lentil lectin (3 bands)	—	7.8, 8.0, 8.2
3. Human hemoglobin C	Red	7.5
4. Human hemoglobin A	Red	7.1
5. Equine myoglobin (2 bands)	Brown	6.8, 7.0
6. Human carbonic anhydrase	—	6.5
7. Bovine carbonic anhydrase	—	6.0
8. β-Lactoglobulin B	—	5.1
9. Phycocyanin (3 bands)	Blue	4.45, 4.65, 4.75

* Because the IEF standards are in native form, they cannot be used with reducing or denaturing agents such as urea, β-mercaptoethanol, or dithiothreitol. For calibration of IEF tube gels containing urea, use 2-D SDS-PAGE standards.



IEF standards stained with IEF gel stain. Run on Criterion™ Tris-HCl (**left**) and Ready Gel® IEF gels (**right**).

Ordering Information

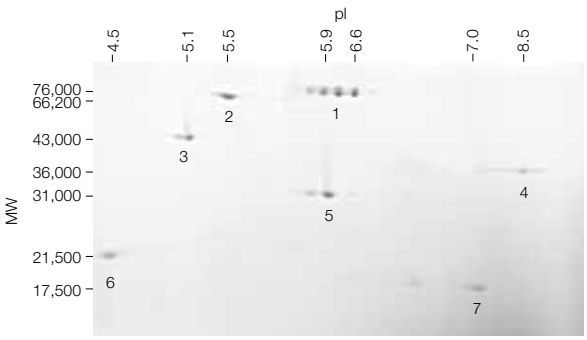
Catalog #	Description
161-0310	**IEF Standards**, 250 µl

2-D SDS-PAGE Standards

2-D SDS-PAGE protein standards provide calibrated references for the pI and MW of proteins in 2-D SDS-PAGE applications. These standards consist of seven reduced, denatured proteins that can be visualized with silver or Coomassie Blue stains and require no dilution prior to use.

Constituent Proteins of 2-D SDS-PAGE Standards

Protein	pI	MW, kD
1. Hen egg white conalbumin	6.0, 6.3, 6.6	76
2. Bovine serum albumin (BSA)	5.4, 5.5, 5.6	66
3. Bovine muscle actin	5.0, 5.1	43
4. Rabbit muscle GAPDH	8.3, 8.5	36
5. Bovine carbonic anhydrase	5.9, 6.0	31
6. Soybean trypsin inhibitor	4.5	21.5
7. Equine myoglobin	7.0	17.5



Migration pattern of 2-D SDS-PAGE standards. First dimension separation was performed with 7 cm ReadyStrip™ IPG strips. Second dimension separation was achieved with the Mini-PROTEAN® II cell.

Ordering Information

Catalog #	Description
161-0320	**2-D SDS-PAGE Standards**, 500 µl

Buffers and Reagents for Protein Electrophoresis

See Also

ReadyPrep 2-D sample preparation kits: pages 3–4.

ReadyStrip IPG strips: pages 164–165.

Premixed Sample Loading Buffers

The concentrated formulas of these buffers allow them to be used with both liquid and lyophilized samples. All premixed sample buffers are tested to ensure quality and consistency.

For More Information
Web: www.bio-rad.com/proteinreagents



Premixed Sample Loading Buffer Selection Guide

Buffer	Formulation	Applications
Laemmli sample buffer (2x)	62.5 mM Tris-HCl, pH 6.8, 2% SDS, 20% glycerol (w/v), 0.01% bromophenol blue (BPB)	SDS-PAGE
Laemmli sample buffer (4x)	250 mM Tris-HCl, pH 6.8, 4% LDS, 40% glycerol (v/v), 0.02% bromophenol blue (BPB)	SDS-PAGE
Native sample buffer	62.5 mM Tris-HCl, pH 6.8, 40% glycerol (w/v), 0.01% BPB	Native PAGE
Tricine sample buffer	200 mM Tris-HCl, pH 6.8, 2% SDS, 40% glycerol (w/v), 0.04% Coomassie Brilliant Blue G-250	Peptide and small protein SDS-PAGE
IEF sample buffer	50% glycerol (v/v)	IEF
Zymogram sample buffer	62.5 mM Tris-HCl, pH 6.8, 4% SDS, 25% glycerol (w/v), 0.01% BPB	Protease analysis

Ordering Information

Catalog #	Description
Premixed Protein Sample Loading Buffers	
161-0737	**2x Laemmli Sample Buffer**, 30 ml
161-0747	**4x Laemmli Sample Buffer**, 10 ml
161-0738	**Native Sample Buffer**, 30 ml
161-0739	**Tricine Sample Buffer**, 30 ml
161-0763	**IEF Sample Buffer**, 30 ml
161-0764	**Zymogram Sample Buffer**, 30 ml
161-0791	**XT Sample Buffer**, 4x, 10 ml

Premixed Running Buffers

Premixed running buffers can be used with handcast or precast gels. Simply dilute with distilled deionized water. For running buffers designed especially for extended shelf life Criterion™ XT precast gels, see page 147.



Electrophoresis Running Buffer Selection Guide

Buffer	1x Formulation	Applications
Protein Electrophoresis		
10x Tris/glycine/SDS	25 mM Tris, 192 mM glycine, 0.1% SDS, pH 8.3	General SDS-PAGE
10x Tris/glycine	25 mM Tris, 192 mM glycine, pH 8.3	Native PAGE
10x Tris/Tricine/SDS	100 mM Tris, 100 mM tricine, 0.1% SDS, pH 8.3	Peptide SDS-PAGE
10x IEF anode buffer	7 mM phosphoric acid	Analytical isoelectric focusing
10x IEF cathode buffer	20 mM lysine, 20 mM arginine	Analytical isoelectric focusing
10x zymogram renaturation buffer	2.5% Triton X-100	Protease analysis; renatures enzymes after electrophoresis
10x zymogram development buffer	50 mM Tris-HCl, pH 7.5, 200 mM NaCl, 5 mM $CaCl_2$, 0.02% Brij 35	Protease analysis; activates enzymes after electrophoresis
Nucleic Acid Electrophoresis		
10x TBE	89 mM Tris, 89 mM boric acid, 2 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels
10x TBE extended range	130 mM Tris, 45 mM boric acid, 2.5 mM EDTA	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels; extends the buffer capacity for longer DNA sequencing runs
50x TAE	40 mM Tris, 20 mM acetic acid, 1 mM EDTA, pH 8.0	Nucleic acid electrophoresis; polyacrylamide or agarose gels

Ordering Information

Catalog #	Description
Premixed Protein Running Buffers	
161-0732	**10x Tris/Glycine/SDS**, 1 L
161-0772	**10x Tris/Glycine/SDS**, 5 L cube
161-0734	**10x Tris/Glycine**, 1 L
161-0771	**10x Tris/Glycine**, 5 L cube
161-0744	**10x Tris/Tricine/SDS**, 1 L
161-0761	**10x IEF Anode Buffer**, 250 ml
161-0762	**10x IEF Cathode Buffer**, 250 ml
161-0765	**10x Zymogram Renaturation Buffer**, 125 ml
161-0766	**10x Zymogram Development Buffer**, 125 ml

Catalog #	Description
Premixed Nucleic Acid Running Buffers	
161-0733	**10x Tris/Boric Acid/EDTA (TBE)**, 1 L
161-0770	**10x Tris/Boric Acid/EDTA (TBE)**, 5 L cube
161-0741	**10x Tris/Boric Acid/EDTA (TBE)**, extended range, 1 L
161-0743	**50x Tris/Acetic Acid/EDTA (TAE)**, 1 L

Premixed Gel-Casting Buffers

Tris-HCl buffers are available to prepare the stacking and resolving portions of native or SDS-PAGE gels using discontinuous buffer systems according to Laemmli (1970) or Ornstein and Davis (1959). Use the 0.5 M Tris-HCl, pH 6.8, buffer for stacking gels and the 1.5 M Tris-HCl, pH 8.8, buffer for resolving gels.

Ordering Information

Catalog #	Description
161-0798	**Resolving Gel Buffer**, 1.5 M Tris-HCl, pH 8.8, 1 L
161-0799	**Stacking Gel Buffer**, 0.5 M Tris-HCl, pH 6.8, 1 L

See Also
ReadyStrip IPG strips: pages 164–165.
Vertical electrophoresis: pages 133–160.
Horizontal electrophoresis: pages 224–232.

Gel-Casting Reagents

Acrylamide

- **Acrylamide powders** — acrylamide and bis-acrylamide powders allow adjustment of concentration and acrylamide/bis ratio
- **Premixed acrylamide/bis powders** — premeasured amounts allow stock solutions from 30–50% to be prepared directly in the bottle by adding the indicated amount of water
- **Acrylamide solutions** — ready to use and available in two concentrations (30% and 40%) and in three acrylamide/bis ratios (19:1, 29:1, and 37.5:1)

Pore Size Determination: %T and %C

Polyacrylamide gels are described in terms of two parameters that determine pore size: total monomer concentration (%T) and weight percentage of cross-linker (%C).

$$\%T = \frac{\text{grams acrylamide + grams cross-linker}}{\text{total volume (ml)}} \times 100\%$$

$$\%C = \frac{\text{grams cross-linker}}{\text{grams acrylamide + grams cross-linker}} \times 100\%$$

By varying these two parameters, the pore size of the gel can be optimized to give the best separation and resolution for the molecule of interest. For help in determining the best %T and %C for your application, refer to the Precast Gels section on page 137. Examples of migration patterns of proteins on gels of different compositions can be found on page 138 (Mini-PROTEAN® TGX™ precast gels) and 147–149 (Criterion precast gels), or contact Bio-Rad Technical Support.



Acrylamide/Cross-linker Ratio by Application

Ratio	%C	Common Applications
19:1	5	DNA sequencing
29:1	3.3	Protein separation
37.5:1	2.6	Protein separation

For More Information
Web: www.bio-rad.com/proteinreagents
Request or download bulletins: 1156 and 1866

Ordering Information

Catalog #	Description		
Acrylamide Solutions*		**500 ml**	**2 x 500 ml**
30% acrylamide/bis, 19:1		161-0154	161-0155
30% acrylamide/bis, 29:1		161-0156	161-0157
30% acrylamide/bis, 37.5:1		161-0158	161-0159
40% acrylamide/bis, 19:1		161-0144	161-0145
40% acrylamide/bis, 29:1		161-0146	161-0147
40% acrylamide/bis, 37.5:1		161-0148	161-0149
40% acrylamide		161-0140	161-0141
2% bis solution		161-0142	161-0143

Catalog #	Description
Acrylamide Powder	
161-0100	**Acrylamide**, 99.9%, 100 g
161-0101	**Acrylamide**, 99.9%, 500 g
161-0107	**Acrylamide**, 99.9%, 1 kg
161-0103	**Acrylamide**, 99.9%, 2 kg
161-0108	**Acrylamide**, 99.9%, 5 kg

Premixed Acrylamide/Bis Powders	**30 g**	**150 g**
Acrylamide/bis, 19:1	161-0120	161-0123
Acrylamide/bis, 29:1	161-0121	161-0124
Acrylamide/bis, 37.5:1	161-0122	161-0125

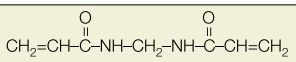
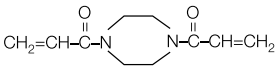
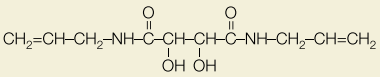
Catalog #	Description
Related Products	
161-5100	**SDS-PAGE Reagent Starter Kit**, includes 100 g acrylamide, 5 g bis, 5 ml TEMED, 10 g ammonium persulfate
163-2091	**ReadyPrep Proteomics Grade Water**, 500 ml

* Store acrylamide solutions at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

Cross-linkers and Catalysts

Bio-Rad offers standard and alternative cross-linkers for a variety of applications.

Cross-linker Application Guide

	Formal Name	Chemical Structure	Applications
Bis	N,N'-methylene-bis-acrylamide		General cross-linker in PAGE
PDA	Piperazine diacrylamide		Reduction of silver stain background in SDS-PAGE and 2-D gels, increased resolution, higher gel strength
DATD	N,N'-diallyl-tartardiamide		Increased pore size of IEF gels where molecular sieving is a problem. Used in scintillation counting. 1,2-diol structure is soluble in periodic acid

Ordering Information

Catalog #	Description
Crosslinkers	
161-0200	**Bis Crosslinker**, 5 g
161-0201	**Bis Crosslinker**, 50 g
161-0142	**2% Bis Solution**, 500 ml
161-0143	**2% Bis Solution**, 2 x 500 ml
161-0202	**PDA Crosslinker**, 10 g
161-0620	**DATD Crosslinker**, 25 g
Catalysts	
161-0800	**TEMED***, 5 ml (hazardous shipping charges may apply)
161-0801	**TEMED**, 50 ml
161-0700	**Ammonium Persulfate (APS)***, 10 g
161-0501	**Riboflavin-5'-Phosphate***, 10 g

* For longer shelf life, store desiccated at room temperature.

IEP/IEF Agaroses

Standard low –m_r agarose — with high strength, clarity, and low –m_r value, this agarose is recommended for all standard immunoelectrophoresis applications.

High –m_r agarose — the –m_r value of ≥0.25 makes this gel suitable for counterimmunoelectrophoresis and to blend with standard low –m_r agarose to increase its –m_r for special applications.

Zero –m_r agarose — this agarose is specific for IEF. It has no detectable electroendosmosis and is recommended for IEF of very high MW proteins or complexes that are subject to varying degrees of molecular sieving in polyacrylamide gels. Agarose IEF and post-run processing can be completed more quickly than polyacrylamide gel IEF.

For More Information
Web: www.bio-rad.com/nareagents

Ordering Information

Catalog #	Description
162-0100	**Standard Low –m$_r$ Agarose**, 100 g
162-0102	**Standard Low –m$_r$ Agarose**, 500 g
162-0001	**High –m$_r$ Agarose**, 50 g
162-0022	**Zero –m$_r$ Agarose**, 10 g

All reagents should be stored at room temperature, dry, and away from direct sunlight.

Accessory Reagents

Tracking Dyes

Bio-Rad offers two tracking dyes to monitor electrophoresis runs:

- Bromophenol blue for monitoring protein electrophoresis
- Xylene cyanole (FF) for monitoring nucleic acid electrophoresis

Ordering Information

Catalog #	Description
161-0404	**Bromophenol Blue**, 10 g
161-0423	**Xylene Cyanole FF**, 25 g

All dyes and stains should be stored at room temperature, dry, and away from direct sunlight.

See Also
ReadyPrep 2-D sample preparation kits: pages 3–4.

Detergents

SDS is available in a powder form or as 10% and 20% solutions. They are prepared with 18 MΩ water and have no detectable DNase or RNase activity. Also available are Tween 20 for blotting solutions and Triton X-100 and CHAPS for membrane protein solubilization. For simple, accurate pipetting, a solution of 10% Tween 20 is available.

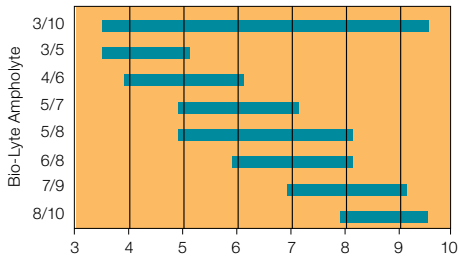
Ordering Information

Catalog #	Description
161-0301	**SDS (Sodium Dodecyl Sulfate)**, 100 g
161-0302	**SDS (Sodium Dodecyl Sulfate)**, 1 kg
161-0416	**SDS Solution**, 10% (w/v), 250 ml
161-0418	**SDS Solution**, 20% (w/v), 1 L
170-6531	**Tween 20**, EIA grade, 100 ml
161-0407	**Triton X-100 Detergent**, 500 ml
161-0460	**CHAPS**,* 1 g
161-0781	**10% Tween 20**, for easy pipetting, 1 L

* Store desiccated at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

Bio-Lyte® Ampholytes

Bio-Lyte carrier ampholytes, supplied as aqueous solutions, are blended to give a complete range of isoelectric points for linear pH gradients. Bio-Lyte 3/10, 3/5, and 8/10 ampholytes extend from approximately pH 3.5–9.5 units on the acidic and basic ends. All other ranges are within 0.1–0.2 pH units of their specified range. Bio-Lyte ampholytes are also used as IPG buffers. For ready-to-use ampholytes, see ReadyStrip™ IEF buffers (page 165).



pH range of each Bio-Lyte ampholyte.

Ordering Information

Catalog #	Description	Catalog #	Description
163-1112	**Bio-Lyte 3/10 Ampholyte**, 40%, 10 ml	163-1192	**Bio-Lyte 5/8 Ampholyte**, 40%, 10 ml
163-1113	**Bio-Lyte 3/10 Ampholyte**, 40%, 25 ml	163-1193	**Bio-Lyte 5/8 Ampholyte**, 40%, 25 ml
163-1132	**Bio-Lyte 3/5 Ampholyte**, 20%, 10 ml	163-1162	**Bio-Lyte 6/8 Ampholyte**, 40%, 10 ml
163-1142	**Bio-Lyte 4/6 Ampholyte**, 40%, 10 ml	163-1163	**Bio-Lyte 6/8 Ampholyte**, 40%, 25 ml
163-1143	**Bio-Lyte 4/6 Ampholyte**, 40%, 25 ml	163-1172	**Bio-Lyte 7/9 Ampholyte**, 40%, 10 ml
163-1152	**Bio-Lyte 5/7 Ampholyte**, 40%, 10 ml	163-1182	**Bio-Lyte 8/10 Ampholyte**, 20%, 10 ml
163-1153	**Bio-Lyte 5/7 Ampholyte**, 40%, 25 ml		

See Also

ReadyStrip IPG strips: pages 164–165.

Rotofor, mini Rotofor, and MicroRotofor preparative IEF cells: pages 173–175.

PROTEAN i12 IEF system: pages 161–162.

Cleaning Concentrate

Bio-Rad's cleaning concentrate is a moderately alkaline detergent that cleans by solubilization and emulsification. It is ideal for cleaning glass plates and other laboratory equipment and is harmless to skin and clothing.

Ordering Information

Catalog #	Description
161-0722	**Bio-Rad Cleaning Concentrate**, 50x, 1 kg

Gel Drying Solution

Bio-Rad's gel drying solution is a pretreatment for polyacrylamide gels that helps prevent gels from cracking during air or vacuum drying. Just 10 minutes of equilibration in the solution before drying prevents excessive gel swelling and cracking.

Ordering Information

Catalog #	Description
161-0752	**Gel Drying Solution**, 1 L

See Also

Gel drying systems: pages 199–201.

Protein Stains

Bio-Rad offers visible and fluorescent gel stains to accommodate your needs for sensitivity, linearity, and mass spectrometry compatibility.

Gel Stain Selection Guide

Stain	Staining per Band	Time	Comments
Coomassie Stains			
Bio-Safe™ Coomassie G-250	8.0–28.0 ng	1–2.5 hr	Nonhazardous staining in aqueous solution; premixed; mass spectrometry-compatible
Coomassie Brilliant Blue R-250	36.0–47.0 ng	2.5 hr	Simple and consistent; mass spectrometry-compatible
Silver Stains			
Silver Stain Plus™ kit (Gottlieb and Chavko 1987)	0.6–1.2 ng	1.5 hr	Simple and robust; mass spectrometry-compatible
Silver stain (Merril et al. 1981)	0.6–1.2 ng	2 hr	Stains glycoproteins, lipoproteins, lipopolysaccharides, nucleic acids
Fluorescent Stains			
Oriole™ fluorescent gel stain	0.5–1.0 ng	1.5 hr	Rapid fluorescent gel stain; no destaining; mass spectrometry-compatible; only compatible with UV excitation
Flamingo™ fluorescent gel stain	0.25–0.5 ng	5 hr	High sensitivity; broad dynamic range; no destaining; simple; mass spectrometry-compatible; excellent for laser-based scanners
SYPRO Ruby protein gel stain	1.0–10.0 ng	3 hr	Fluorescent protein stain; simple, robust protocol; broad dynamic range; mass spectrometry-compatible
Nucleic Acid Stains			
Ethidium bromide	50 .0ng	1 hr	Classic fluorescent DNA stain

See Also

Precast polyacrylamide gels: pages 137–141, 146–150.

EXQuest spot cutter: page 266.

Imaging systems: pages 258–266.

Coomassie Stains

Bio-Safe™ Coomassie Stain

Bio-Safe Coomassie Brilliant Blue G-250 stain is a premixed, ready-to-use, nonhazardous solution that does not require the use of methanol and acetic acid for destaining. Bio-Safe Coomassie stain produces blue bands on a clear background and is fast, simple, sensitive, and convenient. Advantages include:

- Staining in aqueous solution — no special handling or fume hood requirements
- Visibility of bands while gel is in the stain
- No solvent waste problems or disposal costs

For More Information
Web: www.bio-rad.com/coomassie
Request or download bulletin: 2423



Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

Coomassie Brilliant Blue R-250 staining solution is the fastest and easiest way to stain Criterion™ or other polyacrylamide protein gels using Coomassie stain. Coomassie R-250 staining and destaining solutions are ready to use.

Ordering Information

Catalog #	Description
Bio-Safe Coomassie Stain	
161-0786	**Bio-Safe Coomassie Stain**, 1 L
161-0787	**Bio-Safe Coomassie Stain**, 5 L
Coomassie Brilliant Blue R-250 Staining and Destaining Solutions	
161-0435	**Coomassie Brilliant Blue R-250 Staining Solutions Kit**, includes 1 L Coomassie Brilliant Blue R-250 staining solution, 2 x 1 L Coomassie Brilliant Blue R-250 destaining solution

continues

Ordering Information

Catalog #	Description
Coomassie Brilliant Blue R-250 Staining and Destaining Solutions (cont.)	
161-0436	**Coomassie Brilliant Blue R-250 Staining Solution**, 1 L
161-0437	**Coomassie Brilliant Blue R-250 Staining Solution**, 4 x 1 L
161-0438	**Coomassie Brilliant Blue R-250 Destaining Solution**, 1 L
161-0439	**Coomassie Brilliant Blue R-250 Destaining Solution**, 4 x 1 L
Coomassie Stain Powders	
161-0400	**Coomassie Brilliant Blue R-250**, 10 g
161-0406	**Coomassie Brilliant Blue G-250**, 10 g

Silver Stains

Silver Stain Plus™ Kit

Silver Stain Plus kit provides the most sensitive and easiest to use silver stain. It is derived from the method developed by Gottlieb and Chavko (1987) for detection of native and denatured eukaryotic DNA in agarose gels. The chemistry has been modified so that it is ideal for both proteins and nucleic acids in polyacrylamide and agarose gels.

The Silver Stain Plus kit:

- Detects nanogram quantities of protein and DNA
- Eliminates background by preventing silver precipitation in the gel matrix
- Does not require destaining
- Stains 13 full-size gels or 40 mini gels

Bio-Rad Silver Stain Kit

Bio-Rad's original silver stain kit, derived from the method of Merril et al. (1981), is ideal for staining polysaccharides and highly glycosylated proteins that are difficult to stain with the Silver Stain Plus kit. This kit will stain 24 full-size gels or 48 mini gels in 2 hours. The lowest sensitivity is 0.25–0.5 ng.

For More Information
Web: www.bio-rad.com/silverstain
Request or download bulletin: 1089

Specifications

Kit	Time	Number of Gels	Shelf Life	Storage	Lowest Sensitivity
Silver Stain Plus	1.5 hr	40 mini gels	1 yr	4°C	0.6–1.2 ng
Silver Stain	2 hr	48 mini gels	1 yr	Ambient	0.6–1.2 ng

Ordering Information

Catalog #	Description
Silver Stain Plus Kit	
161-0449	**Silver Stain Plus Kit**, includes fixative enhancer concentrate, silver complex solution, reduction moderator solution, image development reagent, development accelerator reagent, stains 13 full size or 40 mini gels
161-0448	**Development Accelerator Reagent**, 50 g
161-0461	**Fixative Enhancer Concentrate***, 1 L
161-0462	**Silver Complex Solution***, 100 ml
161-0463	**Reduction Moderator Solution***, 100 ml
161-0464	**Image Development Reagent***, 100 ml
Bio-Rad Silver Stain Kit**	
161-0443	**Silver Stain Kit**, includes oxidizer concentrate, silver reagent concentrate, silver stain developer, stains 20 full-size or 48 mini gels
161-0450	**Silver Stain Developer**, 115 g
161-0447	**Silver Stain Developer**, 4 x 115 g
161-0444	**Oxidizer Concentrate**, 480 ml
161-0445	**Silver Reagent Concentrate**, 480 ml *

* Hazardous shipping charges may apply.

** The Bio-Rad silver stain kit and components should be stored at 4°C.

See Also

Imaging systems: pages 258–266.

Precast polyacrylamide gels: pages 137–141, 146–150.

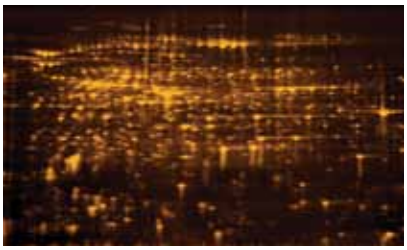
2-D electrophoresis: pages 161–171.

Fluorescent Stains

Oriole™ Fluorescent Gel Stain

Oriole stain is a an easy-to-use, fast, and sensitive fluorescent protein gel stain.

- One-step protocol, no fixing or destaining required, full sensitivity acheived in 90 min
- Full compatibility with downstream proteolysis and mass spectrometric analysis
- Nanogram sensitivity and low background
- Wide dynamic range and highly linear response (three orders of magnitude)
- Compatible with UV excitation imagers such as the Gel Doc™ EZ and ChemiDoc™ MP imaging systems

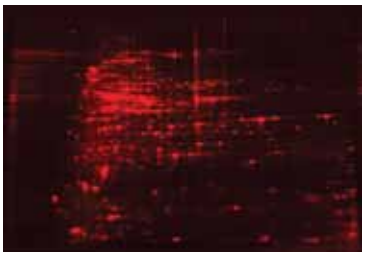


2-D gel stained with Oriole stain. *E. coli* protein (40 µg) was run on an 11 cm pH 5–8 ReadyStrip™ IPG strip for the first dimension and a Tris-HCl 8–16% Criterion™ gel for the second dimension.

Flamingo™ Fluorescent Gel Stain

This easy-to-use, economical gel stain is for use with laser-based scanners such as the PharosFX™ system and a variety of fluorescence imaging systems.

- Two-step protocol that can be completed in as little as 5 hr
- Compatible with mass spectrometry and Edman-based sequencing applications
- Broad linear range
- Applicable as IEF gel stain

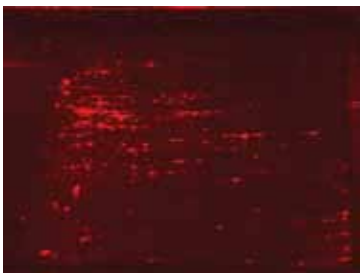


Flamingo fluorescent gel stain. *E. coli* protein sample (10 µg).

SYPRO Ruby Protein Gel Stain

SYPRO Ruby protein gel stain is compatible with mass spectrometry and Edman-based sequencing applications.

- Detection of glycoproteins, lipoproteins, and metalloproteins
- No detection of extraneous nucleic acids in the sample
- Suitable for IEF gels



SYPRO Ruby protein gel stain. *E. coli* protein sample (10 µg).

For More Information
Web: www.bio-rad.com/fluorescentstain
Request or download bulletin: Flamingo, 5346, 5705, 5754 and Oriole, 5900, 5991, 5921

Ordering Information

Catalog #	Description
Oriole Fluorescent Gel Stain	
161-0495	**Oriole Fluorescent Gel Stain**, 1x solution, 200 ml
161-0496	**Oriole Fluorescent Gel Stain**, 1x solution, 1 L
Flamingo Fluorescent Gel Stain	
161-0490	**Flamingo Fluorescent Gel Stain**, 10x solution, 20 ml
161-0491	**Flamingo Fluorescent Gel Stain**, 10x solution, 100 ml
161-0492	**Flamingo Fluorescent Gel Stain**, 10x solution, 500 ml
SYPRO Ruby Protein Gel Stain	
170-3126	**SYPRO Ruby Protein Gel Stain**, 1x solution, 200 ml
170-3125	**SYPRO Ruby Protein Gel Stain**, 1x solution, 1 L
170-3138	**SYPRO Ruby Protein Gel Stain**, 1x solution, 5 L

Gel Drying Equipment

Bio-Rad offers flexible gel drying systems that will accommodate multiple gel types and allow optimization of drying conditions.

For More Information
Web: www.bio-rad.com/geldrying

Model 583 and HydroTech™ Gel Drying Systems

The Model 583 gel dryer accommodates sequencing gels or multiple standard size gels. With variable temperature control and three preprogrammed cycles, drying conditions can be optimized to prevent gel cracking. The HydroTech vacuum pump is a unique, environmentally friendly vacuum pump. The gel dryer and vacuum pump can be purchased individually or together as an economical system.

Model 583 Gel Dryer

The Model 583 gel dryer has a drying surface large enough to fit up to 16 mini gels, 9 Criterion™ gels, 2 large format gels, or 1 sequencing gel. The floating heating element heats gels from the top while a vacuum is pulled through the bottom porous gel support, distributing the vacuum evenly so gels dry without cracking. The transparent sealing gasket allows monitoring of gels during the drying cycle.

HydroTech Vacuum Pump*

The HydroTech vacuum pump uses ordinary tap water, not vacuum pump oil, eliminating messy oil changes and hazardous waste. A vapor trap is not needed because the pump traps gel-drying liquids and vapors in the 4 L water reservoir.

The self-contained HydroTech pump applies vacuum by pumping pressurized water through dual Venturi injectors. The vacuum strength is temperature dependent; by circulating the water through a cooling unit, the pump maintains a strong, constant vacuum.

For More Information
Request or download bulletin: 1992

Double-Up Gel Dryer Rack

The double-up gel dryer rack accommodates two gel dryers up to 60 x 50 cm. The bottom shelf is on interlocking glides that allow full extension and easy access to the gel dryer's surface. When a dryer is placed on the stationary top shelf, it stabilizes the unit and helps prevent tilting of the rack when the bottom shelf is fully extended. The rack is plumbed for vacuum, made of sturdy sheet metal, and arrives assembled. The rack can be ordered separately, or as a system including two Model 583 gel dryers and a HydroTech vacuum pump.

For More Information
Request or download bulletin: 2210



HydroTech Vacuum Pump



Model 583 Gel Dryer and Double-Up Gel Dryer Rack

Model 583 Gel Drying Supports

Available supports for use with the Model 583 gel dryer include filter paper backing for stained gels, cellophane membrane backing for transmission densitometry, filter paper for fragile sequencing gels, and porous gel supports to ensure evenly distributed vacuum pressure.

Gel drying solution for polyacrylamide gels and drying supports for discontinued products are also available.

For More Information
Request or download bulletin: 2210

See Also

Precast gels: pages 137–141, 146–150.
Acrylamide: page 192.
Premixed buffers: pages 190–191.

* U.S. patent 5,582,509. The HydroTech vacuum pump is not suitable for rotary evaporation or general aspiration.

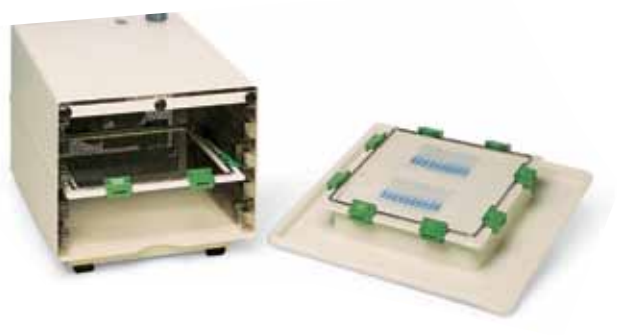
Ordering Information

Catalog #	Description
165-1789	**HydroTech Gel Drying System**, 100/120 V, includes #165-1745 and #165-1781
165-1790	**HydroTech Gel Drying System**, 220/240 V, includes #165-1746 and #165-1782
165-1745	**Model 583 Gel Dryer**, 100/120 V, includes porous gel support, transparent sealing gasket, filter paper backing, cellophane membrane backing, sequencing gel filter paper
165-1746	**Model 583 Gel Dryer**, 220/240 V, includes all items in #165-1745
HydroTech Vacuum Pumps	
165-1781	**HydroTech Vacuum Pump**, 100/120 V, includes pump, quick disconnect fittings for 1/4 and 3/8" ID vacuum tubing, vacuum tubing, drain tubing
165-1782	**HydroTech Vacuum Pump**, 220/240 V, includes all items in #165-1781
HydroTech Vacuum Pump Accessories	
165-1783	**Quick Disconnect Fitting**, fits 1/4" ID tubing
165-1784	**Quick Disconnect Fitting**, fits 3/8" ID tubing
165-1785	**Vacuum Tubing**, 2 m, includes quick disconnect fitting, hose clamps, 2-way stopcock
165-1786	**Drain Tubing**, 2 m, includes quick disconnect fitting, hose clamp
910-0509	**2-Way Stopcock**
165-1787	**3-Way Stopcock**
165-1788	**HydroTech Vacuum Gauge**
165-1791	**Anti-Foam Agent**, 100 ml
Double-Up Gel Drying Rack and Systems	
165-1796	**Double-Up Gel Dryer Rack**
165-1797	**Double-Up Gel Dryer System**, 100/120 V, includes 2 Model 583 gel dryers (#165-1745), HydroTech vacuum pump (#165-1781), double-up gel dryer rack (#165-1796)
165-1798	**Double-Up Gel Dryer System**, 220/240 V, includes 2 Model 583 gel dryers (#165-1746), HydroTech vacuum pump (#165-1782), double-up gel dryer rack (#165-1796)
Model 583 Drying Supports	
165-0962	**Filter Paper Backing**, for stained gels, 35 x 45 cm, 25 sheets
165-0963	**Cellophane Membrane Backing**, clear membrane for transmission densitometry or overhead projection, 35 x 45 cm, 50 sheets
165-0959	**Sequencing Gel Filter Paper**, for fragile sequencing gels, 35 x 45 cm, 25 sheets
165-1747	**Model 583 Gel Dryer Porous Gel Support**, 35 x 45 cm
165-1748	**Model 583 Transparent Sealing Gasket**, 41 x 51 cm
Drying Supports for Discontinued Products	
165-0922	**Cellophane Membrane Backing**, 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 50 sheets
165-0921	**Thick Blot Paper**, 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets
Gel Drying Solution	
161-0752	**Gel Drying Solution**, 1 L

GelAir™ Drying System

The GelAir drying system is perfect for drying polyacrylamide and agarose gels. Dried between two sheets of cellophane, the gels come out completely clear with a glossy finish, ideal for densitometry, photodocumentation, autoradiography, overheads, and long-term storage.

The heated drying chamber works like a convection oven to dry mini gels in 45 minutes or 20.0 x 20.0 cm gels in 60 minutes, rivaling the speed of conventional gel dryers that require a vacuum pump. Drying times may vary depending on the percentage and thickness of the gel. The dryer holds up to four drying frames at once.



For More Information
Web: www.bio-rad.com/geldrying
Request or download bulletin: 1965

Specifications

GelAir Dryer	
Timer control	0–3 hr, fully adjustable
Function modes	Fan only; fan and heat; off
Dryer capacity	4 shelves, each accommodating 1 drying frame
Dimensions (W x D x H)	27.0 x 43.0 x 30.0 cm
Weight	8 kg (18 lb)

GelAir Drying Frames	
Inner dimensions	20.0 x 20.0 cm
Drying frame	Molded polycarbonate bottom frame, stainless-steel top frame
Clamps	Molded polysulfone, 8 clamps per drying frame
Gel capacity (per frame)	4 mini (8.0 x 7.0 cm) gels, 2 Criterion (13.3 x 8.7 cm) gels, 1 large (20.0 x 20.0 cm) gel

Ordering Information

Catalog #	Description
165-1771	**GelAir Drying System**, 115 V, 60 Hz, includes #165-1777, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution
165-1772	**GelAir Drying System**, 230 V, 50 Hz, includes #165-1778, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution
165-1777	**GelAir Dryer**, 115 V, 60 Hz, gel drying oven only
165-1778	**GelAir Dryer**, 230 V, 50 Hz, gel drying oven only
Accessories	
165-1775	**GelAir Drying Frames**, includes plastic drying frame, metal square frame, 16 clamps
165-1776	**GelAir Assembly Table**
920-7965	**GelAir Plastic Drying Frame**, for GelAir assembly table, does not include metal square frame
165-1779	**GelAir Cellophane Support**, 50 precut sheets
165-1780	**GelAir Drying Frame Clamps**, 8
161-0752	**Gel Drying Solution**, 1 L

Western Blotting

Bio-Rad's western blotting products include the V3 Western Workflow™, systems for protein transfers, blotting membranes, filter paper, premixed blotting buffers, reagents, protein standards, and detection kits.

Learn More about the Technology
Web: www.bio-rad.com/tech/westernblotting

NEW V3 Western Workflow™ Protocol

Bio-Rad's V3 Western Workflow — consisting of TGX Stain-Free™ precast gels, the Trans-Blot® Turbo™ system, and the ChemiDoc™ MP imager — incorporates traditional blotting techniques with innovative technology. The five-step streamlined protocol allows quick confirmation of gels and blot transfer quality prior to western blotting, and provides total protein blot normalization for rapid and robust quantitation.

Five Steps

1. **Separate proteins** — Mini-PROTEAN® TGX Stain-Free™ precast gels and Criterion™ TGX Stain-Free™ precast gels offer fast, superior protein separation. TGX Stain-Free precast gels feature proprietary in-gel chemistry, enabling high-quality protein separation in as little as 15 min (pages 137, 147)
2. **Visualize proteins** — protein separation is visualized and confirmed using stain-free technology, after 1 minute activation on the ChemiDoc MP imager. Stain-free technology is a sensitive, time-saving alternative to traditional Coomassie staining (page 259)
3. **Transfer proteins** — Trans-Blot Turbo system, a rapid protein transfer apparatus, reduces transfer protocols to as little as 3 minutes across a broad MW range (page 204)
4. **Verify protein transfer** — ChemiDoc MP imager paired with stain-free technology enables instant verification of protein transfer (page 259)
5. **Validate and quantitate** — ChemiDoc MP imager and Image Lab™ software validate western blotting data via total protein normalization as an alternative to using housekeeping proteins. By normalizing to total protein, stripping and reprobing is no longer necessary.



Separate Proteins
Rapidly separate proteins with TGX Stain-Free precast gels

Visualize Separation
Immediately visualize separation using stain-free technology and the ChemiDoc MP imager

Transfer Proteins
Use the Trans-Blot Turbo system for rapid and efficient protein transfer

Verify Transfer
Verify high-quality transfer by instantly imaging proteins on the membrane

Validate Western Blot
Perform multiplex imaging and validate results by total protein normalization on the ChemiDoc MP imager

Ordering Information

Catalog #	Description
170-8292	**V3 Western Workflow Complete System for Mini Gels**, includes ChemiDoc MP imager with LEDs and Image Lab software, 50 Mini-PROTEAN TGX Any kD Stain-Free 10-well precast gels with SDS-PAGE accessories, Mini-PROTEAN Tetra cell, Trans-Blot Turbo starter kit, 50 Trans-Blot Turbo PVDF transfer packs for mini gels
170-8293	**V3 Western Workflow Complete System for Midi Gels**, includes ChemiDoc MP imager with LEDs and Image Lab software, 50 Criterion TGX Stain-Free 4–20% 18-well precast gels with SDS-PAGE accessories, Criterion cell, Trans-Blot Turbo starter kit, 50 Trans-Blot Turbo PVDF transfer packs for midi gels

Transfer Devices

Overview of Blot Transfer Systems

- **Semi-dry transfer systems** — for rapid, high-intensity transfers best suited for mid-range proteins, 10–100 kD or >200 kD for the Trans-Blot Turbo system (page 204)
- **Tank transfer systems** — ideal for most routine protein work, tank transfer systems provide efficient and quantitative protein transfers over a broad MW range and are available with either plate or wire electrodes (pages 206–209)
- **Microfiltration (dot blotting) and screening systems** — used to determine working conditions for a new blotting assay or in situations where protein separation is not required; suitable for both protein and nucleic acid blotting (pages 210–211)
- **Vacuum transfer system** — quick and efficient transfer of DNA or RNA from an agarose gel onto a nylon membrane (page 244)

Blotting Selection Guide

	Mini Trans-Blot®	Criterion Blotter	Trans-Blot	Trans-Blot Plus	Trans-Blot SD	Trans-Blot Turbo
Blotting area	10.0 x 7.5 cm	15.0 x 9.4 cm	16.0 x 20.0 cm	28.0 x 26.5 cm	24.0 x 16.0 cm	15.0 x 11.0 cm
Gel capacity	2 Mini-PROTEAN gels	4 Mini-PROTEAN or 2 Criterion gels	3 PROTEAN® II xi, 6 Criterion, or 12 Mini-PROTEAN gels	Three 26.5 x 28 cm gels or 12 Criterion gels	2 PROTEAN II gel sandwiches, stacked and separated by dialysis membrane; 4 Mini-PROTEAN gels side by side; 3 Criterion gels side by side	2 midi gels (13.5 x 8.5 cm), 4 mini gels (7.0 x 8.5 cm) or similar
Number of gel holders	2	2	3	3	—	—
Buffer requirement	1.2 L	1.3 L	3–4 L	10–12 L	200 ml	N/A
Electrode distance	4.0 cm	4.3 cm	2 positions: 4.0 and 8.0 cm	3 positions: 4.0, 7.0, and 10.0 cm	Determined by thickness of the gel and membrane sandwich and filter paper stack	~8 mm depending on gel thickness
Electrode dimensions	—	—	—	—	25.0 x 18.0 cm	16.0 x 12.0 cm
Electrode materials	Platinum wire	Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire	Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire	Platinum-coated titanium anode and stainless-steel cathode plates	Platinum-coated titanium anode and stainless-steel cathode plates	Platinum-coated titanium anode and stainless-steel cathode plates
Transfer time						
Wire electrodes	Standard: 16 hr High-intensity: 1 hr	Standard: 60 min to overnight	Standard: 5 hr Overnight: 16 hr High-intensity: 30 min–4 hr	—	~30 min	3–10 min
Plate electrodes		Standard: 30 min to overnight	Standard: 1–5 hr Overnight: 16 hr High-intensity: 30 min–1 hr	Standard: 16 hr High-intensity: 15 min–1 hr	—	—
Cooling	Blue cooling unit	Sealed ice block or optional Criterion blotter cooling unit	Super cooling coil	Super cooling coil	—	—
Overall dimensions (W x L x H)	12.0 x 16.0 x 18.0 cm	21.8 x 11.8 x 15.0 cm	18.0 x 9.5 x 24.0 cm	30.0 x 17.3 x 39.4 cm	37.0 x 24.0 x 11.0 cm	26.0 x 21.0 x 20.0 cm

Semi-Dry and Rapid Blotting Systems

Trans-Blot® Turbo™ Transfer System

The Trans-Blot Turbo transfer system represents the next generation of protein transfer by integrating speed, improved performance, and ease of use into a complete system, providing results faster than any other method currently available.

The Trans-Blot Turbo blotting system combines traditional blotting techniques with modern filter paper and buffers, allowing rapid transfer of proteins with minimal preparation time. By providing the entire system in a ready-to-use format, researchers can obtain their results faster and easier with reproducibility that is difficult to achieve by traditional tank and semi-dry blotting methods.

Rapid, High-Throughput Transfer

- Transfers standard mini or midi gels in as little as 3 min
- Efficient transfer of high- and low-MW proteins
- Can transfer 1–4 mini or 1–2 midi gels in a single run
- No cooling period required between runs
- Specialized protocol for Mini-PROTEAN® TGX™ gel transfer in 3 min
- No need to pre-equilibrate gels prior to transfer

Ready-to-Use Transfer Packs

- Ready-to-use transfer packs eliminate the need for buffer and membrane preparation
- Transfer packs available with nitrocellulose and PVDF
- Proprietary buffer included in each transfer pack

NEW Ready-to-Assemble (RTA) Transfer Kits

- Kits provide enough consumables for 40 blots
- Consists of pre-cut membranes, pre-cut filter pads, and specially formulated transfer buffer
- Kits available with nitrocellulose, PVDF, and low fluorescence PVDF



Flexible Design

- Option to use either rapid preset protocols or customize transfer conditions
- Accommodates traditional semi-dry consumables
- Compatible with various gel types and percentages
- Ability to customize and store protocols within the instrument
- Integrated power supply means no external power supply is needed

Environmentally Friendly

- Environmentally safe consumables eliminate disposal cost
- Single-use consumables reduce waste

For More Information
Web: www.bio-rad.com/turbo
Request or download bulletin: 6039

Ordering Information

Catalog #	Description
170-4150	**Trans-Blot Turbo Transfer System**, includes 2 cassettes, roller
170-4151	**Trans-Blot Turbo Cassette**, 1 cassette
170-4152	**Trans-Blot Turbo Base**, base instrument, no cassettes included

Description	Mini (7 x 8.5 cm)	Midi (8.5 x 13.5 cm)
Trans-Blot Turbo Transfer Pack, PVDF, pkg of 10	170-4156	170-4157
Trans-Blot Turbo Transfer Pack, Nitrocellulose, pkg of 10	170-4158	170-4159
Trans-Blot Turbo RTA Transfer Kit, Nitrocellulose, for 40 blots	170-4270	170-4271
Trans-Blot Turbo RTA Transfer Kit, PVDF, for 40 blots	170-4272	170-4273
Trans-Blot Turbo RTA Transfer Kit, LF PVDF, for 40 blots	170-4274	170-4275

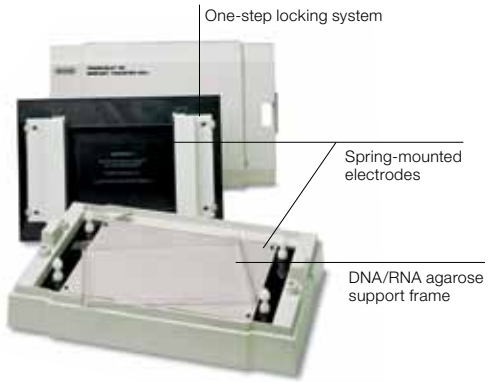
Trans-Blot® SD Semi-Dry Transfer Cell

The Trans-Blot SD semi-dry transfer cell allows fast and efficient blotting without buffer tank or gel cassettes. Features include:

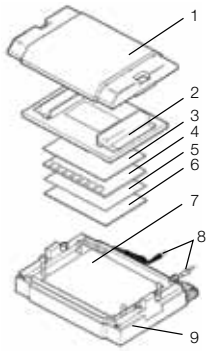
- Transfers in as little as 15–60 min
- Minimal buffer requirements
- Capacity to transfer multiple gel sizes
- Single-step locking system for simple setup
- Platinum-coated titanium anode and stainless-steel cathode plate electrodes that provide consistent and reliable transfers, durability, and years of use
- Safety cover to break the electrical current when lifted, preventing electrical shock

In addition to western blotting, the Trans-Blot SD cell can also transfer DNA and RNA using the unique agarose gel semi-dry blotting support frame. The frame protects fragile agarose gels from compression by the electrodes. Southern and northern blot transfers can be run in 10–35 minutes.

For More Information
Web: www.bio-rad.com/transblotsd
Request or download bulletin: 2895



Expanded view of the Trans-Blot SD cell assembly:
1. Safety lid.
2. Cathode assembly with latches.
3. Filter paper.
4. Gel.
5. Membrane.
6. Filter paper.
7. Spring-loaded anode platform mounted on four guideposts.
8. Power cables.
9. Base.



See Also

PowerPac HC power supply: page 181.

Blotting buffers: page 216.

Specifications

Maximum gel size (W x L)	24 x 16 cm
Buffer requirement	200 ml
Gel capacity	4 Mini-PROTEAN precast gels, 4 Ready Gel® precast gels, 4 Mini-PROTEAN handcast gels, 3 Criterion gels, or 1–3 PROTEAN II gel sandwiches*
Recommended power supply	PowerPac™ HC
Dimensions (W x L x H)	37 x 24 x 11 cm
Weight	3.6 kg (7.9 lb)

* Dialysis membrane between each gel sandwich.

Ordering Information

Catalog #	Description
170-3940*	**Trans-Blot SD Semi-Dry Electrophoretic Transfer Cell**, includes transfer cell, agarose gel support frame, extra thick blot paper (7 x 8.4 cm, 60 sheets; 8 x 13.5 cm, 60 sheets; 14 x 16 cm, 30 sheets; 18 x 18.5 cm, 30 sheets)
170-3848	**Trans-Blot SD Cell and PowerPac HC Power Supply**, 100–120/220–240 V, includes #170-3940 and #164-5052
170-3849	**Trans-Blot SD Cell and PowerPac Universal Power Supply**, 100–120/220–240 V, includes #170-3940 and #164-5070
Accessories	
170-3947	**Cathode Plate**, stainless-steel upper electrode
170-3942	**Anode Plate**, platinum-coated lower electrode
170-4019	**Trans-Blot SD Agarose Gel Support Frame**, includes extra thick blot paper (15 x 20 cm, 30 sheets)
170-3957	**Trans-Blot SD DNA/RNA Blotting Kit**, includes SD agarose gel support frame, extra thick blot paper (15 x 20 cm, 30 sheets), 1 L 10x TBE buffer

* The Trans-Blot SD semi-dry transfer cell requires the use of a microprocessor-controlled power supply.

Wet/Tank Blotting Systems

See Also

PowerPac Basic and HC power supplies: page 181.

Ready Gel precast gels: pages 140–141.

Blotting membranes: pages 212–214.

Blot detection reagents: pages 217–222.

Buffers: page 216.

Mini Trans-Blot® Cell

This cell provides rapid, high-quality blotting of mini gels. A component of the Mini-PROTEAN Tetra system, the Mini Trans-Blot cell accommodates two gel holder cassettes for electrophoretic transfer of mini format gels.

- Ability to transfer two 10 x 7.5 cm gels in just 1 hr; low-intensity, overnight transfers are also possible
- Placement of wire electrodes 4 cm apart for strong electrical fields and efficient protein transfer
- Color-coded cassettes and electrodes to ensure proper orientation of the gel during transfer
- Blue cooling unit, contained within the Mini Trans-Blot cell, absorbs heat generated during rapid transfers
- Availability either as a complete stand-alone apparatus or as a module compatible with the Mini-PROTEAN Tetra cell

Mini Trans-Blot cell components:
1. Buffer tank and lid.
2. Blue cooling unit.
3. Foam pads.
4. Gel holder cassette.
5. Electrophoresis blotting module.



For More Information
Request or download bulletin: 2033

Specifications

Maximum gel size (W x L)	10 x 7.5 cm
Buffer requirement	1.2 L
Gel capacity	2 Mini-PROTEAN handcast gels, 2 Mini-PROTEAN precast gels, or 2 Ready Gel® precast gels
Recommended power supply	PowerPac™ HC (PowerPac Basic is a suitable alternative)
Dimensions (W x L x H)	12 x 16 x 18 cm

Ordering Information

Catalog #	Description
170-3930	**Mini Trans-Blot Electrophoretic Transfer Cell**, includes 2 gel holder cassettes, 4 foam pads, modular electrode assembly, blue cooling unit, lower buffer tank, lid with cables
170-3935*	**Mini Trans-Blot Module**, without lower buffer tank and lid
170-3989	**Mini Trans-Blot Cell and PowerPac Basic Power Supply**, includes #170-3930 and #164-5050
170-3836	**Mini Trans-Blot Cell and PowerPac HC Power Supply**, includes #170-3930 and #164-5052
165-8029	**Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module**, includes 10-well, 1.0 mm, 4-gel system (#165-8001) and blotting module (#170-3935) without lower buffer tank and lid, gel casting accessories
165-8033	**Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply**, includes #165-8001, #170-3935, and #164-5050
165-8034	**Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply**, includes #165-8004, #170-3935, and #164-5050
165-8036	**Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply**, includes #165-8004, #170-3935, and #164-5052
165-8035	**Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply**, includes #165-8001, #170-3935, and #164-5052
Accessories	
170-3931	**Mini Gel Holder Cassette**
170-3932	**Thick Blot Paper**, 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets
170-3933	**Foam Pads**, 8 x 11 cm, 4
170-3812	**Mini Trans-Blot Central Core**
170-3919	**Blue Cooling Unit**, for Mini-PROTEAN Tetra tanks
170-3934	**Bio-Ice Cooling Unit**, for Mini-PROTEAN 3 tanks
165-1279	**Roller**, 3.5" wide

* Also fits in the Mini-PROTEAN 3 electrophoresis cell.

Criterion™ Blotter

- Efficient transfers in 30 min to 1 hr for most proteins; overnight transfer at lower voltages is also an option
- Plate electrodes, for faster and more efficient transfers, or wire electrodes
- Included assembly tray and roller
- Sealed ice block provides sufficient cooling for most applications
- Optional cooling coil — available for applications that require precise temperature control
- Cassettes with handles for easy removal from the tank

For More Information
Request or download bulletin: 2558

Criterion blotter components:
1. Tank and lid.
2. Assembly tray with gel holder cassette, roller, foam pads, and blotting filter paper.
3. Wire electrodes.
4. Plate electrodes.
5. Sealed ice block.
6. Optional cooling coil.



Specifications

Maximum gel size (W x L)	15 x 9.4 cm
Buffer requirement	1.3 L
Gel capacity	4 Mini-PROTEAN precast gels, 4 Ready Gel precast gels, 4 mini handcast gels, or 2 Criterion precast gels
Electrode choices	Platinum-coated titanium anode and stainless-steel cathode plate electrodes*, or economical platinum wire electrodes
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	21.8 x 11.8 x 15 cm

* Plate electrodes create a high-strength electrical field with higher current densities than other electrodes, producing faster and more efficient transfers.

Ordering Information

Catalog #	Description
170-4070	**Criterion Blotter with Plate Electrodes**, includes cell assembled with plate electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
170-4071	**Criterion Blotter with Wire Electrodes**, includes cell assembled with wire electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
165-6024	**Criterion Cell/Plate Blotter System**, includes #165-6001 and #170-4070
165-6025	**Criterion Cell/Wire Blotter System**, includes #165-6001 and #170-4071
170-3872	**Criterion Blotter with Plate Electrodes and PowerPac HC Power Supply**, includes #170-4070 and #164-5052
170-3874	**Criterion Blotter with Wire Electrodes and PowerPac HC Power Supply**, includes #170-4071 and #164-5052

Accessories and Replacement Parts

170-4076	**Optional Criterion Blotter Cooling Coil**, optional
170-4077	**Criterion Blotter Buffer Tank**
170-4079	**Criterion Blotter Lid**
170-4080	**Criterion Blotter Gel Holder Cassette**
170-4081	**Criterion Blotter Platinum Anode Plate Electrode**
170-4082	**Criterion Blotter Stainless-Steel Cathode Plate Electrode**
170-4083	**Criterion Blotter Wire Electrode Card**, anode
170-4084	**Criterion Blotter Wire Electrode Card**, cathode
170-4085	**Thick Blot Paper**, 9.5 x 15.2 cm, for Criterion blotter, 50 sheets
170-4086	**Foam Pads**, 9.5 x 15.2 cm, 4
170-4087	**Sealed Ice Blocks**, for Criterion blotter, 2
170-4089	**Criterion Gel/Blot Assembly Tray**
165-1279	**Roller**, 3.5" wide

See Also

PowerPac Basic and PowerPac HC power supplies: page 181.
Criterion precast gels: pages 146–150.
Blotting membranes: pages 212–214.
Blot detection reagents: pages 217–222.
Buffers: page 216.

See Also

PowerPac HC power supply: page 181.

Precast gels: pages 137–141, 146–150.

Blotting membranes: pages 212–214.

Blot detection reagents: pages 217–222.

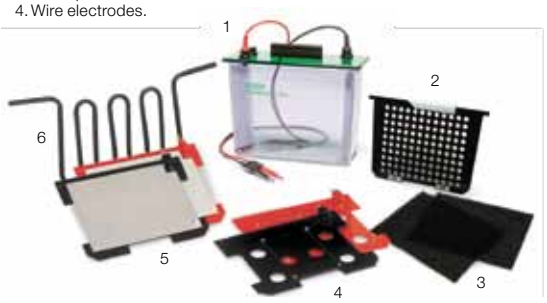
Buffers: page 216.

Trans-Blot® Cell

Features of the Trans-Blot transfer cell include:

- Ability to transfer up to 12 mini or 6 midi gels at the same time
- Plate electrodes for faster and more efficient transfers or wire electrodes
- Temperature regulation with the super cooling coil and a water recirculator
- A hinged gel holder cassette clamping system that eliminates slipping and ensures tight contact between the membrane and the gel
- Color-coded cassettes ensure proper orientation in the cell

Trans-Blot cell components:
1. Buffer tank and lid with cables.
2. Gel holder cassette.
3. Foam pads.
4. Wire electrodes.
5. Plate electrodes.
6. Super cooling coil.



Specifications

Maximum gel size (W x L)	16 x 20 cm
Buffer requirement	3–4 L
Gel capacity	12 Mini-PROTEAN precast gels, 12 Ready Gel precast gels, 12 mini handcast gels, 6 Criterion precast gels, or 3 PROTEAN II xi handcast gels
Electrode choices	Durable platinum-coated titanium anode and stainless-steel cathode plate electrodes*, or economical platinum wire electrodes
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	18 x 9.5 x 24 cm

* Plate electrodes create a high-strength electrical field with higher current densities than other electrodes, producing faster and more efficient transfers.

Ordering Information

Catalog #	Description
170-3939*	**Trans-Blot Cell with Plate Electrodes and Super Cooling Coil**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
170-3853*	**Trans-Blot Cell with Plate Electrodes, Super Cooling Coil, and PowerPac HC Power Supply**, includes #170-3939, #170-3912, and #164-5052
170-3946	**Trans-Blot Cell with Plate Electrodes**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
170-3850	**Trans-Blot Cell with Plate Electrodes and PowerPac HC Power Supply**, includes #170-3946 and #164-5052
170-3910	**Trans-Blot Cell with Wire Electrodes**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
170-3825	**Trans-Blot Cell with Wire Electrodes and PowerPac HC Power Supply**, includes #170-3910 and #164-5052
Accessories	
170-3914	**Foam Pads**, 15.5 x 20.5 cm, 6
170-3956	**Thick Blot Paper**, 15 x 20 cm, for Trans-Blot cassette, 25 sheets
170-3960	**Extra Thick Blot Paper**, 15 x 20 cm, 30 sheets
170-3943	**Trans-Blot Platinum Anode Plate Electrode**
170-3944	**Trans-Blot Stainless-Steel Cathode Plate Electrode**
170-3945	**Trans-Blot Plate Electrode Pair**, platinum anode and stainless-steel cathode
170-3920	**Trans-Blot Standard Wire Electrode Card**, cathode
170-3921	**Trans-Blot Standard Wire Electrode Card**, anode
170-3912	**Super Cooling Coil**, required for all high-intensity transfers
170-3913	**Gel Holder Cassette**, includes 2 foam pads
170-3922	**Trans-Blot Cell Buffer Tank**
170-3923	**Trans-Blot Cell Lid with Power Cables**

* Trans-Blot cells require the super cooling coil for high-intensity transfers; the super cooling coil is also recommended for all applications using plate electrodes.

Trans-Blot® Plus Cell

The Trans-Blot Plus cell provides transfers of proteins from large format gels in as little as 15–30 minutes.

- Durable plate electrodes (platinum coated and stainless steel) that provide a strong and uniform electrical field
- Rigid gel holder cassettes that ensure uniform contact along the entire gel and membrane surface
- A hinged cassette design that prevents slipping and facilitates cassette assembly
- Color-coded cassettes and electrode plates to ensure proper orientation in the cell
- Temperature regulation with the super cooling coil and refrigerated water recirculator
- An optional assembly tray that is ideal for gel sandwich and cassette assembly

For More Information
Request or download bulletin: 2866

Trans-Blot Plus cell components:
1. Buffer tank and lid with cables.
2. Gel holder cassettes.
3. Foam pads.
4. Plate electrodes.
5. Super cooling coil.



See Also

PowerPac HC power supply: page 181.
Precast gels: pages 137–141, 146–150.
Blotting membranes: pages 212–214.
Blot detection reagents: pages 217–222.
Gel clip: pages 159–160.
Buffers: page 216.

Specifications

Maximum gel size (W x L)	26.5 x 28 cm
Buffer requirement	10–12 L
Gel capacity	27 Mini-PROTEAN precast gels, 27 Mini-PROTEAN handcast gels, 27 Ready Gel precast gels, 12 Criterion gels, or 3 PROTEAN II XL gels
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	30 x 17.3 x 39.4 cm

Ordering Information

Catalog #	Description
170-3990*	**Trans-Blot Plus Cell with Plate Electrodes and Super Cooling Coil**, includes 3 gel holder cassettes, buffer tank, lid with power cables, 6 foam pads, 1 pack blot absorbent filter paper (26.5 x 28 cm, 30 sheets), roller, stirbar
170-3991	**Trans-Blot Plus Cell and PowerPac HC Power Supply**, 100–120/220–240 V, includes #170-3990 and #164-5052
170-3992	**Trans-Blot Plus Cell and PowerPac Universal Power Supply**, 100–120/220–240 V, includes #170-3990 and #164-5070
165-4144	**PROTEAN Plus Dodeca Cell (100/120 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply**, includes #165-4150, #170-3990, and #164-5070
165-4145	**PROTEAN Plus Dodeca Cell (220/240 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply**, includes #165-4151, #170-3990, and #164-5070
Accessories	
170-3995	**Foam Pads**, 27 x 28.5 cm, 2
170-3997	**Stirbar**
170-3998	**Trans-Blot Plus Roller**, 6 in wide
170-3999	**Trans-Blot Plus Gel Holder Cassette with Clamps**
170-4990	**Trans-Blot Plus Super Cooling Coil**
170-4991	**Trans-Blot Plus Platinum Anode Plate Electrode**
170-4992	**Trans-Blot Plus Stainless-Steel Cathode Plate Electrode**
170-4995	**Trans-Blot Plus Cell Buffer Tank**
170-4996	**Trans-Blot Plus Cell Lid with Cables**
170-4997	**Gel Holder Cassette Clamps**, for Trans-Blot Plus cell, set of 3

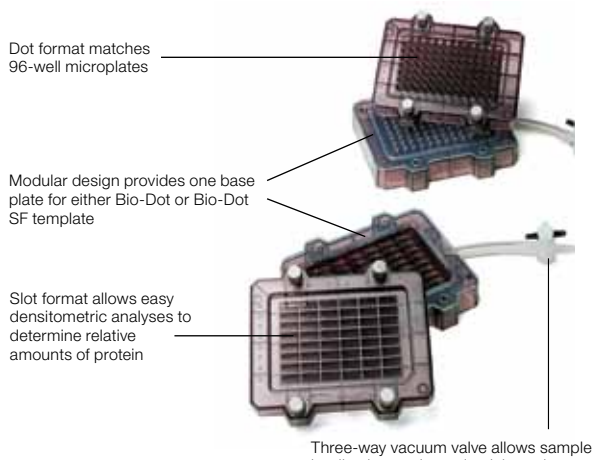
* Trans-Blot cells require the super cooling coil for high-intensity transfers; the super cooling coil is also recommended for all applications using plate electrodes.

Microfiltration and Screening Systems

Bio-Dot® and Bio-Dot SF Microfiltration Apparatus

The 96-well Bio-Dot and 48-well Bio-Dot SF (slot format) microfiltration units provide easy, reproducible methods for binding proteins or nucleic acids in solution onto membranes. The Bio-Dot SF apparatus focuses sample to a thin line instead of a circle, making quantitation by densitometry more reproducible. Each is available as a complete, independent unit, or as a modular template without the manifold base. Features include:

- Resistance to 100% ethanol, strong acid, and NaOH
- Autoclavability
- Sealing gasket to eliminate lateral leakage
- Easy sample application with microplate-based spacing
- Flow valve (three-way) for adjustable vacuum



Specifications

	Bio-Dot Apparatus	Bio-Dot SF Apparatus
Format	Dot blot	Slot blot
Samples	96-well, 8 x 12 format	48-well, 6 x 8 format
Sample volume	50–600 µl	50–500 µl
Well size	3 mm diameter	7 x 0.75 mm
Quantitation with densitometer	Yes, but Bio-Dot SF unit recommended	Yes
Overnight incubations	Yes	No
Membrane size (W x L)	12 x 9 cm	12 x 9 cm
Dimensions (W x H x D)	9 x 6.5 x 12"	9.5 x 7 x 12"
Weight	1.1 kg (2.5 lb)	1.2 kg (2.6 lb)

Ordering Information

Catalog #	Description
170-3938	**Bio-Dot Microfiltration System**, includes Bio-Dot apparatus (#170-6545) and Bio-Dot SF module (#170-6543) templates, vacuum manifold base, gasket support plates, gasket
170-6545	**Bio-Dot Apparatus**, includes Bio-Dot sample template, vacuum manifold base, gasket support plate, gasket
170-6547	**Bio-Dot Module**, without vacuum manifold base, for conversion of Bio-Dot SF to Bio-Dot apparatus
170-6542	**Bio-Dot SF Apparatus**, includes Bio-Dot SF sample template, vacuum manifold base, gasket support plate, gasket, filter paper
170-6543	**Bio-Dot SF Module**, without vacuum manifold base, for conversion of Bio-Dot to Bio-Dot SF apparatus
Accessories	
170-6546	**Bio-Dot Gaskets**, 3
170-6544	**Bio-Dot SF Gaskets**, 2
162-0161	**Bio-Dot/Bio-Dot SF Filter Paper**, 11.3 x 7.7 cm, 60 sheets

Mini-PROTEAN® II Multiscreen Apparatus

Advantages of the Mini-PROTEAN II multiscreen apparatus include:

- Quick and efficient screening or filtering of up to 40 different antibodies or sera without cutting a western blot into individual strips
- Compatibility with all common western blotting procedures
- Precise side-by-side comparison of results
- Economical use of antibody samples — requires only 600 µl per channel
- Separate, detachable sample templates that accommodate one or two 8 x 7 cm blots
- Clamps that secure the blot to form 40 leakproof channels
- Molded gasket that eliminates cross-contamination between samples
- Easy operation and assembly



Specifications

Membrane size (W x L)	8 x 7 cm
Channel dimensions	2.5 mm x 5.2 cm x 5 mm
Dimensions (W x L x H)	27 x 11 x 6 cm

Ordering Information

Catalog #	Description
170-4017	**Mini-PROTEAN II Multiscreen Apparatus**, includes 2 sample templates, 2 gaskets, base plate
170-4018	**Multiscreen Gaskets**, 2

Mini Incubation Trays

Trays allow screening of antigens that have been blotted onto membranes. An entire immunological screening process can be carried out in a single tray.

- Each tray has eight 10.5 cm x 5 mm channels to accommodate strips cut from the blotted membrane. Channels align with an eight-channel pipet
- Minimal reagent volumes needed (400 µl/channel)
- Numbered channels for sample identification
- Unique ribs in the tray lid and the design of the sample channels ensure that no cross-contamination occurs



Ordering Information

Catalog #	Description
170-3902	**Mini Incubation Trays**, 20
170-3903	**Mini Incubation Trays**, 100

Membranes and Filter Papers

Bio-Rad offers a comprehensive line of blotting membranes including different grades of nitrocellulose, PVDF, and Zeta-Probe® nylon membranes. Use the selection guide below to choose the membrane appropriate for your application.

For More Information
Web: www.bio-rad.com/blottingmembranes
Request or download bulletins: 1939 and 2212

Blotting Membrane and Filter Paper Selection Guide

Membrane	Pore Size	Binding Capacity (µg/cm²)	Compatible Detection Methods	Notes
Nitrocellulose	0.45 µm 0.2 µm	80–100	Colorimetric, chemiluminescence, chemifluorescence, radioactive	General-purpose protein blotting membrane
Supported nitrocellulose	0.45 µm 0.2 µm	80–100	Colorimetric, chemiluminescence, chemifluorescence, radioactive	Pure nitrocellulose cast on an inert synthetic support; increased strength for easier handling and for reprobing
Immun-Blot® PVDF	0.2 µm	150–160	Colorimetric, chemiluminescence, radioactive	High mechanical strength and chemical stability; recommended for western blotting
NEW Immun-Blot LF PVDF	0.45 µm	155–300	Colorimetric, chemiluminescence, chemifluorescence, fluorescence	High mechanical strength and chemical stability; low autofluorescence; recommended for western blotting using fluorescence detection
Sequi-Blot™ PVDF	0.2 µm	170–200	Colorimetric, radioactive	High mechanical strength and chemical stability; recommended for protein sequencing

Blotting Apparatus	Precut Membrane Sizes	Precut Filter Paper Sizes	Membrane/Filter Paper Sandwiches
Mini Trans-Blot® cell	7 x 8.5 cm	7.5 x 10.5 cm	7 x 8.5 cm
Criterion™ blotter	8.5 x 13.5 cm	9.5 x 15.2 cm	8.5 x 13.5 cm
Trans-Blot® cell	13.5 x 16.5 cm	15 x 20 cm	—
Trans-Blot Plus cell	25 x 28 cm 26.5 x 28 cm	— —	— —
Trans-Blot SD cell	7 x 8.5 cm 11.5 x 16 cm 15 x 15 cm 15 x 9.2 cm 20 x 20 cm	7 x 8.5 cm 8 x 13.5 cm 14 x 16 cm 18 x 18.5 cm —	7 x 8.5 cm 8.5 x 13.5 cm — — —
Mini-PROTEAN® II multiscreen apparatus	7 x 8.5 cm 7 x 8.5 cm	7 x 8.5 cm —	7 x 8.5 cm —
Bio-Dot® apparatus	9 x 12 cm	11.3 x 7.7 cm	—
Bio-Dot SF apparatus	9 x 12 cm	11.3 x 7.7 cm	—
Vacuum blotter	—	—	—

See Also
Filter paper: page 215.

Nitrocellulose Membranes

Nitrocellulose

Nitrocellulose with the 0.45 µm pore size is recommended for most analytical blotting including protein, ssDNA, and RNA transfers. For transfer of low MW proteins (<15 kD) or nucleic acids, the 0.2 µm nitrocellulose membrane prevents sample loss due to transfer through the membrane.

Supported Nitrocellulose

Made of 100% pure nitrocellulose cast on an inert synthetic support, this nitrocellulose is a solid support for nucleic acid and protein applications and can withstand the rigors of multiple reprobing and autoclaving (121°C).



Ordering Information

Catalog #	Description	Recommended Uses
Nitrocellulose Membranes (0.2 µm)		
162-0112	**Nitrocellulose Membrane**, 0.2 µm, 30 cm x 3.5 m, 1 roll	Transfer of low MW proteins or nucleic acids (has smaller pore size)
162-0212	**Nitrocellulose/Filter Paper Sandwiches**, 0.2 µm, 7 x 8.4 cm, 20 pack	
162-0213	**Nitrocellulose/Filter Paper Sandwiches**, 0.2 µm, 7 x 8.4 cm, 50 pack	
162-0232	**Nitrocellulose/Filter Paper Sandwiches**, 0.2 µm, 8.5 x 13.5 cm, 20 pack	
162-0233	**Nitrocellulose/Filter Paper Sandwiches**, 0.2 µm, 8.5 x 13.5 cm, 50 pack	
162-0146	**Nitrocellulose Membranes**, 0.2 µm, 7 x 8.4 cm, 10 sheets	
162-0168	**Nitrocellulose Membranes**, 0.2 µm, 8.5 x 13.5 cm, 10 sheets	
162-0147	**Nitrocellulose Membranes**, 0.2 µm, 13.5 x 16.5 cm, 10 sheets	
162-0150	**Nitrocellulose Membranes**, 0.2 µm, 20 x 20 cm, 5 sheets	
162-0252	**Nitrocellulose Membranes**, 0.2 µm, 26.5 x 28 cm, 10 sheets	
Nitrocellulose Membranes (0.45 µm)		
162-0115	**Nitrocellulose Membrane**, 0.45 µm, 30 cm x 3.5 m, 1 roll	Transfer of proteins (antigens, immunoglobulins, glycoprotein receptor proteins, histones and nonhistones, etc.); capillary Southern blotting of ssDNA and RNA <500 bp (use Zeta-Probe membranes for blotting ssDNA and RNA of all sizes)
162-0214	**Nitrocellulose/Filter Paper Sandwiches**, 0.45 µm, 7 x 8.4 cm, 20 pack	
162-0215	**Nitrocellulose/Filter Paper Sandwiches**, 0.45 µm, 7 x 8.4 cm, 50 pack	
162-0234	**Nitrocellulose/Filter Paper Sandwiches**, 0.45 µm, 8.5 x 13.5 cm, 20 pack	
162-0235	**Nitrocellulose/Filter Paper Sandwiches**, 0.45 µm, 8.5 x 13.5 cm, 50 pack	
162-0145	**Nitrocellulose Membranes**, 0.45 µm, 7 x 8.4 cm, 10 sheets	
162-0167	**Nitrocellulose Membranes**, 0.45 µm, 8.5 x 13.5 cm, 10 sheets	
162-0117	**Nitrocellulose Membranes**, 0.45 µm, 9 x 12 cm, 10 sheets	
162-0148	**Nitrocellulose Membranes**, 0.45 µm, 11.5 x 16 cm, 10 sheets	
162-0114	**Nitrocellulose Membranes**, 0.45 µm, 15 x 9.2 cm, 10 sheets	
162-0116	**Nitrocellulose Membranes**, 0.45 µm, 15 x 15 cm, 10 sheets	
162-0113	**Nitrocellulose Membranes**, 0.45 µm, 20 x 20 cm, 5 sheets	
162-0251	**Nitrocellulose Membranes**, 0.45 µm, 26.5 x 28 cm, 10 sheets	
Supported Nitrocellulose Membranes (0.2 µm)		
162-0097	**Supported Nitrocellulose Membrane**, 0.2 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting
162-0095	**Supported Nitrocellulose Membranes**, 0.2 µm, 7 x 8.4 cm, 10 sheets	
162-0071	**Supported Nitrocellulose Membranes**, 0.2 µm, 8.5 x 13.5 cm, 10 sheets	
Supported Nitrocellulose Membranes (0.45 µm)		
162-0094	**Supported Nitrocellulose Membrane**, 0.45 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting
162-0090	**Supported Nitrocellulose Membranes**, 0.45 µm, 7 x 8.4 cm, 10 sheets	
162-0070	**Supported Nitrocellulose Membranes**, 0.45 µm, 8.5 x 13.5 cm, 10 sheets	
162-0093	**Supported Nitrocellulose Membranes**, 0.45 µm, 20 x 20 cm, 10 sheets	

PVDF Membranes

The chemically resistant PVDF membrane has very high protein binding capacity and resistance to tearing and cracking, even after repeated stripping and reprobing. All Bio-Rad PVDF membranes have a 0.2 µm pore size.

Immun-Blot PVDF for Western Blotting

This membrane is ideal for chemiluminescent and colorimetric western blots because it retains target protein very strongly but reduces nonspecific protein binding that can obscure high-sensitivity detection. Binding capacity is 150–160 µg/cm^2.

Sequi-Blot PVDF for Protein Sequencing

This membrane gives outstanding performance in protein sequencing, even for low-abundance samples. Sequi-Blot PVDF retains all transferred protein and has a binding capacity of 170–200 µg/cm^2.

NEW Immun-Blot Low Fluorescence PVDF Membrane

Optimized for fluorescence applications, the low fluorescence property of the membrane enhances image quality and improves sensitivity of all fluorescence detection protocols. It is ideal for multiplex, fluorescence western blotting, and chemifluorescence applications. The membrane is also compatible with other detection methods such as chemiluminescence and colorimetric detection.

For More Information
Request or download bulletins: 2212 and 6116

Ordering Information

Catalog #	Description
Immun-Blot PVDF Membranes	
162-0177	**Immun-Blot PVDF Membrane**, 26 cm x 3.3 m, 1 roll
162-0218	**Immun-Blot PVDF/Filter Paper Sandwiches**, 7 x 8.4 cm, 20 pack
162-0219	**Immun-Blot PVDF/Filter Paper Sandwiches**, 7 x 8.4 cm, 50 pack
162-0238	**Immun-Blot PVDF/Filter Paper Sandwiches**, 8.5 x 13.5 cm, 20 pack
162-0239	**Immun-Blot PVDF/Filter Paper Sandwiches**, 8.5 x 13.5 cm, 50 pack
162-0174	**Immun-Blot PVDF Membranes**, 7 x 8.4 cm, 10 sheets
162-0175	**Immun-Blot PVDF Membranes**, 10 x 15 cm, 10 sheets
162-0176	**Immun-Blot PVDF Membranes**, 20 x 20 cm, 10 sheets
162-0255	**Immun-Blot PVDF Membranes**, 25 x 28 cm, 10 sheets
Sequi-Blot PVDF Membranes	
162-0184	**Sequi-Blot PVDF Membrane**, 26 cm x 3.3 m, 1 roll
162-0237	**Sequi-Blot PVDF/Filter Paper Sandwiches**, 8.5 x 13.5 cm, 50 pack
162-0186	**Sequi-Blot PVDF Membranes**, 7 x 8.4 cm, 10 sheets
162-0180	**Sequi-Blot PVDF Membranes**, 10 x 15 cm, 10 sheets
162-0181	**Sequi-Blot PVDF Membranes**, 15 x 15 cm, 10 sheets
162-0182	**Sequi-Blot PVDF Membranes**, 20 x 20 cm, 10 sheets
Immun-Blot Low-Fluorescence PVDF Membranes	
162-0260	**Low Fluorescence PVDF/Filter Paper Sandwiches**, 7 x 8.5 cm, 10 pack
162-0261	**Low Fluorescence PVDF/Filter Paper Sandwiches**, 7 x 8.5 cm, 20 pack
162-0262	**Low Fluorescence PVDF/Filter Paper Sandwiches**, 8.5 x 13.5 cm, 10 pack
162-0263	**Low Fluorescence PVDF/Filter Paper Sandwiches**, 8.5 x 13.5 cm, 20 pack
162-0264	**Low Fluorescence PVDF Roll**, 28 x 3.8 m, 1 roll

Zeta-Probe® Nylon Membranes

Zeta-Probe Membranes

Zeta-Probe membranes bind nucleic acids independently of buffer pH, so they can be used in traditional Southern blots, rapid alkaline Southern and northern blotting techniques, and electrophoretic transfer of nucleic acids from agarose and polyacrylamide gels. Zeta-Probe membranes can be repeatedly hybridized and stripped as many as 20 times for DNA (Li et al. 1987) and six times for RNA (Gatti et al. 1984). Oligonucleotides as short as six bases will bind to the membrane and oligonucleotides ≥20 bases long will be retained after repeated hybridization and washing.

Zeta-Probe GT Membranes

Zeta-Probe GT (genomic DNA-tested) membranes meet all performance specifications of Zeta-Probe membranes, and each lot is also functionally tested to ensure that 3 pg of single-copy factor VIII human DNA can be detected in 5 µg total genomic DNA.

For More Information
Request or download bulletin: 2096

C/P Lift® Membranes

C/P Lift membranes yield strong, sharp signals and very low background from positive colonies or plaques in confluent lawns. The membranes complement the screening of genomic and cDNA libraries using either DNA or RNA probes. The membranes wet easily and can be used directly out of the box with no pretreatment.

Ordering Information

Description	Zeta-Probe	Zeta-Probe GT
Zeta-Probe and Zeta-Probe GT Membranes		
30 cm x 3.3 m, 1 roll	162-0159	162-0196
20 cm x 3.3 m, 1 roll	162-0165	162-0197
7 x 10 cm, 15 sheets	162-0206	162-0208
9 x 12 cm, 15 sheets	162-0153	162-0190

continues

Ordering Information

Description	Zeta-Probe	Zeta-Probe GT
Zeta-Probe and Zeta-Probe GT Membranes (cont.)		
10 x 15 cm, 15 sheets	162-0154	162-0191
15 x 15 cm, 15 sheets	162-0155	162-0192
15 x 20 cm, 15 sheets	162-0156	162-0193
20 x 20 cm, 15 sheets	162-0157	162-0194
20 x 25 cm, 3 sheets	162-0158	162-0195

Catalog #	Description
C/P Lift Membranes	
162-0162	**C/P Lift Membrane Disks**, 85 mm, 50
162-0163	**C/P Lift Membrane Disks**, 137 mm, 15
170-3202	**Supported Nitrocellulose Membrane Disks**, 82.5 mm, 50

Filter Paper

Bio-Rad offers a range of filter papers for blotting applications, including filter paper precut to fit standard gel sizes.

Ordering Information

Catalog #	Description	Recommended Uses
Blot Absorbent Filter Paper (Extra Thick)		
170-3965	**Extra Thick Blot Paper**, 7.5 x 10 cm, for Ready Gel or Mini-PROTEAN Tetra gels, 60 sheets	All blotting applications using the Trans-Blot SD cell or Trans-Blot cell (precut to gel dimensions from well to bottom of gel)
170-3966	**Extra Thick Blot Paper**, 7 x 8.4 cm, for Ready Gel or Mini-PROTEAN Tetra gels, 60 sheets	
170-3967	**Extra Thick Blot Paper**, 8 x 13.5 cm, for Criterion precast gels, 60 sheets	
170-3968	**Extra Thick Blot Paper**, 14 x 16 cm, for PROTEAN II xi gels, 30 sheets	
170-3969	**Extra Thick Blot Paper**, 19 x 18.5 cm, for PROTEAN II XL gels, 30 sheets	
170-3958	**Extra Thick Blot Paper**, 10 x 15 cm, 30 sheets	
170-3959	**Extra Thick Blot Paper**, 15 x 15 cm, 30 sheets	
170-3960	**Extra Thick Blot Paper**, 15 x 20 cm, 30 sheets	
Blot Absorbent Filter Paper (Thick)		
170-3932	**Thick Blot Paper**, 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets	All blotting applications requiring thick, high-wet-strength filter paper
170-4085	**Thick Blot Paper**, 9.5 x 15.2 cm, for Criterion blotter, 50 sheets	
170-3955	**Thick Blot Paper**, 14 x 16 cm, for PROTEAN II xi gels, 25 sheets	
170-3956	**Thick Blot Paper**, 15 x 20 cm, for Trans-Blot cassette, 25 sheets	
165-0921	**Thick Blot Paper**, 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets	
162-0161	**Bio-Dot/Bio-Dot SF Filter Paper**, 7.7 x 11.3 cm, 60 sheets	
165-0962	**Filter Paper Backing**, 35 x 45 cm, for stained gels, 25 sheets	
Blot Absorbent Filter Paper (Thin)		
162-0118	**Thin Blot Paper**, 33 cm x 3 m, 1 roll	All blotting applications requiring thin, high-wet-strength filter paper

Blotting Stains and Tracking Dyes

Bio-Rad offers a selection of stains for blotting applications; see page 223. Tracking dyes can be found on page 194.

Blotting Buffers and Reagents

Premixed Blotting Buffers and Buffer Reagents

Two transfer buffers are available: 10x Tris/glycine and 10x Tris/CAPS. Premixed blocking buffers, available as 1x PBS with casein and 1x TBS with casein, take the time and effort out of solubilizing casein. Bio-Rad offers a complete line of reagents for preparation of buffers to your own specifications.

Blotting Buffer Selection Guide

	1x Formulation	Applications
Transfer Buffers*		
10x Tris/glycine	25 mM Tris, 192 mM glycine, pH 8.3	Western blotting
10x Tris/CAPS	Anode buffer: 60 mM Tris, 40 mM CAPS, 15% methanol, pH 9.6 Cathode buffer: 60 mM Tris, 40 mM CAPS, 0.1% (w/v) SDS, pH 9.6	A discontinuous buffer system that increases transfer efficiency in semi-dry applications
Processing Buffers		
10x PBS	10 mM sodium phosphate, 150 mM NaCl, pH 7.4	Western blotting wash solution
10x TBS	20 mM Tris, 500 mM NaCl, pH 7.4	Western blotting wash solution
1x PBS with 1% casein	10 mM sodium phosphate, 150 mM NaCl, 1% (w/v) casein, pH 7.4	Western blotting blocking buffer (casein blockers recommended for all applications, including those with biotin-avidin complexes)
1x TBS with 1% casein	20 mM Tris, 500 mM NaCl, 1% (w/v) casein, pH 7.4	Western blotting blocking buffer (casein blockers recommended for all applications, including those with biotin-avidin complexes)

* These buffers can be used for all gel types and formulations.

Ordering Information

Catalog #	Description	Catalog #	Description
Blot Transfer and Processing Buffers		**Detergents and Blocking Reagents**	
161-0734	**10x Tris/Glycine**, 1 L	170-6537	**Gelatin, EIA grade**, 200 g
161-0771	**10x Tris/Glycine**, 5 L cube	170-6404	**Blotting-Grade Blocker, nonfat dry milk**, 300 g
161-0778	**10x Tris/CAPS**, 1 L		
161-0780	**10x Phosphate Buffered Saline**, 1 L	170-6531	**Tween 20**, EIA grade, 100 ml
170-6435	**10x Tris Buffered Saline**, 1 L	161-0781	**10% (w/v) Tween 20**, for easy pipetting, 1 L
		161-0418	**SDS Solution**, 20% (w/v), 1 L
		161-0783	**1x Phosphate Buffered Saline with 1% Casein***, 1 L
		161-0782	**1x Tris Buffered Saline with 1% Casein***, 1 L
Reagents			
161-0610	**Dithiothreitol (DTT)****, 1 g	161-0710	**2-Mercaptoethanol**, 25 ml
161-0611	**Dithiothreitol (DTT)****, 5 g	163-2101	**Tributylphosphine (TBP)**, 200 mM, 0.6 ml
161-0729	**EDTA**, 500 g	161-0713	**Tricine**, 500 g
170-6537	**Gelatin**, EIA grade, 200 g	161-0716	**Tris**, 500 g
161-0717	**Glycine**, 250 g	161-0719	**Tris**, 1 kg
161-0718	**Glycine**, 1 kg	161-0730	**Urea**, 250 g

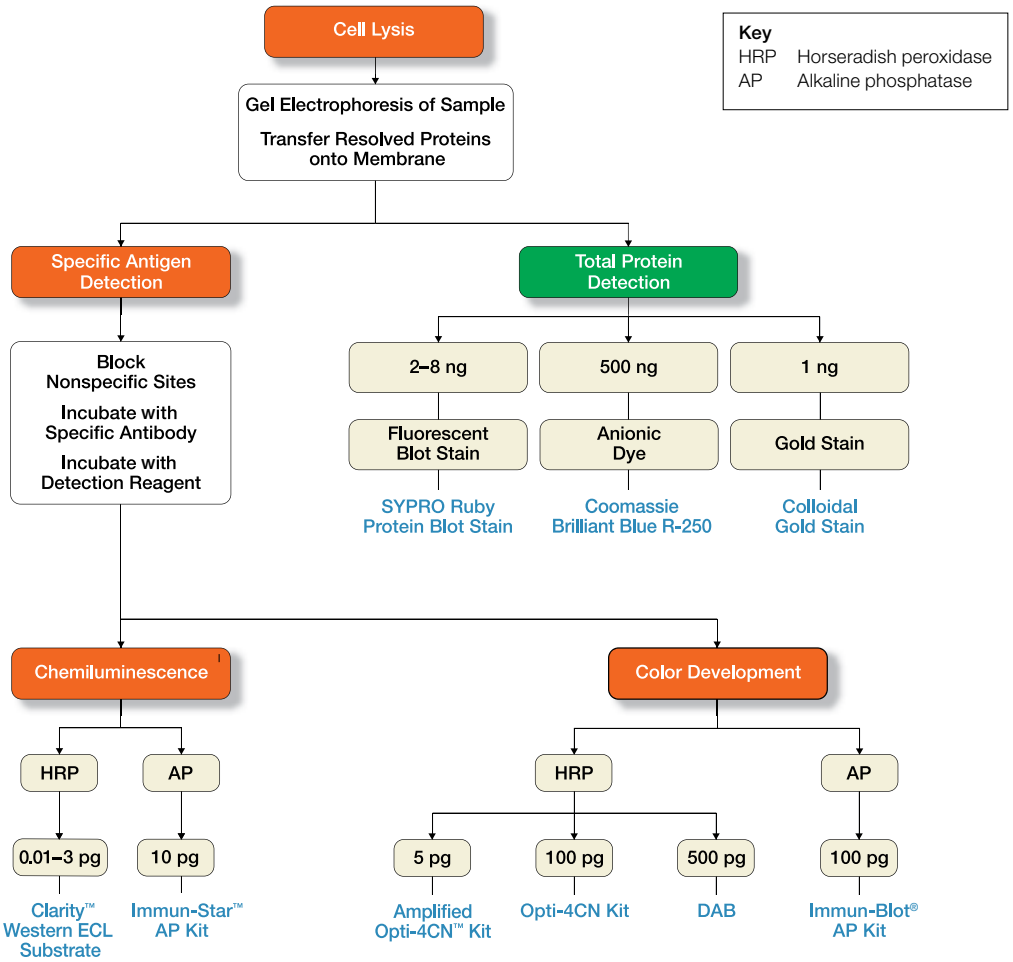
* Store at 2–8°C.

** Store desiccated at 2–8°C; store other reagents at room temperature, dry, and away from direct sunlight. Hazardous shipping charges may apply.

Immunodetection Reagents and Kits

The most common blot detection techniques use antibodies to either probe for specific antigens in a complex protein sample or stain all proteins bound to a membrane. The chart indicates the maximum sensitivity achievable with each detection system.

For more information on methods, equipment, and reagents used in protein blotting, request the Protein Blotting Guide (bulletin 2895).



Blot detection reagent selection guide.

Chemiluminescence Detection

Chemiluminescent western blot detection offers highly sensitive detection of proteins bound to blotting membranes. Most specific antigen detection methods are based on HRP (horseradish peroxidase) or AP (alkaline phosphatase) secondary antibody conjugates. The signal can be captured with film or dedicated imaging equipment (see pages 259, 262).

Chemiluminescence-Based Kit Selection Guide

	Clarity Western ECL	Immun-Star AP
Lower detection limit	Mid femtogram	10 pg
Signal duration	24 hr	24 hr
Primary detection method	Digital imager and film	Film
Suggested anitbody dilution	Primary: 1/1,000–1/50,000; Secondary: 1/50,000–1/250,000	Primary: 1/1,000–1/6,000; Secondary: 1:3,000
Recommended membrane	Nitrocellulose, PVDF, or LF PVDF	Nitrocellulose or PVDF

New Clarity™ Western ECL Substrate

Western ECL substrate is compatible with any HRP-conjugate secondary detection reagent and ideal for both digital and film-based imaging. The Clarity substrate provides excellent sensitivity with an extremely long signal duration that allows re-imaging without loss of signal. Features include:

- Low background levels, yielding very clear images
- Bright, long signal
- Shelf life of 12 months at room temperature

For More Information
Web: www.bio-rad.com/clarity
Request or download bulletin: 6305



Ordering Information

Catalog #	Description
170-5060	**Clarity Western ECL Substrate**, 200 ml size contains Clarity western peroxide reagent, 100 ml, and Clarity western luminol/enhancer reagent, 100 ml
170-5061	**Clarity Western ECL Substrate**, 500 ml size contains Clarity western peroxide reagent, 250 ml, and Clarity western luminol/enhancer reagent, 250 ml

Immun-Star™ AP Chemiluminescence Kits

These kits combine Bio-Rad's blotting reagents and CDP-*Star* chemiluminescence technology. Exposure times on film are typically between 30 seconds and 5 minutes, depending on sample amount and antibody specificity. Immun-Star AP kit features include:

- The ability to reactivate a blot, even weeks later, with the addition of fresh chemiluminescent substrate
- Detection of as little as 10 pg of protein
- Stable light signal duration of 24 hr
- Ability to strip and reprobe

Choose from two kits based on goat anti-mouse or goat anti-rabbit conjugates.



For More Information
Web: www.bio-rad.com/blotdetection
Request or download bulletin: 2050

Ordering Information

Catalog #	Description	Substrate	Enhancer*	Antibody
Immun-Star AP Kits and Components**				
170-5010	**GAM-AP Detection Kit****	•	•	•
170-5011	**GAR-AP Detection Kit****	•	•	•
170-5018	**AP Substrate**, 125 ml	•		
170-5012	**AP Substrate Pack**	•	•	

* The enhancer is used on nitrocellulose blots, but is not optimized for PVDF blots. Additional testing is recommended to determine appropriate conditions for PVDF blots.

** GAM, goat anti-mouse; GAR, goat anti-rabbit.

*** Detection kits provide sufficient reagents to cover 2,500 cm^2 of membrane (~50 mini blots). Detection kits include 1 L 10x TBS, 75 g blocker (nonfat dry milk), 15 ml Tween 20, 2 ml conjugate.

Colorimetric Detection

Enzymes such as HRP or AP convert several substrates to a colored precipitate. As the precipitate accumulates on the blot, a colored signal develops. The reaction can be monitored and stopped when the desired signal over background is observed. Colorimetric detection is easier to perform than film-based chemiluminescence detection; however, the method's single end-point result does not allow the multiple exposures of chemiluminescent methods. Colorimetric detection is typically considered a medium-sensitivity method compared to radioactive or chemiluminescence detection. However, Bio-Rad offers amplified colorimetric systems that provide high sensitivity, comparable to or exceeding that of chemiluminescent detection.

For More Information
Web: www.bio-rad.com/blotdetection

Colorimetric HRP Detection

Bio-Rad offers three types of kits based on the detection reagent 4-chloro-1-naphthol (4CN) for colorimetric HRP detection; individual reagents are also available, including 3,3'-diaminobenzidine (DAB), an alternative reagent.

For More Information
Request or download bulletin: 2260

Opti-4CN™ Substrate and Detection Kits

Detection sensitivity using 4CN is about 500 pg of antigen, with the benefit of very low background. The Opti-4CN kit improves detection sensitivity over that of 4CN, to 100 pg, with no additional steps required.

Amplified Opti-4CN Substrate and Detection Kits

Amplified Opti-4CN detection kits are based on proprietary HRP-activated amplification reagents from Bio-Rad. These kits allow colorimetric detection to 5 pg, which is comparable to chemiluminescence detection sensitivity. No additional materials or special equipment are required.



Immun-Blot® HRP Assay Kits

Immun-Blot HRP assay kits provide the reagents required to perform standard HRP/4CN colorimetric detection on western blots with the added convenience of premixed buffers and enzyme substrates. All kit components are individually tested for quality control in blotting applications.

Premixed and Individual HRP Colorimetric Substrates

Premixed enzyme substrate kits are convenient and reliable and reduce exposure to hazardous reagents used in the color development of western blots.

Ordering Information

Catalog #	Description
Opti-4CN Kits*	
170-8235	**Opti-4CN Substrate Kit**
Amplified Opti-4CN Kits*	
170-8238	**Amplified Opti-4CN Substrate Kit**
170-8240	**Amplified Opti-4CN Goat Anti-Mouse Detection Kit**
170-8239	**Amplified Opti-4CN Goat Anti-Rabbit Detection Kit**
Immun-Blot HRP Assay Kits, With 4CN**	
170-6463	**Goat Anti-Rabbit IgG (H + L)-HRP Assay Kit**
170-6464	**Goat Anti-Mouse IgG (H + L)-HRP Assay Kit**
170-6465	**Goat Anti-Human IgG (H + L)-HRP Assay Kit**
Premixed Substrate Reagents	
170-6431	**HRP Conjugate Substrate Kit**, contains premixed 4CN, hydrogen peroxide solutions, color development buffer; makes 1 L color development solution
Individual Blotting Substrates	
170-6534	**HRP Color Development Reagent**, 4CN, 5 g
170-6535	**HRP Color Development Reagent**, DAB, 5 g

* Each kit contains enough reagent for 2,500 cm^2 of membrane or approximately 50 mini blots.

** Kits contain 0.5 ml of specific HRP blotting-grade conjugate; each kit provides reagents (blotting-grade TBS buffer, Tween 20 detergent, gelatin blocking reagent, and 4CN substrate solution) for 200 assays on a 0.6–0.8 x 9.2 cm nitrocellulose strip using a total volume of 5.0 ml.

Colorimetric AP Detection

Immun-Blot® AP Assay Kits

A common substrate for colorimetric detection on western blots based on AP-conjugated secondary antibodies is 5-bromo-4-chloro-3-indolyl phosphate/nitroblue tetrazolium (BCIP/NBT). Immun-Blot AP assay kits provide the essential reagents to perform colorimetric detection (of up to 100 pg of protein) based on AP and BCIP/NBT with the added convenience of premixed buffers and enzyme substrates. All kit components are individually tested for quality control in blotting applications.



Premixed and Individual AP Colorimetric Substrates

Premixed enzyme substrate kits provide convenience and reliability and reduce exposure to hazardous reagents.

For More Information
Web: www.bio-rad.com/blotdetection
Request or download bulletins: 1600 and 2032

Ordering Information

Catalog #	Description
Immun-Blot AP Assay Kits with BCIP/NBT*	
170-6460	**Goat Anti-Rabbit IgG (H + L)-AP Assay Kit**
170-6461	**Goat Anti-Mouse IgG (H + L)-AP Assay Kit**
170-6462	**Goat Anti-Human IgG (H + L)-AP Assay Kit**
Immun-Blot Amplified AP Accessory	
170-6404	**Blotting-Grade Blocker**, nonfat dry milk, 300 g
Premixed Substrate Reagent Kit	
170-6432	**AP Conjugate Substrate Kit**, contains premixed BCIP and NBT solutions and color development buffer; makes 1 L color development solution
Individual Blotting Substrates	
170-6539	**AP Color Development Reagent****, BCIP, 300 mg (reagent necessary for purple color development; also order #170-6532)
170-6532	**AP Color Development Reagent****, NBT, 600 mg (reagent necessary for purple color development; also order #170-6539)

* Kits contain 0.5 ml of specific AP blotting-grade conjugate; each kit provides reagents (blotting grade TBS buffer, Tween 20 detergent, gelatin blocking reagent, and BCIP and NBT substrate solution) for 200 assays on a 0.6–0.8 x 9.2 cm nitrocellulose strip using a total volume of 5.0 ml.

** Both reagents are necessary for purple color development.

Western Blot Conjugates and Reagents

Blotting-Grade Conjugates and Reagents

Protein A and Protein G Conjugates

Proteins A and G are bacterial cell surface proteins that bind to the Fc region of IgG molecules. Each reagent has different IgG binding capabilities, depending on the species of origin of the immunoglobulin.

Blotting-Grade Reagents

Detergents and blocking reagents for western blotting are available individually.

For More Information
Web: www.bio-rad.com/blotdetection

Binding Specificities of Protein A and Protein G Conjugates

Immunoglobulin	Protein A	Protein G	Immunoglobulin	Protein A	Protein G
Human IgG_1	•	•	Mouse IgG_{2b}	•	•
Human IgG_2	•	•	Mouse IgG_3	•	•
Human IgG_3	—	•	Rat IgG_1	◦	◦
Human IgG_4	•	•	Rat IgG_{2a}	—	•
Mouse IgG_1	°/—	◦	Rat IgG_{2b}	—	◦
Mouse IgG_{2a}	•	•	Rat IgG_{2c}	•	•

• Strong binding. ° Weak bind. — No binding.

Conjugate Specifications*

Products	Volume, ml	Recommended Dilution	Products	Volume, ml	Recommended Dilution
Avidin-HRP	2	1:1,000–1:3,000	Goat anti-rabbit IgG-AP	1	1:3,000
Goat anti-rabbit (H + L)	2	1:3,000	Goat anti-mouse IgG-AP	1	1:3,000
Goat anti-mouse (H + L)	2	1:3,000	Goat anti-human IgG-AP	1	1:3,000
Goat anti-human (H + L)	2	1:3,000	Avidin-AP	1	1:1,000–1:3,000
Protein A-HRP	1	1:3,000	Biotinylated-AP	1	1:3,000
Protein G-HRP	1	1:3,000	Biotinylated-GAR (H + L), human IgG adsorbed	1	1:3,000

* Shelf life of conjugates is one year when stored at 4° C.

Ordering Information

Catalog #	Description	Catalog #	Description
Blotting-Grade Conjugates, HRP			
170-6515	**Goat Anti-Rabbit IgG (H + L)-HRP**, 2 ml	170-6522	**Protein A-HRP**, 1 ml
170-6516	**Goat Anti-Mouse IgG (H + L)-HRP**, 2 ml	170-6425	**Protein G-HRP**, 1 ml
172-1050	**Goat Anti-Human IgG (H + L)-HRP**, 2 ml	170-6528	**Avidin-HRP**, 2 ml
Blotting-Grade Conjugates, AP			
170-6518	**Goat Anti-Rabbit IgG-AP**, 1 ml	170-6521	**Goat Anti-Human IgG-AP**, 1 ml
170-6520	**Goat Anti-Mouse IgG-AP**, 1 ml		
Detergents and Blocking Reagents			
170-6537	**Gelatin**, EIA grade, 200 g	161-0418	**SDS Solution**, 20% (w/v), 1 L
170-6404	**Blotting-Grade Blocker**, nonfat dry milk, 300 g	161-0783	**1x Phosphate Buffered Saline with 1% Casein***, 1 L
170-6531	**Tween 20**, EIA grade, 100 ml	161-0782	**1x Tris Buffered Saline with 1% Casein***, 1 L
161-0781	**10% Tween 20**, for easy pipetting, 1 L		

* Store at 2–8° C.

Total Protein Blot Detection

Bio-Rad offers three stain options for total protein detection. For electrophoresis stains, see pages 196–198.

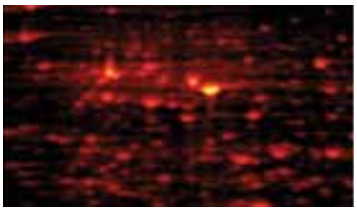
Total Protein Stains

Comparison of Total Protein Staining Methods

Stain	Sensitivity	Staining Time	Advantages	Disadvantages
SYPRO Ruby protein blot stain	2–8 ng	<1 hr	Mass spectrometry compatible	UV fluorescence detection system required
Coomassie Brilliant Blue R-250	100–1,000 ng	~1 hr	Inexpensive, rapid stain	Low sensitivity, shrinks nitrocellulose membranes
Colloidal gold total protein stain	1 ng	~2 hr	Very sensitive, rapid stain	High background with nylon membranes

SYPRO Ruby Protein Blot Stain

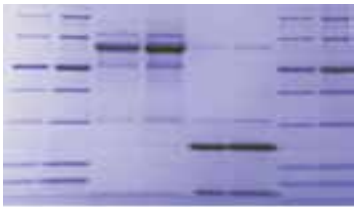
SYPRO Ruby protein blot stain provides highly sensitive detection of proteins on PVDF or nitrocellulose membranes. After staining, target proteins can be detected by colorimetric or chemiluminescence immunostaining or analyzed by microsequencing or mass spectrometry with no interference from the stain.



SYPRO Ruby protein gel stain.

Coomassie Brilliant Blue R-250 Dye

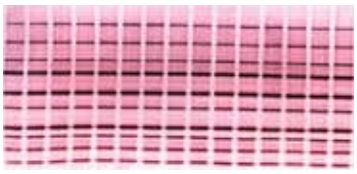
Coomassie Brilliant Blue R-250 is an anionic dye used for staining gels and membranes (PVDF and nitrocellulose). It is a rapid and inexpensive stain that can detect nanogram levels of protein. Since this dye can interfere with antibody binding sites, subsequent detection of proteins by immunostaining is not recommended.



Coomassie Brilliant Blue stain.

Colloidal Gold Total Protein Stain

Colloidal gold total protein stain is a stabilized gold stain optimized for rapid and sensitive identification of proteins bound to nitrocellulose membranes (Rohringer and Holden 1985). Protein bands stain dark red following incubation of the membrane with colloidal gold solution. The stained membrane yields a permanent record of the protein pattern for exact comparison to immunostained results. Colloidal gold total protein stain is provided ready to use.



Colloidal gold total protein stain.

For More Information
Web: www.bio-rad.com/totalprotein

Ordering Information

Catalog #	Description
170-3127	**SYPRO Ruby Protein Blot Stain**, 200 ml
161-0400	**Coomassie Brilliant Blue R-250**, 10 g
170-6527	**Colloidal Gold Total Protein Stain**, 500 ml

Nucleic Acid Electrophoresis and Blotting

Bio-Rad offers a wide range of nucleic acid electrophoresis and blotting tools for life science research — from molecular ladders to mutation detection systems. Different system formats and sizes are available to accommodate a variety of application needs.

Learn More about the Technology
Web: www.bio-rad.com/tech/DNAelectro

DNA Electrophoresis Systems

See Also

Certified agaroses: page 241.
PowerPac Basic power supply: page 181.
DNA size standards: pages 242–243.
Premixed electrophoresis buffers: page 240.
Nucleic acid reagents: pages 239–241.
Gel documentation systems: pages 258–265.
ReadyAgarose precast gels: page 232.

Bio-Rad offers a complete line of easy-to-use horizontal agarose gel electrophoresis systems, varying in length and width, for both low- and high-throughput applications. Submerged horizontal electrophoresis cells include two models that can run precast or handcast gels:

- Mini-Sub® cell GT cell
- Wide Mini-Sub cell GT cell

Three models that can run handcast gels only:

- Sub-Cell® GT cell
- Sub-Cell Model 96 cell
- Sub-Cell Model 192 cell

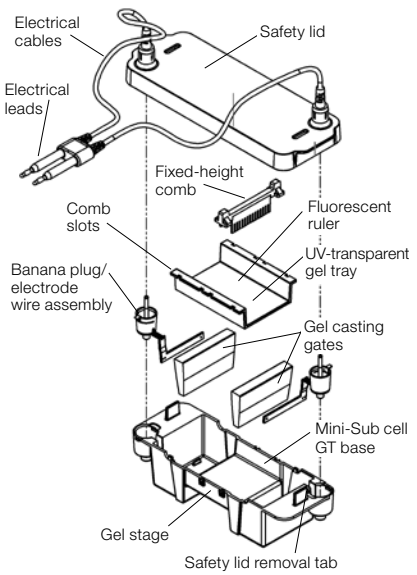
And two models configured to run ReadyAgarose™ precast gels:

- Mini ReadySub-Cell™ GT cell
- Wide mini ReadySub-Cell GT cell

Key features of the Sub-Cell family of cells include:

- UV-transparent gel trays with an integrated fluorescent ruler
- Multiple options for hand casting gels of different sizes
- Combs to fit virtually every need
- Clear plastic construction for easy sample visualization
- Buffer recirculation ports for applications that require high voltages or extended runs
- Easy-to-replace electrode cassettes
- IEC 1010 (EN 61010) electrical safety certification

For More Information
Web: www.bio-rad.com/DNAelectro
Request or download bulletin: 2660



Components of the Mini-Sub cell GT cell.

Sub-Cell Family Selection Guide



	Mini-Sub Cell GT*	Wide Mini-Sub Cell GT**	Sub-Cell GT	Sub-Cell Model 96	Sub-Cell Model 192
Cell size (W x L x H)	9.2 x 25.5 x 5.6 cm	17.8 x 25.5 x 6.8 cm	18 x 40.5 x 9.4 cm	29 x 30 x 9 cm	29 x 40 x 9 cm
Gel tray sizes (outside dimensions, W x L)	7 x 7 cm 7 x 10 cm	15 x 7 cm 15 x 10 cm	15 x 10 cm 15 x 15 cm 15 x 20 cm 15 x 25 cm	25 x 10 cm 25 x 15 cm	25 x 10 cm 25 x 15 cm 25 x 20 cm 25 x 25 cm
ReadyAgarose gels accommodated	Yes (mini format 8-, 12-, 2 x 8-well)	Yes (wide mini and 96 Plus formats)	No	No	No
Sample throughput	8–30***	10–60***	1–120†	24–96***	24–192†
Base buffer volume	~270 ml	~650 ml	~1 L	~2 L	~3 L
Buffer recirculation	No	No	No	Yes	Yes
Bromophenol blue migration	~4.5 cm/hr (at 75 V)	~4.5 cm/hr (at 75 V)	~3.0 cm/hr (at 75 V)	~6.2 cm/hr (at 200 V)	~5.2 cm/hr (at 200 V)

* The mini ReadySub-Cell™ GT cell is a Mini-Sub cell GT cell dedicated to running ReadyAgarose precast gels, gel size 7 x 10 cm; sample throughput is 8-, 12-, or 2 x 8-well. This cell does not include casting gates, tray, or combs.

** The wide mini ReadySub-Cell GT cell is a wide Mini-Sub cell GT cell dedicated to running ReadyAgarose precast gels, gel size 15 x 10 cm; sample throughput is 20-, 32-, 2 x 32-, or 4 x 26-well. This cell does not include casting gates, tray, or combs.

*** Sample throughput value assumes 1–2 combs per gel.

† Sample throughput value assumes 1–4 combs per gel.

Mini-Sub® Cell GT Cells

The redesigned Mini-Sub cell GT cell offers updated features that make electrophoresis even easier. Mini-Sub cell GT cell can resolve up to 30 samples. Its short, narrow format allows 7 and 10 cm runs with speed, simplicity, and economy. Bio-Rad's mini cells resolve EcoRI or HindIII digests of lambda phage DNA in only 1.5 hours at 60 V. Small DNA fragments can be separated in as little as 15 minutes at 150 V. All mini cells accommodate ReadyAgarose precast gels and include a buffer tank, safety lid with cables, and leveling bubble.



The mini ReadySub-Cell GT cell (#170-4487 and #164-0303) is identical to the Mini-Sub cell GT cell, except it is dedicated to running mini ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. Kits are available to upgrade the ReadySub-Cell GT cell for handcasting capability.

For More Information
Web: www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm 7 x 7*	UVTP Tray, cm 7 x 10	Combs 8-Well	Combs 15-Well	PowerPac Basic Power Supply (#164-5050)
Mini-Sub Cell GT Systems**							
170-4406	•		•		•	•	
170-4466				•	•	•	
170-4486	•	•	•		•	•	
170-4467		•		•	•	•	
164-0300		•		•	•	•	•
170-4487							
164-0303							•

Catalog #	Description
Mini-Sub Cell GT Accessories	
170-4491	**Mini Handcasting Kit**, includes 7 x 7 cm tray, casting gates, 15-well 1.5 mm fixed-height comb, 8-well 1.5 mm fixed-height comb
170-4422	**Mini-Gel Caster**, for Mini-Sub and wide Mini-Sub cell GT systems
170-4436*	**Sub-Cell GT UV-Transparent Mini-Gel Tray**, 7 x 7 cm (trays have 2 slots for fixed-height combs)
170-4435	**Sub-Cell GT UV-Transparent Mini-Gel Tray**, 7 x 10 cm (trays have 2 slots for fixed-height combs)
170-4330**	**Original UV-Transparent Mini-Gel Tray**, 7 x 10 cm
170-4434	**Mini-Sub Cell GT Casting Gates**, 2
170-4362	**Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly**
170-4363	**Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly**
170-4331	**Mini-Comb Holder**, for Mini-Sub cell adjustable-height combs

Catalog #	# of Wells	Height†	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, µl (in 5 mm deep gel)
Combs for Mini-Sub Cell GT Systems						
170-4464	15	Fixed	0.75	2.6	10.2	9.7
170-4465***	15	Fixed	1.5	2.6	10.2	19.4
170-4332	15	Adjustable	1.0	2.6	10.2	13.0
170-4462	8	Fixed	0.75	5.5	11.0	20.8
170-4463***	8	Fixed	1.5	5.5	11.0	41.6
170-4333	8	Adjustable	1.0	5.5	10.2	27.7
170-4461	2 preparative	Fixed	1.5	20.0	10.2	152.4
	2 reference			4.0		30.0
170-4460	1 preparative	Fixed	1.5	43.4	10.2	325.7
	2 reference			3.0		22.5
170-4342	1 preparative	Adjustable	3.0	43.4	10.2	651.4
	2 reference			3.0		45.0

* Allows casting gels in the cell using casting gates; 7 x 10 gels can be cast with a gel caster.

** Mini-Sub cell systems purchased before 1996 (Mini-Sub DNA cell) require casting tray, #170-4330. This tray is not compatible with the Mini-Sub cell GT system.

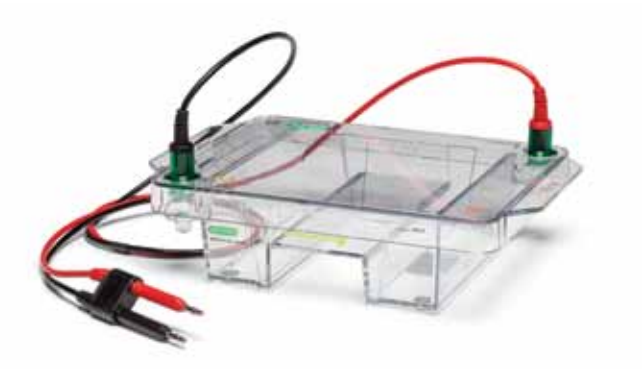
*** Combs included in systems.

† Fixed-height combs must be used with Mini-Sub cell GT system gel trays. Adjustable-height combs require comb holder, #170-4331.

Wide Mini-Sub® Cell GT Cells

The redesigned wide Mini-Sub cell GT cell offers updated features that make electrophoresis even easier for multiple samples and rapid screening applications. This popular system has a wide platform that can separate 30 samples per comb. The wide Mini-Sub cell GT cell is the same width as the Sub-Cell GT cell so the comb holders, combs, and 15 x 10 cm gel trays are interchangeable with the larger Sub-Cell GT units. All wide mini cells accommodate ReadyAgarose precast gels and include a buffer tank, safety lid with cables, and leveling bubble.

The wide mini ReadySub-Cell GT cell (#170-4489 and #164-0304) is identical to the wide Mini-Sub cell GT cell, except it is dedicated to running ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. Kits are available to upgrade the wide mini ReadySub-Cell GT cell for handcasting capability.



For More Information
Web: www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm 15 x 7*	UVTP Tray, cm 15 x 10	Combs 15-Well	Combs 20-Well	PowerPac Basic Power Supply (#164-5050)
Wide Mini-Sub Cell GT Systems							
170-4405	•		•		•	•	
170-4468				•	•	•	
170-4485	•	•	•		•	•	
170-4469		•		•	•	•	
164-0301		•		•	•	•	•
170-4489							
164-0304							•

Catalog #	Description
Wide Mini-Sub Cell GT Accessories	
170-4497	**Wide Mini Handcasting Kit**, includes 15 x 7 cm tray, casting gates, 15-well 1.5 mm fixed-height comb, 20-well 1.5 mm fixed-height comb
170-4422	**Mini-Gel Caster**, for Mini-Sub and wide Mini-Sub cell GT systems
170-4426	**Sub-Cell GT UV-Transparent Wide Mini-Gel Tray**, 15 x 7 cm (trays have 2 slots for fixed-height combs)
170-4416**, ***	**Sub-Cell GT UV-Transparent Gel Tray**, 15 x 10 cm (trays have 2 slots for fixed-height combs)
170-4425	**Wide Mini-Sub Cell GT Casting Gates**, 2
170-4372	**Wide Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly**
170-4373	**Wide Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly**
170-4320	**Comb Holder**, for Sub-Cell and wide Mini-Sub cell adjustable-height combs

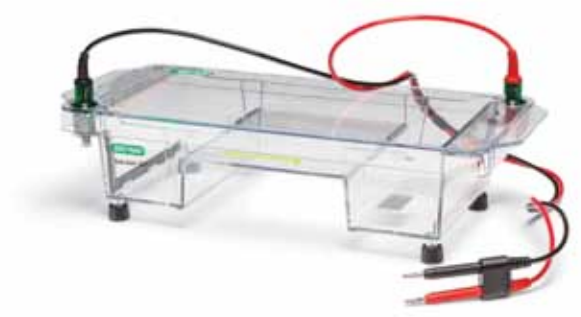
* Allows casting gels in the cell using casting gates; 15 x 10 cm gels can be cast with a gel caster.

** Tray is compatible with the Sub-Cell DNA system.

*** 15 x 10 cm gel tray can be used for both wide Mini-Sub cell GT and Sub-Cell GT cells.

Sub-Cell® GT Cell

The redesigned Sub-Cell GT cell is the most versatile horizontal electrophoresis cell in the Sub-Cell family, offering the greatest choice of gel lengths, combs, and separation modes that make it ideal for Southern and northern blotting protocols. Up to 30 samples can be resolved over a distance of 25 cm. Using four rows of combs, the cell can run up to 120 samples. All Sub-Cell GT cells include a buffer tank, safety lid with cables, leveling bubble, and combs (15- and 20-well). System configurations that include additional accessories are also available.



For More Information
Web: www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm 15 x 10	15 x 15*	15 x 20	15 x 25	Combs 15-well	20-well	PowerPac Basic Power Supply (#164-5050)
Sub-Cell GT Systems									
170-4401			•				•	•	
170-4402	•			•			•	•	
170-4403					•		•	•	
170-4404						•	•	•	
170-4481		•	•				•	•	
170-4482	•	•		•			•	•	
170-4483		•			•		•	•	
170-4484		•				•	•	•	
164-0302	•	•		•			•	•	•

Catalog #	Description
Sub-Cell GT Accessories	
170-4412	**Gel Caster**, full size
170-4416**	**Sub-Cell GT UV-Transparent Gel Tray**, 15 x 10 cm (trays have 2 slots for fixed-height combs)
170-4417*	**Sub-Cell GT UV-Transparent Gel Tray**, 15 x 15 cm
170-4418	**Sub-Cell GT UV-Transparent Gel Tray**, 15 x 20 cm
170-4419	**Sub-Cell GT UV-Transparent Gel Tray**, 15 x 25 cm
170-4415	**Sub-Cell GT Casting Gates**, 2
170-4392	**Sub-Cell GT Anode (Red) Quick Snap Electrode Assembly**
170-4393	**Sub-Cell GT Cathode (Black) Quick Snap Electrode Assembly**
170-4320	**Comb Holder**, for Sub-Cell and wide Mini-Sub cell adjustable-height combs

* Allows casting gels in the cell using casting gates. Other gel sizes can be cast with a gel caster.

** 15 x 10 cm gel tray can be used for both Sub-Cell GT and wide Mini-Sub cell GT cells.

Combs for Wide Mini-Sub® Cell and Sub-Cell® GT Cells

Ordering Information

Catalog #	# of Wells	Height	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, µl (in 5 mm deep gel)
Combs for Wide Mini Sub-Cell and Sub-Cell GT Systems*						
170-4449	30	Fixed	1.5	2.7	14.0	20.2
170-4344	30	Adjustable	1.5	2.7	19.1	20.2
170-4447	20	Fixed	0.75	4.8	14.0	18.2
170-4448**	20	Fixed	1.5	4.8	14.0	36.3
170-4321	20	Adjustable	0.75	4.8	19.1	18.2
170-4322	20	Adjustable	1.5	4.8	19.1	36.4
170-4445	15	Fixed	0.75	5.5	14.0	20.7
170-4446**	15	Fixed	1.5	5.5	14.0	41.4
170-4323	15	Adjustable	0.75	5.5	19.1	20.7
170-4324	15	Adjustable	1.5	5.5	19.1	41.4
170-4443	10	Fixed	0.75	9.9	14.0	37.0
170-4444	10	Fixed	1.5	9.9	14.0	74.0
170-4325	10	Adjustable	0.75	9.9	19.1	37.0
170-4326	10	Adjustable	1.5	9.9	19.1	74.0
Preparative Combs for Sub-Cell GT Systems*						
170-4442	4 preparative	Fixed	1.5	26.4	14.0	200.0
	2 reference			3.0		22.0
170-4441	2 preparative	Adjustable	1.5	50.3	14.0	377.0
	2 reference			4.0		30.0
170-4440	1 preparative	Fixed	1.5	106.4	14.0	800.0
	2 reference			4.0		30.0
170-4328	1 preparative	Adjustable	3.0	106.4	14.0	1,596.0
	2 reference			4.0		60.0
Multichannel Pipet-Compatible Combs for Wide Mini Sub-Cell and Sub-Cell GT Systems*						
170-4456	26	Fixed	0.75	2.9	14.0	10.9
170-4457	26	Fixed	1.5	2.9	14.0	21.8
170-4454	18	Fixed	0.75	2.9	14.0	11.2
170-4455	18	Fixed	1.5	2.9	14.0	22.5
170-4452	14	Fixed	0.75	5.8	14.0	22.5
170-4453	14	Fixed	1.5	5.8	14.0	45.0
170-4450	10	Fixed	0.75	5.8	14.0	22.5
170-4451	10	Fixed	1.5	5.8	14.0	45.0

* Fixed-height combs must be used with GT gel trays. Adjustable-height combs require comb holder, #170-4320.

** Combs included in systems.

Sub-Cell® Model 96 Cell

This electrophoresis cell is ideal for medium- to high-throughput analyses because it accommodates two 51-well combs that are also multichannel pipet–compatible. The shorter gel lengths (10 and 15 cm) and 26-well comb also allow the Sub-Cell Model 96 cell to be used for routine applications. This model also contains buffer recirculation ports for applications that require high voltages or extended runs. All Sub-Cell Model 96 systems include a buffer tank, safety lid with cables, leveling bubble, and combs (26- and 51-well). System configurations that include additional accessories are also available.



For More Information
Web: www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm 25 x 10*	UVTP Tray, cm 25 x 15	Combs 26-well	Combs 51-well	PowerPac Basic Power Supply (#164-5050)
Sub-Cell Model 96 Systems							
170-4502	•		•		•	•	
170-4503				•	•	•	
170-4500	•	•	•		•	•	
170-4501		•		•	•	•	
164-0305	•	•	•		•	•	•

Catalog #	Description
Sub-Cell Model 96 Accessories	
170-4514	**Model 96 Gel Caster**
170-4521*	**Model 96/192 UV-Transparent Gel Tray**, 25 x 10 cm
170-4522	**Model 96/192 UV-Transparent Gel Tray**, 25 x 15 cm
170-4520	**Model 96/192 Gel Casting Gates**, 2
170-4518	**Model 96/192 Anode (Red) Electrode Assembly**
170-4519	**Model 96/192 Cathode (Black) Electrode Assembly**
170-4537	**Model 96/192 Buffer Recirculation Kit**, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips
170-4525	**Sub-Cell Models 96 and 192 Comb Holder**

Catalog #	# of Wells	Height	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, µl (in 5 mm deep gel)
Adjustable-Height Combs for Sub-Cell Model 96 Systems**						
170-4528***	51	—	0.75	3.0	15.0	11.2
170-4529***†	51	—	1.5	3.0	15.0	22.5
170-4526***	26	—	0.75	6.0	15.0	22.5
170-4527***†	26	—	1.5	6.0	15.0	45.0
170-4530	2 or 4 preparative 2 reference	—	0.75	46.0 or 97.0 6.0	15.0	172.5 or 364.0 22.5
170-4531	2 or 4 preparative 2 reference	—	1.5	46.0 or 97.0 6.0	15.0	345.0 or 727.5 45.0

* Allows casting gels in the cell using casting gates; 25 x 15 cm gels can be cast with a gel caster.

** Combs for Sub-Cell Model 96 cells can be used with Sub-Cell Model 192 cells and vice versa. Adjustable-height combs require comb holder, #170-4525. Each system includes one comb holder.

*** Multichannel pipet–compatible.

† Combs included in systems.

Sub-Cell® Model 192 Cell

The Sub-Cell Model 192 electrophoresis cell has higher throughput capabilities and is compatible with multichannel pipets. It can run gels up to 25 cm long and allows four or more 51-well combs to be used, accommodating more than two microplates of samples. The longer gels and buffer recirculation ports of the Model 192 make this cell ideal for RFLP, Southern and northern blotting, and separation of cosmid DNA restriction digests. All Sub-Cell Model 192 cells include a buffer tank, safety lid with cables, leveling bubble, and combs (26- and 51-well). System configurations that include additional accessories are also available.



For More Information
Web: www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm 25 x 10	25 x 15*	25 x 20	25 x 25	Combs 26-well	51-well	PowerPac Basic Power Supply (#164-5050)
Sub-Cell Model 192 Systems									
170-4508			•				•	•	
170-4509	•			•			•	•	
170-4510					•		•	•	
170-4511						•	•	•	
170-4504		•	•				•	•	
170-4505	•	•		•			•	•	
170-4506		•			•		•	•	
170-4507		•				•	•	•	
164-0306	•	•		•			•	•	•

Catalog #	Description
Sub-Cell Model 192 Accessories	
170-4517	**Model 192 Gel Caster**
170-4521	**Model 96/192 UV-Transparent Gel Tray**, 25 x 10 cm
170-4522*	**Model 96/192 UV-Transparent Gel Tray**, 25 x 15 cm
170-4523	**Model 192 UV-Transparent Gel Tray**, 25 x 20 cm
170-4524	**Model 192 UV-Transparent Gel Tray**, 25 x 25 cm
170-4520	**Model 96/192 Gel Casting Gates**, 2
170-4518	**Model 96/192 Anode (Red) Electrode Assembly**
170-4519	**Model 96/192 Cathode (Black) Electrode Assembly**
170-4537	**Model 96/192 Buffer Recirculation Kit**, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips
170-4525	**Sub-Cell Models 96 and 192 Comb Holder**

Catalog #	# of Wells	Height	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, µl (in 5 mm deep gel)
Adjustable-Height Combs for Sub-Cell Model 192 Systems**						
170-4528***	51	—	0.75	3.0	15.0	11.2
170-4529***†	51	—	1.5	3.0	15.0	22.5
170-4526***	26	—	0.75	6.0	15.0	22.5
170-4527***†	26	—	1.5	6.0	15.0	45.0
170-4530	2 or 4 preparative	—	0.75	46.0 or 97.0	15.0	172.5 or 364.0
	2 reference			6.0		22.5
170-4531	2 or 4 preparative	—	1.5	46.0 or 97.0	15.0	345.0 or 727.5
	2 reference			6.0		45.0

* Allows casting gels in the cell using casting gates; other gel sizes can be cast with a gel caster.

** Combs for Sub-Cell Model 192 cells can be used with Sub-Cell Model 96 cells and vice versa. Adjustable-height combs require comb holder, #170-4525. Each system includes one comb holder.

*** Multichannel pipet–compatible.

† Combs included in systems.

See Also

Certified agaroses: page 241.

Nucleic acid reagents: page 239.

Model 785 vacuum blotter: page 244.

PowerPac Basic and PowerPac HC power supplies: page 181.

Premixed electrophoresis buffers: page 240.

Freeze 'N Squeeze DNA spin columns: page 16.

ReadyAgarose™ Precast Gel System

ReadyAgarose precast gels are prepared in gel trays designed to fit securely in Mini-Sub® cell GT and wide Mini-Sub cell GT cells (pages 225–227). They come in a choice of 27 gel types, including ReadyAgarose 96 Plus gels, which resolve DNA fragments from 20–10,000 bp. Gels are individually packaged and cast in their own running tray with Bio-Rad's Certified™ line of agaroses. Gel types to choose from include:

- Mini, wide, and 96-sample formats
- 1% and 3% agarose
- TBE or TAE buffer
- With or without ethidium bromide
- Multichannel pipet–compatible wells
- Compatible with Mini-Sub and wide Mini-Sub cell GT cells

ReadyAgarose 96 Plus Products — Ideal for High-Throughput Applications

ReadyAgarose 96 Plus products include:

- ReadyAgarose 96 Plus precast gels
- Wide mini ReadySub-Cell™ GT cell
- ReadyAgarose 96 Plus wizard for data analysis with Quantity One® Basic software

ReadyAgarose 96 Plus gels are 4- and 12-channel multichannel pipet–compatible. The ReadyAgarose 96 Plus wizard of Quantity One software rearranges the lanes from samples run on the gel and displays them in the original 96-well microplate format, simplifying sample tracking for analysis.

For More Information
Web: www.bio-rad.com/agarosegel; to download ReadyAgarose 96 Plus wizard, go to www.bio-rad.com/software
Request or download bulletins: 2647 and 2980

Ordering Information

Description	8-Well	12-Well	2 x 8-Well
Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	161-3004	161-3010	—
3.0% plus ethidium bromide	161-3006	161-3012	—
Mini ReadyAgarose Gels, TAE			
1.0%	161-3015	—	161-3057
1.0% plus ethidium bromide	161-3016	161-3022	—
3.0%	161-3017	—	—
3.0% plus ethidium bromide	161-3018	161-3024	—
	20-Well	**32-Well**	**2 x 32-Well**
Wide Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	161-3028	161-3034	161-3038
3.0% plus ethidium bromide	161-3030	161-3036	161-3040
Wide Mini ReadyAgarose Gels, TAE			
1.0% plus ethidium bromide	161-3044	161-3050	161-3054
3.0% plus ethidium bromide	161-3046	161-3052	161-3056
ReadyAgarose 96 Plus Gels, TBE, 4 x 26-Well (96 Plus)			
1.0% plus ethidium bromide	161-3060		
3.0% plus ethidium bromide	161-3062		
ReadyAgarose 96 Plus Gels, TAE, 4 x 26-Well (96 Plus)			
1.0% plus ethidium bromide	161-3063		
3.0% plus ethidium bromide	161-3065		

Catalog #	Description
ReadySub-Cell GT Cells for ReadyAgarose Gels	
170-4487	**Mini ReadySub-Cell GT Cell**, includes buffer tank, lid and electrodes, leveling bubble; accommodates 8- and 12-well mini ReadyAgarose gels
170-4489	**Wide Mini ReadySub-Cell GT Cell**, includes buffer tank, lid and electrodes, leveling bubble; accommodates 20-, 32-, and 2 x 32-wide mini ReadyAgarose gels
164-0303	**Mini ReadySub-Cell GT Cell and PowerPac Basic Power Supply**
164-0304	**Wide Mini ReadySub-Cell GT Cell and PowerPac Basic Power Supply**
Application Guide	
161-3000	**ReadyAgarose Instruction Manual**, free upon request with ReadyAgarose gel purchase

Pulsed Field Gel Electrophoresis

Pulsed field gel electrophoresis (PFGE) resolves large DNA molecules by alternating the electrical field between spatially distinct pairs of electrodes, causing DNA molecules as large as several megabases to reorient and move at different speeds through the pores in an agarose gel. Bio-Rad offers three CHEF systems that incorporate different PFGE technologies for optimal resolution in various size ranges (see CHEF Systems Selection Guide below).

Learn More about the Technology
Web: www.bio-rad.com/tech/pfge

Agaroses, Reagents, and Standards for PFGE

Bio-Rad offers a comprehensive line of agaroses (page 241), standards, and markers (pages 237–238), buffers (page 238), and other reagents to make PFGE simple and convenient. See page 237 for genomic DNA plug preparation kits.

For More Information
Web: www.bio-rad.com/PFGE

CHEF Systems Selection Guide

Feature	CHEF Mapper® XA	CHEF-DR® III	CHEF-DR II
Fragment size	100 bp–10 Mb	100 bp–10 Mb	5 kb–6 Mb
Optimal separation size range	100 bp–10 Mb	100 bp–6 Mb	100 kb–2 Mb
Auto-algorithm and interactive algorithm	•	—	—
Program storage	20 complex programs	Last program run	—
Programming blocks of run conditions	8 blocks	3 blocks	2 blocks
Battery-operated backup RAM	•	•	—
Pulse angle	0–360°	90–120° in 1° increments	Fixed angle of 120°
Asymmetrical angles	•	—	—
Nonlinear switch-time ramping (expands linear range of fragment separation to 50–700 kb)	•	—	—
Multistate separation	•	—	—
Secondary pulses (voltage interrupts)	•	—	—
FIGE and asymmetric FIGE (resolution of fragments in the 100 bp–250 kb range)	•	—	—
Resolution	All size ranges	DNA fragments >2 Mb	DNA fragments <2 Mb
Recommended use	Ideal for all PFGE applications Most accurate results Most reproducible results Fastest runs	Better suited for more advanced separations than CHEF-DR II system	Suitable for routine separations with the same organism

CHEF Mapper® XA System

The CHEF Mapper XA system is ideal for any PFGE application. Features include:

Automation
- Built-in auto-algorithm and interactive algorithm

Customization
- Store up to 99 simple programs or 20 complex programs with up to 8 blocks of programming each

Application Versatility
- Ability to choose any pulse angle from 0–360°C
- Optimal resolution of both megabase- and kilobase-sized DNA fragments
- Resolution of very large DNA molecules with secondary pulses that release DNA caught in the gel matrix



- Rapid resolution of small fragments in the 100 bp–250 kb range with FIGE and AFIGE technologies*
- Expanded linear range of fragment separation to 50–700 kb
- Enhanced resolution in selected fragment size ranges

For More Information
Web: www.bio-rad.com/chefXA
Request or download bulletin: 1906

Ordering Information

Catalog #	Description
CHEF Mapper XA System*	
170-3670	**CHEF Mapper XA System**, 120 V, includes power module, embedded auto-algorithm for protocol optimization, interactive algorithm program disk, electrophoresis cell, cooling module, variable-speed pump, Tygon tubing (12'), 14 x 13 cm (W x L) casting stand, 15-well 1.5 mm comb and comb holder, screened cap, disposable plug molds, leveling bubble, cables, *S. cerevisiae* DNA size standards, two 0.5 A FB fuses, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
170-3671	**CHEF Mapper XA System**, 100 V, for Japan
170-3672	**CHEF Mapper XA System**, 220 V, for Asia Pacific/Europe
170-3673	**CHEF Mapper XA System**, 240 V, for Asia Pacific/Europe

* All accessories are compatible with CHEF-DR II and DR III systems. Accessories can be found on page 236. A comprehensive listing of replacement parts can be found at **www.bio-rad.com**.

*U.S. patent 5,549,796.

CHEF-DR® III Variable Angle System

The CHEF-DR III variable angle system combines PACE and CHEF technologies in an easy-to-use instrument that yields high-resolution separations.





Automation

- Recalls last used conditions and uses them as the default protocol
- Recalls current run conditions and run progress if interrupted by power failure and resumes the run without intervention

Customization

- Customize desired conditions using examples provided in the instruction manual for a variety of size separation ranges

Application Versatility

- Ability to program the electrophoresis angle from 90–120°C for separations of DNA molecules ranging from 100 bp–10 Mb
- Selection of optimal voltage gradient, switch time, and angle for specific DNA size ranges
- Ability to program up to 3 consecutively executing blocks of run conditions

For More Information
Web: www.bio-rad.com/chef3

Ordering Information

Catalog #	Description
CHEF-DR III Variable Angle System*	
170-3700	**CHEF-DR III Variable Angle System**, 120 V, includes power module, electrophoresis cell, cooling module, variable-speed pump, 14 x 13 cm casting stand with frame and platform, comb holder, 15-well 1.5 mm thick comb, screened cap, disposable plug molds, 12' Tygon tubing, 2 plugs *S. cerevisiae* DNA size standards, two 0.5 A FB fuses, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
170-3702	**CHEF-DR III Variable Angle System**, 220/240 V, for Asia Pacific/Europe
170-3703	**CHEF-DR III Variable Angle System**, 100 V, for Japan

* All accessories are compatible with CHEF-DR II and DR III systems. Accessories can be found on page 236. A comprehensive listing of replacement parts can be found at **www.bio-rad.com**.

CHEF-DR® II Chiller System

The CHEF-DR II chiller system resolves DNA fragments in the 5 kb–6 Mb range and is the most cost-effective PFGE instrument. It is simple to program and lets you enhance resolution by executing two blocks of running conditions successively.

Customization

You can program run conditions into the CHEF-DR II system. The instrument manual provides examples of run conditions for a variety of size separation ranges for easy startup.

Application Versatility

The CHEF-DR II system uses the most common angle for PFGE, 120°. This unit can be used to separate fragments up to 6 Mb by adjusting the running conditions for low voltage and extended run times; optimal separation range is up to 2 Mb.

For More Information
Web: www.bio-rad.com/chef2





Ordering Information

Catalog #	Description
CHEF-DR II Chiller System*	
170-3725	**CHEF-DR II System**, 120 V, includes electrophoresis cell, drive module, cooling module, control module, variable-speed pump, 14 x 13 cm casting stand with frame and platform, comb holder, 15-well 1.5 mm thick comb, screened cap, disposable plug molds, 12' Tygon tubing, 2 plugs *S. cerevisiae* DNA size standards, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
170-3727	**CHEF-DR II System**, 220/240 V, for Asia Pacific/Europe
170-3728	**CHEF-DR II System**, 100 V, for Japan
Accessories for Chef Mapper, CHEF-DR III, and CHEF-DR II Systems*	
170-3654	**Cooling Module**, 120 V, for North America
170-3688	**Cooling Module**, 100 V, for Japan
170-3655	**Cooling Module**, 220/240 V, for Asia Pacific/Europe
170-3644	**Variable-Speed Pump**, 120 V
170-3648	**Electrodes**, thick gauge (0.02"), 6
170-3711	**Screened Caps**, 5
170-3713	**50-Well Disposable Plug Molds**, enough for 250 plugs
170-3622	**Reusable Plug Mold**, 10 plug
170-3689	**Standard Casting Stand**, includes 14 x 13 cm frame and platform
170-3704	**Wide/Long Combination Casting Stand**, includes 21 x 14 cm frame and platform
170-3699	**Combination Comb Holder**
170-4326	**10-Well Adjustable-Height Comb**, 1.5 mm
170-4325	**10-Well Adjustable-Height Comb**, 0.75 mm
170-4324	**15-Well Adjustable-Height Comb**, 1.5 mm
170-4323	**15-Well Adjustable-Height Comb**, 0.75 mm
170-4322	**20-Well Adjustable-Height Comb**, 1.5 mm
170-4344	**30-Well Adjustable-Height Comb**, 1.5 mm
170-3627	**15-Well Comb**, 21 cm wide, 1.5 mm thick
170-3628	**30-Well Comb**, 21 cm wide, 1.5 mm thick
170-3645	**45-Well Comb**, 21 cm wide, 1.5 mm thick
170-3623	**Preparative Comb**, 14 cm wide, 1.5 mm thick, with 2 outer wells for size standards
170-4046	**Leveling Table**, 20 x 30 cm
170-3643	**Gel Scoop**

* All accessories are compatible with Chef Mapper, CHEF-DR III, and CHEF-DR II systems. A comprehensive listing of replacement parts can be found at **www.bio-rad.com**.

CHEF Genomic DNA Plug Kits

CHEF genomic DNA plug kits provide a convenient means for preparing intact, chromosome-sized DNA for PFGE. Three kits are available for the preparation of bacterial (lysozyme-sensitive) or mammalian genomic DNA and yeast chromosomes (YACs). Each kit contains all the enzymes, reaction buffers, and restriction digest-qualified CleanCut™ agarose necessary to prepare 100 plugs as well as disposable plug molds and screened caps for simplified plug processing. Each kit is thoroughly tested to ensure that prepared genomic DNA can be restriction digested and separated on a CHEF electrophoresis system.



Ordering Information

Catalog #	Description
CHEF Genomic DNA Plug Kits	
170-3591	**CHEF Mammalian Genomic DNA Plug Kit**, contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, screened cap, 2 disposable plug molds; makes 100 plugs
170-3592	**CHEF Bacterial Genomic DNA Plug Kit**, contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lysozyme (25 mg/ml), 30 ml lysozyme buffer, screened cap, 2 disposable plug molds; makes 100 plugs
170-3593	**CHEF Yeast Genomic DNA Plug Kit**, contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lyticase, 25 ml lyticase buffer, screened cap, 2 disposable plug molds; makes 100 plugs
170-3594	**CleanCut Agarose**, 2%, 12 ml

Agaroses and Standards for Pulsed Field Gel Electrophoresis

Bio-Rad offers a comprehensive line of agaroses for use with PFGE as well as CHEF DNA standards and convenient buffers and reagents to simplify your PFGE experiments. See page 241 for agaroses, pages 231–238 for size standards, and page 238 for buffers.

Pulsed Field Standards

Bio-Rad offers standards for applications from FIGE separation of cosmid inserts to the largest chromosomal separations. The higher MW standards are prepared in low-melt agarose blocks that can be cut to fit most well dimensions.

See Also

Pulsed field gel electrophoresis systems: pages 234–236.

Imaging systems: pages 258–266.

Bioinformatics software: pages 268–272.

Certified agaroses: page 241.

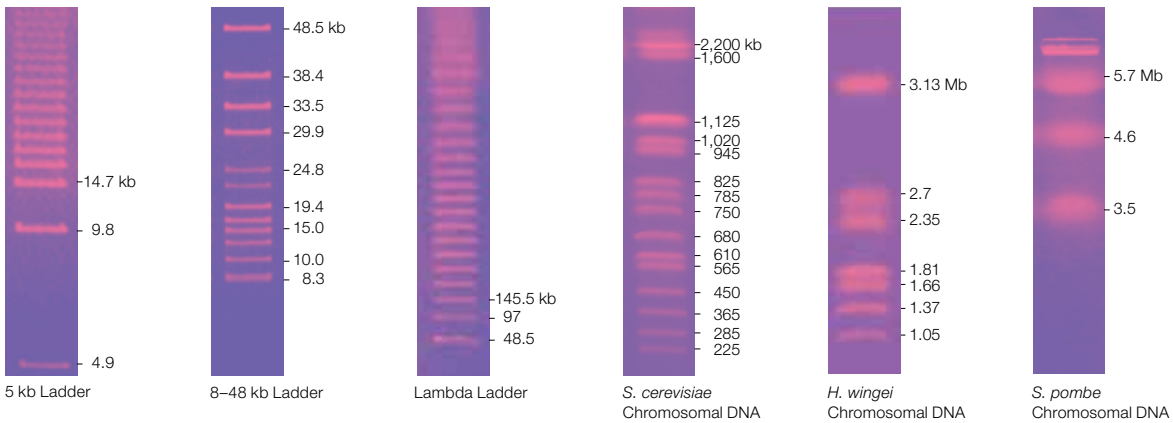
DNA Ladders Selection Guide

Type	Description
Pulsed Field Standards	
CHEF DNA standards	Derived from plasmids and lambda phage
CHEF DNA markers	Chromosomal DNA in low-melt agarose blocks

Pulsed Field Standards Selection Guide

	Range	Contents	Amount	Number of Applications
5 kb ladder	4.9–120 kb	Concatemers of pBR328	20 µg in 200 µl	20–25
8–48 kb ladder	8.3–48.5 kb	Mixed digest of phage	25 µg in 125 µl	125
Lambda) ladder	0.05–1 Mb	Concatemers of phage cl857Sam7	5 agarose blocks	25–40
S. cerevisiae	0.225–2.2 Mb	*Saccharomyces cerevisiae* chromosomal DNA	5 agarose blocks	25–40
H. wingei	1–3.1 Mb	*Hansenula wingei* chromosomal DNA	5 agarose blocks	25–40
S. pombe	3.5–5.7 Mb	*Schizosaccharomyces pombe* chromosomal DNA	5 agarose blocks	25–40

Pulsed Field Standards



5 kb Ladder | 8–48 kb Ladder | Lambda Ladder | *S. cerevisiae* Chromosomal DNA | *H. wingei* Chromosomal DNA | *S. pombe* Chromosomal DNA

Ordering Information

Catalog #	Description
Agaroses and Standards for Pulsed Field Gel Electrophoresis	
161-3108	**Certified Megabase Agarose**, 25 g
161-3109	**Certified Megabase Agarose**, 125 g
161-3110	**Certified Megabase Agarose**, 500 g
161-3100	**Certified Molecular Biology Agarose**, 25 g
161-3101	**Certified Molecular Biology Agarose**, 125 g
161-3102	**Certified Molecular Biology Agarose**, 500 g
162-0137	**Pulsed Field Certified Agarose**, 100 g
162-0138	**Pulsed Field Certified Agarose**, 500 g
Premixed Nucleic Acid Electrophoresis Buffers	
161-0733	**10x Tris/Boric Acid/EDTA (TBE)**, 1 L
161-0770	**10x Tris/Boric Acid/EDTA (TBE)**, 5 L cube
161-0743	**50x Tris/Acetic Acid/EDTA (TAE)**, 1 L
161-0773	**50x Tris/Acetic Acid/EDTA (TAE)**, 5 L cube
Pulsed Field Standards*	
170-3624	**CHEF DNA Size Standard**, 5 kb ladder, 4.9–120 kb, 20–25 lanes
170-3707	**CHEF DNA Size Standard**, 8–48 kb, 125 lanes
170-3635	**CHEF DNA Size Standard**, lambda ladder, 0.05–1 Mb, 5 agarose blocks, sufficient for 25–40 plugs
Pulsed Field Markers*	
170-3605	**CHEF DNA Size Marker**, *S. cerevisiae*, 0.2–2.2 Mb, 5 agarose blocks, sufficient for 25–40 plugs
170-3667	**CHEF DNA Size Marker**, *H. wingei*, 1–3.1 Mb, 5 agarose blocks, sufficient for 25–40 plugs
170-3633	**CHEF DNA Size Marker**, *S. pombe*, 3.5–5.7 Mb, 5 agarose blocks, sufficient for 25–40 plugs

* CHEF, clamped homogeneous electrical field. For more information, see pages 233–237.

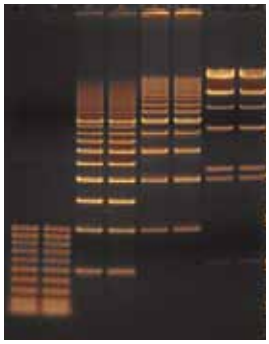
Buffers and Reagents for Nucleic Acid Electrophoresis

Ethidium Bromide Solution

Ethidium bromide is a sensitive fluorescent stain for visualizing DNA or RNA in agarose and polyacrylamide gels. Ethidium bromide is excited with a standard 302 nm UV transilluminator and emits a red-orange signal that can be photographed with Polaroid film or with a CCD-based gel documentation system.

Bio-Rad's premixed ethidium bromide solution eliminates preparation steps and minimizes exposure to hazardous ethidium bromide. Ethidium bromide solution is supplied as a 10 mg/ml solution in 10 ml bottles.

For More Information
Web: www.bio-rad.com/nastains



DNA stained with ethidium bromide.



Ordering Information

Catalog #	Description
161-0433	**Ethidium Bromide Solution**, 10 mg/ml, 10 ml

Tracking Dyes

Bio-Rad offers two tracking dyes to monitor electrophoresis runs:

- Bromophenol blue for monitoring nucleic acid and protein electrophoresis
- Xylene cyanol (FF) for monitoring nucleic acid electrophoresis



Ordering Information

Catalog #	Description
161-0404	**Bromophenol Blue**, 10 g
161-0423	**Xylene Cyanol FF**, 25 g

Premixed Sample Loading and Running Buffers

Premixed Sample Loading Buffers

The concentrated formulas of these buffers allow them to be used with both liquid and lyophilized samples. All premixed sample buffers are tested to ensure quality and consistency.



Premixed Sample Loading Buffer Selection Guide

Buffer	Formulation	Applications
TBE-urea sample buffer	89 mM Tris-HCl, pH 8.0, 89 mM boric acid, 2 mM EDTA, 7 M urea, 12% Ficoll, 0.01% BPB, 0.02% xylene cyanole FF	Denaturing ssDNA, RNA
Nucleic acid sample buffer	50 mM Tris-HCl, pH 8.0, 25% glycerol, 5 mM EDTA, 0.2% BPB, 0.2% xylene cyanole FF	Nondenaturing dsDNA, TBE gels

Premixed Running Buffers

Premixed running buffers can be used with handcast or precast gels. Simply dilute with distilled deionized water. Save time and standardize electrophoresis runs with these premixed running buffers.



Premixed Running Buffer Selection Guide

Buffer	1x Formulation	Applications
Nucleic Acid Electrophoresis		
10x TBE	89 mM Tris, 89 mM boric acid, 2 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels
10x TBE extended range	130 mM Tris, 45 mM boric acid, 2.5 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels; extends the buffer capacity for longer DNA sequencing runs
50x TAE	40 mM Tris, 20 mM acetic acid, 1 mM EDTA, pH 8.0	Nucleic acid electrophoresis; polyacrylamide or agarose gels

Ordering Information

Catalog #	Description
Premixed Nucleic Acid Sample Loading Buffers	
161-0767	**5x Nucleic Acid Sample Buffer**, 10 ml
161-0768	**1x TBE-Urea Sample Buffer**, 30 ml
Premixed Nucleic Acid Electrophoresis Buffers	
161-0773	**50x Tris/Acetic Acid/EDTA (TAE)**, 5 L cube
161-0770	**10x Tris/Boric Acid/EDTA (TBE)**, 5 L cube
161-0741	**10x Tris/Boric Acid/EDTA (TBE)**, extended range, 1 L bottle
161-0743	**50x Tris/Acetic Acid/EDTA (TAE)**, 1 L bottle
161-0733	**10x Tris/Acetic Acid/EDTA (TBE)**, 1 L bottle

Certified™ Agaroses

All Certified agarose products are 100% pure and GQT grade, guaranteeing the absence of inhibitors, DNases, and RNases and minimizing background staining. Use the guide below to choose the agarose for your application.



Certified Agarose Selection Guide

Application	Molecular Biology Agarose	PCR Agarose	Low Range Ultra Agarose	Low-Melt Agarose	PCR Low-Melt Agarose	Megabase Agarose	Pulsed Field Agarose
Analytical Separation							
≥1,000 bp	•			•			
≤1,000 bp		•			•		
10–200 bp			•				
1 kb–2 Mb						•	•
1 kb–5 Mb						•	

Certified molecular biology agarose — this general-purpose agarose ensures that DNA recovered from a preparative gel can be manipulated without compromising quality. It has a very low sulfate content that yields a very high gel strength and higher exclusion limit. The high electrophoretic mobility increases resolution and reduces run time, and the gels are easy to handle even at low agarose percentages.

Certified PCR agarose — certified PCR agarose is recommended for separation of DNA fragments ≤1,000 bp. This high-strength agarose forms gels that are easy to handle even at high gel percentages, minimizing the risk of cracking or breaking. PCR agarose gels at 40°C so it is faster and easier to prepare, unlike GQT products with similar sieving properties that gel at higher temperatures.

Certified low range ultra agarose — this agarose provides superior resolution of small PCR fragments and primers. A 3% gel clearly resolves a 10 bp ladder and a 4% gel approaches the resolution of an 8% polyacrylamide gel.

Certified low-melt agarose — this low melting temperature agarose has a high resolving capacity for DNA fragments ≥1,000 kb. It is recommended for preparative electrophoresis and for in-gel applications such as digestion and ligation. It is also recommended for embedding chromosomes and megabase-sized DNA for pulsed field applications.

Certified PCR low-melt agarose — this agarose yields excellent resolution of fragments ≤1,000 bp in an analytical or preparative format. It is ideal for digestion by agarase and for all in-gel applications.

Certified megabase agarose — this Certified agarose is the superior choice for CHEF and FIGE applications. The gels are easy to handle even at concentrations as low as 0.3%. The separation range is between 1 kb and 5 Mb. Low background staining also provides superior imaging of high MW DNA.

Pulsed field Certified agarose — this agarose enables excellent separation and resolution of large DNA fragments in pulsed field gel applications. The optimal separation range is 1 kb–2 Mb. Running conditions for this agarose are a preset selectable method of the CHEF Mapper® XA system auto-algorithm.

For More Information
Web: www.bio-rad.com/agarose
Download bulletin: 2755

Ordering Information

Description	25 g	125 g	500 g
Certified Agaroses for Standard Applications			
Certified molecular biology agarose	161-3100	161-3101	161-3102
Certified PCR agarose	161-3103	161-3104	161-3105
Certified low range ultra agarose	161-3106	161-3107	—
Certified megabase agarose	161-3108	161-3109	161-3110
Certified low-melt agarose	161-3111	161-3112	—
Certified PCR low-melt agarose	161-3113	161-3114	161-3115

Catalog #	Description
162-0137	**Pulsed Field Certified Agarose**, 100 g
162-0138	**Pulsed Field Certified Agarose**, 500 g

See Also

DNA gel electrophoresis: pages 224–232.
Overlay agaroses: page 167.
CleanCut agarose: page 237.
CHEF genomic DNA plug kits: page 237.
Buffers: page 240.

DNA Ladders

See Also

Pipet tips: pages 371–374.

Micro test tubes: pages 375–376.

Freeze 'N Squeeze DNA gel extraction spin columns: page 16.

ReadyAgarose precast gels: page 232.

Imaging systems: pages 258–266.

DNA gel electrophoresis systems: pages 224–232.

Bio-Rad offers a broad variety of DNA ladders for conventional DNA gel electrophoresis, including molecular rulers with evenly spaced banding patterns and EZ Load™ rulers premixed with loading buffer.

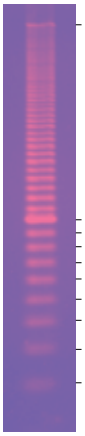
DNA Ladder Selection Guide

Type	Description
Molecular Rulers Standard and EZ Load molecular rulers	DNA ladders of even base pair length increments, available in 5 size ranges
AmpliSize® molecular ruler	Blunt-end DNA of precise length and known sequence
Molecular Mass Rulers Standard and EZ Load molecular mass rulers	Multiple bands of defined mass ranging from 10–100 ng for DNA quantitation

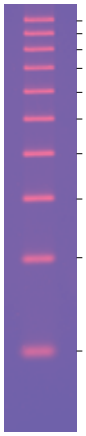
Molecular Rulers Selection Guide

Ruler	Concentration	Range	Number of Bands	Reference Band	Amount	Suggested Gel Type	Number of Applications
20 bp EZ Load 20 bp	0.2 µg/µl 0.1 µg/µl	20–1,000 bp	50 in 20 bp increments	200 bp	50 µg DNA	2.5–4% agarose	100
100 bp EZ Load 100 bp	0.1 µg/µl 0.05 µg/µl	100–1,000 bp	10 in 100 bp increments	None	25 µg DNA	2.5–4% agarose	100
100 bp PCR EZ Load 100 bp PCR	0.2 µg/µl 0.08 µg/µl	100–3,000 bp	30 in 100 bp increments	1,000 bp and 3,000 bp	40 µg DNA	0.8–3% agarose	100
500 bp EZ Load 500 bp	0.2 µg/µl 0.08 µg/µl	500–8,000 bp	16 in 500 bp increments	5,000 bp	40 µg DNA	0.8–1% agarose	100
1 kb EZ Load 1 kb	0.2 µg/µl 0.08 µg/µl	1–15 kb	15 in 1 kb increments	5 kb	40 µg DNA	0.8–1% agarose	100
2.5 kb	0.1 µg/µl	2.5–35 kb	14 in 2.5 kb increments	10 kb	40 µg DNA	0.8% agarose	100
AmpliSize	0.1 µg/µl (10 ng/band/µl)	50–2,000 bp	10	None	25 µg DNA	1.5–3% agarose	50
Precision	0.1 µg/µl	100–1,000 bp	5, from 10–100 ng	None	25 µg DNA	1–3% agarose	100
EZ Load precision	0.05 µg/µl	100–1,000 bp	5, from 10–100 ng	None	25 µg DNA	1–3% agarose	100

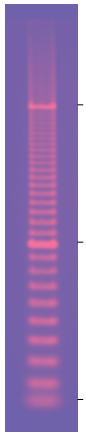
Molecular Rulers



20 bp and EZ Load 20 bp Rulers



100 bp and EZ Load 100 bp Rulers



100 bp PCR and EZ Load 100 bp PCR Rulers



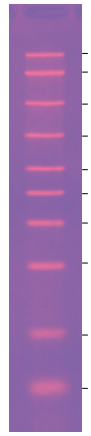
500 bp and EZ Load 500 bp Rulers



1 kb and EZ Load 1 kb Rulers



2.5 kb Ruler



AmpliSize Ruler

Molecular Mass Rulers



Precision, EZ Load Precision Mass Rulers

Molecular Rulers

Molecular rulers are DNA ladders with precisely defined size intervals between bands for simplified estimation of the length of single- and double-stranded DNA separated on agarose gels. Bio-Rad provides three types of molecular rulers for simplified estimation of length.

- **Standard molecular rulers** — DNA ladders of even base pair length increments; ready for dilution
- **EZ Load molecular rulers** — similar to standard molecular rulers but prediluted to a concentration appropriate for most electrophoresis runs
- **AmpliSize molecular rulers** — blunt-end DNA of precise length and known sequence

Ordering Information

Catalog #	Description
20 bp Molecular Rulers	
170-8201	**20 bp Molecular Ruler**, 250 µl, 20–1,000 bp, 100 applications
170-8351	**EZ Load 20 bp Molecular Ruler**, 500 µl, 20–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
100 bp Molecular Rulers	
170-8202	**100 bp Molecular Ruler**, 250 µl, 100–1,000 bp, 100 applications
170-8352	**EZ Load 100 bp Molecular Ruler**, 500 µl, 100–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
170-8206	**100 bp PCR Molecular Ruler**, 200 µl, 100–3,000 bp, 100 applications
170-8353	**EZ Load 100 bp PCR Molecular Ruler**, 500 µl, 100–3,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
500 bp Molecular Rulers	
170-8203	**500 bp Molecular Ruler**, 200 µl, 500–8,000 bp, 100 applications
170-8354	**EZ Load 500 bp Molecular Ruler**, 500 µl, 500–8,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
1 kb Molecular Rulers	
170-8204	**1 kb Molecular Ruler**, 200 µl, 1–15 kb, 100 applications
170-8355	**EZ Load 1 kb Molecular Ruler**, 500 µl, 1–15 kb, includes 1 ml 5x nucleic acid sample buffer, 100 applications
2.5 kb Molecular Ruler	
170-8205	**2.5 kb Molecular Ruler**, 400 µl, 2.5–35 kb, 100 applications
AmpliSize Molecular Ruler	
170-8200	**AmpliSize Molecular Ruler**, 250 µl, 50–2,000 bp, 50 applications

Molecular Mass Rulers

Bio-Rad's precision molecular mass rulers are DNA markers that allow accurate DNA quantitation in gels, making them ideal for densitometry or image analysis. These ladders have five bands, which contain 100, 70, 50, 20, and 10 ng of DNA. The EZ Load precision molecular mass ruler has been blended with sample loading buffer and is ready to load.

Ordering Information

Catalog #	Description
170-8207	**Precision Molecular Mass Ruler**, 250 µl, 100–1,000 bp, 10–100 ng, 100 applications
170-8356	**EZ Load Precision Molecular Mass Ruler**, 500 µl, 100–1,000 bp, 10–100 ng, 100 applications

Northern and Southern Blotting

Vacuum Transfer System

The vacuum transfer system is available for rapid transfer of DNA or RNA from agarose gels onto membranes for northern and Southern blotting applications.

Model 785 Vacuum Blotter

This vacuum blotter transfers DNA or RNA from an agarose gel onto a nylon membrane. Small fragments (≤1,500 bp) are transferred in 30 minutes and genomic DNA-size fragments in 90 minutes. Features include:

- Easy assembly — gel-to-membrane alignment is simple using the green window gaskets, and the sealing frame requires no screws or clamps to tighten
- Window gaskets that can be cut to accommodate gels as large as 20 x 25 cm
- Uniform transfers regardless of the gel size
- Unique regulator for simple pressure control to avoid high pressures that can lead to gel collapse
- Durable molded plastic construction that is resistant to the chemicals commonly used in transfers such as 0.25 N HCl and 0.5 N NaOH; the window gaskets are also resistant to these chemicals



For More Information
Web: www.bio-rad.com/nablotters
Request or download bulletin: 1584

Ordering Information

Catalog #	Description
165-5000	**Model 785 Vacuum Blotter with Regulator**, includes vacuum regulator, base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid
165-5001	**Model 785 Vacuum Blotter System**, 100/120 V, includes vacuum pump, vacuum regulator, base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid
165-5002	**Model 785 Vacuum Blotter System**, 220/240 V
165-5003	**Model 785 Vacuum Blotter Basic Unit**, includes base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid
Accessories	
165-5004	**Vacuum Station**, 100/120 V, includes vacuum pump, vacuum regulator
165-5005	**Vacuum Station**, 220/240 V
165-5006	**Vacuum Regulator**
165-5007	**Reservoir Seal O-Ring**
165-5008	**Blank Window Gaskets**, 6
165-5012	**Porous Vacuum Plate**

Premixed Blotting Buffers

Bio-Rad offers a complete line of reagents for preparation of buffers to your own specifications.



Blotting Buffer Selection Guide

	1x Formulation	Applications
Transfer Buffers*		
20x SSC	150 mM NaCl, 15 mM sodium citrate, pH 7.0	Capillary transfer of agarose gels
Processing Buffers		
20x SSC	150 mM NaCl, 15 mM sodium citrate, pH 7.0	Northern and Southern blotting prehybridization and hybridization solutions

* These buffers can be used for all gel types and formulations.

Ordering Information

Catalog #	Description
Blot Transfer and Processing Buffers	
161-0774	**20x SSC**, 1 L
161-0775	**20x SSC**, 5 L cube

Mutation Analysis

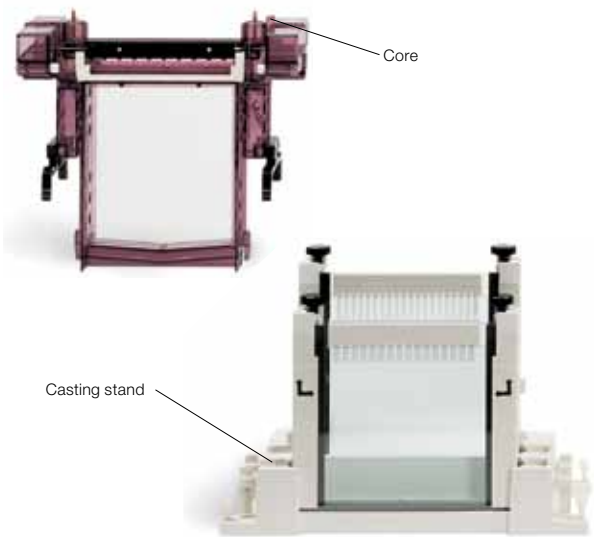
DCode™ Universal Mutation Detection System

The DCode universal mutation detection system enables mutation detection by various electrophoretic techniques. The DCode system can be used to scan single-base changes with any of the following electrophoretic techniques:

- Single-strand conformation polymorphism (SSCP)
- Denaturing gradient gel electrophoresis (DGGE)
- Constant denaturing gel electrophoresis (CDGE)
- Temporal temperature gradient gel electrophoresis (TTGE)

The DCode system meets the demands of all major mutation detection techniques with:

- Ability to run 64 samples in a single gel in as little as 2 hr, with accurate temperature control between 5–70°C
- Modular design to allow customization for current and future laboratory needs
- Specific reagents and controls that are optimized for each electrophoretic technique



See Also

DNA amplification/PCR: pages 324–368.
PowerPac Basic and PowerPac HV power supplies: page 181.
Acrylamide: page 192.
Premixed buffers: page 240.

Model 475 Gradient Delivery System

The patented* cam-operated manual gradient former creates linear gradient gels for the DCode system. It mixes and delivers high- and low-density solutions without using a peristaltic pump or magnetic stirrer. The gradients formed are linear and reproducible.

WinMelt™ Software Optimizes Primer Placement

Windows-based WinMelt software predicts the melting profile of any DNA sequence up to 3,200 bp (Lerman and Silverstein 1987). Placement of primers and GC clamps can be optimized by analysis of the placement effect on the DNA melting profile. WinMelt (Windows XP system compatibility) software is recommended for all DGGE, CDGE, and TTGE applications.

An interactive CD-ROM describes the principles of DGGE, CDGE, TTGE, and SSCP (Training Guide, #170-9241) and includes videos on setting up and using the DCode system, a WinMelt software tutorial, DCode application notes, instruction manual, and other literature.

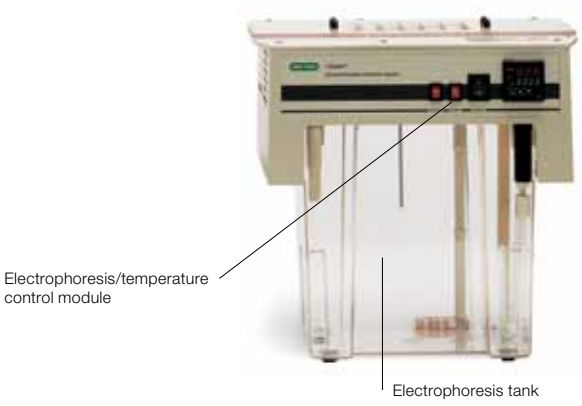
For More Information

Web: www.bio-rad.com/dcode

For examples of DCode system applications, including screening for mutations in the Fas antigen of lymphoma tumors and mutations such as K-ras and p53, and for examples of monitoring microbial diversity in environmental samples using the DCode system, request bulletin 5479 (CD-ROM). For more information on the DCode system and accessories, request or download bulletins 2069 and 2100.

For complete ordering information, request or download bulletin 2100.





* U.S. patent 5,540,498.

Ordering Information

Catalog #	Description
DCode Systems*	
170-9080	**DCode System for DGGE**, 120 V, for 16 cm gels with single prep well (1 mm), includes comb gasket, 2 sets of clamps, Model 475 gradient former, all parts required to cast gradient gels
170-9081	**DCode System for DGGE**, 220/240 V, for 16 cm gels with single prep well (1 mm)
170-9082	**DCode System for DGGE**, 100 V, for 16 cm gels with single prep well (1 mm)
170-9083	**DCode System for DGGE**, 120 V, for 10 cm gels with 2 prep wells (1 mm)
170-9084	**DCode System for DGGE**, 220/240 V, for 10 cm gels with 2 prep wells (1 mm)
170-9085	**DCode System for DGGE**, 100 V, for 10 cm gels with 2 prep wells (1 mm)
170-9086	**DCode System for CDGE**, 120 V, for 16 cm gels with 20 wells (1 mm)
170-9087	**DCode System for CDGE**, 220/240 V, for 16 cm gels with 20 wells (1 mm)
170-9088	**DCode System for CDGE**, 100 V, for 16 cm gels with 20 wells (1 mm)
170-9089	**DCode System for TTGE**, 120 V, for 16 cm gels with 20 wells (1 mm)
170-9090	**DCode System for TTGE**, 220/240 V, for 16 cm gels with 20 wells (1 mm)
170-9091	**DCode System for TTGE**, 100 V, for 16 cm gels with 20 wells (1 mm)
170-9092	**DCode System for SSCP**, 120 V, for 20 cm gels with 20 wells (0.75 mm), includes cooling tank adaptor for use with external cooling bath, control reagents for SSCP
170-9093	**DCode System for SSCP**, 220/240 V, for 20 cm gels with 20 wells (0.75 mm)
170-9094	**DCode System for SSCP**, 100 V, for 20 cm gels with 20 wells (0.75 mm)

* Each system includes electrophoresis/temperature control module, sandwich core, kit to cast gels of indicated size and type (2 sets of plates, 2 sets of clamps and spacers, 2 combs), and control reagents for indicated application(s).

continues

Ordering Information

Catalog #	Description
DCode Systems* (cont.)	
170-9105**	**Complete DCode System**, 120 V, PC, for all gel sizes and types described above, includes software, standard and cooling tanks, Model 475 gradient former, sandwich clamps, pressure clamp, comb gasket and holder, fittings required for gradient gels
170-9106**	**Complete DCode System**, 220/240 V, PC
170-9107**	**Complete DCode System**, 100 V, PC
Adaptor Kits***	
170-9125	**DGGE Kit**, for 16 cm gels with single prep well (1 mm), includes sandwich clamps, pressure clamp, comb gasket and holder, fittings required for gradient gel casting
170-9126	**DGGE Kit**, for 10 cm gels with 2 prep wells (1 mm)
170-9127	**CDGE/TTGE Kit**, for 16 cm gels with 20 prep wells (1 mm)
170-9128	**Complete SSCP Kit**, for 20 cm gels with 20 wells (0.75 mm), includes sandwich clamps, cooling finger adaptor for use with external chiller
170-9129	**Basic SSCP Kit**, for 20 cm gels with 20 wells (0.75 mm), includes sandwich clamps
Accessories†	
170-9240	**WinMelt Software**, PC/Windows
170-9241	**Interactive CD-ROM Training Guide**
170-9042	**Model 475 Gradient Delivery System**, includes cam-operated manual gradient former, 2 each of 10 and 30 ml syringes, all accessories required to cast gradient gels
170-9140	**Electrophoresis Cooling Tank**, with cooling adaptor for hookup to laboratory recirculating chiller
Electrophoresis Reagents and DNA Control Reagents	
170-9150	**DCode Control Reagent Kit for DGGE/CDGE/TTGE**, includes primers (one GC-clamped) and DNA templates for production of wild-type and mutant DNA
170-9151	**DCode Control Reagent Kit for SSCP**, includes primers and DNA templates for production of wild-type and mutant DNA
170-9170	**DCode Electrophoresis Reagent Kit for DGGE**, includes 500 ml 40% acrylamide/bis (37.5:1), 2 x 1 L 50x TAE buffer, 225 ml 100% deionized formamide, 10 ml 10 mg/ml ethidium bromide, 10 ml DCode dye solution, 5 ml TEMED, 1 ml 2x gel loading dye, 10 g ammonium persulfate
170-9171	**DCode Electrophoresis Reagent Kit for TTGE**, includes 500 ml 40% acrylamide/bis (37.5:1), 1 kg urea, 2 x 1 L 50x TAE buffer, 10 ml 10 mg/ml ethidium bromide, 1 ml 2x gel loading dye, 5 ml TEMED, 10 g ammonium persulfate
170-9172	**DCode Electrophoresis Reagent Kit for SSCP**, includes 500 ml 40% acrylamide solution, 500 ml 2% bis-acrylamide solution, 100 ml glycerol, 6 x 1 L 10x TBE buffer, 2x SSCP gel loading dye, 5 ml TEMED, 10 g ammonium persulfate

* Each system includes electrophoresis/temperature control module, sandwich core, kit to cast gels of indicated size and type (2 sets of plates, 2 sets of clamps and spacers, 2 combs), control reagents for indicated application(s).

** For PC, includes WinMelt software.

*** Each kit includes 2 sets of plates, 2 sets of spacers, 2 combs.

† For a complete list of accessories, including combs and spacers, for the DCode system, go to **www.bio-rad.com/dcode**.

Nucleic Acid Sequencing

Sequi-Gen® GT Sequencing Cell

The system's design ensures smile-free patterns and offers an easy horizontal casting method. Four different IPC sizes fit into the space-saving universal base/lower buffer chamber for the Sequi-Gen GT cell. The 38 x 30 cm size is wide enough to accommodate 100 samples, but short enough for applications that do not require long run times.

- Problem-free horizontal gel casting — lever-operated clamps facilitate rapid assembly and gel casting
- Unique upper buffer chamber design allows heat dissipation, maintains uniform temperature, and eliminates smile patterns



For More Information
Web: www.bio-rad.com/nasequencing
Request or download bulletin: 2160

Ordering Information

Catalog #	Description
Sequi-Gen GT System*	
165-3860	**Sequi-Gen GT System**, 21 x 40 cm
165-3861	**Sequi-Gen GT System**, 21 x 50 cm
165-3862	**Sequi-Gen GT System**, 38 x 30 cm
165-3863	**Sequi-Gen GT System**, 38 x 50 cm
165-3802	**Sequi-Gen GT System and PowerPac HV Power Supply**, 21 x 40 cm, includes #165-3860 and #164-5056
165-3803	**Sequi-Gen GT System and PowerPac HV Power Supply**, 21 x 50 cm, includes #165-3861 and #164-5056
165-3810	**Sequi-Gen GT System and PowerPac HV Power Supply**, 38 x 30 cm, includes #165-3862 and #164-5056
165-3804	**Sequi-Gen GT System and PowerPac HV Power Supply**, 38 x 50 cm, includes #165-3863 and #164-5056
Accessories	
165-3870**	**Sequi-Gen GT IPC Assembly**, 21 x 40 cm
165-3871**	**Sequi-Gen GT IPC Assembly**, 21 x 50 cm
165-3872**	**Sequi-Gen GT IPC Assembly**, 38 x 30 cm
165-3873**	**Sequi-Gen GT IPC Assembly**, 38 x 50 cm
165-3880	**Sequi-Gen GT IPC**, 21 x 40 cm, includes bonded inner glass plate and electrical components
165-3881	**Sequi-Gen GT IPC**, 21 x 50 cm, includes bonded inner glass plate and electrical components
165-3882	**Sequi-Gen GT IPC**, 38 x 30 cm, includes bonded inner glass plate and electrical components
165-3883	**Sequi-Gen GT IPC**, 38 x 50 cm, includes bonded inner glass plate and electrical components
165-3866	**Sequi-Gen GT Universal Base**
165-3878	**Precision Caster Assembly**, 21 cm, includes precision caster base, precision caster gasket, syringe, tubing, luer tapers
165-3879	**Precision Caster Assembly**, 38 cm, includes precision caster base, precision caster gasket, syringe, tubing, luer tapers
165-3886	**Precision Caster Base**, 21 cm
165-3887	**Precision Caster Base**, 38 cm
165-3888	**Precision Caster Gasket**, 21 cm
165-3889	**Precision Caster Gasket**, 38 cm
165-3892	**Precision Caster Syringe**, 140 ml
165-3720	**Gel Temperature Indicators**, 5

* Sequi-Gen GT systems include IPC assembly (see following footnote), universal base, safety covers with cables, stabilizer bar, precision caster assembly, 0.40 mm vinyl sharkstooth comb and spacers, gel temperature indicator, leveling bubble, drain port connector. Systems with PowerPac HV power supply include temperature probe.

** IPC assemblies include bonded inner glass plate, outer glass plate, lever clamp set.

Combs and Spacers for the Sequi-Gen® Cell

Machined Vinyl Sharkstooth Combs and Spacers
Spacers (0.4 mm thick) are available in 30, 40, and 50 cm lengths.

Multichannel Pipet (MP)-Compatible Combs
Multichannel pipet-compatible well spacing is available in sharkstooth and well-forming formats. MP sharkstooth combs come with 34, 68, or 100 teeth and are 0.4 mm thick.

Machined Vinyl Wedge Spacers
The use of wedge spacers results in a gel that becomes gradually thicker toward the bottom, resulting in bands more closely spaced at the bottom. Wedge spacers eliminate the need for buffer gradient gels.

Plastic Combs and Spacers
Plastic combs and spacers are 0.4 mm thick. Well-forming combs are 14 or 31 cm wide.

Ordering Information

Catalog #	Thickness, mm	# of Wells	Approximate Well Volume, µl	Width, cm
MP-Compatible Sharkstooth Combs				
165-3845	0.4	34	5.0	15
165-3846	0.4	68	5.0	30
165-3847	0.4	100	3.7	30
MP-Compatible Well-Forming Combs				
165-3848	0.4	34	4.8	15
165-3849	0.4	68	4.8	30
Machined Vinyl Sharkstooth Combs				
165-3836	0.4	24	7.3	15
165-3837	0.4	36	5.0	15
165-3838	0.4	48	3.7	15
165-3839	0.4	49	7.3	30
165-3840	0.4	73	5.0	30
165-3841	0.4	97	3.7	30
Plastic Well-Forming Combs				
165-3684	0.4	16	42.5	14
165-3686	0.4	20	31.0	14
165-3688	0.4	36	3.6	14
165-3692	0.4	32	30.0	31
165-3694	0.4	44	5.5	31
165-3696	0.4	60	3.5	31
165-3698	0.4	80	4.0	31
Plastic Sharkstooth Combs				
165-3700	0.4	24	7.3	15
165-3702	0.4	48	3.7	15

Catalog #	Length, cm	Thickness, mm
Machined Vinyl Sharkstooth Spacers (2 per package)		
165-3812	30	0.4
165-3814	40	0.4
165-3816	50	0.4
Machined Vinyl Wedge Spacers (2 per package)		
165-3821	40	0.4–1.2
165-3823	50	0.4
Plastic Spacers (10 per package)		
165-3710	40	0.4
165-3712	50	0.4

See Also

Real-time PCR systems: pages 331–336.

DuoFlow systems: pages 94–105.

Profinia protein purification system: pages 121–123.

ProteOn protein interaction array system: pages 274–280.

Experion™ Automated Electrophoresis System

The Experion automated electrophoresis system automatically performs all the steps of gel-based electrophoresis, providing a comprehensive platform for the analysis of nucleic acids and proteins.

Learn More about the Technology
Web: www.bio-rad.com/tech/experion



Rapid Analysis of Proteins, RNA, and DNA

The Experion system performs automated sample separation, staining, destaining, imaging, band detection, quantitation, and data analysis in as little as 30 minutes. Results are digitally stored for easy record keeping and reporting. The software interface and functionality are intuitive, and the system's microfluidic technology provides good reproducibility and accuracy for routine analysis.

Reproducible Separation, Sizing, and Quantitation

- Single-step protein sizing from 10–260 kD
- Protein sensitivity down to 2.5 ng/µl
- RNA concentration and integrity (RQI) determination at nanogram and picogram levels
- Single-step sizing and quantitation analysis of DNA fragments
- Simple chip priming — automated method for reproducible, error-free results

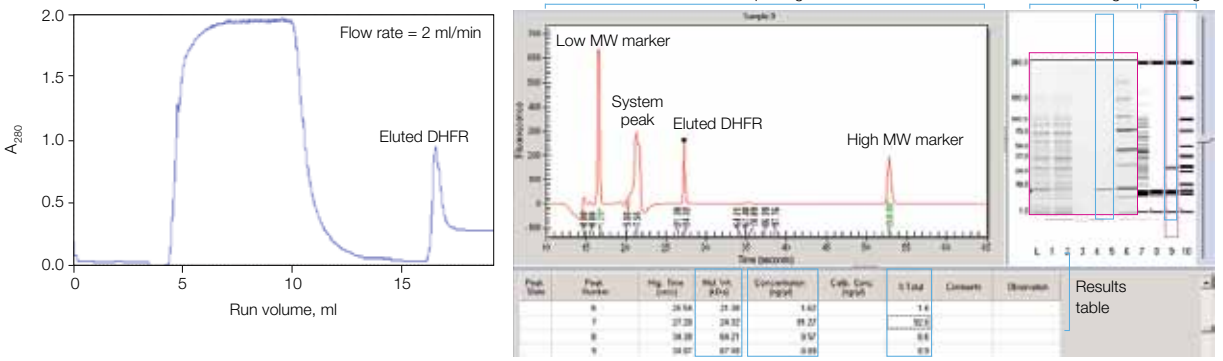
Convenient Data Analysis Tools

- Automatic sizing and quantitation calculations
- Intuitive navigation of separation and data analysis screens
- Quick comparisons of samples across the chip or from chip to chip
- Digital data storage for easy record keeping and reporting
- Flexible and easy export options and annotation ability for publications, reports, and presentations

A Powerful Complement to Many Applications

The Experion system is the ideal complement to a number of applications including sizing and quantitation of DNA fragments for PCR and restriction digest experiments, RNA integrity assessments prior to real-time PCR, microarray, and next-generation sequencing experiments (for example, using Illumina or Roche sequencers). RNA integrity assessment via RQI has been recommended as part of the MIQE guidelines. Leading scientists have developed these guidelines to increase the quality and reproducibility of quantitative PCR and real-time PCR data. The Experion system also provides quick protein purity analysis and results in digitized formats, which complement protein applications such as laboratory-scale chromatography, crystallography, and process-scale purification.

For More Information
Web: www.bio-rad.com/experion
Request or download bulletins: 3140, 3169, 3170, 3171, 3184, and 5520



Analysis of chromatographic fractions with the Experion system. Left, chromatogram showing purification of His-tagged DHFR using Profinity™ IMAC resin and the BioLogic DuoFlow™ system. **Right**, comparison of analysis of fractions using the Experion system and SDS-PAGE (shown as inset). The Experion system generated an electropherogram and virtual gel image of the separation. Note that the virtual gel image is comparable to the SDS-PAGE gel image. The Experion system also automatically reports the size (MW), relative concentration, and percent of each resolved protein in the total sample in the results table.

Ordering Information

Catalog #	Description
700-7000*	**Experion System**, 100–240 V, for protein analysis, includes electrophoresis station, priming station, software, USB2 cable
701-7000*	**Experion System**, 100–240 V, for protein analysis, includes electrophoresis station, priming station, software, USB2 cable, Experion Pro260 starter kit
700-7001	**Experion System**, 100–240 V, for RNA and DNA analyses, includes electrophoresis station, priming station, vortex station, software, USB2 cable
701-7001	**Experion System**, 100–240 V, for RNA and DNA analyses, includes electrophoresis station, priming station, vortex station, software, USB2 cable, Experion RNA StdSens starter kit
Experion Automated Electrophoresis Systems with Computers	
700-7060*	**Experion System with Dell Computer and Monitor**, 100–240 V, for protein analysis, includes electrophoresis station, priming station, Dell OptiPlex computer, monitor, software, USB2 cable (analysis kits sold separately)
700-7061*	**Experion System with Dell Computer**, 100–240 V, for protein analysis (without monitor; analysis kits sold separately)
700-7062	**Experion System with Dell Computer and Monitor**, 100–240 V, for RNA and DNA analyses, includes electrophoresis station, priming station, vortex station, Dell OptiPlex computer, monitor, software, USB2 cable (analysis kits sold separately)
700-7063	**Experion System with Dell Computer**, 100–240 V, for RNA and DNA analyses (without monitor; analysis kits sold separately)

* The same system is used for protein, RNA, and DNA analyses with the exception that systems for protein analysis do not include a vortex station (used only with RNA/DNA assays).

Experion™ Automated Electrophoresis Station

The Experion automated electrophoresis station is an electrophoresis cell, power supply, imager, and data storage tool all in a single device.

Easy, Precise Operation

- High-quality laser provides precise fluorescence detection
- USB port allows easy installation and connectivity
- Easy-access platform for chip insertion and removal



Experion automated electrophoresis station. The analysis chip is placed on the chip platform; the 16 platinum pins in the electrode manifold line up precisely with the 16 wells on the chip. A large LED “On” light blinks when a run is in progress.

Ordering Information

Catalog #	Description
700-7010	**Experion Electrophoresis Station**, 100–240 V, includes USB2 cable
700-7022	**Experion USB2 Cable with Ferrite**, replacement

Experion™ Priming Station

The Experion automated priming station consistently prepares chips for successful automated electrophoresis with minimal hands-on time. It is used with all Experion chips regardless of whether the application is for protein, RNA, or DNA samples. Preset time and pressure settings ensure optimal priming of the gel matrix into the microchannels of the chip in preparation for sample analysis. This device helps ensure higher quality and more reproducible results than those obtainable with less reliable manual priming methods.

Automated Chip Priming

- Large LCD display clearly shows the preset time and pressure settings
- Integrated timer conveniently counts down the time-sensitive priming step
- Coordinating alignment arrows on the chip and priming station ensure proper chip placement



Experion priming station. The priming station primes the chip by applying pressure and pushing the gel-stain solution into the microchannels of the chip. This automated priming method helps ensure reproducible chip performance.

- Built-in, pressure-activated release mechanism ensures precise priming
- Secure locking mechanism prevents early release while priming

Ordering Information

Catalog #	Description
700-7030	**Experion Priming Station**, 100–240 V, includes 2 priming seals
700-7031	**Experion Priming Seals**, replacement, provides air seal on top of priming well, 2

Experion™ Vortex Station II

The Experion vortex station II ensures complete mixing of RNA or DNA samples and analysis reagents. The specially designed vortex adaptor prongs securely hold the chip during the 1 minute vortex cycle. Preset speed and time settings provide single-step, precise mixing of samples and reagents.



Experion vortex station II. The vortex station is needed for nucleic acid analysis.

Ordering Information

Catalog #	Description
700-7043	**Experion Vortex Station II**, 100–240 V, for preparing Experion RNA/DNA chips

Experion™ Software

Experion software adds to the efficiency of the Experion automated electrophoresis system. Results are displayed with peak electropherograms, in a virtual gel view, and as results tables. Additionally, versions 3.0 and above automatically generate a validated RNA quality indicator (RQI) number that correlates with eukaryotic total RNA sample integrity. The RQI complements the electropherogram and reported ribosomal peak area ratio visual assessments.

Key Features

- Real-time display of data acquisition
- Manual integration of peaks
- Automatic sizing, quantitation, and % total calculations
- Statistical evaluations (mean, std deviation, and %CV)
- Multiple protein quantitation method options
- Flexible printing and data export options

Experion Validation Kit (Optional)

The IQ/OQ validation kit includes automated protocols that test the critical functions of the system to verify and validate the system to the specified functionality. Validation should be performed at least biannually, when troubleshooting, and after moving the instrument.

Experion Security Edition Software (Optional)

The optional Security Edition offers tools for compliance with U.S. FDA 21 CFR Part 11 regulations:

- Different levels of access to different software functions
- Audit trail table tracks daily use of the system
- Password protection and auto lock function maintain database and file integrity
- Electronic signatures facilitate record keeping and tracking
- Report generation enables quick viewing and archiving of multiple run parameters, data, audit trail, and electronic signatures

For More Information
Web: www.bio-rad.com/experionsoftware
Request or download bulletins: 3171; RQI — 5761

System Requirements

Operating system	Windows XP (Service Pack 3), Windows Vista (Service Pack 1), WIndows 7 (32 bit)
Processor (CPU)	Pentium 4 (3 GHz processor) PC only
RAM	1 GB
Hard drive space	80 GB
USB 2.0	1 port
Other drives	CD-ROM

Ordering Information

Catalog #	Description
700-7050	**Experion Software**, system operation and standard data analysis tools, includes software CD-ROM
700-7051	**Experion Validation Kit**, includes 3 test chips, qualification procedures, dongle for PC
700-7052	**Experion Software, Security Edition**, standard and 21 CFR Part 11 compliance data analysis tools, includes 3 test chips, qualification procedures, dongle for PC

See Also

Chromatography systems: pages 84–123.

Real-time PCR systems: pages 331–336.

Sample preparation products: pages 2–18.

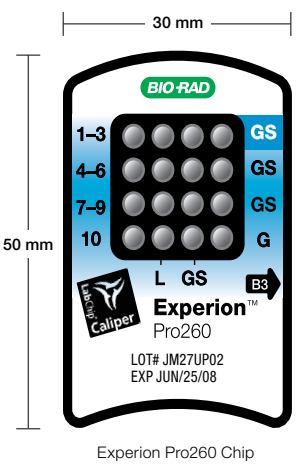
ProteOn protein interaction array system: pages 274–280.

Experion™ Analysis Kits

Experion analysis kits combine innovative chip design with high-quality reagents to perform reproducible, quantitative, and accurate protein, RNA, or DNA analyses in minutes. Streamlined chip preparation methods and low sample and reagent volume requirements result in rapid experiments with minimal hands-on time.

For More Information
Web: www.bio-rad.com/experionanalysiskits
Request or download bulletins: 3140, 3169, 3170, 3171, 5520, and 5761





Experion Pro260 Chip

Experion Pro260 Analysis Kit

The Experion Pro260 analysis kit makes protein separation, sizing, and quantitation fast and easy. The Pro260 kit offers the ability to analyze ten protein samples (between 10–260 kD) in approximately 30 minutes. Accurate sizing is achieved with the Experion Pro260 ladder, part of the Precision Plus Protein™ family of standards. Refer to the specifications table for more details.

Experion RNA HighSens and RNA StdSens Analysis Kits

For accurate assessment of RNA quality prior to downstream experiments, Experion RNA analysis kits offer rapid single-step quality assessments and the ability to analyze 11 or 12 samples in approximately 30 minutes. Sample concentrations in nanogram or picogram amounts can be analyzed, depending on the kit. Refer to the specifications table for more details. For a fast and objective assessment of total RNA integrity, an RNA quality indicator (RQI) value is automatically generated for eukaryotic samples.

Experion DNA 1K and DNA 12K Analysis Kits

The Experion DNA 1K and DNA 12K analysis kits allow analysis of DNA samples with size ranges between 15–1,500 bp and 50–17,000 bp, respectively. These DNA assays provide high sensitivity and excellent resolution (down to 5 bp) over a broad dynamic range. Consuming only 1 µl of sample for each analysis, the Experion automated system can analyze 11 samples in approximately 30–40 minutes. These assays are recommended for analysis of restriction digests, amplified DNA, microsatellites, and AFLPs.

Specifications

	Pro260 Chip	RNA HighSens Chip	RNA StdSens Chip	DNA 1K Assay	DNA 12K Assay
Number of samples	1–10	1–11	1–12	1–11	1–11
Sample volume	4 µl	1 µl	1 µl	1 µl	1 µl
Linear dynamic range	5–2,000 ng/µl BSA	—	—	—	—
Concentration range	5–2,000 ng/µl	100–5,000 pg/µl	5–500 ng/µl	0.1–50 ng/µl	0.1–50 ng/µl
Separation range	10–260 kD	—	—	15–1,500 bp	50–17,000 bp
Sensitivity	2.5 ng/µl of carbonic anhydrase in 1x PBS	100 pg	5 ng	0.1 ng	0.1 ng

Ordering Information

Catalog #	Description
700-7101	**Experion Pro260 Analysis Kit for 10 Chips**, includes 10 Pro260 chips, 1 cleaning chip, 3 x 520 µl Pro260 gel, 45 µl Pro260 stain, 60 µl Pro260 ladder (10–260 kD), 400 µl Pro260 sample buffer, 3 spin filters
700-7102	**Experion Pro260 Analysis Kit for 25 Chips**, includes 25 Pro260 chips, 1 cleaning chip, 5 x 520 µl Pro260 gel, 2 x 45 µl Pro260 stain, 2 x 60 µl Pro260 ladder (10–260 kD), 2 x 400 µl Pro260 sample buffer, 5 spin filters
700-7103	**Experion RNA StdSens Analysis Kit for 10 Chips**, includes 10 RNA StdSens chips, 2 cleaning chips, 1,250 µl RNA gel, 20 µl RNA StdSens stain, 20 µl RNA ladder, 900 µl RNA StdSens loading buffer, 2 spin filters
700-7104	**Experion RNA StdSens Analysis Kit for 25 Chips**, includes 25 RNA StdSens chips, 2 cleaning chips, 2 x 1,250 µl RNA gel, 2 x 20 µl RNA StdSens stain, 2 x 20 µl RNA ladder, 2 x 900 µl RNA StdSens loading buffer, 4 spin filters
700-7105	**Experion RNA HighSens Analysis Kit for 10 Chips**, includes 10 RNA HighSens chips, 2 cleaning chips, 1,250 µl RNA gel, 20 µl RNA HighSens stain, 20 µl RNA ladder, 900 µl RNA HighSens loading buffer, 100 µl RNA sensitivity enhancer, 2 spin filters
700-7106	**Experion RNA HighSens Analysis Kit for 25 Chips**, includes 25 RNA HighSens chips, 2 cleaning chips, 2 x 1,250 µl RNA gel, 2 x 20 µl RNA HighSens stain, 20 µl RNA ladder, 2 x 900 µl RNA HighSens loading buffer, 2 x 100 µl RNA sensitivity enhancer, 4 spin filters
700-7107	**Experion DNA 1K Analysis Kit for 10 Chips**, includes 10 DNA chips, 1 cleaning chip, 3 x 250 µl DNA 1K gel, 40 µl DNA 1K stain, 20 µl DNA 1K ladder, 750 µl DNA 1K loading buffer, 3 spin filters
700-7108	**Experion DNA 12K Analysis Kit for 10 Chips**, includes 10 DNA chips, 1 cleaning chip, 650 µl DNA 12K gel, 40 µl DNA 12K stain, 20 µl DNA 12K ladder, 750 µl DNA 12K loading buffer, 3 spin filters
700-7307	**Experion DNA 1K Analysis Kit for 30 Chips**, includes 30 DNA chips, 3 cleaning chips, 9 x 250 µl DNA 1K gel, 3 x 40 µl DNA 1K stain, 3 x 20 µl DNA 1K ladder, 3 x 750 µl DNA 1K loading buffer, 9 spin filters
700-7308	**Experion DNA 12K Analysis Kit for 30 Chips**, includes 30 DNA chips, 3 cleaning chips, 3 x 650 µl DNA 12K gel, 3 x 40 µl DNA 12K stain, 3 x 20 µl DNA 12K ladder, 3 x 750 µl DNA 12K loading buffer, 9 spin filters

Experion Analysis Kit Accessories

700-7151	**Experion Pro260 Chips**, 10, plus 1 cleaning chip
700-7152	**Experion Pro260 Reagents and Supplies for 10 Chips**, includes 3 x 520 µl Pro260 gel, 45 µl Pro260 stain, 60 µl Pro260 ladder (10–260 kD), 400 µl Pro260 sample buffer, 3 spin filters
700-7153	**Experion RNA StdSens Chips**, 10, plus 2 cleaning chips
700-7154	**Experion RNA StdSens Reagents and Supplies for 10 Chips**, includes 1,250 µl RNA gel, 20 µl RNA StdSens stain, 20 µl RNA ladder, 900 µl RNA StdSens loading buffer, 2 spin filters
700-7155	**Experion RNA HighSens Chips**, 10, plus 2 cleaning chips
700-7156	**Experion RNA HighSens Reagents and Supplies for 10 Chips**, includes 1,250 µl RNA gel, 20 µl RNA HighSens stain, 20 µl RNA ladder, 900 µl RNA HighSens loading buffer, 100 µl RNA sensitivity enhancer, 2 spin filters
700-7163	**Experion DNA Chips**, 10, for DNA 1K and 12K analyses, plus 1 cleaning chip
700-7164	**Experion DNA 1K Reagents and Supplies for 10 Chips**, includes 3 x 250 µl DNA 1K gel, 40 µl DNA 1K stain, 20 µl DNA 1K ladder, 750 µl DNA 1K loading buffer, 3 spin filters
700-7165	**Experion DNA 12K Reagents and Supplies for 10 Chips**, includes 650 µl DNA 12K gel, 40 µl DNA 12K stain, 20 µl DNA 12K ladder, 750 µl DNA 12K loading buffer, 3 spin filters
700-7251	**Experion Cleaning Chips**, 10
700-7252	**Experion Electrode Cleaner**, 250 ml
700-7253	**Experion DEPC-Treated Water**, 100 ml
700-7254	**Experion Spin Filters**, 10
700-7255	**Experion RNA Ladder**, 20 µl
700-7256	**Experion Pro260 Ladder**, 60 µl
700-7261	**Experion DNA 1K Ladder**, 20 µl
700-7262	**Experion DNA 12K Ladder**, 20 µl
700-7112	**Experion Mouse Liver Total RNA Standard**, 500 ng/µl, 20 µl
500-0208	**Bovine Gamma Globulin (BGG) Standard**, 2 mg/ml, 2 ml
700-7264	**Cleaning Swabs**, lint free, for electrode deep cleaning, 25
700-7270	**Experion Pro260 Sample Buffer**, 400 µl, 2 vials
163-2091	**ReadyPrep Proteomics Grade Water**, 500 ml
161-0710	**2-Mercaptoethanol**, 25 ml
161-0610	**Dithiothreitol (DTT)**, 1 g

Experion™ Starter Kits

Experion starter kits include all the necessary consumables to illustrate the utility of the Experion system in protein or RNA applications.



The Experion protein starter kit (using the Pro260 chip) provides information on:

- How best to prepare and load a protein chip
- Protein quantitation and sizing using a known standard
- Creating and running a calibration curve
- The concept of scaling for the virtual gel
- Tips and common mistakes

The Experion RNA starter kit (using RNA StdSens chip) provides information on:

- How best to prepare and load an RNA chip
- How to confirm RNA quality and integrity
- The concept of scaling for the virtual gel
- Tips and common mistakes

Each kit contains:

- Experion reagents
- Three Experion chips
- Cleaning chips
- RNase-free tips
- RNase-free tubes
- DEPC-treated water
- DTT (protein kit only)
- Spin filters
- Electrode cleaner
- Cleaning swabs (lint free)
- Control sample
- Detailed instruction manual
- CD-ROM with system introduction and chip loading video

For More Information
Web: www.bio-rad.com/experionstarterkits
Request or download bulletin: 5732

Ordering Information

Catalog #	Description
700-7110	**Experion Pro260 Starter Kit**, includes 3 Experion chips, 1 cleaning chip, Experion reagents, spin filters, IgG protein standard, DTT, cleaning swabs (lint free), electrode cleaner, narrow bore polypropylene pipet tips, polypropylene 0.5 ml microcentrifuge tubes, DEPC-treated water (0.2 µm filtered)
700-7111	**Experion RNA StdSens Starter Kit**, includes 3 Experion chips, 2 cleaning chips, Experion reagents, spin filters, total RNA standard, cleaning swabs (lint free), electrode cleaner, narrow bore polypropylene pipet tips, RNase- and DNase-free polypropylene 0.5 ml microcentrifuge tubes, DEPC-treated water (0.2 µm filtered)

Imaging Instruments

Imaging Systems 258

Imaging Systems

Imaging systems detect images and quantitate colorimetric, chemiluminescent, fluorescent, and radioisotopic signals. Bio-Rad also offers software (pages 268–272) that provides automation for image acquisition with data analysis and validation. Refer to the guide below to select the imaging system best suited for your applications.

Learn More about the Technology
Web: www.bio-rad.com/tech/proteinimaging

Imaging System Selection Guide







Application	ChemiDoc™ MP	Gel Doc™ EZ	GS-800™ Densitometer	Gel Doc XR+	ChemiDoc XRS+	PharosFX™	PharosFX Plus	Personal Molecular Imager™
Nucleic Acid Detection								
Ethidium bromide stain	5	4	—	4	4	5	5	—
SYBR® Green I stain	5	4	—	4	4	5	5	—
SYBR® Safe stain	5	4	—	4	4	5	5	—
Fast Blast™ DNA stain	4	4	5	4	4	—	—	—
Protein Detection, 1-D Gels								
Stain-free gels	5	5	—	—	—	—	—	—
Coomassie Blue stain	4	4	5	4	4	2	2	—
Silver stain	4	4	5	4	4	2	2	—
SYPRO Ruby protein gel stain	4	4	—	4	4	5	5	—
Flamingo™ fluorescent gel stain	4	3	—	4	4	5	5	—
Oriole™ fluorescent gel stain	5	4	—	5	5	—	—	—
Protein Detection, 2-D Gels								
Coomassie Blue stain	4	3	5	3	3	2	2	—
Silver stain	4	3	5	3	3	2	2	—
SYPRO Ruby protein gel stain	4	3	—	3	3	5	5	—
Flamingo fluorescent gel stain	4	2	—	3	3	5	5	—
Oriole fluorescent gel stain	5	3	—	3	3	—	—	—
Pro-Q stain	4	2	—	2	3	5	5	—
Cy2, Cy3, Cy5 label	4	—	—	—	—	5	5	—
Blot Detection								
Stain-free blots	5	5	—	—	—	—	—	—
Coomassie Blue stain	4	—	5	4	4	2	2	—
Silver stain	5	—	5	4	4	2	2	—
SYPRO Ruby protein blot stain*	5	—	—	—	—	5	5	—
Chemiluminescence	5	—	—	—	4	—	—	—
Chemifluorescence*	5	—	—	1	1	4	4	—
Quantum dot*	5	2	—	2	2	5	5	—
Multiplex fluorescence	5	—	—	—	—	5	5	—
Micro- and Macroarray Detection**								
Radiolabel	—	—	—	—	—	—	5	5
Fluorescence	5	—	—	2	2	5	5	—
Chemiluminescence	5	—	—	—	4	—	—	—
Colony Counting								
Colorimetric detection	5	—	—	4	4	3	3	—
Fluorescence detection	5	—	—	4	4	5	5	—
Isotopic Detection								
Radiolabel	—	—	—	—	—	—	5	5
X-ray film	4	4	5	4	4	3	3	—

— Not recommended; 1–5, recommendation level (5 = highest).
* Optimal with low fluorescence PVDF membrane.
** With spot diameters ≥400 µm.

ChemiDoc™ MP Imaging System

The ChemiDoc MP imaging system enables stain-free operation and lets you visualize proteins at every stage of your experiment. Its flexibility and sensitivity are complemented by simple, intuitive operation that integrates seamlessly into your workflow.



- **Stain-free technology** — eliminates extra steps and allows you to check electrophoresis results and transfer performance before western blotting, conserving precious samples and reducing waste
- **Ease of use** — auto focus, auto exposure, and simple operation mean that with little or no training, you can acquire publication-quality images in seconds
- **Versatility** — can be used for a variety of sample types or experiments that require differing detection methods, including chemiluminescence, multiplex fluorescence, and routine gel imaging, as well as for colorimetric gel and blot documentation
- **Image quality** — resolution remains high at any zoom level without creating artifacts; exceptional dynamic range enables visualization of faint and intense bands on same blot or gel. With Image Lab software, you can edit and analyze images on the spot without exporting to other programs (see the Image Quality section in bulletin 6133)
- **Sensitivity** — advanced detection technology creates optimal exposure even for small or faint bands

For More Information
Web: www.bio-rad.com/chemidoc
Request or download bulletin: 6133

Ordering Information

Catalog #	Description
170-8280	**ChemiDoc MP Imaging System with Image Lab Software**, PC or Mac, includes darkroom, UV transilluminator, epi-white illumination, camera, power supply, cables, Image Lab software
170-8283	**ChemiDoc MP Red LED Module Kit**, for use with applications requiring red fluorophore detection, includes 2 epi-red LED modules, 1 red emission filter
170-8284	**ChemiDoc MP Green LED Module Kit**, for use with applications requiring green fluorophore detection, includes 2 epi-green LED modules, 1 green emission filter
170-8285	**ChemiDoc MP Blue LED Module Kit**, for use with applications requiring blue fluorophore detection, includes 2 epi-blue LED modules, 1 blue emission filter
170-8294	**ChemiDoc MP IQ/OQ**, Image Lab software
170-8182	**XcitaBlue Conversion Screen**, includes view goggles; blue conversion screen for viewing SYBR Green, SYBR Safe, GFP, Flamingo, and other fluorescent gel stains
170-8183	**XcitaBlue Conversion Screen and Filter**, includes view goggles and SYBR Safe filter #170-8075; blue conversion screen for viewing SYBR Green, SYBR Safe, and other fluorescent gel stains
170-8098	**25 nm UV Lamps**, 6 replacement bulbs
170-8289	**White Light Conversion Screen**, for use with ChemiDoc MP, ChemiDoc XR+, and Gel Doc XR+ systems
170-6887	**365 nm UV Lamps**, 6 replacement bulbs
170-8097	**Standard 302 nm UV Lamps**, 6 replacement bulbs
170-8089	**Mitsubishi Thermal Printer**
170-7581	**Mitsubishi Thermal Printer Paper**, 4 rolls, for use with Mitsubishi printer
170-8184	**Gel Alignment Templates**, pkg of 3, templates for aligning gels and blots, for use with ChemiDoc XRS+, ChemiDoc MP, and Gel Doc XR+ systems

Gel Doc™ EZ Imaging System

The Gel Doc EZ imaging system is a compact and automated system for obtaining publication-quality images and analyzed results with just the push of a button.



Smart Imaging

- **Modular design** — use specific trays for specific applications; clearly defined and color-coded trays eliminate any confusion in usage
- **Flexible options** — purchase only what you want and upgrade when your needs change
- **Simplicity** — create your default protocol once and simply log in to use the tray
- **Image Lab™ software** — automate image capture, analysis, user preferences, and a myriad of other features
- **Completely analyzed results** — obtain high-quality images and analyzed results, including relative MW, quantitation of bands, Excel reports, and PDFs
- **Reproducibility** — user-introduced errors are minimized; rely on the system to give consistent results time after time
- **Condensed protocol** — convert a 2 hr Coomassie staining protocol into a 5 min stain-and-image step with stain-free technology
- **Compatibility** — stain-free gels are western blot compatible, allowing you to check electrophoresis results and quality prior to western blotting
- **Publication-quality images** — obtain clean and smooth images that are visually appealing and publication ready
- **Increased image resolution** — get images with better resolution when images are cropped or zoomed
- **Greater functionality** — no need to export images to another image editing program to change the dpi before importing for publication; define your desired dpi with Image Lab software

For More Information
Web: www.bio-rad.com/geldocez
Request or download bulletins: 5976 and 6088



White Tray
For use with protein applications that use Coomassie Blue, copper, silver, and zinc stains.



Blue Tray
For use with all nucleic acid applications that use GelGreen, SYBR® Green, SYBR® Safe, and SYBR® Gold stains.



UV Tray
For use with ethidium bromide, SYBR®, Oriole™ fluorescent gel stain, GelRed, SYPRO Ruby, Coomassie Fluor Orange, and Krypton stains.



Stain-Free Tray
For use with stain-free gels, such as Mini-PROTEAN® TGX Stain-Free™ gels and Criterion™ TGX Stain-Free™ gels, and stain-free blots.

Ordering Information

Catalog #	Description
170-8270	**Gel Doc EZ Imaging System**, PC or Mac, includes darkroom, camera, cables, Image Lab software; stain-free sample tray #170-8274; other sample trays available separately
170-8277	**Gel Doc EZ, IQ/OQ**, Image Lab software
Gel Doc EZ Sample Trays	
170-8271	**UV Sample Tray**, for gels using ultraviolet illumination
170-8272	**White Sample Tray**, for gels stained with Coomassie Blue, copper, silver, or zinc stains
170-8273	**Blue Sample Tray**, for gels stained with GelGreen or any SYBR stain
170-8274	**Stain-Free Sample Tray**, for stain-free gels and blots
170-8276	**Sample Tray Holder**, holds 4 sample trays
Accessories	
170-7581	**Mitsubishi Thermal Printer Paper**, 4 rolls, for use with Mitsubishi thermal printer
170-8089	**Mitsubishi Thermal Printer**, optional
170-8097	**Standard 302 nm UV Lamps**, 6 replacement bulbs

Gel Doc™ XR+ and ChemiDoc™ XRS+ Systems

The Gel Doc XR+ and ChemiDoc XRS+ systems are based on CCD high-resolution, high-sensitivity detection technology, and provide application flexibility. Key benefits include:

- Accurate, protocol-driven gel and blot imaging and analysis
- Automated quantitative analysis of protein and DNA samples in seconds
- Wide range of applications with special accessories to preserve sample integrity for downstream research while ensuring user safety
- Publication-quality results

Gel Doc XR+ System

The Gel Doc XR+ system consists of a darkroom hood, CCD camera and software-controlled motorized optics, UV and white light illuminators, filter slider with standard filter, and UV-protection shield. The system enables you to:

- Increase cloning efficiency and protein production by protecting DNA electrophoresis samples from UV exposure using the XcitaBlue™ conversion screen and blue light–excitable stains such as GelGreen, SYBR® Safe, and SYBR® Green I
- Maintain standard operating procedures or criteria for sample performance as there is no loss in sensitivity compared to UV and ethidium bromide staining

The Gel Doc XR+ system can be upgraded to the ChemiDoc XRS+ system.

For More Information
Request or download bulletin: 5838



See Also

Protein gel stains: pages 196–198.

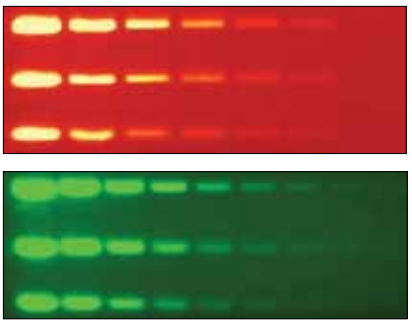
Nucleic acid gel stain: page 239.

Gel analysis software: pages 268–272.

ReadyAgarose precast gel system: page 232.

Western blotting: pages 202–223.

Northern and Southern blotting: pages 244–245.



An alternative to UV illumination to better preserve DNA samples. Top, serial dilutions of precision molecular mass ruler (Bio-Rad) stained with ethidium bromide (EtBr) on agarose gel imaged with UV light; **bottom**, serial dilutions of precision molecular mass ruler stained with SYBR® Safe on agarose gel imaged with XcitaBlue™ conversion screen. Lane 1 of 51.2 bp has an initial load of 51.2 ng and the Gel Doc™ XR+ system detects down to 100 pg. There is no loss in sensitivity when a combination of SYBR® Safe nucleic acid fluorescent stain and less harmful blue excitation is used instead of UV-excitable EtBr. The SYBR® Safe image was taken using the XcitaBlue conversion screen and SYBR® Safe/GFP emission filter.

ChemiDoc™ XRS+ System

The ChemiDoc XRS+ system offers sensitive chemiluminescence detection in addition to gel and blot documentation of fluorescent and colorimetric samples. The system includes a supersensitive 16-bit CCD camera that is supercooled for detection of faint samples. The system eliminates the need to use costly and unreliable X-ray film technologies while providing quantitative and reproducible data in seconds. It features a signal accumulation mode (SAM), which guides a user through determining optimum exposure time and capturing a desired image of a chemiluminescent sample.

For More Information
Web: www.bio-rad.com/imagingsystems
Request or download bulletin: 5837

Ordering Information

Catalog #	Description
170-8195	**Gel Doc XR+ System with Image Lab Software**, PC or Mac, includes darkroom, UV transilluminator, epi-white illumination standard filter, camera, cables, Image Lab software
170-8193	**Gel Doc XR+ IQ/OQ**, Image Lab software
170-8265	**ChemiDoc XRS+ System with Image Lab Software**, PC or Mac, includes darkroom, UV transilluminator, epi-white illumination standard filter, camera, power supply, cables, Image Lab software
170-8256	**ChemiDoc XRS+ IQ/OQ**, Image Lab software
Accessories	
170-8199	**Gel Doc XR+ Installation Kit**
170-8299	**ChemiDoc XRS+ Installation Kit**
170-7950	**White Light Transilluminator**, plugs into universal hood
170-8289	**White Light Conversion Screen**, for use with ChemiDoc MP, ChemiDoc XR+, and Gel Doc XR+ systems
170-8074	**Filter**, 520DF30, 62 mm, for SYBR Green I/GFP/SYBR Gold/fluorescein stain
170-8075	**Filter**, 560DF50, 62 mm, for Cy3/rhodamine stains
170-8076	**Filter**, 630BP30, 62 mm, for SYPRO Ruby/Texas Red stains
170-8081	**Filter**, standard emission, 62 mm
170-8098	**254 nm UV Lamps**, 6, replacement lamps
170-6887	**365 nm UV Lamps**, 6, replacement lamps
170-8097	**Standard 302 nm UV Lamps**, 6
170-8089	**Mitsubishi Thermal Printer**, optional
170-7581	**Mitsubishi Thermal Printer Paper**, 4 rolls, for use with Mitsubishi thermal printer
170-8183	**XcitaBlue Conversion Screen Kit**, includes viewing goggles and standard detection filter
170-8008	**Orange Fluorescence Reference Plate**
170-3759	**Bio-Rad Fluorescent Ruler**
170-3760	**Gel Cutter Ruler**
170-8184	**Gel Alignment Templates**, pkg of 3, templates for aligning gels and blots, for use with ChemiDoc XRS+, ChemiDoc MP, and Gel Doc XR+ systems
170-8026	**Image Lab Focus Calibration Target**
170-8027	**Image Lab Flat Fielding Disc**

PharosFX™ and Personal Molecular Imager™ (PMI™) Systems*

PharosFX Systems

The PharosFX Plus system combines the sophisticated fluorescence imaging capabilities of the PharosFX system with the ability to image radiolabeled samples using storage phosphor screens, all in a convenient, ergonomically designed unit. For capabilities of specific systems, refer to the guide below.

PMI System

The PMI system is designed specifically for detection of radiolabeled samples using storage phosphor screens. The PMI system has all the storage phosphor detection capabilities and functionality of the top-of-the-line PharosFX Plus system.

Fluorescence Detection

PharosFX systems are specially designed for imaging complex fluorescence applications with the highest data accuracy.

- **Optimal detection** — image single and multicolor fluorescence via direct laser excitation with high sensitivity, high resolution, and precise spectral assignment
- **Wide range of fluorophores** — excitation laser lines (532 nm laser and optional external 488 and 635 nm lasers) and detection filters are optimized to detect almost any fluorescent stain or label
- **Flexible sample options** — image blots, microtiter plates, and gels of thicknesses up to 12 mm
- **Automation** — select your application and Quantity One™ software automatically selects the optimal hardware (laser and filter) settings
- **Customization** — novel applications can be configured with custom filters and special detection options
- **Proteomics optimized** — seamless integration with PDQuest™ 2-D analysis software and the EXQuest™ spot cutter ensures reliable sample preparation for mass spectrometry protein identification
- **Multiple workflows** — robust design, ease of use, and low maintenance accommodate labs with multiple users and versatile worklows



Laser Scanner

Storage Phosphor Imaging for Radioisotope Detection

PharosFX Plus and PMI systems apply storage phosphor technology that offers ultimate sensitivity, with exposure times typically 1/10 that of film, and quantitative accuracy that is far superior. The PharosFX Plus and PMI systems are compatible with Kodak storage phosphor screens that can be used with Bio-Rad exposure cassettes or with standard autoradiography cassettes. Screens from other suppliers can also be used.

Compatible Kodak phosphor screens include:

- **Imaging screen-K** — general-purpose screen designed for all common radioisotopic emitters such as ^{32}P, ^{33}P, ^{35}S, and ^{14}C. The screen is available in 35 x 43 cm and 20 x 25 cm formats and is guaranteed for 1 year
- **Imaging screen-K/tritium** — specialty screen available for imaging ^{3}H. This screen requires special care and handling and is reusable if cared for properly. The screen is 20 x 24 cm and is guaranteed for 6 months

For More Information
Web: www.bio-rad.com/pharos
Request or download bulletins: 5331, 5475, and 5476

* Class I laser products.

See Also

Fluorescent protein gel stains: page 198.
Nucleic acid stain: page 239.
Gel analysis software: pages 268–272.

Configuration Guide

Features	PharosFX System	PharosFX Plus System	PMI System
Fluorescence detection			
Blue-excited (488 nm external laser)	○	○	—
Green-excited (532 nm internal laser)	•	•	—
Red-excited (635 nm external laser)	○	○	—
Multiplex applications	•	•	—
Radioisotope detection	—	•	•
Kodak/Fuji phosphor screens (using internal laser)		(532 nm)	(635 nm)
Choice of emission filters (including custom filters)	•	•	—

• Standard. ○ Optional. — Not available.

Ordering Information

Catalog #	Description
170-9460	**PharosFX Plus System**, PC or Mac, 110/240 V, includes Quantity One software, sample tray set, fluorescence filters #170-7866, #170-7896, and phosphor imaging filters, USB2 cable
170-9450	**PharosFX System**, PC or Mac, 110/240 V, includes Quantity One software, sample tray set, fluorescence filters #170-7866, #170-7896, and USB2 cable
Personal Molecular Imager (PMI) System	
170-9400	**Personal Molecular Imager (PMI) System**, PC or Mac, 110/240 V, includes Quantity One software, sample tray set, USB2 cable
Accessories for PharosFX and PharosFX Plus Systems	
170-7893	**635 nm External Laser Upgrade,** for #170-7890, includes #170-7865 filter
170-7892	**External Lasers**, 488 and 635 nm, includes #170-7865 filter
170-7896	**Filter 640 nm BP**, for Texas Red dye
170-9459	**Filter 530 nm BP**, for ECL Plus, AttoPhos, SYBR Green I, Alexa Fluor 488, FITC, Cy2, and Pro-Q Emerald dyes
170-7866	**Filter 605 nm BP**, for ethidium bromide, SYPRO Red, SYPRO Ruby, Alexa Fluor 532 and 546, and Cy3 dyes
170-7865	**Filter 695 nm BP**, for Cy5 and Alexa Fluor 635 dyes
170-7863	**Filter 555 nm LP**, for Texas Red dye
170-7867	**Blank Filter Holder**
Accessories for PharosFX, PharosFX Plus, and PMI Systems	
170-7811	**Sample Tray**
170-7812	**Multi-Sample Tray I**, for small aluminum-mounted screens and microplates
170-7814	**Microplate Adaptor**, for multi-sample tray I
170-7819	**Multi-Sample Tray II**, for scanning gels mounted to glass plates
Accessories for PharosFX Plus and PMI Systems	
170-7845	**Imaging Screen-K (Kodak)/Tritium**, 20 x 24 cm
170-7843	**Imaging Screen-K (Kodak)**, 20 x 25 cm
170-7841	**Imaging Screen-K (Kodak)**, 35 x 43 cm
170-7861	**Exposure Cassette-K**, for 20 x 25 cm Kodak screen
170-7862	**Exposure Cassette-K**, for 35 x 43 cm Kodak screen
170-7809	**Eraser Screen-K**, 110/120 V
170-7806	**Eraser Screen-K**, 220/240 V

GS-800™ USB Calibrated Densitometer

The GS-800 USB calibrated densitometer offers superior accuracy, sensitivity, and data reproducibility. It automatically self-calibrates the optical density to optimize detection. Features include:

- Imaging of a wide variety of samples such as 1-D and 2-D gels, colorimetric dot and slot blots, film-based chemiluminescent blots, autoradiograms, slides, and photographs
- Transmissive and reflective imaging using red, green, and blue CCD technology to scan chromogenic samples at the optimal detection wavelength
- IQ/OQ for verification of the reflectance and transmittance calibration functions using NIST-traceable calibration targets
- High resolution and analysis of closest bands on a gel due to 12-bit precision and 36.3 µm resolution
- Scanning of larger gels for enhanced separation of proteins on oversized 29 x 40 cm sample platen
- Accurate quantitation of samples such as Coomassie Blue and silver-stained gels over a large dynamic range (up to 3.0 OD)
- Sealed imaging platen to accommodate wet samples of variable thickness
- Purity analysis and lane background tools for manufacturing QC
- U.S. FDA 21 CFR Part 11 regulation compliance software



For More Information
Web: www.bio-rad.com/gs800
Request or download bulletin: 2596

Ordering Information

Catalog #	Description
170-7983	**GS-800 USB Calibrated Densitometer**, PC or Mac, 100/240 V
170-7956	**Installation Qualification/Operational Qualification (IQ/OQ)**, set of protocols for validating GS-800 densitometer calibration
170-9615	**Quantity One Software CFR Module**

See Also

Mini-format vertical electrophoresis: pages 133–143.

Midi-format vertical electrophoresis: pages 144–152.

Protein gel stains: pages 196–198.

Gel analysis software: pages 268–272.

See Also

2-D electrophoresis: pages 161–170.

First-dimension IEF: pages 161–167.

Second-dimension electrophoresis systems: pages 168–169.

2-D buffers and reagents: pages 166–167.

EXQuest™ Spot Cutter

The EXQuest spot cutter is designed to cut spots or bands from gels and blots with high efficiency, then deliver them to 96- and 384-well microplates or 96-tube racks. This fully integrated system is controlled through PDQuest™ 2-D analysis software or Quantity One® 1-D analysis software. It includes an enclosure, an imaging system, a fluidics system, robotics, sensors, a cutting head, a gel tray, a microplate rack, and a wash station. The spot cutter is also available with a PC.

Hands-Free Spot Cutting (Multiple Gels) and Plate Processing

- Capability to image gels and blots that are visibly stained (for example, with silver or Coomassie Blue stain) or fluorescence stained (SYPRO Ruby, Flamingo™, or Oriole™ fluorescent gel stains)
- Resolution of 100 µm for unbeatable precision
- Ability to image and cut up to 4 gels at a time at up to 600 spots/hour
- High-throughput delivery with >99.5% accuracy to 96- and 384-well microplates or 96-tube racks



Software Features

- PDQuest software automatically selects spots in order from lowest to highest amount of protein, minimizing the chance of carryover contamination from spot to spot
- Quantity One software provides convenient tools for 1-D gel cutting
- Tracking of spot information is controlled from image analysis to protein annotation; analyses can be compiled to direct automated spot excision

For More Information
Web: www.bio-rad.com/exquest
Request or download bulletin: 3194

Ordering Information

Catalog #	Description
165-7200	**EXQuest Spot Cutter**, includes enclosure, imaging system, fluidics system, robotics, sensors, cutting head, gel tray, microplate rack, wash station
165-7201	**EXQuest Spot Cutter with PC**
Accessories	
165-7202	**Cutting Tip**, 1.0 mm
165-7203	**Cutting Tip**, 1.5 mm
165-7204	**Glass Bottle**, 1 L
165-7205	**Calibration Pucks**, 10
165-7206	**Membrane Cutting Head**, with 1.0 mm tip
165-7207	**Membrane Cutting Tip**, 1.0 mm
165-7208	**Gel Cutting Sheets**, 15
165-7209	**Gel Holding Clips**, 2
165-7210	**Calibration Target**
165-7211	**Camera Target**
165-7212	**Micro Tubes**, 1.5 ml, 20
165-7214	**Bottle Holder**
165-7215	**Gel Tray**
165-7216	**Transilluminator Lamp**
165-7217	**Round-Bottom Microplates**, 96-well, 20
165-7218	**Ferrule**, 10–32, 1/16" OD, 10
165-7219	**Bar Code Reader**
165-7220	**Microplate Holder**
170-9630	**PDQuest Advanced 2-D Analysis Software**, 1-user license, 2-D analysis software, provides advanced functionality
170-9600	**Quantity One 1-D Analysis Software**, 1-user license, PC or Mac, image acquisition and analysis software for use with Bio-Rad imaging systems

Imaging and Bioinformatics Software

Software Overview 268

Gel Analysis Software 269

Software Overview

See Also

Imaging systems: pages 258–266.

Bio-Plex Manager software: pages 286–289.

Microplate Manager software: page 307.

Bio-Rad offers stand-alone software across a range of laboratory needs for image acquisition, image and data analysis, and data management. Software for 1-D and 2-D image analysis includes advanced tools to obtain the best image data possible. Built-in quick guides and software wizards enable you to optimize images and generate printed copies easily and quickly. Advanced software tools for pattern recognition and trend analysis utilize image and other data for optimal results. Image acquisition software runs in a Windows or Macintosh environment and has easy-to-use graphical interfaces with standard pull-down menus, toolbars, and keyboard commands. File formats and menu commands are shared across programs, allowing easy switching between applications.

For information on instrument platform-specific software, refer to the appropriate instrument section of this catalog.

For More Information
Web: www.bio-rad.com/imageanalysisSW
Request or download bulletin: 6126

Software Application Guide

	Gel Analysis		
	Image Lab™, page 269	**Quantity One**®, page 270	**PDQuest**™, page 271
Image acquisition	•	•	—
Automated analysis	•	•	•
Automated imaging and analysis	•	—	—
1-D gel analysis	•	•	—
Colony counting	—	•	—
Dot/slot blot analysis	•	•	—
2-D gel analysis	—	—	•
Image stacking*	—	—	•
Integrated gel excision (spot cutting)	—	•	•
U.S. FDA 21 CFR Part 11 compliance tools	—	•	•

* Image stacking is available in PDQuest Advanced software only.

Gel Analysis Software System Requirements

Component	Image Lab	Quantity One and PDQuest
Operating system	Windows XP Pro SP3 or Windows 7 (32- or 64-bit); Mac OSX 10.6	Windows XP Pro SP3 Mac OSX 10.5
Processor	Intel 2.0 GHz; Pentium 4, dual core or better (Windows); Core 2 Duo 2.0 GHz or higher (Mac)	Intel 2.0 GHz; Pentium 4, dual core or better (Windows); Core 2 Duo 2.0 GHz or higher (Mac)
Hard disk space	Minimum >20 GB; recommend ≥100 GB	Minimum >20 GB; recommend ≥100 GB
System memory (RAM)	Minimum 1 GB; recommend ≥2 GB	Minimum 1 GB; recommend ≥2 GB
Screen resolution	1024 x 768 or higher (Windows); 128 MB video RAM 1280 x 1024 or higher (Mac); 128 MB video RAM	1024 x 768 or higher (Windows); 128 MB video RAM 1280 x 1024 or higher (Mac); 128 MB video RAM
USB port	1 free USB 2.0 port	2 free USB 2.0 ports; 4 USB ports recommended
Quantity One HASP dongle	—	1 USB 1.0 or better or parallel port (Windows) 1 USB 1.0 or better or Mac ADB port
Optional software	Microsoft Office 2003 or 2007 (Windows) Microsoft Office 2008 or iWork (Mac)	Microsoft Office 2003 or 2007 (Windows) Microsoft Office 2008 or iWorks (Mac)
FireWire port (required only for ChemiDoc™ XRS+ system with FireWire camera)	—	1 free FireWire port (FW 400; 6 pin) or 1 full size PCI slot (Windows only) **Warning:** PCI card requires full size PCI slot

Gel Analysis Software

Image Lab™ Software

Image Lab image acquisition and analysis software runs the Gel Doc™ EZ, Gel Doc XR+, ChemiDoc™ XRS+, and ChemiDoc MP imaging systems. After the sample is loaded, a single integrated and automated workflow captures optimized gel or blot image data, analyzes the gel or blot features, and produces a comprehensive report in mere seconds. Image Lab software includes detailed tutorials and requires no previous imaging experience to produce optimum gel and blot images.

Automated Workflow

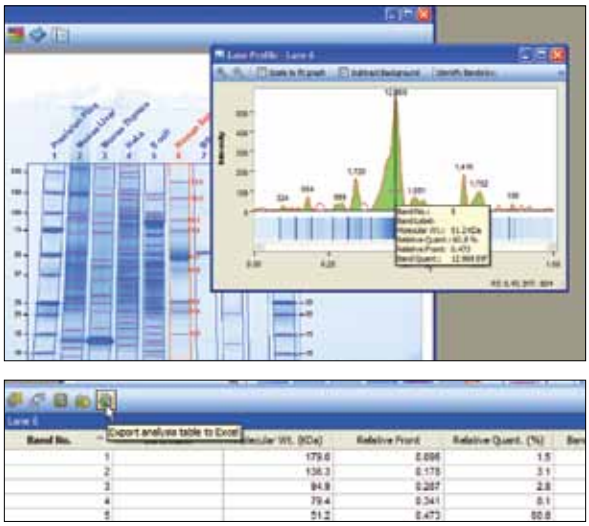
- Executes preprogrammed and user-created protocols to perform imaging experiments from image capture to analysis to printed reports with a single click of the mouse
- Simplifies and optimizes imaging and analysis while saving time
- Ensures that workflows are reproducible

System Optimization at Setup

- Selects the optimum detection conditions for the sample stain, label, or light-emitting reaction
- Uses proprietary algorithms to calibrate the system for automatic control of focus at any zoom level and automatic correction of imaging artifacts
- Performs flat fielding corrections specifically and consistently for every application
- Generates accurate data and beautiful images

Automated or Manual Data Analysis

- Performs all the image analysis steps automatically; can be user-modified for more precise band detection, control of background level, and choice of lane
- Updates results tables instantly when experimental parameters are changed
- Offers optional manual image analysis for adjustments by the user in every step
- Displays MW (or base pair) values and presents a quantitative comparison to evaluate sample purity and identify sample components for all bands and lanes



Data analysis and reporting.

Customized Data Tables, Reports, and Visuals

- Generates a customized data table with all sample information organized lane by lane and band by band each time a data analysis is performed or modified
- Copies any part of a data table to popular document processing applications such as Adobe Acrobat, Microsoft Word, or Microsoft Excel
- Saves reports within customized protocols designed by the user
- Provides multiple tools for displaying, viewing, and annotating images; exports Image Lab software visuals directly into publications and presentations

For More Information
Web: www.bio-rad.com/imagelabsoftware

Ordering Information

Catalog #	Description
170-9690	**Image Lab Software**, for automated image capture, optimization, and 1-D data analysis, for use with Gel Doc EZ, Gel Doc XR+, ChemiDoc XRS+, and ChemiDoc MP imaging systems, software, PC or Mac

See Also

Imaging instruments: pages 258–265.

EXQuest spot cutter: page 266.

Protein electrophoresis systems: pages 131–160.

DNA electrophoresis systems: pages 224–232.

Quantity One® 1-D Analysis Software

Image acquisition is simple with Quantity One software. The software can acquire, quantitate, and analyze a variety of data, including radioactive, chemiluminescent, fluorescent, and color-stained samples acquired from densitometers, storage phosphor imagers, fluorescence imagers, and gel documentation systems. It allows automatic configuration of these imaging systems with appropriate filters, lasers, LEDs, and other illumination sources. Its flexible tools allow automated analysis of 1-D electrophoretic gels, dot blots, slot blots, and colony counts for fast, high-quality results.

Flexible Lane and Band Analysis

- Automatic lane and band detection
- Rapid MW determination with choice of multiple regression models and preset standards
- Band and lane matching analysis with comparative dendrogram creation
- Background subtraction correction of gradient gels
- Purity analysis

Quick and Easy Quantitation

- Accurate concentration analysis using sophisticated volume tools (volume box, volume circle, volume contour, or freehand drawing)
- Local background subtraction for individual bands or global background for the entire gel or blot

Reproducible

- Save and recall acquisition settings for repeated use
- Use the same imaging conditions for similar samples

Automation Manager

The Automation Manager tool allows templates for the following functions to be saved and run automatically:

- Recall of lane and sample layouts
- MW determination
- Volume overlays
- Text and line overlays

Integration with the EXQuest™ Spot Cutter

- Easy-to-use point-and-click spot cutting of specified bands or entire lanes from 1-D gels
- Increased accuracy and reproducibility by integrating Quantity One software with the EXQuest spot cutter to cut 1-D gels prior to mass spectrometric identification



Merge and view up to three images in different color channels.

Other Functionality

- Colony counting that discriminates colonies and plaques
- Array tools to analyze and quantitate dot blots, slot blots, and medium-density arrays
- Annotation tools to add text and lines
- Tools for compliance with U.S. FDA 21 CFR Part 11 regulations
- ReadyAgarose™ precast gel wizard for simplified sample tracking
- Lane matching to compare the similarity of samples using the phylogenetic tree, similarity matrix, or band type report to determine absence or presence of bands

Quantity One Basic Software

Many of the features described are available in Quantity One Basic software. Images can be acquired and analyzed, data shared among colleagues, and images annotated and submitted for journal publication with this free software, which includes the basic functionality. Quantity One Basic software is available without a license or password restrictions and can be loaded on an unlimited number of computers.

For More Information
Web: www.bio-rad.com/quantityone
Request or download bulletin: 3002

Ordering Information

Catalog #	Description
170-9600	**Quantity One 1-D Analysis Software**, PC or Mac
170-9601	**Quantity One 1-User Network License**, PC or Mac
170-9602	**Quantity One 2-User Network License**, PC or Mac
170-9603	**Quantity One 3-User Network License**, PC or Mac
170-9604	**Quantity One 4-User Network License**, PC or Mac
170-9605	**Quantity One 5-User Network License**, PC or Mac
170-9606	**Quantity One 10-User Network License**, PC or Mac
170-9607	**Quantity One 20-User Network License**, PC or Mac
170-9608	**Quantity One Add 1 User to Network License**
170-9610	**Quantity One Version Upgrade**, PC or Mac
170-9612	**Quantity One User Guide**
170-9615	**Quantity One CFR Module**

PDQuest™ 2-D Analysis Software, Version 8.0

PDQuest software offers comprehensive and flexible 2-D gel electrophoretic analysis. Choose PDQuest Basic software for simple 2-D gel analysis or PDQuest Advanced software for comprehensive functionality used in 2-D gel-based expression proteomics studies. Whether you choose the basic or advanced version, the sophisticated analysis tools reveal subtle differences among 2-D gels. Powerful auto-matching algorithms quickly and accurately match gels with little or no manual intervention.

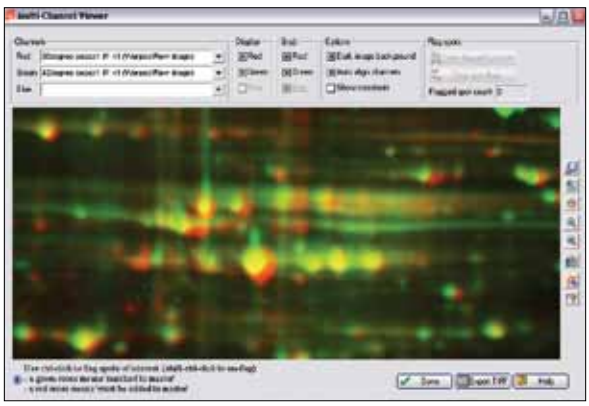
Ease of Use

- User-friendly, application-directed user interface
- Quick guides and wizards to simplify workflow through the major applications of the software, from image acquisition to output of analyzed data and spot cutting
- Onscreen, context-sensitive help
- Context-sensitive right-click menus for quick access to common commands
- True multiplatform files for PC and Mac
- TIFF file import; TIFF and JPEG file export

Image Optimization and Visualization

- Adjustment of brightness, contrast, and image filtering
- Full incremental image rotation
- Color palette for realistic color representation
- Multichannel merging of up to 3 images in independent color channels — allows convenient viewing of merged data
- Viewing function for 3-D modeling of any user-defined area of the gel (gel analysis software)





Experiment wizards and image warping enable easy identification of differentially expressed proteins from 2-D gels.

See Also

2-D electrophoresis: pages 161–171.

PROTEAN i12 IEF system: pages 161–167.

Second-dimension electrophoresis systems: pages 168–170.

2-D buffers and reagents: pages 166–167.

EXQuest spot cutter: page 266.

Advanced Data Analysis
- Wide variety of statistical tools
- Comparative analysis
- Biological relationship models
- Comprehensive reports

Automation
- Repeatable analysis for samples of similar types
- Recallable templates
- Batch processing of multiple experiments

Information Repository
- Flexible annotation features
- Any type of characterizing data can be linked to each spot on a master gel image
- Easy to view and share information associated with identified proteins

Data Security
- Compliance with U.S. FDA 21 CFR Part 11 regulations
- Options for network licenses

Integration with the EXQuest™ Spot Cutter
- Seamless integration of 2-D analysis with robotic control of spot cutting
- Automated excision of spots of interest identified by 2-D analysis and statistical tools
- Easy-to-use point-and-click spot cutting of specified spots on 2-D gels
- Spot cutting configurations for a high degree of accuracy, high throughput, and flexibility in protein identification experiments

For More Information
Web: www.bio-rad.com/pdquest
Request or download bulletin: 3121

Ordering Information

Catalog #	Description
170-9630	**PDQuest Advanced 2-D Analysis Software**
170-9631	**PDQuest Advanced 1-User Network License**
170-9632	**PDQuest Advanced 2-User Network License**
170-9633	**PDQuest Advanced 3-User Network License**
170-9634	**PDQuest Advanced 4-User Network License**
170-9635	**PDQuest Advanced 5-User Network License**
170-9636	**PDQuest Advanced 10-User Network License**
170-9640	**PDQuest Basic to Advanced Software Version Upgrade**
170-9642	**PDQuest User Guide**
170-9645	**PDQuest Advanced CFR Module**
170-9620	**PDQuest Basic 2-D Analysis Software**
170-9660	**PDQuest Basic Software Version Upgrade**, 7.x–8.0
170-9670	**PDQuest Advanced Software Version Upgrade**, 7.x–8.0

Protein Interaction Analysis

ProteOn™ XPR36 Protein Interaction Array System **274**

Instrument 274
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Kits, Reagents, and Consumables 278

ProteOn™ XPR36 Protein Interaction Array System

See Also

Profinia protein purification system: pages 121–123.

Experion automated electrophoresis system: pages 250–256.

The ProteOn XPR36 protein interaction array system is an SPR optical biosensor that provides real-time data on the affinity, specificity, and interaction kinetics of protein interactions. Using proprietary XPR™ technology, a unique approach to multiplexing, this system generates a 6 x 6 interaction array for the simultaneous analysis of up to six targets with up to six analytes. ProteOn Manager™ user-friendly software provides a flexible, guided approach to coordinate instrument control, experiment setup, and data analysis.



Key Features and Benefits

- Analysis of up to 36 different protein interactions in a single run on a single chip
- Complete kinetic analysis in a single run
- Full kinetic data in a single run using our patented One-shot Kinetics™ method
- Ability to simultaneously measure a variety of experimental conditions in parallel
- Ability to screen multiple panels of analytes
- Automated system with real-time data acquisition
- Analysis of interaction kinetics, binding affinity, and analyte concentration
- No radiochemical or fluorescent labels needed
- Unique referencing options such as interspot and real-time double referencing

Applications

- Large and small molecule drug development
- Antibody characterization
- Epitope binning of up to 36 antibodies on a single chip

For More Information
Web: www.bio-rad.com/proteon
Request or download bulletins: 5390 and 5538

Learn More about the Technology
Web: www.bio-rad.com/tech/proteon

Instrument

ProteOn™ XPR36 Instrument

The ProteOn XPR36 instrument incorporates the microfluidics, optical detection, and temperature control systems that are required for interaction analysis. It integrates a high-efficiency crisscross microfluidic system with a highly sensitive optical system to generate interaction array data on up to six targets with up to six analytes in a single injection. ProteOn XPR36 instrument features include:

- Advanced optics and interspot referencing
- Innovative microfluidics design
- Flexible sample configuration (72 vials with pierceable caps or two 96-well standard or deep-well microplates)
- A temperature-controlled sensor surface (15–40°C) and cooled sample rack (2–35°C)
- Hardware and software control of the fluidics, including two 2 L buffer reservoirs
- Status LEDs to monitor instrument, chip, experiment, and temperature state
- Bar code recognition of sensor chips

Advanced Optics and Interspot Referencing
The ProteOn XPR36 protein interaction array system uses imaging technology to detect the SPR response for each spot on a sensor chip. The ProteOn XPR36 system measures a total of 78 spots: 36 spots represent the interaction data from the 6 x 6 array, and 42 interspot references can be used for reference subtraction.

Innovative Fluidics and Parallel Processing
The 6 x 6 interaction array and microfluidic system provide efficient parallel processing of multiple samples. Two sets of six 0.5 ml syringe pumps operate in unison for parallel aspiration and injection of six samples or reagents.

Bar Code Recognition
Bar codes provide automatic recognition of sensor chip type, expiration date, and lot number as well as a usage record that includes associated protocols and experiments.

For More Information
Web: www.bio-rad.com/proteon
Request or download bulletin: 5413

Ordering Information

Catalog #	Description
176-0100	**ProteOn XPR36 Protein Interaction Array System**, 100–240 V, includes ProteOn XPR36 instrument, 2 licensed copies of ProteOn Manager software, controller and display, communication cable, sample rack, rack needle set, microplate needle set, collection tank, choice of 2 sensor chips, One-shot Kinetics kit, maintenance kit, 2 bottles of PBS/Tween running buffer, chip normalization solution, 100 sample vials, 25 microplates with standard wells, 50 sheets of microplate sealing film, instruction manual
Accessories*	
176-4114	**ProteOn Buffer Inlet Filters**, 2
176-6000	**ProteOn Sample Rack**, holds 72 sample vials
176-6003	**ProteOn Needles**, 6
176-6004	**ProteOn Wash Station**
176-6061	**ProteOn Collection Tank Tubing**
176-6005	**ProteOn Syringe**, replacement, 1
176-6050	**ProteOn Syringe**, replacement, 6

* For additional accessories, go to **www.bio-rad.com/proteininteraction**.

Software

ProteOn Manager™ Software

ProteOn Manager software is an intuitive workflow-oriented software package that coordinates instrument control, experiment setup, data collection, and analysis.

Key Features

- Windows 7 and Windows XP validated software
- Control and monitoring of instrument communication, temperature, power status, chip docking and undocking, instrument fluidics, and autosampler illumination
- Automated protocol creation and application-based protocol templates
- Real-time data collection and display
- Color coded sample layout, data filtering, and grouping tools
- Reference subtraction and real-time double reference modes to ensure highest quality data
- Langmuir, Langmuir with mass transfer, bivalent analyte, heterogeneous analyte, heterogeneous ligand, two state, Langmuir with drift, and off-rate analysis models
- Easily review protocols using Protocol Check screen
- Automated protocol and data analysis templates
- Simplified sample information import



- Three analysis options: kinetics, equilibrium, and concentration
- Customizable analysis reports — includes sensorgrams; equilibrium and concentration analysis graphs; residuals to evaluate accuracy of data fitting; kinetic, equilibrium, and concentration constants determination
- Sensorgram data can be exported as data or as an image for presentations and reports
- Control over sensorgram line color and thickness for publication-quality data

For More Information
Web: www.bio-rad.com/proteonsoftware
Request or download bulletin: 5627

Ordering Information

Catalog #	Description
176-0200	**ProteOn Manager Software**, 1-user license, includes 1 HASP key
176-0210	**ProteOn Manager Software, Security Edition**, allows U.S. FDA 21 CFR Part 11 compliance, 1-user license, includes 1 HASP key

Regulatory Tools

ProteOn™ XPR36 System Regulatory Tools Package

ProteOn Manager™ Software, Security Edition

ProteOn Manager software is available with controls to help achieve U.S. FDA 21 CFR Part 11 compliance. Included in the many features of this Security Edition release are:

- Audit trails
- Electronic signatures
- Data validation
- User log-ins and permissions
- Closed-system security

ProteOn XPR36 Installation Qualification/Operation Qualification (IQ/OQ) Kit

The ProteOn XPR36 IQ/OQ kit has been designed to test critical system functions to ensure reliability and consistency of performance. Key features include:

- Wizard-driven software
- Printable electronic reports for document controls
- Electronic log of IQ/OQ and test results



- Ready-to-use reagents and sensor chip for testing system performance
- Unattended operation

For More Information
Web: www.bio-rad.com/proteonregulatorytools
Request or download bulletins: 5409, 5627, and 5819

Ordering Information

Catalog #	Description
176-4225	**ProteOn XPR36 Regulatory Tools Package**, includes ProteOn Manager software, Security Edition, 1-user license, includes 1 HASP key, ProteOn XPR36 IQ/OQ kit
176-0210	**ProteOn Manager Software, Security Edition**, allows U.S. FDA 21 CFR Part 11 compliance, 1-user license, includes 1 HASP key
176-4200	**ProteOn XPR36 IQ/OQ Kit**, includes ProteOn XPR36 IQ/OQ software, ProteOn OQ kit
176-4220	**ProteOn Operation Qualification Kit**, includes ProteOn OQ Kit 1, ProteOn OQ Kit 2, ProteOn GLC sensor chip

Sensor Chips

ProteOn™ Sensor Chips

For use with the ProteOn XPR36 protein interaction array system, ProteOn sensor chips combine advanced surface chemistries with state-of-the-art microfluidics. Robust, real-time, label-free biomolecular interaction data are generated in this novel 6 x 6 SPR technology.

NEW ProteOn LCP Sensor Chip
Provides a surface that contains NeutrAvidin in a planar configuration. Designed for use with the ProteOn LCP reagent kit, which allows capturing of both single and multiple layers of lipid assemblies such as liposomes.

ProteOn GLC Sensor Chip
Designed for general amine coupling, this chip has a compact polymer matrix layer with a binding capacity of approximately one protein monolayer. The GLC sensor chip is suitable for various research applications, including protein-protein interaction analysis.

ProteOn GLM Sensor Chip
Designed for general amine coupling, featuring an extended polymer matrix with intermediate binding capacity for high analyte response. Suitable for many applications, including protein–small molecule and protein-protein interaction analyses.

ProteOn GLH Sensor Chip
Designed for general amine coupling, this chip consists of a highly extended polymer matrix layer for maximum binding capacity. Optimal for protein–small molecule interactions and suitable for protein-protein interactions.

ProteOn NLC Sensor Chip
Features a NeutrAvidin protein immobilized to a GLC polymer layer for binding of biotinylated molecules. The binding capacity is approximately one protein monolayer. Suitable for many applications, including DNA-protein and protein-protein interaction analyses.



ProteOn Histidine-Tag Capturing Sensor Chips
ProteOn histidine-tag capturing sensor chips contain novel tris-NTA complexes for improved capture of histidine-tagged proteins. The complexes are attached to an alginate matrix layer.

- **NEW ProteOn HTE sensor chip** — higher tris-NTA surface density optimal for protein–small molecule interaction analysis
- **ProteOn HTG sensor chip** — compact tris-NTA surface density and less nonspecific binding, most suitable for protein-protein, protein-peptide, and protein-DNA interaction analyses

For More Information
Web: www.bio-rad.com/sensorchips
Request or download bulletins: 5404, 5409, and 6295

Ordering Information

Catalog #	Description
176-5011	**ProteOn GLC Sensor Chip**, for general amine coupling, compact polymer layer with binding capacity of approximately one protein monolayer
176-5012	**ProteOn GLM Sensor Chip**, for general amine coupling, polymer matrix layer with intermediate binding capacity
176-5013	**ProteOn GLH Sensor Chip**, for general amine coupling, polymer matrix layer with highest binding capacity
176-5021	**ProteOn NLC Sensor Chip**, for binding of biotinylated molecules, contains NeutrAvidin immobilized to GLC layer
176-5031	**ProteOn HTG Sensor Chip**, for capturing of histidine-tagged proteins, polymer matrix layer contains novel tris-NTA complexes with compact binding capacity
176-5033	**ProteOn HTE Sensor Chip**, for capturing of histidine-tagged proteins, polymer matrix layer contains novel tris-NTA complexes with higher binding capacity
176-5041	**ProteOn LCP Sensor Chip**, for capturing of lipid assemblies such as liposomes; for use with the ProteOn LCP capturing reagent kit

Kits, Reagents, and Consumables

ProteOn™ Kits and Reagents

ProteOn™ Development Kits

These kits provide the reagents and sensor chips needed to perform and analyze data from a complete experiment using the ProteOn XPR36 system. Each protocol development kit includes an amine coupling kit.

- **ProteOn™ One-shot Kinetics™ Kit** — interaction between the cytokine IL-2 and an IL-2 antibody is used to demonstrate a detailed kinetic analysis in a single injection cycle (One-shot Kinetics). The kit also demonstrates a useful method for controlling target immobilization levels during protocol development and optimization
- **ProteOn Multiple Protein Interaction Kit** — interaction between five mutant TEM1 β-lactamase proteins and wild-type β-lactamase inhibitor protein (BLIP) is used to demonstrate the power of the ProteOn XPR36 system to produce a detailed kinetic analysis of multiple simultaneous interactions in a single injection cycle and to map protein interfaces
- **ProteOn Protein-Small Molecule Kit** — interaction between the carbonic anhydrase II protein and the small molecule 4-carboxybenzene sulfonamide (4-CBS) is used to demonstrate the capability of the ProteOn XPR36 system to detect low molecular weight analytes

For More Information
Web: www.bio-rad.com/proteonkits
Request or download bulletins: 5409 and 5410

NEW **ProteOn Liposome Capturing Kit** — includes one ProteOn LCP sensor chip, one ProteOn LCP capturing reagent kit, and the ProteOn lipid modification conditioning solution. Captures lipid assemblies on a hydrophilic chip surface through DNA hybridization.

NEW **ProteOn GLC Lipid Kit** — includes one ProteOn GLC sensor chip and one ProteOn lipid modification kit. Captures lipid assemblies on a modified lipophilic GLC chip surface.

NEW **ProteOn Histidine-Tag Capturing Kits** — used for capturing histidine-tagged targets. Includes the HTG and HTE capturing kits, each with its own sensor chip (HTG or HTE) and a common reagent kit (HTG and HTE). The reagent kit is designed for easy activation and regeneration of the sensor chips and contains sufficient reagents for more than 80 injection cycles.



ProteOn Multiple Protein Interaction Kit

ProteOn Amine Coupling Kit — provides the reagents required for coupling targets that have amine groups (for example, proteins and nucleic acids) to surface carboxyl groups of ProteOn GLC, GLM, and GLH sensor chips. Ethanolamine HCl solution is included for deactivation of residual active sites. Sufficient reagents are provided for 60 moderate or up to 600 light activations.

ProteOn Immobilization Buffer Kit — designed to dilute protein samples for coupling to ProteOn sensor chips. Each buffer is sufficient for 100 ligand immobilizations.

ProteOn Regeneration and Conditioning Kit — buffers are available as a complete kit of nine solutions or individually. They include glycine buffers, SDS, sodium hydroxide, hydrochloric acid, phosphoric acid, and sodium chloride.



ProteOn Maintenance Kit — contains maintenance and cleaning chips (MNT and CLN chips) and maintenance solutions for post-experiment cleaning and weekly maintenance of the ProteOn XPR36 protein interaction array system.

ProteOn Running Buffers — prefiltered and sufficient for approximately two weeks of daily operation.

ProteOn Chip Normalization Solution — a 50% glycerol solution used for normalization of ProteOn sensor chip surfaces. It is sufficient for six months of daily use.

For More Information
Web: www.bio-rad.com/proteonkits
Request or download bulletin: 5409

Ordering Information

Catalog #	Description
176-1010	**ProteOn One-shot Kinetics Kit**, includes ProteOn IL-2/IL-2 antibody pair, GLC sensor chip, amine coupling kit, 50 ml sodium acetate buffer, pH 4.5
176-1020	**ProteOn Multiple Protein Interaction Kit**, includes ProteOn TEM1/BLIP protein set, GLC sensor chip, amine coupling kit, 50 ml sodium acetate buffer, pH 4.0
176-1030	**ProteOn Protein–Small Molecule Kit**, includes ProteOn carbonic anhydrase II/CBS pair, GLM sensor chip, amine coupling kit, 50 ml sodium acetate buffer, pH 5.0
ProteOn Lipid/Membrane Protein Application Kits	
176-2300	**ProteOn Liposome Capturing Kit**, includes 1 ProteOn LCP sensor chip, 1 ProteOn LCP capturing reagent kit, and ProteOn lipid modification conditioning solution
176-2310	**ProteOn LCP Capturing Reagent Kit**, for capturing lipid assemblies such as liposomes; for use with the ProteOn LCP sensor chip
176-2350	**ProteOn GLC Lipid Kit**, includes 1 ProteOn GLC sensor chip and 1 ProteOn lipid modification kit
176-2360	**ProteOn Lipid Modification Kit**, includes ProteOn lipid modification conditioning solution and ProteOn lipid modification solution
176-2361	**ProteOn Lipid Modification Conditioning Solution**, 45 ml, for cleaning and stabilizing the chip surface before capturing lipid assemblies such as liposomes
176-2365	**ProteOn Lipid Modification Solution**, 10 ml, for modifying the lipophilicity of the ProteOn GLC sensor chip
ProteOn Histidine-Tag Capturing Kits and Reagents	
176-2500	**ProteOn HTG Capturing Kit**, includes 1 ProteOn HTG sensor chip, 1 ProteOn HTG and HTE reagent kit
176-2510	**ProteOn HTG and HTE Reagent Kit**, includes 10 mM $NiSO_4$ (activation solution), 50 ml EDTA (regeneration solution); sufficient reagents for more than 80 cycles
176-2600	**ProteOn HTE Capturing Kit**, includes 1 ProteOn HTE sensor chip, 1 ProteOn HTG and HTE reagent kit
ProteOn Amine Coupling Kit	
176-2410	**ProteOn Amine Coupling Kit**, includes EDAC (EDC), sulfo-NHS, ethanolamine HCl
176-2450	**ProteOn Ethanolamine HCl**, 1 M, 40 ml
ProteOn Immobilization Buffer Kit and Components	
176-2110	**ProteOn Immobilization Buffer Kit**, includes one of each sodium acetate buffer (pH 4.0, 4.5, 5.0, 5.5)
176-2120	**ProteOn Acetate Buffer, pH 4.0**, 10 mM sodium acetate, 50 ml
176-2121	**ProteOn Acetate Buffer, pH 4.5**, 10 mM sodium acetate, 50 ml
176-2122	**ProteOn Acetate Buffer, pH 5.0**, 10 mM sodium acetate, 50 ml
176-2123	**ProteOn Acetate Buffer, pH 5.5**, 10 mM sodium acetate, 50 ml
ProteOn Regeneration Kit and Components	
176-2210	**ProteOn Regeneration and Conditioning Kit**, includes one of each glycine buffer (pH 1.5, 2.0, 2.5, 3.0), sodium hydroxide solution, SDS solution, hydrochloric acid solution, phosphoric acid solution, sodium chloride solution, 50 ml each
176-2220	**ProteOn Glycine Buffer, pH 1.5**, 10 mM glycine HCl, 50 ml
176-2221	**ProteOn Glycine Buffer, pH 2.0**, 10 mM glycine HCl, 50 ml
176-2222	**ProteOn Glycine Buffer, pH 2.5**, 10 mM glycine HCl, 50 ml
176-2223	**ProteOn Glycine Buffer, pH 3.0**, 10 mM glycine HCl, 50 ml
176-2230	**ProteOn Sodium Hydroxide Solution**, 50 mM, 50 ml
176-2240	**ProteOn SDS Solution**, 0.5%, 50 ml
176-2250	**ProteOn Hydrochloric Acid Solution**, 100 mM, 50 ml
176-2260	**ProteOn Phosphoric Acid Solution**, 0.85%, 50 ml
176-2270	**ProteOn Sodium Chloride Solution**, 1 M, 50 ml

continues

Ordering Information

Catalog #	Description
ProteOn Maintenance Kit and Components	
176-4300	**ProteOn Maintenance Kit**, includes 1 maintenance chip, 2 cleaning chips, 2 maintenance solutions (2 x 1 L 2% Contrad 70, 2 x 1 L 70% IPA)
176-4115	**ProteOn Maintenance Solution 1**, 2% Contrad 70, 2 x 1 L bottles
176-4116	**ProteOn Maintenance Solution 2**, 70% IPA, 2 x 1 L bottles
176-4117	**ProteOn Post-Experiment Cleaning Kit**, includes 2 cleaning solutions (50 ml 2% Contrad 70, 50 ml 20 mM HCl)
176-4118	**ProteOn Post-Experiment Cleaning Kit Solution 1**, 2% Contrad 70, 50 ml
176-4119	**ProteOn Post-Experiment Cleaning Kit Solution 2**, 20 mM HCl, 50 ml
176-2520	**ProteOn Maintenance and Post-Experiment Cleaning Kit**, includes 1 maintenance chip, 2 cleaning chips, 2 maintenance solutions (2 x 1 L 2% Contrad 70, 2 x 1 L 70% IPA), 2 cleaning solutions (50 ml 2% Contrad 70, 50 ml 20 mM HCl)
176-5100	**ProteOn MNT Maintenance Chip**, for use in instrument maintenance protocol
176-5110	**ProteOn CLN Cleaning Chip**, for use in microfluidics network cleaning protocol
ProteOn Running Buffers, Buffer Bottle, and Chip Normalization Solution	
176-2710	**ProteOn PBS**, phosphate buffered saline, pH 7.4, 2 L
176-2720	**ProteOn PBS/Tween**, phosphate buffered saline, pH 7.4, 0.005% Tween 20, 2 L
176-2730	**ProteOn PBS/Tween/EDTA**, phosphate buffered saline, pH 7.4, 0.005% Tween 20, 3 mM EDTA, 2 L
176-2700	**ProteOn Running Buffer Bottle**, 2 L capacity
176-2810	**ProteOn Chip Normalization Solution**, 50% glycerol, 100 ml

ProteOn™ Vials, Microplates, and Sealing Film

ProteOn Sample Vials

Compatible with the ProteOn sample rack, each 1.5 ml vial includes a pierceable cap to prevent evaporation.

ProteOn Standard Microplates

Compatible with the ProteOn autosampler platform, each microplate is a standard 96-well array, and each well holds 350 µl.

ProteOn Deep-Well Microplates

Compatible with the ProteOn autosampler platform, each microplate is a standard 96-well array, and each well holds 2.0 ml.

ProteOn Microplate Sealing Film

Specifically designed for use with the fluidic components of the ProteOn instrument, the film is required for covering ProteOn standard and deep-well microplates to prevent evaporation while running a protocol or during storage. It is easily applied to each microplate and is pierceable.

For More Information
Web: www.bio-rad.com/proteonkits
Request or download bulletin: 5409

Ordering Information

Catalog #	Description
176-6010	**ProteOn Sample Vials**, 1.5 ml, with pierceable caps, 100
176-6020	**ProteOn Standard Microplates**, 96 wells, 25
176-6023	**ProteOn Deep-Well Microplates**, 96 wells, 5
176-6040	**ProteOn Microplate Sealing Film**, 50 sheets

Bio-Plex® Multiplex System

Bio-Plex® Multiplex System	**282**
Instruments, Software, and Tools	282
Bio-Plex® Assays	**289**
Bio-Plex Pro™ Magnetic Cytokine, Chemokine, and Growth Factor Assays	289
Bio-Plex Pro Magnetic Cell Signaling Assays	295
Bio-Plex Signal Transduction Assays	296
Bio-Plex Pro Disease Research Assays	298
Bio-Plex COOH Beads and Related Reagents	303

Bio-Plex® Multiplex System

The Bio-Plex multiplex platform is built on the most flexible technology available. Bio-Rad offers instruments to satisfy a variety of research needs and budgets for multiplex applications. These readers include the compact Bio-Plex® MAGPIX™ reader, the versatile Bio-Plex 200 system, and the high-throughput capacity Bio-Plex 3D suspension array system.

Learn More about the Technology
Web: www.bio-rad.com/tech/bio-plex

Instruments, Software, and Tools

Bio-Plex System Selection Guide

	NEW Bio-Plex MAGPIX	Bio-Plex 200	Bio-Plex 3D
			
Features	Simple and convenient workflow Ideal for labs with budget constraints Compact footprint saves lab space	Versatile — accommodates multiple users Flexible — can read both magnetic and nonmagnetic assays One acquisition and analysis software package User-friendly data management	Meets high-throughput needs Optimal for labs with fewer budget restrictions Offers robotics interfacing
Read time (1 x 96-well plate)	~60 min	~45 min	~20 min
Plate compatibilities	96-well	96-well	96- and 384-well
Number of measurable analytes/well	50	100	500
Assay compatibility (refer to table below)	Most magnetic beads	All magnetic and nonmagnetic (polystyrene) bead-based assays	Most magnetic and all nonmagnetic (polystyrene) bead-based assays
Acquisition software	xPONENT*	Bio-Plex Manager	xPONENT
Analysis software	Bio-Plex Manager™ and Bio-Plex Data Pro™	Bio-Plex Manager and Bio-Plex Data Pro	Bio-Plex Manager and Bio-Plex Data Pro
Robotics and LIMS/LIS compatible	—	—	Yes**
Onsite training	—	Included	Included
Investment	$	$$	$$$
Footprint (W x D x H)	6.5 x 23.5 x 17" (16.5 x 60 x 43 cm)	16.9 x 20.1 x 9.1" (43 x 51 x 23 cm)	23 x 25.7 x 18" (58.4 x 63.5 x 54.7 cm)

* Bio-Plex Manager software for MAGPIX available in late 2013.

** Included in xPONENT automation module.

Bead and Assay Compatibility Table

Assay	MAGPIX	Bio-Plex 200	Bio-Plex 3D
Bio-Plex Pro™ cytokine*	◆	◆	◆
Bio-Plex Pro diabetes	◆	◆	◆
Bio-Plex Pro TGF-β	◆	◆	◆
NEW Bio-Plex Pro human cancer biomarker panels 1 and 2	◆	◆	◆
NEW Bio-Plex Pro Th17	◆	◆	◆
NEW Bio-Plex Pro cell signaling (magnetic)	◆	◆	◆
Bio-Plex signal transduction (nonmagnetic)	—	■	■
Bio-Plex Pro acute phase	—	▲	—
Bio-Plex® Precision Pro™ human cytokine	—	▲	—

* Except Bio-Plex Precision Pro human cytokine assay, #171-A1001P.

◆, 6.5 µm magnetic bead; ■, 5.6 µm nonmagnetic bead; ▲, 8.0 µm magnetic bead.

New Bio-Plex® MAGPIX™ Multiplex Reader

The Bio-Plex MAGPIX multiplex reader is a compact system providing solid performance and low maintenance for magnetic bead–based immunoassays. This multiplex reader is capable of reading assays designed on magnetic xMAP (MagPlex) beads, compatible with Bio-Plex Pro™ magnetic assays.

Features include:

- More data — up to 50 analytes per sample
- Simple and convenient workflow — easy to perform by researchers familiar with ELISA assays
- Sample and cost savings in single or multiplex format
- Industry-leading Bio-Plex Manager and optional Bio-Plex Data Pro software for data analysis
- Improved multiplex productivity and convenience with magnetic bead–based assays



- Compact footprint saves bench space
- Affordable low-maintenance system
- High-quality results

For More Information
Web: www.bio-rad.com/magpix
Request or download bulletin: 6005

Ordering Information

Catalog #	Description
Kits and Reagents	
171-015001	**Bio-Plex MAGPIX Multiplex Reader with Bio-Plex Manager Software**, includes Bio-Plex MAGPIX instrument, PC with xPONENT acquisition software installed, Bio-Plex Manager desktop license, calibration kit, verification kit, 2 drive fluid cartridges, 2 waste containers
171-213003	**Bio-Plex MAGPIX Drive Fluid**, 4 x 700 ml drive fluid for use with Bio-Plex MAGPIX multiplex reader
171-213001	**Bio-Plex MAGPIX Calibration Kit**, calibration kit good for 25 uses; kit includes 5 ml calibrator, microspheres, CD, pkg of 25 8-well strips
171-213002	**Bio-Plex MAGPIX Verification Kit**, verification kit good for 25 uses; kit includes MAGPIX verifier, 5 ml of microspheres, MAGPIX fluidics 1, MAGPIX fluidics 2, MAGPIX performance verification kit CD, pkg of 25 8-well strips
Bio-Plex MAGPIX Accessories	
171-012004	**Bio-Plex MAGPIX Replacement Waste Fluid Container**, pkg of 1, 850 ml container, holds waste fluid, for use with Bio-Plex MAGPIX reader
171-012005	**Bio-Plex MAGPIX Sample Probe Needle**, sample probe needle for use with Bio-Plex MAGPIX multiplex reader
171-012006	**Bio-Plex MAGPIX Sample Probe Height Adjustment Kit**, sample probe height adjustment kit for use with Bio-Plex MAGPIX multiplex reader
171-012008	**Bio-Plex MAGPIX 96-Well Plate Heater Block**, 96-well plate heater block for use with Bio-Plex MAGPIX multiplex reader
300-34376	**Bio-Plex Pro Wash Station**, for magnetic bead–based assays, includes magnetic plate carrier, waste bottle, 2 liquid bottles
300-34377	**Bio-Plex Pro II Wash Station**, for magnetic and polystyrene bead–based assays, includes magnetic plate carrier, vacuum manifold plate carrier, waste bottle, 2 buffer bottles
171-020100	**Bio-Plex Handheld Magnetic Washer**, includes magnetic washer and adjustment hex tools for use in manual wash steps for all Bio-Plex magnetic assays

Bio-Plex® 200 System

The Bio-Plex 200 system integrates xMAP suspension array technology with a reliable instrument, dedicated software, and validation tools. The system includes:

- **Array reader** — distinguish up to 100 different color-coded bead sets, each representing a different assay. Results in up to 9,600 data points in 45 min from a familiar 96-well format
- **Optional high-throughput fluidics (HTF)** — delivers up to 20 L of sheath fluid (40 plates) without user intervention
- **Bio-Plex MCV plate IV** — customized for hands-free startup, shutdown, and performance testing
- **Bio-Plex Manager™ software** — controls the instrument, data acquisition, and analysis (Standard and Security Edition)



Time-saving features include:

- Simplified startup, shutdown, control, and pre- and post-run maintenance routines
- Sophisticated analysis and instrument control software
- Automated IQ/OQ
- Integrated system validation and calibration logs for a record of system performance
- Superior curve fitting, statistics reporting, and charting features
- Calibration capabilities for both broad and low range standard dilutions

For More Information
Web: www.bio-rad.com/bio-plex200
Request or download bulletin: 6006

Ordering Information

Catalog #	Description
171-000201	**Bio-Plex 200 System**, 100–240 V, includes array reader, microplate platform, Bio-Plex Manager software with workstation license, PC, monitor, calibration kit, validation kit 4.0, MCV plate IV, Bio-Plex reservoir, 20 L sheath fluid, spare sample needle
171-000205	**Bio-Plex 200 System with HTF**, same as #171-000201 with high-throughput fluidics (HTF)
Bio-Plex 200 Accessories and Replacement Parts	
171-203050	**Bio-Plex Reservoir**
171-000055	**Sheath Fluid**, 1x, 20 L
171-002001	**Communication Cable**, 5' DB9 cable, connects the microplate platform with the PC serial port
171-002002	**Communication Cable**, 3' CAN BUS cable, connects the array reader with the HTF system
171-002003	**Communication Cable**, 5' USB cable, connects the array reader with a PC USB port
171-002010	**Sheath Fluid Bottle**, 1 L
171-002012	**Sheath Waste Bottle**, 1 L
171-002020	**Sample Needle**, 4.6" (11.6 cm)
171-002024	**Alignment Guide**, aligns the array reader on the microplate platform
171-002026	**Needle Adjustment Wrench**
171-002030	**Protective Shield for Sample Needle**
171-002032	**Air Intake Filter**
171-002033	**Syringe Seal**
171-002034	**Syringe Seal with Cylinder**
171-002038	**Sheath Fluid Filter with Quick Connect Tubing**, removes particles >5 µm in diameter
171-002040	**Sheath Cube Filter**, 10 µm, removes particles >5 µm in diameter
171-002056	**Sheath Cube Filter**, 10 µm, includes tubing, removes particles >10 µm in diameter
171-002023	**Needle Guide**, allows sample needle access to microplates
Bio-Plex 200 System Performance Validation and Calibration Tools	
171-203001	**Bio-Plex Validation Kit 4.0**, includes optics validation, reporter validation, classify validation, and fluidics validation bead sets for approximately 50 validation routines using Bio-Plex Manager software, current version, (Standard or Security Edition), and MCV plate IV
171-203033	**Bio-Plex MCV Plate IV**, for use with Bio-Plex Manager software, current version (Standard or Security Edition), and validation kit 4.0
171-203060	**Bio-Plex Calibration Kit**, includes Cal1 and Cal2 calibration beads for approximately 50 daily calibration routines

Bio-Plex® 3D Multiplex System

The Bio-Plex 3D multiplex system is the next-generation multiplexing platform based on xMAP technology. Expanded multiplexing capability, faster time to results, and automation capability make it the platform of choice for high-throughput testing for nucleic acid and protein applications.

Features include:

- Rapid read times — twice as fast as with the Bio-Plex 200 system
- Measurement of up to 500 unique analytes in a single sample
- 96- and 384-well plate capability
- Laboratory information system (LIMS/LIS)-compatible software
- Automation-compatible tray design
- Robotics interfacing capabilities
- Compatibility with magnetic or nonmagnetic assays
- Bio-Plex Manager software for data analysis
- Onsite training

For More Information
Web: www.bio-rad.com/bio-plex3D
Request or download bulletins: 5967 and 5980



Bio-Plex 3D Suspension Array System with Bio-Plex Manager Software

System Throughput Capabilities

Test (50 µl well volume, 2,500 beads/well)	Read Time*	Tests/Hr
96-well (100-plex)	18 min	32,000
384-well (100-plex)	1 hr 15 min	30,700
96-well (500-plex)	45 min	64,000
384-well (500-plex)	2 hr 15 min	85,000

* Read times measured across four instruments. Actual results may vary.

Ordering Information

Catalog #	Description
Bio-Plex3D	**Bio-Plex 3D Multiplex System**, includes Bio-Plex 3D multiplex system, xPONENT acquisition software, PC, calibration and verification reagents, Bio-Plex Manager desktop license
8920-18500001*	**xPONENT 21 CFR Part 11 Software Module**, enables U.S. FDA 21 CFR Part 11 compliance
8920-18700001*	**xPONENT Automation Module**, enables interfacing with robotics workstations
171-022001*	**Swivel Base**, allows rotation of the instrument away from the robotics workstation for maintenance and sample loading
8920-18600001*	**xPONENT LIS Software Module**, enables interfacing with LIMS/LIS databases
8920-18200001*	**xPONENT Extra Seat Licenses**, 3 additional seats of xPONENT software
171-213004	**Bio-Plex 3D Calibration Kit**, good for 25 uses; includes reagents, CD, 25 stripwells
171-213005	**Bio-Plex 3D Performance Verification Kit**, good for 25 uses; kit includes reagents, fluidics, CD, 25 stripwells

* All additional accessories may be purchased through Bio-Rad Laboratories, Inc. at the time of system purchase. Post-system purchase accessories must be purchased directly from Luminex Corporation.

Bio-Plex Pro™ Washing Accessories

Automated Bio-Plex Pro Wash Station

The Bio-Plex Pro and Bio-Plex Pro II wash stations streamline multiplex assays by eliminating manual wash steps. Bio-Plex Pro wash stations help decrease variability and increase consistency in results between experiments and are specifically designed to perform Bio-Plex assay wash steps. Benefits include:

- Reliable and reproducible results
- Optimized onboard protocols



- Simple ELISA-like workflow
- Custom protocol option for developing other xMAP applications

The Bio-Plex Pro wash station incorporates a magnetic plate carrier for simple and reliable hands-free washing of 96-well plates.

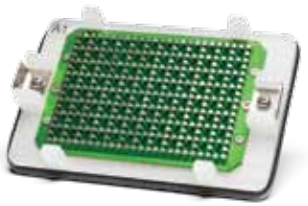
The Bio-Plex Pro II wash station includes both a magnetic plate carrier and an interchangeable vacuum manifold, providing the added flexibility of washing magnetic or nonmagnetic bead–based assays.

Both stations include preset wash programs that have been optimized for Bio-Plex assays.

NEW Bio-Plex Handheld Magnetic Washer
The Bio-Plex handheld magnetic washer is used in manual wash steps for all Bio-Plex magnetic assays.

Bio-Plex Pro Wash Station Selection Guide

Assay (Bead) Type	Bio-Plex Pro Wash Station	Bio-Plex Pro II Wash Station
Bio-Plex assays (polystyrene)	—	•
xMAP microspheres (polystyrene)	—	•
Bio-Plex Pro assays (magnetic)	•	•
Bio-Plex® Precision Pro™ assays (magnetic)	•	•
MagPlex microspheres (magnetic)	•	•



Ordering Information

Catalog #	Description
300-34376	**Bio-Plex Pro Wash Station**, includes magnetic plate carrier, waste bottle, 2 buffer bottles
300-34377	**Bio-Plex Pro II Wash Station**, includes magnetic plate carrier, vacuum manifold plate carrier, waste bottle, 2 buffer bottles
171-020100	**Bio-Plex Handheld Magnetic Washer**, includes magnetic washer and adjustment hex tools for washing all Bio-Plex magnetic assays
Accessories	
171-025001	**Bio-Plex Pro Flat Bottom Plates**, 40 x 96-well plates, for washing magnetic beads using the Bio-Plex Pro or Bio-Plex Pro II wash stations
171-304500	**Bio-Plex Wash Buffer**, 1.5 L
171-304502	**Filter Plate**, 1 x 96-well filter plate with clear plastic lid, plate holder tray, for washing nonmagnetic beads using the Bio-Plex Pro II wash station, optional vacuum manifold; sealing tape not included

Bio-Plex Manager™ Software, Standard Edition

Bio-Plex Manager software is a comprehensive, all-in-one software package that provides advanced data analysis for multiplex assays.

Simple Operation
- Ability to self train — just follow the steps outlined on the screen
- Familiar Windows interface — no new terms or menus to learn

Save Time
- Simplified input — values for standards are easy to enter; automatic addition of new lots reduces setup time
- Automated data processing — proprietary algorithm automatically sets the appropriate dynamic range and identifies data points outside this range
- Immediate recalculation of results efficiently updates data when settings are changed

Use Tools that Meet Your Unique Needs
- Superior sensitivity and dynamic range with onboard Brendan Scientific StatLIA 4PL and 5PL weighted curve-fitting models
- Data normalization using multiple internal controls (housekeeping genes) for gene expression applications
- Gene Manager analysis module for presence and absence analysis, pathogen detection, and genotyping applications

Analyze Data with Easy-to-Use Reports
- Automated export of standard curve graphs
- View of all wells or summary (average) of replicate samples
- Data organized by sample type, group, or well
- One-click navigation between analytes
- Flexible data presentation

Data Export, Cross-Platform Capabilities, and System Compatibility

- Import and analyze data from xPONENT and other third-party software
- Use any commercial or custom xMAP assay built on any Luminex microsphere
- Copy and paste data into popular word processing and presentation software applications
- Export to text, XML, and Excel in column or 96-well format
- Analyze data in LIMS and other third-party software by customizing export options
- Request Bio-Plex Manager 4.1.1 software for installation on Luminex systems with IS 2.3 software

Bio-Plex Manager Software Licenses

License	Capabilities and Uses
Instrument control	Full-system, data acquisition, and analysis; included with all Bio-Plex 200 systems
Desktop	Single-user license for protocol setup and data analysis; does not control the array reader
Network	Multiuser (5, 10, 25, or 50) licenses for data access from a server; does not control the array reader
Security edition	Enables U.S. FDA 21 CFR Part 11 compliance

System Requirements

CPU	Pentium 4 or higher, PC only
Operating system	Windows XP Professional, Windows 7

For More Information
Web: www.bio-rad.com/bio-plexmanager
Request or download bulletin: 5613

Ordering Information

Catalog #	Description
171-STND01	**Bio-Plex Manager Software**, includes 1-user desktop license, to analyze Bio-Plex data and generate protocols, does not operate the instrument
171-STND05	**Bio-Plex Manager Software**, 5-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171-STND10	**Bio-Plex Manager Software**, 10-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171-STND25	**Bio-Plex Manager Software**, 25-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171-STND50	**Bio-Plex Manager Software**, 50-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument

Contact Bio-Rad Technical Support to verify whether your current system is compatible with these software products.

Bio-Plex Manager™ Software Conversions and Upgrades

Bio-Plex Manager software conversions and upgrades allow you to upgrade previous versions of Bio-Plex Manager or convert non Bio-Plex systems to run like a Bio-Plex 200 system.

- **Preprogrammed routine processes** — automate startup, calibration, validation, run, and shutdown
- **Unattended routine operations** — program pre- and post-run maintenance operations to save time

Ordering Information

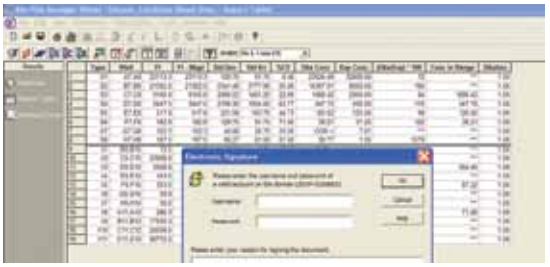
Catalog #	Description
171-STND23	**Bio-Plex Manager Software for IS 2.3 System**, system license, most current version, for converting Luminex IS and xPONENT systems
171-SUPG30	**Bio-Plex Manager Software for 3.0 Instrument Control Software**, system license for upgrading standard or security software version 3.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171-SCRT00)
171-SUPG40	**Bio-Plex Manager Software for 4.0 Instrument Control Software**, system license for upgrading the standard or security software version 4.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171-SCRT00)
171-SUPG41	**Bio-Plex Manager Software for 4.1 Instrument Control Software**, system license for upgrading the standard or security software 4.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171-SCRT00)
171-SUPG50	**Bio-Plex Manager Software for 5.0 Instrument Control Software**, system license for upgrading the standard or security software 4.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171-SCRT00)

Bio-Plex Manager™ Software, Security Edition

Includes all standard edition software features and has built-in security features for U.S. FDA 21 CFR Part 11 compliance:

- Includes Bio-Plex Gene Manager data analysis utility
- Control user log-in with different user levels for access to different functions
- Audit trails
- Secure protocol and data files
- Secure databases for reporting of calibration, validation, and instrument operations

For More Information
Web: www.bio-rad.com/bio-plexmanager
Request or download bulletin: 5613



Electronic signature window allows you to bring documents into a secure environment.

Ordering Information

Catalog #	Description
171-SCRT00	**Bio-Plex Manager Instrument Control License**, Security Edition, upgrades workstation with Bio-Plex Manager software, allows compliance with U.S. FDA 21 CFR Part 11 regulations
171-SCRT01	**Bio-Plex Manager Software**, Security Edition desktop, includes 1-user desktop license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument.
171-SCRT05	**Bio-Plex Manager Software**, Security Edition desktop, includes 5-user network license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument.
171-SCRT10	**Bio-Plex Manager Software**, Security Edition desktop, includes 10-user network license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument.
171-SCRT25	**Bio-Plex Manager Software**, Security Edition desktop, includes 25-user network license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument.
171-SCRT50	**Bio-Plex Manager Software**, Security Edition desktop, includes 50-user network license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument.

Contact Bio-Rad Technical Support to verify whether your current system is compatible with these software products.

Bio-Plex Data Pro™ Software

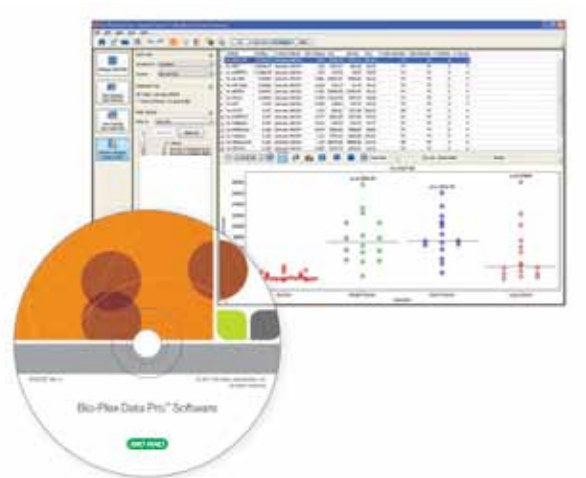
Bio-Plex Data Pro software simplifies the management and analysis of large data sets generated from multiplex assays. The software allows up to ten data file imports per project; optional Bio-Plex Data Pro Plus software is available for projects with more than ten data file imports.

Organize Data
- Merge, import, sort, and filter data from multiple data sets

Automate Calculations
- Perform common calculations and statistical tests quickly and confidently

Visualize Results
- Clearly present data with customized graphs and tables

For More Information and to Download a Free Trial
Web: www.bio-rad.com/datapro



Ordering Information

Catalog #	Description
171-001523	**Bio-Plex Data Pro Plus Software**, includes 5 Bio-Plex Data Pro Plus software licenses
171-001513	**Bio-Plex Data Pro Software**, includes 5 Bio-Plex Data Pro software licenses

Bio-Plex® Assays

Bio-Plex Pro™ Magnetic Cytokine, Chemokine, and Growth Factor Assays

Human, Mouse, and Rat Assays

Bio-Plex Pro cytokine, chemokine, and growth factor assays are magnetic bead–based multiplex immunoassays, offering accurate and reproducible measurements of multiple analytes simultaneously. These assays have been developed to provide reliable performance with the flexibility required to meet all of your research needs. Assays are available for human, mouse, or rat studies.

- **Magnetic beads** — automated plate washing and improved reproducibility across experiments
- **Increased productivity** — measure multiple analytes simultaneously, get results in about 3 hr
- **Flexible ordering options** — order either premixed all-in-one kits, singleplex sets, or customize your assay with the Bio-Plex assay builder (**www.bio-rad.com/assaybuilder**)
- **Cross-platform compatibility** — can be used with all xMAP life science instruments supplied by any Luminex partner
- **Convenient pathway panels** — Th17, Th1/Th2, and TGF-β available

For More Information
Web: www.bio-rad.com/CCGFassays
Request or download bulletins: 5828, 6054, 6100, and 6110

Available Assays

Analytes	Human	Mouse	Rat
β-NGF	•	—	—
Basic FGF	•	•	—
CD40L	—	•	—
CTACK	•	—	—
Eotaxin	•	•	—
EPO	—	—	•
G-CSF	•	•	•
GM-CSF	•	•	•
GRO/KC	—	•	•
GRO-α	•	—	—
HGF	•	—	—
ICAM-1	•	•	—
IFN-α2	•	—	—
IFN-γ	•	•	•
IL-1α	•	•	•
IL-1β	•	•	•
IL-1ra	•	—	—
IL-2	•	•	•
IL-2Rα	•	—	—
IL-3	•	•	—
IL-4	•	•	•
IL-5	•	•	•
IL-6	•	•	•
IL-7	•	—	•
IL-8	•	—	—
IL-9	•	•	—
IL-10	•	•	•
IL-12p40	•	•	•
IL-12p70	•	•	•
IL-13	•	•	•
IL-15	•	•	—
IL-16	•	—	—
IL-17A	•	•	•
IL-17A/F	NEW	—	—
IL-17e (IL-25)	—	•	—

continues

Available Assays (cont.)

Analytes	Human	Mouse	Rat
IL-17F	NEW	•	—
IL-18*	•	•	•
IL-21	NEW	•	—
IL-22	NEW	•	—
IL-23	NEW	—	—
IL-23p19	—	•	—
IL-25	NEW	—	—
IL-27p28	—	•	—
IL-31	NEW	•	—
IL-33	NEW	•	—
IP-10	•	—	—
KC	—	•	•
LIF	•	•	—
MCP-1	•	•	NEW
MCP-3	•	—	—
M-CSF	•	•	•
MIF	•	—	—
MIG	•	•	—

Available Assays (cont.)

Analytes	Human	Mouse	Rat
MIP-1α	•	•	•
MIP-1β	•	•	—
MIP-2	—	•	•
MIP-3α	—	•	•
PDGF-BB	•	•	—
RANTES	•	•	•
sCD40L	NEW	—	—
SCF	•	—	—
SCGF-β	•	—	—
SDF-1α	•	—	—
TGF-β1	•	•	•
TGF-β2	•	•	•
TGF-β3	•	•	•
TNF-α	•	•	•
TNF-β	•	—	—
TRAIL	•	—	—
VCAM-1	•	—	—
VEGF	•	•	•

* IL-18 is not available as a singleplex.

Ordering Information

Catalog #	Description
Human Premixed All-in-One Kits*	
M50-000007A	**Bio-Plex Pro Human Cytokine 8-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-2, IL-4, IL-6, IL-8, IL-10, GM-CSF, IFN-γ, TNF-α
M50-00031YV	**Bio-Plex Pro Human Cytokine 17-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12p70, IL-13, IL-17, G-CSF, GM-CSF, IFN-γ, MCP-1, MIP-1β, TNF-α
MF0-005KMII	**Bio-Plex Pro Human Cytokine 21-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1α, IL-2Rα, IL-3, IL-12p40, IL-16, IL-18, CTACK, GRO-α, HGF, IFN-α2, LIF, MCP-3, M-CSF, MIF, MIG, β-NGF, SCF, SCGF-β, SDF-1α, TNF-β, TRAIL
M50-0KCAF0Y	**Bio-Plex Pro Human Cytokine 27-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1β, IL-1ra, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12p70, IL-13, IL-15, IL-17, basic FGF, eotaxin, G-CSF, GM-CSF, IFN-γ, IP-10, MCP-1, MIP-1α, MIP-1β, PDGF-BB, RANTES, TNF-α, VEGF
M50-00005L3	**Bio-Plex Pro Human Cytokine Th1/Th2 Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-2, IL-4, IL-5, IL-10, IL-12p70, IL-13, GM-CSF, IFN-γ, TNF-α
Human Th17 Premixed All-in-One Kit	
171-AA001M	**Bio-Plex Pro Human Th17 Cytokine 15-Plex Panel**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, 2-level controls, detection antibody diluent, standard diluent HB, sample diluent HB, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions for detecting IL-1β, IL-4, IL-6, IL-10, IL-17A, IL-17F, IL-21, IL-22, IL-23, IL-25, IL-31, IL-33, IFN-γ, sCD40L, TNF-α, (IL-17A/F available as singleplex only)

continues

Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Human Cytokine Singleplex Sets, Group I*, 1 x 96-Well			
171-B5001M	**IL-1β Set**	171-B5015M	**Eotaxin Set**
171-B5002M	**IL-1ra Set**	171-B5016M	**Basic FGF Set**
171-B5003M	**IL-2 Set**	171-B5017M	**G-CSF Set**
171-B5004M	**IL-4 Set**	171-B5018M	**GM-CSF Set**
171-B5005M	**IL-5 Set**	171-B5019M	**IFN-γ Set**
171-B5006M	**IL-6 Set**	171-B5020M	**IP-10 Set**
171-B5007M	**IL-7 Set**	171-B5021M	**MCP-1 Set**
171-B5008M	**IL-8 Set**	171-B5022M	**MIP-1α Set**
171-B5009M	**IL-9 Set**	171-B5023M	**MIP-1β Set**
171-B5010M	**IL-10 Set**	171-B5024M	**PDGF-BB Set**
171-B5011M	**IL-12p70 Set**	171-B5025M	**RANTES Set**
171-B5012M	**IL-13 Set**	171-B5026M	**TNF-α Set**
171-B5013M	**IL-15 Set**	171-B5027M	**VEGF Set**
171-B5014M	**IL-17A Set**		

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

Catalog #	Description
Standards	
171-D50001	**Bio-Plex Pro Human Cytokine Standards Group I**, pkg of 1 vial, lyophilized mixture of 27 analytes
171-D10501	**Bio-Plex Pro Human Cytokine Standards Group I**, pkg of 50 lot-matched vials, lyophilized mixture of 27 analytes

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Human Cytokine Singleplex Sets, Group II*, 1 x 96-Well			
171-B6001M	**IL-1α Set**	171-B6012M	**MCP-3 Set**
171-B6002M	**IL-2Rα Set**	171-B6013M	**M-CSF Set**
171-B6003M	**IL-3 Set**	171-B6014M	**MIF Set**
171-B6004M	**IL-12p40 Set**	171-B6015M	**MIG Set**
171-B6005M	**IL-16 Set**	171-B6016M	**β-NGF Set**
171-B6006M	**CTACK Set**	171-B6017M	**SCF Set**
171-B6007M	**GRO-α Set**	171-B6018M	**SCGF-β Set**
171-B6008M	**HGF Set**	171-B6019M	**SDF-1α Set**
171-B6009M	**ICAM-1 Set**	171-B6020M	**TNF-β Set**
171-B6010M	**IFN-α2 Set**	171-B6021M	**TRAIL Set**
171-B6011M	**LIF Set**	171-B6022M	**VCAM-1 Set**

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

Catalog #	Description
Standards	
171-D60001	**Bio-Plex Pro Human Cytokine Standards Group II**, pkg of 1 vial, lyophilized mixture of 23 analytes
171-D10502	**Bio-Plex Pro Human Cytokine Standards Group II**, pkg of 50 lot-matched vials, lyophilized mixture of 23 analytes
Reagent Kits*	
171-304070	**Bio-Plex Pro Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent
171-304070M	**Bio-Plex Pro Reagent Kit with Flat Bottom Plate**, 1 x 96-well, includes flat bottom plate, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent, and instructions
171-304071	**Bio-Plex Pro Reagent Kit**, 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent

* Required only with singleplex sets.

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Human Th17 Cytokine Singleplex Sets*, 1 x 96-Well			
171-BA001M	**IL-1β**	171-BA009M	**IL-23**
171-BA002M	**IL-4**	171-BA010M	**IL-25**
171-BA003M	**IL-6**	171-BA011M	**IL-31**
171-BA004M	**IL-10**	171-BA012M	**IL-33**
171-BA005M	**IL-17A**	171-BA013M	**IFN-γ**
171-BA006M	**IL-17F**	171-BA014M	**sCD40L**
171-BA007M	**IL-21**	171-BA015M	**TNF-α**
171-BA008M	**IL-22**	171-BA016M	**IL-17A/F****

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

** IL-17A/F cannot be mixed with IL-17A or IL-17F assays.

continues

Ordering Information

Catalog #	Description
Standards	
171-DA0001	**Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 1 vial, lyophilized mixture of 16 standard analytes
171-DA0501	**Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 50 lot-matched vials, lyophilized mixture of 16 standard analytes
Reagent Kits	
171-304055	**Bio-Plex Pro Reagent Kit II with Filter Plate**, 1 x 96-well, includes detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, filter plate, and sealing tape, for vacuum separation methods
171-304055M	**Bio-Plex Pro Reagent Kit II with Flat Bottom Plate**, 1 x 96-well, includes detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, flat bottom plate, and sealing tape, for magnetic separation methods
Mouse Premixed All-in-One Kits*	
M60-000007A	**Bio-Plex Pro Mouse Cytokine 8-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1β, IL-2, IL-4, IL-5, IL-10, GM-CSF, IFN-γ, TNF-α
MD0-00000EL	**Bio-Plex Pro Mouse Cytokine 9-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-15, IL-18, basic FGF, LIF, M-CSF, MIG, MIP-2, PDGF-BB, VEGF
M60-009RDPD	**Bio-Plex Pro Mouse Cytokine 23-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1α, IL-1β, IL-2, IL-3, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12p40, IL-12p70, IL-13, IL-17, eotaxin, G-CSF, GM-CSF, IFN-γ, KC, MCP-1, MIP-1α, MIP-1β, RANTES, TNF-α
M60-00003J7	**Bio-Plex Pro Mouse Cytokine Th1/Th2 Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-2, IL-4, IL-5, IL-10, IL-12p70, GM-CSF, IFN-γ, TNF-α
L60-00004C6	**Bio-Plex Pro Mouse Cytokine Th1 7-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-1β, IL-2, IL-6, IL-10, IL-12p70, IFNα, TFN-α
L60-000UKVT	**Bio-Plex Pro Mouse Cytokine Th2 7-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-13
171-FA001M	**Bio-Plex Pro Mouse Cytokine Th17 Panel B 8-Plex Group III**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of CD40L, IL-17F, IL-21, IL-22, IL-23p19, IL-31, IL-33, MIP-3α
M60-00007NY	**Bio-Plex Pro Mouse Cytokine Th17 Panel A 6-Plex Group I**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent and instructions for the detection of IL-1β, IL-6, IL-10, IL-17A, IFN-γ, TNF-α

* Please contact your local Bio-Rad sales representative for pricing and availability of 10 x 96-well assay kits.

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group I*, 1 x 96-Well			
171-G5001M	**IL-1α Set**	171-G5013M	**IL-17A Set**
171-G5002M	**IL-1β Set**	171-G5014M	**Eotaxin Set**
171-G5003M	**IL-2 Set**	171-G5015M	**G-CSF Set**
171-G5004M	**IL-3 Set**	171-G5016M	**GM-CSF Set**
171-G5005M	**IL-4 Set**	171-G5017M	**IFN-γ Set**
171-G5006M	**IL-5 Set**	171-G5018M	**KC Set**
171-G5007M	**IL-6 Set**	171-G5019M	**MCP-1 Set**
171-G5008M	**IL-9 Set**	171-G5020M	**MIP-1α Set**
171-G5009M	**IL-10 Set**	171-G5021M	**MIP-1β Set**
171-G5010M	**IL-12p40 Set**	171-G5022M	**RANTES Set**
171-G5011M	**IL-12p70 Set**	171-G5023M	**TNF-α Set**
171-G5012M	**IL-13 Set**		

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

continues

Ordering Information

Catalog #	Description
Standards	
171-I50001	**Bio-Plex Pro Mouse Cytokine Standards Group I**, pkg of 1 vial, lyophilized mixture of 23 analytes
171-I10501	**Bio-Plex Pro Mouse Cytokine Standards Group I**, pkg of 50 lot-matched vials, lyophilized mixture of 23 analytes

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group II*, 1 x 96-Well			
171-G6001M	**IL-15 Set**	171-G6005M	**MIG Set**
171-G6002M	**Basic FGF Set**	171-G6006M	**MIP-2 Set**
171-G6003M	**LIF Set**	171-G6007M	**PDGF-BB Set**
171-G6004M	**M-CSF Set**	171-G6008M	**VEGF Set**

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

Catalog #	Description
Standards	
171-I60001	**Bio-Plex Pro Mouse Cytokine Standards Group II**, pkg of 1 vial, lyophilized mixture of 9 analytes
171-I10502	**Bio-Plex Pro Mouse Cytokine Standards Group II**, pkg of 50 lot-matched vials, lyophilized mixture of 9 analytes

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group III*, 1 x 96-Well			
171-GA001M	**CD40L Set**	171-GA007M	**IL-27p28 Set**
171-GA002M	**IL-17F Set**	171-GA008M	**IL-31 Set**
171-GA003M	**IL-21 Set**	171-GA009M	**IL-33 Set**
171-GA004M	**IL-22 Set**	171-GA010M	**ICAM-1 Set****
171-GA005M	**IL-23p19 Set**	171-GA011M	**MIP-3α Set**
171-GA006M	**IL-25 Set**		

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

** Requires high dilution reagent kit.

Catalog #	Description
Standards	
171-IA0001	**Bio-Plex Pro Mouse Cytokine Standards Group III**, pkg of 1 vial, lyophilized standard for detecting 11 analytes
171-IA0501	**Bio-Plex Pro Mouse Cytokine Standards Group III**, pkg of 50 lot-matched vials, lyophilized standard for detecting 11 analytes
Reagent Kits*	
171-304070	**Bio-Plex Pro Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent
171-304070M	**Bio-Plex Pro Reagent Kit with Flat Bottom Plate**, 1 x 96-well, includes flat bottom plate, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent, and instructions
171-304071	**Bio-Plex Pro Reagent Kit**, 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent
171-304080M	**Bio-Plex Pro High Dilution Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, filter plate, sealing tape, standard diluent, sample diluent

* Required only with singleplex sets.

Rat Premixed All-in-One Kits*	
171-K1001M	**Bio-Plex Pro Rat Cytokine 24-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of EPO, G-CSF, GM-CSF, GRO/KC, IFN-γ, IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12p70, IL-13, IL-17A, IL-18, MCP-1, M-CSF, MIP-1α, MIP-3α, RANTES, TNF-α, VEGF
171-K1002M	**Bio-Plex Pro Rat Cytokine Th1/Th2 12-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent and instructions for the detection of IL-α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12p70, IL-13, GM-CSF, IFN-γ, TNF-α

* Please contact your local Bio-Rad sales representative for pricing and availability of 10 x 96-well assay kits.

continues

Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Rat Cytokine Singleplex Sets*, 1 x 96-Well			
171-L1002M	**EPO Set**	171-L1009M	**IL-2 Set**
171-L1003M	**G-CSF Set**	171-L1010M	**IL-4 Set**
171-L1004M	**GM-CSF Set**	171-L1011M	**IL-5 Set**
171-L1005M	**GRO/KC Set**	171-L1012M	**IL-6 Set**
171-L1006M	**IFN-γ Set**	171-L1013M	**IL-7 Set**
171-L1007M	**IL-1α Set**	171-L1014M	**IL-10 Set**
171-L1008M	**IL-1β Set**	171-L1015M	**IL-12p40 Set**
171-L1016M	**IL-12p70 Set**	171-L1022M	**MIP-2 Set**
171-L1017M	**IL-13 Set**	171-L1023M	**MIP-3α Set**
171-L1018M	**IL-17A Set**	171-L1024M	**RANTES Set**
171-L1020M	**M-CSF Set**	171-L1025M	**TNF-α Set**
171-L1027M	**MCP-1 Set**	171-L1026M	**VEGF Set**
171-L1021M	**MIP-1α Set**		

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

Catalog #	Description
Standards	
171-NZ0001	**Bio-Plex Pro Rat Cytokine Standards**, pkg of 1 vial, lyophilized mixture of 31 analytes, compatible with rat cytokine and rat diabetes assays
171-NZ0501	**Bio-Plex Pro Rat Cytokine Standards**, pkg of 50 lot-matched vials, lyophilized standard, for detecting 31 rat targets. Compatible with rat cytokine and rat diabetes assays
Reagent Kits*	
171-304070	**Bio-Plex Pro Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent
171-304070M	**Bio-Plex Pro Reagent Kit with Flat Bottom Plate**, 1 x 96-well, includes flat bottom plate, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent, and instructions
171-304071	**Bio-Plex Pro Reagent Kit**, 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard diluent, sample diluent

* Required only with singleplex sets.

Bio-Plex TGF-β Human, Mouse, and Rat Premixed All-in-One Kits	
171-W4001M	**Bio-Plex Pro TGF-β 3-plex Assay**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard diluent, sample diluent for the detection of TGF-β1, TGF-β2, TGF-β3
Bio-Plex TGF-β Singleplex Sets*, 1 x 96-Well	
171-V4001M	**TGF-β 1 Set**
171-V4002M	**TGF-β 2 Set**
171-V4003M	**TGF-β 3 Set**

* Includes coupled magnetic beads and detection antibody. Requires reagent kit and standards.

Standards	
171-X40001	**Bio-Plex Pro TGF-β Standard**, pkg of 1 vial, lyophilized standard for detecting TGF-β1, TGF-β2, and TGF-β3 analytes
171-X40501	**Bio-Plex Pro TGF-β Standard**, pkg of 50 lot-matched vials, lyophilized standard for detecting TGF-β1, TGF-β2, and TGF-β3 analytes
Bio-Plex Pro Assay Accessories	
171-304500	**Bio-Plex Wash Buffer**, 1.5 L
171-025001*	**Bio-Plex Pro Flat Bottom Plates**, 40 x 96-well plates
171-304502	**Filter Plate**, 1 x 96-well filter plate with clear plastic lid, plate-holder tray. Sealing tape not included.

* Required for washing Bio-Plex Pro assays or other magnetic bead-based assays using Bio-Plex Pro and Bio-Plex Pro II wash stations.

Note: x-Plex assay panels can be ordered with any combination of available assays. For more information, go to **www.bio-rad.com/bio-plex/assaybuilder**.

Bio-Plex Pro™ Magnetic Cell Signaling Assays

New Bio-Plex Pro™ Magnetic Cell Signaling Assays

The Bio-Plex Pro cell signaling assays are magnetic bead–based immunoassays designed to meet the sensitivity needs of the most discerning scientists. The multiplex format enables robust, reproducible, and simultaneous measurement of proteins involved in key intracellular signaling pathways. Choose from a broad selection of phosphoprotein and total protein targets to investigate pathways associated with cancer, cardiovascular disorders, inflammation, drug mechanism of action, diabetes, toxicology, and neurological disorders.

These assays incorporate several features to enhance both quality and ease of use:

- Assay quick guide to get you started right away
- Assay protocol optimized for exceptional sensitivity and broad dynamic range
- Flexible ordering options — order singleplex sets or visit **www.bio-rad.com/assaybuilder** to configure a custom premixed kit

Available Assays

Phosphoprotein Assays	Available Total Protein Assays	Phosphoprotein Assays		Total Protein Assays	
		Lysate Control*	Catalog #	Lysate Control*	Catalog #
Akt (Ser^{473})	•			Untreated HeLa	#171-YZT002
Akt (Thr^{308})	•			Untreated HeLa	#171-YZT002
Erk1/2 (Thr^{202}/Tyr^{204}, Thr^{185}/Tyr^{187})	•	EGF-treated HEK-293	#171-YZ0001	Untreated HeLa	#171-YZT002
GSK-3α/β (Ser^{21}/Ser^{9})	•			Untreated HeLa	#171-YZT002
MEK1 (Ser^{217}/Ser^{221})	•			Untreated HeLa	#171-YZT002
c-Jun (Ser^{63})	•			Untreated HEK-293	#171-YZT001
JNK (Thr^{183}/Tyr^{185})	•	UV-treated HEK-293	#171-YZ0009	Untreated HeLa	#171-YZT002
p38 MAPK (Thr^{180}/Tyr^{182})	•			Untreated HeLa	#171-YZT002
EGFR (Tyr^{1068})	—	EGF-treated HeLa	#171-YZ0002	Untreated HeLa	#171-YZT002
EGFR (Tyr^{1173})	—			Untreated HeLa	#171-YZT002
HER-2 (Tyr^{1248})	•	EGF-treated SK-Br3	#171-YZ0003	EGF-treated SK-Br3	#171-YZ0003
IGF-IR (Tyr^{1131})	—	IGF-1-treated HEK-293	#171-YZ0005	Untreated HeLa	#171-YZT002
IκB-α (Ser^{32}/Ser^{36})	•			Untreated HeLa	#171-YZT002
NF-κB p65 (Ser^{536})	—	TNF-α-treated HeLa	#171-YZ0008	Untreated HeLa	#171-YZT002
Smad2 (Ser^{465}/Ser^{467})	•			Untreated HeLa	#171-YZT002
p70 S6 Kinase (Thr^{421}/Ser^{424})	•	NGFβ-treated PC-12	#171-YZ0006	Untreated HeLa	#171-YZT002
p70 S6 Kinase (Thr^{389})	•			Untreated HeLa	#171-YZT002
PDGFR-α (Tyr^{754})	—	PDGF-treated NIH3T3	#171-YZ0007	Untreated HeLa	#171-YZT002
PDGFR-β (Tyr^{751})	—			Untreated HeLa	#171-YZT002
Stat1 (Tyr^{701})	—			Untreated HeLa	#171-YZT002
Stat3 (Ser^{727})	—	IFN-α-treated HeLa	#171-YZ0004	Untreated HeLa	#171-YZT002
Stat3 (Tyr^{705})	—			Untreated HeLa	#171-YZT002
VEGFR-2 (Tyr^{1175})	—	VEGF-treated HUVEC	#171-YZ0010	Untreated HeLa	#171-YZT002
Negative control for all phosphoprotein assays		Phosphatase-treated HeLa	#171-YZB001		
Negative control for all total target assays		Detection antibody diluent**			

* All controls are shipped as one vial of lyophilized cell lysate.
** Included with the Bio-Plex Pro cell signaling reagent kit (#171-304006M).

For More Information
Web: www.bio-rad.com/cellsignalingassays
Request or download bulletins: 5405 and 5483

Ordering Information

Catalog #	Description
Bio-Plex Pro Cell Signaling Reagents	
171-304006M	**Bio-Plex Pro Cell Signaling Reagent Kit**, 1 x 96-well, includes assay cell lysis buffer, cell lysis factor QG, cell wash buffer, bead resuspension buffer, detection antibody diluent, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, instructions
171-304515	**Bio-Plex Pro Cell Signaling Wash Buffer**, 330 ml, for 1 x 96-well assay, for use with Bio-Plex Pro cell signaling assays only, compatible with both magnetic and vacuum separation methods

Catalog #	Phosphoprotein	Catalog #	Phosphoprotein
Phosphoprotein Singleplex Sets			
171-V50001M	**Akt (Ser^{473})**	171-V50013M	**NF-κB p65 (Ser^{536})**
171-V50002M	**Akt (Thr^{308})**	171-V50014M	**p38 MAPK (Thr^{180}/Tyr^{182})**
171-V50003M	**c-Jun (Ser^{63})**	171-V50015M	**p70 S6 Kinase (Thr^{421}/Ser^{424})**
171-V50004M	**EGFR (Tyr^{1068})**	171-V50016M	**p70 S6 Kinase (Thr^{389})**
171-V50005M	**EGFR (Tyr^{1173})**	171-V50017M	**PDGFR-α (Tyr^{754})**
171-V50006M	**Erk1/2 (Thr^{202}/Tyr^{204}, Thr^{185}/Tyr^{187})**	171-V50018M	**PDGFR-β (Tyr^{751})**
171-V50007M	**GSK-3α/β (Ser^{21}/Ser^{9})**	171-V50019M	**Smad2 (Ser^{465}/Ser^{467})**
171-V50008M	**HER-2 (Tyr^{1248})**	171-V50020M	**Stat1 (Tyr^{701})**
171-V50009M	**IGF-IR (Tyr^{1131})**	171-V50021M	**Stat3 (Ser^{727})**
171-V50010M	**IκB-α (Ser^{32}/Ser^{36})**	171-V50022M	**Stat3 (Tyr^{705})**
171-V50011M	**JNK (Thr^{183}/Tyr^{185})**	171-V50023M	**VEGFR-2 (Tyr^{1175})**
171-V50012M	**MEK1 (Ser^{217}/Ser^{221})**		
Total Target Singleplex Sets			
171-V60001M	**Akt**	171-V60007M	**JNK**
171-V60002M	**c-Jun**	171-V60008M	**MEK1**
171-V60003M	**Erk1/2**	171-V60009M	**p38 MAPK**
171-V60004M	**GSK-3β**	171-V60010M	**p70 S6 Kinase**
171-V60005M	**HER-2**	171-V60011M	**Smad2**
171-V60006M	**IκB-α**		

Bio-Plex® Signal Transduction Assays

Bio-Plex® Nonmagnetic Phosphoprotein and Total Target Assays

Bio-Rad's selection of multiplexable phosphoprotein and total target assays includes phosphoprotein and total target assays. Bio-Plex phosphoprotein and total target assays (xMAP technology) are bead-based multiplexable assays that directly detect phosphorylated and total proteins in lysates derived from cell culture or tissue samples. These easy-to-use assays feature highly specific antibodies developed by Cell Signaling Technology, Inc. (CST).

Bio-Plex phosphoprotein and total target assays — includes coupled beads, detection antibodies, and lysates to test for specific proteins of interest in lysate samples

Bio-Plex cell lysis kit — includes cell lysis buffer, cell wash buffer, factor 1, and factor 2; essential for optimal lysis of cell culture or tissue samples

Bio-Plex phosphoprotein detection reagent kit — includes assay buffer, wash buffer, antibody diluent, resuspension buffer, streptavidin-PE, 96-well filter plate, sealing tape, and instructions required to prepare assays and acquire data. This kit is compatible with Bio-Plex 200 and Bio-Plex 3D. It is not compatible with the Bio-Plex® MAGPIX™ system

Flexible ordering options — order either singleplex sets or customize your assay with the Bio-Plex assay builder (**www.bio-rad.com/assaybuilder**)

For More Information
Web: www.bio-rad.com/cellsignalingassays

Available Nonmagnetic Assays

Assays	Phosphoprotein	Total
Akt (Ser^{473})	•	•
ATF-2 (Thr^{71})	•	•
Bcr-Abl (Tyr^{245})	•	•
c-Abl (Tyr^{245})	•	—
c-Abl (Tyr^{412})	•	—
c-Jun (Ser^{63})	•	•
CREB (Ser^{133})	•	•
EGFR (Tyr)	•	—
ERK1 (Thr^{202}/Tyr^{204})	•	—
ERK2 (Thr^{185}/Tyr^{187})	•	•
ERK1/2 (Thr^{202}/Tyr^{204}, Thr^{185}/Tyr^{187})	•	•
GSK-3α/β (Ser^{21}/Ser^{9})	•	—
Histone H3 (Ser^{10})	•	—
HSP27 (Ser^{78})	•	•
IGF-IR (Tyr^{1131})	•	—
IκB-α (Ser^{32}/Ser^{36})	•	•
IR-β (Tyr^{1146})	•	—
IRS-1 (Ser^{636}/Ser^{639})	•	—

Available Nonmagnetic Assays (cont.)

Assays	Phosphoprotein	Total
JNK (Thr^{183}/Tyr^{185})	•	•
MEK1 (Ser^{217}/Ser^{221})	•	•
NF-κB p65 (Ser^{536})	•	—
p38 MAPK (Thr^{180}/Tyr^{182})	•	•
p53 (Ser^{15})	•	•
p53 (Ser^{37})	•	•
p53 (Ser^{46})	•	•
p70 S6 kinase (Thr^{421}/Ser^{424})	•	—
p90RSK (Thr^{359}/Ser^{363})	•	•
PDGF receptor-β (Tyr^{751})	•	—
S6 ribosomal protein (Ser^{235}/Ser^{236})	•	—
Src (Tyr^{416})	•	—
STAT2 (Tyr^{689})	•	—
STAT3 (Ser^{727})	•	—
STAT3 (Tyr^{705})	•	—
STAT6 (Tyr^{641})	•	—
TrkA (Tyr^{490})	•	—
Tyk2 (Tyr^{1054}/Tyr^{1055})	•	—

Ordering Information

Catalog #	Phosphoprotein	Catalog #	Phosphoprotein
Bio-Plex Nonmagnetic Phosphoprotein Singleplex Assays*			
171-V21075	**Akt (Ser^{473})**	171-V21034	**JNK (Thr^{183}/Tyr^{185})**
171-V21620	**ATF-2 (Thr^{71})**	171-V25340	**MEK1 (Ser^{217}/Ser^{221})**
171-V27145	**Bcr-Abl (Tyr^{245})**	171-V24937	**NF-κB p65 (Ser^{536})**
171-V27545	**c-Abl (Tyr^{245})**	171-V21336	**p38 MAPK (Thr^{180}/Tyr^{182})**
171-V27745	**c-Abl (Tyr^{412})**	171-V25153	**p53 (Ser^{15})**
171-V24356	**c-Jun (Ser^{63})**	171-V28353	**p53 (Ser^{37})**
171-V26119	**CREB (Ser^{133})**	171-V28153	**p53 (Ser^{46})**
171-V23120**	**EGFR (Tyr)**	171-V24155	**p70 S6 Kinase (Thr^{421}/Ser^{424})**
171-V21938	**ERK1 (Thr^{202}/Tyr^{204})**	171-V23535	**p90RSK (Thr^{359}/Ser^{363})**
171-V20438	**ERK2 (Thr^{185}/Tyr^{187})**	171-V25957	**PDGF Receptor-β (Tyr^{751})**
171-V22238	**ERK1/2 (Thr^{202}/Tyr^{204}, Thr^{185}/Tyr^{187})**	171-V25374**	**S6 Ribosomal Protein (Ser^{235}/Ser^{236})**
171-V23318	**GSK-3α/β (Ser^{21}/Ser^{9})**	171-V26741	**Src (Tyr^{416})**
171-V24777	**Histone H3 (Ser^{10})**	171-V23732	**STAT2 (Tyr^{689})**
171-V24551	**HSP27 (Ser^{78})**	171-V26952	**STAT3 (Ser^{727})**
171-V27343	**IGF-IR (Tyr^{1131})**	171-V22552	**STAT3 (Tyr^{705})**
171-V20758	**IκB-α (Ser^{32}/Ser^{36})**	171-V25772	**STAT6 (Tyr^{641})**
171-V27943	**IR-β (Tyr^{1146})**	171-V23973	**TrkA (Tyr^{490})**
171-V25576	**IRS-1 (Ser^{636}/Ser^{639})**	171-V26533	**Tyk2 (Tyr^{1054}/Tyr^{1055})**

* Requires cell lysis kit and phosphoprotein detection reagent kit.
** This assay cannot be multiplexed (EGFR (Tyr) and S6 ribosomal protein).

Catalog #	Total Target	Catalog #	Total Target
Bio-Plex Total Target Singleplex Assays*			
171-V31075	**Akt**	171-V34551	**HSP27**
171-V31620	**ATF-2**	171-V30758	**IκB-α**
171-V37145	**Bcr-Abl**	171-V31034	**JNK**
171-V34356	**c-Jun**	171-V35340	**MEK1**
171-V36119	**CREB**	171-V31336	**p38 MAPK**
171-V30438	**ERK2**	171-V35153	**p53**
171-V32238	**ERK1/2**	171-V33535	**p90RSK**

* Requires cell lysis kit and phosphoprotein detection reagent kit.

continues

Ordering Information

Catalog #	Description
Reagent Kits	
171-304004	**Bio-Plex Phosphoprotein Detection Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, resuspension buffer, streptavidin-PE, filter plate, sealing tape, and instructions
171-304005	**Bio-Plex Phosphoprotein Detection Reagent Kit**, 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, resuspension buffer, streptavidin-PE, filter plate, sealing tape, and instructions
Sample Preparation Kits	
171-304011	**Bio-Plex Cell Lysis Kit**, 1 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2
171-304012	**Bio-Plex Cell Lysis Kit**, 10 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2

Note: Customized Bio-Plex assays can be ordered with any combination of available analytes. Request bulletin 5483 for multiplexing capabilities of specific assay combinations. For more information go to **www.bio-rad.com/bio-plex/assaybuilder**.

Bio-Plex Pro™ Disease Research Assays

Bio-Plex Pro disease research assays are multiplex immunoassays designed on magnetic microspheres for the detection of multiple biomarkers involved in diabetes, cancer, angiogenesis, acute phase, immune response, and inflammation. The magnetic microspheres are classified into xMAP regions and work seamlessly with the Bio-Plex system.

Benefits of Bio-Plex Pro assays include:

- Excellent sensitivity when using either an automated washing system or a standard vacuum manifold
- Automated washing to eliminate manual filtration steps, providing increased throughput and reproducibility

New Bio-Plex Pro™ Human Cancer Biomarker Panel 1 and Panel 2

Bio-Plex Pro human cancer biomarker panels are a unique blend of magnetic bead–based assays designed to meet the needs of preclinical and clinical researchers. The multiplex format enables robust and reproducible measurement of 34 cancer biomarkers involved in disease processes such as angiogenesis, metastasis, cell proliferation, cell adhesion/migration, apoptosis, and inflammation. The assays incorporate several new features to enhance both quality and ease of use:

- **Magnetic beads** — simplified plate processing and improved reproducibility
- **Flexible ordering options** — available in 16- and 18-plex premixed all-in-one kits, singleplex sets, or customized assays using the Bio-Plex assay builder (**www.bio-rad.com/assaybuilder**)
- **Optimized protocols** — high precision and broad assay working ranges
- **Assay quick guide** — get started right away
- **Dual-level quality controls** — included with premixed kits
- **Robustness** — tested in serum, plasma, and other biological fluids
- **Convenience** — all-in-one kit format



- **Cross-platform compatibility** — can be used with all xMAP life science instruments supplied by any Luminex partner

For More Information
Web: www.bio-rad.com/bio-plexprocancer
Request or download bulletins: 6156 and 6159

Available Bio-Plex Pro Human Cancer Biomarker Panel 1

sEGFR	sIL-6Rα	Prolactin
FGF-basic	Leptin	SCF
Follistatin	Osteopontin	sTIE-2
G-CSF	PDGF-AB/BB	sVEGFR-1
sHER-2/neu	PECAM-1	sVEGFR-2
HGF		

Available Bio-Plex Pro Human Cancer Biomarker Panel 2

Angiopoietin-2	IGFBP-1	TGF-α
sCD40L	IL-6	TNF-α
EGF	IL-8	uPA
Endoglin	IL-18*	VEGF-A
sFASL	PAI-1	VEGF-C
HB-EGF	PLGF	VEGF-D

* IL-18 is not available as a singleplex.

Ordering Information

Catalog #	Description
Human Premixed All-in-One Kit	
171-AC500M	**Bio-Plex Pro Human Cancer Biomarker Panel 1, 16-Plex**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standard, 2-level controls, detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions for detection of sEGFR, FGF-basic, follistatin, G-CSF, sHER-2/neu, HGF, sIL-6Rα, leptin, osteopontin, PDGF-AB/BB, PECAM-1, prolactin, SCF, sTIE-2, sVEGFR-1, sVEGFR-2
171-AC600M	**Bio-Plex Pro Human Cancer Biomarker Panel 2, 18-Plex**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standard, 2-level controls, detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions for detection of angiopoietin-2, sCD40L, EGF, endoglin, sFASL, HB-EGF, IGFBP-1, IL-6, IL-8, IL-18, PAI-1, PLGF, TGF-α, TNF-α, uPA, VEGF-A, VEGF-C, VEGF-D

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Human Cancer Biomarker Panel 1 Singleplex Sets*, 1 x 96-Well (Receptors, cytokines, chemokines, growth factors, and hormones)			
171-BC501M	**sEGFR Set**	171-BC509M	**Osteopontin Set**
171-BC502M	**FGF-basic Set**	171-BC510M	**PECAM-1 Set**
171-BC503M	**Follistatin Set**	171-BC511M	**PDGF-AB/BB**
171-BC504M	**G-CSF Set**	171-BC512M	**Prolactin Set**
171-BC505M	**HGF Set**	171-BC513M	**SCF Set**
171-BC506M	**sHER-2/neu Set**	171-BC514M	**sTIE-2 Set**
171-BC507M	**sIL-6Rα Set**	171-BC515M	**sVEGFR-1 Set**
171-BC508M	**Leptin Set**	171-BC516M	**sVEGFR-2 Set**
Bio-Plex Pro Human Cancer Biomarker Panel 2 Singleplex Sets*, 1 x 96-Well (Ligands, cytokines, chemokines, and growth factors)			
171-BC601M	**Angiopoietin-2 Set**	171-BC611M	**PAI-1 Set**
171-BC602M	**sCD40L Set**	171-BC612M	**PLGF Set**
171-BC603M	**EGF Set**	171-BC613M	**TGF-α Set**
171-BC604M	**Endoglin**	171-BC614M	**TNF-α Set**
171-BC605M	**sFASL Set**	171-BC615M	**uPA Set**
171-BC606M	**HB-EGF Set**	171-BC616M	**VEGF-A Set**
171-BC607M	**IGFBP-1 Set**	171-BC617M	**VEGF-C Set**
171-BC608M	**IL-6 Set**	171-BC618M	**VEGF-D Set**
171-BC609M	**IL-8 Set**		

* Requires reagent kit II and standards.

It is not recommended to mix assays between panel 1 and panel 2.

Catalog #	Description
Standards	
171-DC5000	**Bio-Plex Pro Human Cancer Biomarker Panel 1, 16-Plex Standards**, pkg of 1 vial, lyophilized mixture of 16 standard analytes
171-DC5001	**Bio-Plex Pro Human Cancer Biomarker Panel 1, 16-Plex Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 16 standard analytes
171-DC6000	**Bio-Plex Pro Human Cancer Biomarker Panel 2, 18-Plex Standards**, pkg of 1 vial, lyophilized mixture of 18 standard analytes
171-DC6001	**Bio-Plex Pro Human Cancer Biomarker Panel 2, 18-Plex Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 18 standard analytes
Reagent Kits	
171-304055	**Bio-Plex Pro Reagent Kit II with Filter Plate**, 1 x 96-well, includes detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, filter plate, and sealing tape, for use with vacuum seperation methods
171-304055M	**Bio-Plex Pro Reagent Kit II with Flat Bottom Plate**, 1 x 96-well, includes detection antibody diluent, standard diluent HB, sample diluent HB, assay and wash buffers, streptavidin-PE, flat bottom plate, and sealing tape, for use with magnetic seperation methods

Bio-Plex Pro™ Diabetes Assays

The Bio-Plex Pro diabetes assays are magnetic bead–based multiplex assays designed for enhanced assay sensitivity and assay working ranges. These assays detect human, mouse, and rat diabetes-related biomarkers, using as little as 12.5 µl of sample per well.

Benefits of these assays include:

- **Increased productivity** — measure up to 10 diabetes and obesity markers plus adiponectin and adipsin in only 3 hrs
- **Expanded multiplexability** — mix diabetes assays with a host of compatible assays from our cytokine menu
- **Option to use a magnetic wash station** — simplify assay workflow and improve data consistency between experiments
- **Flexible ordering options** — order either premixed all-in-one kits, singleplex sets, or customize your assay with the Bio-Plex assay builder (**www.bio-rad.com/assaybuilder**)
- **Robustness** — performance tested in serum and plasma matrices
- **Cross-platform compatibility** — can be used with all xMAP life science instruments supplied by any Luminex partner

For More Information
Web: www.bio-rad.com/bio-plexprodiabetes
Request or download bulletins: 5943, 5966, and 6119



Available Bio-Plex Pro Diabetes Assays

Human Diabetes	Mouse Diabetes	Rat Diabetes
Adiponectin	Adiponectin	Ghrelin
Adipsin	Ghrelin	GLP-1
C-peptide	GIP	Glucagon
Ghrelin	GLP-1	Leptin
GIP	Glucagon	PAI-1
GLP-1	Insulin	
Glucagon	Leptin	
Insulin	PAI-1	
Leptin	Resistin	
PAI-1		
Resistin		
Visfatin		

Ordering Information

Catalog #	Description
Human Premixed All-in-One Kits	
171-A7001M	**Bio-Plex Pro Human Diabetes 10-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard and sample diluents for the detection of C-peptide, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, resistin, visfatin
171-A7002M	**Bio-Plex Pro Human Diabetes Adipsin and Adiponectin Assays**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin and adipsin
171-A7003M	**Bio-Plex Pro Human Diabetes Adiponectin Assay**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin
171-A7004M	**Bio-Plex Pro Human Diabetes Adipsin Assay**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, serum-based diluent for the detection of adipsin

continues

Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Human Diabetes Singleplex Sets*, 1 x 96-Well			
171-B7003M	**C-Peptide Set**	171-B7008M	**Insulin Set**
171-B7004M	**Ghrelin Set**	171-B7009M	**Leptin Set**
171-B7005M	**GIP Set**	171-B7010M	**PAI-1 Set**
171-B7006M	**GLP-1 Set**	171-B7011M	**Resistin Set**
171-B7007M	**Glucagon Set**	171-B7012M	**Visfatin Set**

* Require reagent kit and standards.

Catalog #	Description
Standards	
171-D70001	**Bio-Plex Pro Human Diabetes Standards**, pkg of 1 vial, lyophilized mixture of 12 standard analytes, including adiponectin, adipsin, C-peptide, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, resistin, and visfatin
171-D70050	**Bio-Plex Pro Human Diabetes Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 12 standard analytes, including adiponectin, adipsin, C-peptide, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, resistin, and visfatin
Mouse Premixed All-in-One Kits	
171-F7001M	**Bio-Plex Pro Mouse Diabetes 8-Plex Panel**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard and sample diluents for the detection of ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, resistin
171-F7002M	**Bio-Plex Pro Mouse Diabetes Adiponectin Assay**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Diabetes Singleplex Sets*, 1 x 96-Well			
171-G7002M	**Ghrelin Set**	171-G7006M	**Insulin Set**
171-G7003M	**GIP Set**	171-G7007M	**Leptin Set**
171-G7004M	**GLP-1 Set**	171-G7008M	**PAI-1 Set**
171-G7005M	**Glucagon Set**	171-G7009M	**Resistin Set**

Catalog #	Description
Standards	
171-I70001	**Bio-Plex Pro Mouse Diabetes Standards**, pkg of 1 vial, lyophilized mixture of 9 standard analytes, includes adiponectin, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, and resistin
171-I70050	**Bio-Plex Pro Mouse Diabetes Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 9 standard analytes, includes adiponectin, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, and resistin

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Rat Diabetes Singleplex Sets*, 1 x 96-Well			
171-L7001M	**Ghrelin Set**	171-L7006M	**Leptin Set**
171-L7003M	**GLP-1 Set**	171-L7007M	**PAI-1 Set**
171-L7004M	**Glucagon Set**		

* Singleplex sets include coupled beads and detection antibodies. Reagent kits and standards are required to run an assay.

Catalog #	Description
Standards	
171-NZ0001	**Bio-Plex Pro Rat Standards**, pkg of 1 vial, lyophilized mixture of 31 standard analytes. Compatible with rat cytokine and rat diabetes assays
171-NZ0501	**Bio-Plex Pro Rat Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 31 standard analytes. Compatible with rat cytokine and rat diabetes assays
Reagent Kit*	
171-304070	**Bio-Plex Pro Reagent Kit**, 1 x 96-well, includes assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, standard and sample diluents
171-304070M	**Bio-Plex Pro Reagent Kit with Flat Bottom Plate**, 1 x 96-well, includes flat bottom plate, assay and wash buffers, detection antibody diluent, streptavidin-PE, sealing tape, standard and sample diluents, and instructions
171-304071	**Bio-Plex Pro Reagent Kit**, 10 x 96-well, includes assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plates, sealing tape, standard and sample diluents

* Same reagent kit can be used for both diabetes and cytokine assays.

Bio-Plex Pro™ Human Acute Phase Assay Panel

Inflammation in response to tissue injury, infection, sepsis, cardiovascular disease, and diabetes typically involves the production and release of multiple acute phase proteins from the liver. The Bio-Plex Pro human acute phase assay panels deliver accurate and reproducible measurement of nine of the most commonly measured acute phase biomarkers in just 3 hours with as little as 13 µl of sample. Bio-Plex Pro human acute phase assays include:

- **Bio-Plex Pro human acute phase 5-plex assay panel** — includes ferritin, fibrinogen, procalcitonin, serum amyloid A, and tissue plasminogen activator
- **Bio-Plex Pro human acute phase 4-plex assay panel** — includes α-2-macroglobulin, CRP, haptoglobin, and serum amyloid P
- Validated in serum, plasma, and culture supernatant
- Compatible with the Bio-Plex 200 system and all Luminex 100- and 200-based readers (uses 25 bead map)

For optimal performance, the acute phase panel exists as separate 5-plex and 4-plex assays with distinct sample dilution requirements.

Available Bio-Plex Pro Human Acute Phase Assays

α-2-macroglobulin	Procalcitonin
CRP	SAA
Ferritin	SAP
Fibrinogen	Tissue plasminogen activator
Haptoglobin	

For More Information
Web: www.bio-rad.com/bio-plexproacutephase
Request or download bulletin: 5650

Ordering Information

Catalog #	Description
Complete Kits*	
171-A4S07M	**Bio-Plex Pro Human Acute Phase 5- + 4-Plex Panel Complete Kit**, 1 x 96-well
171-A4C09M	**Bio-Plex Pro Human Acute Phase 4-Plex Panel Complete Kit**, 1 x 96-well
171-A4C07M	**Bio-Plex Pro Human Acute Phase 5-Plex Panel Complete Kit**, 1 x 96-well
Assay Kits**	
171-A4007M	**Bio-Plex Pro Human Acute Phase 5-Plex Panel**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, and controls for the detection of ferritin, fibrinogen, procalcitonin, serum amyloid A, tissue plasminogen activator, requires acute phase reagent kit and acute phase dilutent kit
171-A4008M	**Bio-Plex Pro Human Acute Phase 5-Plex Panel**, 10 x 96-well, requires 10 acute phase reagent kits and 10 acute phase dilutent kits
171-A4009M	**Bio-Plex Pro Human Acute Phase 4-Plex Panel**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, and controls for the detection of α-2-macroglobulin, CRP, haptoglobin, serum amyloid P, requires acute phase reagent kit and acute phase dilutent kit
171-A4010M	**Bio-Plex Pro Human Acute Phase 4-Plex Panel**, 10 x 96-well, requires 10 acute phase reagent kits and 10 acute phase dilutent kits

* For simplified ordering, the complete kits include the acute phase panel, acute phase reagent kit, and acute phase diluent kit.

** One acute phase reagent kit is required for use with each assay kit.

Standards	
171-D40002	**Bio-Plex Pro Human Acute Phase Standards**, pkg of 2 vials, lyophilized mixture of 9 standard antigens
171-D40006	**Bio-Plex Pro Human Acute Phase Standards**, pkg of 50 lot-matched vials, lyophilized mixture of 9 standard antigens
Reagent Kit	
171-304050	**Bio-Plex Pro Human Acute Phase Reagent Kit**, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, filter plate, sealing tape
Diluent Kit*	
171-305050	**Bio-Plex Pro Human Acute Phase Diluent Kit**, 1 x 96-well, includes 10 ml serum-based diluent and 300 ml serum-free diluent

* One acute phase diluent kit is sufficient to perform one 5-plex and one 4-plex assay.

Bio-Plex® Precision Pro™ Human Cytokine Assay Panel

The Bio-Plex Precision Pro human cytokine assay panel provides accurate measurement of low levels of human cytokines with low intra- and inter-assay %CV. For the detection of IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12p70, IL-13, IFN-γ, and TNF-α.

- Convenient all-in-one kit format that includes assay, reagent, and diluent components in a single box
- Includes standard diluents for both serum and plasma
- Contains controls for generating QC samples
- Robust performance in serum, plasma, and culture supernatant
- Compatible with the Bio-Plex 200 system and all Luminex 100- and 200-based readers (uses 25 bead map)



For More Information
Web: www.bio-rad.com/bio-plexprecisionpro
Request or download bulletin: 5629

Ordering Information

Catalog #	Description
171-A1001P	**Bio-Plex Precision Pro Human Cytokine 10-Plex Panel**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, controls, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, sealing tape, serum standard diluent, plasma standard and sample diluents for the detection of IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12p70, IL-13, IFN-γ, TNF-α

Bio-Plex® COOH Beads and Related Reagents

Bio-Plex Pro™ Magnetic COOH Beads

Carboxylated beads that enable you to build your own magnetic assays for use with either magnetic- or vacuum-based separation protocols during assay preparation. The magnetic beads are available in 20 bead regions in 1 ml vials for immediate delivery (4 ml vials are available with a 30-day lead time). The Bio-Plex amine coupling kit provides a complete set of reagents for coupling proteins to the beads. For nucleic acid coupling, refer to the instruction manual.

- Suitable for protein and nucleic acid multiplex assays
- Compatible with all xMAP readers, both Bio-Plex Pro and Bio-Plex Pro II wash stations, and Bio-Plex handheld magnetic washers



For More Information
Web: www.bio-rad.com/COOH

Ordering Information

Catalog #	Description
MC100xx-01*	**Bio-Plex Pro Magnetic COOH Beads**, 1 ml
MC100xx-04*	**Bio-Plex Pro Magnetic COOH Beads**, 4 ml

*xx = bead region. Bead regions available, 26–29, 34–37, 43–46, 52–55, and 62–65.

Bio-Plex® Nonmagnetic COOH Beads

Develop your own Bio-Plex suspension array assays using these beads. The beads are internally labeled with two fluorescent dyes. Use the Bio-Plex amine coupling kit to attach nucleic acids, antibodies, or other proteins to polystyrene beads for multianalyte analysis of any sample in a 96-well format.

- **Flexible assays** — quickly add or remove analytes from your menu
- **Ready-to-use reagent kits** — optimized for Bio-Plex COOH beads
- **Complete solution** — one-stop source for all your assay needs
- **Compatibility** — works with 200 and 3D xMAP readers

For More Information
Web: www.bio-rad.com/COOH



Ordering Information

Catalog #	Description
171-5060xx*	**Bio-Plex Nonmagnetic COOH Beads**, 1.25 x 10^7 beads/ml, 1 ml
171-6060xx*	**Bio-Plex Nonmagnetic COOH Beads**, 16 ml

* xx = bead region. Bead regions available, 11, 16, 18, 20, 24–28, 30, 31, 33, 35, 38, 42–46, 50–53, 56, and 66.

Bio-Plex® Amine Coupling Kit

This kit was developed specifically for immobilizing antibodies or other proteins on Bio-Plex nonmagnetic COOH beads.

- Sufficient reagents for 30 coupling reactions using 100 µl of Bio-Plex COOH beads
- Each coupling reaction supports the analysis of 200 samples
- Tested on proteins from 6–150 kD
- For use with antibodies or other proteins

For More Information
Web: www.bio-rad.com/COOH



Ordering Information

Catalog #	Description
Bio-Plex Amine Coupling Kit	
171-406001*	**Bio-Plex Amine Coupling Kit**, 30 reactions, includes bead wash buffer, bead activation buffer, storage buffer, staining buffer, coupling reaction tubes

* For protein coupling only.

Bio-Plex Streptavidin-PE*	
171-304501	**Bio-Plex Streptavidin-PE**, streptavidin-phycoeyrthrin for 10 x 96-well reactions

* Streptavidin-PE is a component of all reagent kits and is available seperately.

Microplate Systems

Microplate Absorbance Readers and Accessories	**306**
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Microplate Absorbance Readers and Accessories

Instruments and Software

See Also
Protein assays: pages 20–23.

iMark™ Microplate Absorbance Reader

This reader offers a preprogrammed validation protocol and a built-in printer. The instrument can be used as a stand-alone reader or controlled by a PC or Mac with Microplate Manager® 6 software, and comes with six standard absorbance filters: 415, 450, 490, 595, 655, and 750 nm. Five additional filters are available (405, 540, 550, 570, and 630 nm) as well custom filters at 5 nm intervals from 400–750 nm on request.



- Ability to read flat, U-, or V-bottom microplates or 8- or 12-well strip plates
- Automatic calibration before each reading
- Variable-speed plate-shaking capability
- Multilingual interface and LCD display (English, Japanese, Chinese, and Russian)

For More Information
Web: www.bio-rad.com/iMark
Request or download bulletin: 5670

Ordering Information

Catalog #	Description
168-1130	**iMark Microplate Absorbance Reader**, 100/240 V, includes 6 filters (415, 450, 490, 595, 655, 750 nm), built-in plate shaker, onboard software and thermal printer, one roll printer paper, USB2 and power cables
168-1135	**iMark Microplate Absorbance Reader with Microplate Manager 6 Software**, for PC and MAC
Accessories	
166-0495	**8-Channel Professional Adjustable-Volume 20–200 µl Digital Micropipet**, pkg of 1, 8-channel 20–200 µl adjustable-volume micropipet, includes volume lock mechanism, curved tip ejector, rotating manifold, fully autoclavable
168-6940	**Checkmark Reader Performance Verification Kit**, includes absorbance calibration plate, Checkmark software
168-2230	**IQ/OQ Kit for iMark Microplate Absorbance Reader**, includes #168-6940, IQ/OQ protocols

xMark™ Microplate Absorbance Spectrophotometer

With its monochromator design and spectral scanning feature (which eliminates the need for filters), this spectrophotometer can find the best wavelength within a broad range for any photometric application. The xMark spectrophotometer can read all standard microplates, from 6- to 1,536-well formats, and can perform a wide range of end-point and kinetic applications with spectral scanning within low UV to infrared wavelengths.



- Monochromator-based system for maximum optical efficiency and flexibility in photometry reading
- High-performance optics for low- or high-density formats
- Imaging capabilities for pixel intensity data in a single well or entire plate
- Includes Microplate Manager® software
- Built-in plate shaker with variable mixing direction and adjustable speed and incubator with programmable temperature control

For More Information
Web: www.bio-rad.com/xMark
Request or download bulletin: 5671

Ordering Information

Catalog #	Description
168-1150	**xMark Microplate Absorbance Spectrophotometer**, PC or Mac, built-in incubator, plate shaker, Microplate Manager 6 software, USB2 and power cables
168-2000	**Plate Adaptor**, for using Terasaki plate with xMark microplate absorbance spectrophotometer
Accessories	
168-2250	**IQ/OQ Kit for xMark Microplate Absorbance Spectrophotometer**, includes #168-6940, IQ/OQ protocols

Microplate Manager® 6 Software

Bio-Rad's iMark™ microplate reader and xMark™ microplate spectrophotometer can be utilized to their full potential with Microplate Manager 6 software. This comprehensive software package allows powerful, versatile colorimetric and turbidimetric analyses and report analysis for raw data, qualitative, and quantitative calculations based on absorbance limits, matrix of equations, normalization, and curve fit. Microplate Manager software expands your range of data analysis options to include kinetics and screening, and adds the functionality of flexible template creation for any standard microplate format up to 1,536 wells and for 60- and 70-well Terasaki plates. The custom reporting function provides one-button screening for predefined assays such as those for TSE screening.

For More Information
Web: www.bio-rad.com/microplatemanager

Ordering Information

Catalog #	Description
168-9520	**Microplate Manager 6 Software**, PC and Mac, for end-point and kinetic data analysis with iMark microplate absorbance reader and xMark microplate spectrophotometer

ImmunoWash™ 1575 Microplate Washer

The ImmunoWash 1575 microplate washer makes it easy to customize your plate-washing protocols. It offers complete control of needle position to perform special wash routines and maximize wash efficiency. This washer includes a wide choice of wash sequences to facilitate protocol creation and storage. It's compatible with strips and 96-well microplates that have flat, U-, or V-bottom wells.

- Programmable needle positions (horizontal and vertical) to an accuracy of 0.1 mm for bottom washing, crosswise aspiration, and overflow washing
- Dispensing speed control
- A plate-shaking option to help minimize bubbles and adherence of liquid to well sides



- Waste bottle sensor to detect high waste liquid levels
- Up to 75 programmable washing sequences

For More Information
Web: www.bio-rad.com/immunowash
Request or download bulletins: 2054 and 2135

Ordering Information

Catalog #	Description
170-7009	**ImmunoWash 1575 Microplate Washer**, 110–240 V, includes bottle and tubing set, 8-port manifold, aerosol protection cover
170-7021	**ImmunoWash 1575 12-Channel Manifold**
170-7026	**ImmunoWash 1575 Standard Maintenance Kit**

Singleplex Assays

See Also
Blotting-grade conjugates: page 222.

ELISA Reagents

Enzyme-Antibody Conjugates

Bio-Rad offers enzyme-antibody conjugates and ELISA soluble substrate systems suitable for use in all microtitration enzyme immunoassays. Antibodies are available conjugated to HRP or AP enzymes.

Substrate Systems

The AP substrate kit contains *P*-nitrophenyl phosphate (pNPP) tablets and dilution buffer concentrate to prepare 500 ml of working solution. Benefits of the AP system include an extremely linear reaction rate and low background values for accurate quantitation by ELISA.

There are two convenient substrate systems for detection of HRP-labeled antibodies. Both the 2,2'-azino-di(3-ethylbenzothiazoline)-6-sulfonic acid (ABTS) peroxidase substrate kit and the 3,3',5,5'-tetramethylbenzidine (TMB) peroxidase substrate kit contain liquid reagents that are mixed just prior to use.

The single-component TMB peroxidase EIA substrate kit makes microplate assays convenient and fast.

For More Information
Web: www.bio-rad.com/microplatereagents

Ordering Information

Catalog #	Description
Enzyme-Antibody Conjugates	
172-1011	**Goat Anti-Mouse IgG (H + L)-HRP Conjugate**, 2 ml
172-1033	**Goat Anti-Human IgG (γ)-HRP Conjugate**, 1 ml
172-1019	**Goat Anti-Rabbit IgG (H + L)-HRP Conjugate**, 1 ml
172-1034	**Rabbit Anti-Goat IgG (H + L)-HRP Conjugate**, 1 ml
172-1017	**Rabbit Anti-Sheep IgG (H + L)-HRP Conjugate**, 1 ml
172-1037	**Rabbit Anti-Goat IgG (H + L)-AP Conjugate**, 1 ml
Substrate Systems	
172-1063	**AP Substrate Kit**, contains 100 pNPP tablets and 100 ml 5x concentrate diethanolamine buffer
172-1064	**HRP Substrate Kit**, contains 180 ml ABTS, 20 ml hydrogen peroxide
172-1066	**TMB Peroxidase EIA Substrate Kit**, contains 180 ml TMB solution, 20 ml hydrogen peroxide
172-1067	**TMB Peroxidase EIA Substrate Kit**, contains 900 ml TMB solution, 100 ml hydrogen peroxide
172-1068	**Single-Component TMB Peroxidase EIA Substrate Kit**, contains 100 ml TMB solution
172-1072	**Single-Component TMB Peroxidase ELISA Substrate Kit**, contains 1 L TMB solution

Mouse Antibody Isotyping Kit

This kit provides a convenient ELISA method for identifying the class, subclass, and light-chain type of mouse IgGs in tissue culture supernatant and ascites fluid. The kit allows screening of up to 12 different antibody samples per plate. Each sample is reacted with eight subclass-specific antisera to determine the heavy- and light-chain types of the monoclonal antibody.

For More Information
Web: www.bio-rad.com/microplatereagents

Ordering Information

Catalog #	Description
172-2051	**Mouse Typer Isotyping Kit**, includes mouse isotyping panel, affinity purified goat anti-rabbit IgG (H + L)
172-2055	**Mouse Typer Isotyping Panel**, includes 10 ml each ultrapure rabbit anti-mouse subclass-specific antiserum to mouse IgG_1, IgG_{2a}, IgG_{2b}, IgG_3, IgM, IgA, κ-chain, and λ-chain

In the U.S., call toll free at 1-800-424-6723

Transfection

Transfection Technologies 310

Lipid Transfection Reagents 311

Electroporation Systems and Reagents 312

Biolistic Particle Delivery Systems 319

Transfection Technologies

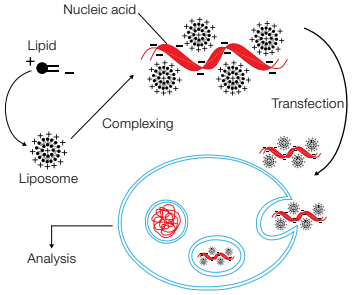
Introducing DNA and RNA into cells is a powerful tool for evaluating gene expression. Bio-Rad's transfection products offer choices for gene delivery to bacterial, fungal, plant, and animal cells. Use the guide below to select the most appropriate transfection technology for your application.

Learn More about the Technology
Web: www.bio-rad.com/tech/transfection

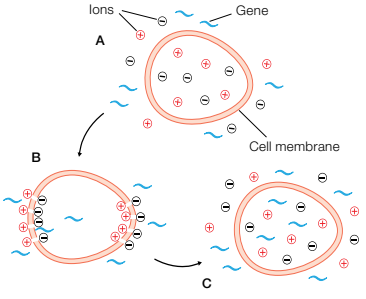
Transfection Technologies	Page	Plants								Bacteria		Fungi		Animals							
		Plant Cell Suspension Cultures	*Plant Cell Adherent Cultures*	*Plant Cell Callus or Explants*	*Pollen*	*Leaves (in situ)*	*Detached Leaves*	*Meristems (in situ)*	*Detached Meristems*	*Gram-Positive Bacteria*	*Gram-Negative Bacteria*	*Yeast*	*Other Fungi*	*Skin or Organs (in vivo)*	*Organ Cultures*	*Ex Vivo Cells or Tissues (e.g., blood)*	*Suspension Cell Cultures*	*Mammalian Cells — Gene Knockdowns*	*Adherent Cells, Trypsinized*	*Adherent Cells, Attached*	*Organelles (chloroplasts, mitochondria)*
Lipid Transfection																					
siLentFect™ lipid reagent for RNAi	311													○	○	◦	●	●	●	●	
TransFectin™ lipid reagent	312													○	○	◦	●	●	●	●	
Electroporation																					
Gene Pulser MXcell™ electroporation system	314	◦*		◦*					●	●	●							◦	●	●	●
Gene Pulser Xcell™ total system	316	◦*		◦*			○		○	●	●	●	●			◦	●	●	●		
Gene Pulser Xcell eukaryotic system	316	◦*		◦*			○		○	○	○	○	○			◦	●	●	●		
Gene Pulser Xcell microbial system	316								●	●	●	●									
MicroPulser™ electroporator	317								◦	●	●	●									
Biolistic Particle Delivery																					
Helios® gene gun system	320	◦	●	◦	◦	●	●	●	○	○	●	◦	◦	●	○	●	●		●	◦	◦
PDS-1000/He™ system	321	●	●	●	●		●		●	○	○	◦	◦		●	○	●		◦	●	●
PDS-1000/He system with Hepta™ adaptor	321	●	●	●	●		●		●	○	○	◦	◦		●	○	●		●	●	●

- ● First choice, highly recommended.
- ◦ Recommended, but other technologies may be better suited to that application.
- ○ Possible, but little data to support its effectiveness.
- * Protoplasts required.

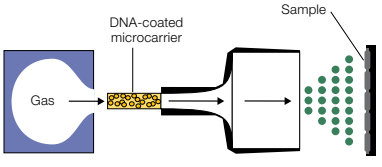
Lipid Transfection
page 311



Electroporation
page 312



Biolistic Particle Delivery
page 319



Helios Gene Gun System Particle Delivery Method

Lipid Transfection Reagents

Lipid transfection is the process of using lipids to cause a cell to absorb DNA from outside itself. The liposome easily merges with the membrane of the cell since they are both composed of a phospholipid bilayer. Once the liposome and membrane are merged the genetic material can then be released inside the cell. Some familiar aliases for lipid transfection are lipid-mediated delivery, lipofection, and liposome-based gene transfection.

Lipid transfection has been shown to be successful in transfecting adherent and suspension cells and some primary cells (for example, mES and neuronal cells). Common applications employing lipid transfection include RNAi studies, protein production, viral production, gene function analysis, and cell-based assays.

Lipid Transfection Reagents Selection Guide

	siLentFect™ Lipid Reagent	TransFectin™ Lipid Reagent
Description	RNAi-specific lipid	General-purpose lipid
Applications	RNAi (siRNA delivery)*	Gene expression RNAi (siRNA/shRNA delivery)
Cell lines**	Variety of adherent and suspension cell lines, including A549, BHK, HeLa, K562, primary fibroblasts, and Vero	Variety of adherent and suspension cell lines, including A549, HeLa, HUVEC, MCF-7, and primary fibroblasts
Shelf life	6 months	6 months

* siLentFect can successfully cotransfect an siRNA molecule with a plasmid DNA.

** For a more complete list of cell lines, see below (siLentFect lipid reagent) and page 312 (TransFectin lipid reagent), or go to **www.bio-rad.com/lipids**.

siLentFect™ Lipid Reagent for RNAi

Effective Gene-Specific Silencing with Low Toxicity
siLentFect lipid reagent delivers siRNA to a broad variety of cultured mammalian cells for RNAi applications. RNAi is a powerful technique used for the specific inhibition of gene expression. An intrinsic cellular mechanism in most eukaryotes, RNAi helps regulate the expression of genes critical to cell fate determination, differentiation, survival, and defense from viral infection.

- **Effective gene-specific silencing** — achieve 90–99% gene-specific knockdown of both high- and low-abundance genes using as little as 1 nM siRNA for certain gene targets
- **Low amounts of siRNA and lipid required** — the high affinity of siLentFect lipid reagent for siRNA allows the use of less lipid and less siRNA per experiment, decreasing the likelihood of off-target effects, reducing cost, and minimizing the experimental bias caused by cell stress/death
- **Simple, flexible protocol** — easily adaptable protocol for high-throughput applications; successfully transfect cells by adding siLentFect reagent and siRNA directly to the culture or by adding siLentFect-siRNA complexes to trypsinized cells still in suspension



- **Cotransfection capabilities** — simultaneous delivery of siRNA and dsDNA vectors for optimization and dual expression analysis
- **Works with many cell types** — 184htrt, 4T1, A549, Caco-2, CHO-K1, COS-7, HEK 293, HeLa, HepG2, HUVEC, LNCaP, MCF-7, murine EC, NIH 3T3, PC-3, primary fibroblast, primary keratinocyte, primary ovarian, SVEC4, VSMC

For More Information
Web: www.bio-rad.com/silenfect
Request or download bulletins: 3105, 5439, and 5894

Ordering Information

Catalog #	Description
170-3360	**siLentFect Lipid Reagent for RNAi**, 0.5 ml
170-3361	**siLentFect Lipid Reagent for RNAi**, 1.0 ml
170-3362	**siLentFect Lipid Reagent for RNAi**, 5 x 1.0 ml

See Also

TC20 automated cell counter: pages 28–29.

Experion automated electrophoresis system: pages 250–256.

Supermixes for PCR and real-time PCR: pages 344–349.

Real-time PCR systems: pages 331–336.

Aurum total RNA kits: pages 11–12.

See Also

Real-time qPCR supermixes: pages 344–349.

Real-time PCR systems: pages 331–336.

Aurum total RNA kits: pages 11–12.

Plasmid isolation kits: pages 14–15.

TransFectin™ Lipid Reagent

Efficient Delivery for High Gene Expression Levels
TransFectin lipid reagent delivers nucleic acids to a broad range of cell lines with high efficiency. Advantages of this reagent include:

- **Enables high-efficiency results** — effective transfection of both easy- and difficult-to-transfect cells
- **Minimally affects cell viability** — less cytotoxicity than other high-efficiency products makes it appropriate for sensitive cell lines; lower toxicity leads to healthier cells for post-transfection analysis
- **Simple to use** — part of an easy three-step protocol; dilute TransFectin reagent and nucleic acid in the appropriate medium, mix, incubate, and add to the cell culture. There is no need to change the medium for most cell types after addition of the complexes; just incubate and assay for expression
- **Allows flexibility in experimental conditions** — efficient transfection in both the presence and absence of serum-containing media; exceptional results are obtained when cells are transfected at densities between 40–90%



- **Affordable** — minimal amounts of TransFectin reagent are required for optimal transfection results compared to other reagents; using less lipid reduces the cost per transfection and reduces toxicity effects
- **Works with many cell types** — A375, A549, ACHN, BHK, CHO, COS-7, CV-1, HEK 293, HeLa, HepG2, K562, LLC-MK2, LNCaP, MEF, NBT-II, Neuro-2a, NIH 3T3, SH-SY5Y, SW480, Vero

For More Information
Web: www.bio-rad.com/transfectin
Request or download bulletins: 2873 and 3197

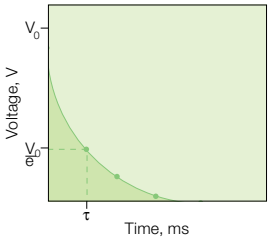
Ordering Information

Catalog #	Description
170-3350	**TransFectin Lipid Reagent**, 0.5 ml
170-3351	**TransFectin Lipid Reagent**, 1.0 ml
170-3352	**TransFectin Lipid Reagent**, 5 x 1.0 ml

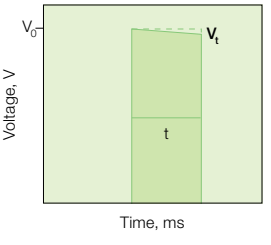
Electroporation Systems and Reagents

Electroporation is a powerful, highly efficient technique for introducing molecules (nucleic acids, proteins, carbohydrates, dyes) and viral particles into a wide variety of prokaryotic and eukaryotic cells. A high-intensity electric field transiently permeabilizes the membrane, enabling uptake of molecules from the surrounding medium. Electroporation provides a valuable and effective alternative to chemical, biological, and other physical methods of transfection.

For More Information
Web: www.bio-rad.com/electroporation
Online protocols: www.bio-rad.com/transfectionprotocols



Exponential-decay pulse. When a capacitor charged to a voltage V_0 is discharged into cells, the voltage applied to the cells decreases over time exponentially. The time required for the initial voltage to drop to V_0/e is referred to as the time constant (τ) and is a convenient expression of the pulse length.



Square-wave pulse. Truncating the pulse from a capacitor after discharging it into the sample generates a square-wave pulse. The pulse length is the time the cells are subjected to the discharge. A slight drop in voltage occurs with all square-wave instruments. This drop in voltage is called the pulse droop and is measured as a percentage of the initial voltage.

A Choice of Exponential-Decay or Square-Wave Pulse
Gene Pulser MXcell™ and Gene Pulser Xcell™ electroporation systems generate both exponential and square waveforms, allowing you to choose the waveform and protocol that work best for your cells.

Both exponential-decay and square-wave pulses have been used effectively for electroporation. Depending on cell type, the shape of the wave can have a significant effect on the transfection efficiency. Electrofusion is also possible with Gene Pulser® systems.

Electroporation Systems Selection Guide

	 **Gene Pulser MXcell System** page 314	 **Gene Pulser Xcell System** page 315	 **MicroPulser™ System** page 317
Plate-based system	Yes	No	No
Cuvette-based system	Yes	Yes	Yes
Eukaryotic or prokaryotic	Eukaryotic	Both	Prokaryotic
Recommended cells	Mammalian cell types, including primary and stem cells	Mammalian, bacterial, and fungal cell lines	Bacterial, yeast, and other microorganisms
Chamber	Plate and/or ShockPod™ chambers	ShockPod chamber	ShockPod chamber
System options	—	Gene Pulser Xcell total system Gene Pulser Xcell eukaryotic system Gene Pulser Xcell microbial system	—

Gene Pulser® Electroporation Buffer

The formulation of Gene Pulser electroporation buffer simulates the natural cell environment to minimize cell mortality while ensuring highly efficient delivery of nucleic acids. This electroporation buffer is a universal reagent for introducing siRNA, plasmid DNA, and other molecules into various mammalian cells, including difficult-to-transfect and primary cells. The buffer is compatible with electroporation systems, including Gene Pulser MXcell, Gene Pulser Xcell, Gene Pulser II, and most other systems. It is compatible with both exponential and square waveforms.



Gene Pulser electroporation buffer:

- Allows you to optimize multiple electroporation parameters, including voltage and capacitance for each cell type
- Improves transfection efficiency and cell viability
- Exhibits low conductivity — compatible with cuvette or multiwell plate formats

For More Information
Web: www.bio-rad.com/electroporationbuffer
Request or download bulletin: 5582

Ordering Information

Catalog #	Description
165-2676	**Gene Pulser Electroporation Buffer**, 10 x 1.8 ml
165-2677	**Gene Pulser Electroporation Buffer**, 30 ml

Gene Pulser MXcell™ Electroporation System

The Gene Pulser MXcell electroporation system is an affordable instrument offering a choice between plate and cuvette delivery with enhanced program features that allow optimal transfection results to be obtained quickly. The Gene Pulser MXcell system user interface provides access to preset and custom protocols that easily adapt to new or existing transfection conditions. Benefits include:

- **Choice of plate or cuvette delivery format** — electroporate a limited number of primary cells or a larger number when scaling up
- **Delivery of any molecule into primary and other mammalian cells** — transfect siRNA, DNA, and other molecules in a completely open format
- **Preprogrammed protocols designed for rapid optimization** — increase transfection efficiency and viability, regardless of cell type
- **Manual protocol programming** — adjust settings according to the wide variations in primary and stem cells
- **Compatible with any electroporation buffer** — use with universal Gene Pulser® electroporation buffer for efficient gene delivery while maintaining cell viability
- **Recommended protocols for primary and mammalian cells** — browse Bio-Rad's expanding Transfection Protocol Library for starting conditions

High Reproducibility, Rapid Delivery

- Cross-compatible protocols allow a simple transition between plates and cuvettes
- Consistent transfection efficiency and activity regardless of delivery format

Electroporation Plates

Electroporation plates for use with the Gene Pulser MXcell electroporation system are available in three formats: 96-well for low-volume or screening experiments, and 24- or 12-well.

Benefits include:

- **Streamlined optimization** — up to 24 different protocols can be delivered on a single 96- or 24-well plate
- **High reproducibility** — well-to-well and plate-to-plate variability is less than 20%
- **Scalability** — consistent transfection efficiency across 96-, 24-, and 12-well plate formats





Gene Pulser MXcell™ ShockPod™ Cuvette Chamber

The Gene Pulser MXcell ShockPod cuvette chamber expands the capabilities of the Gene Pulser MXcell electroporation system by adding a choice in delivery tools. The Gene Pulser MXcell ShockPod cuvette chamber is only compatible with the Gene Pulser MXcell electroporation system and is not interchangable with the Gene Pulser XCell ShockPod cuvette chamber. Key features include:

- Protocols are cross-compatible between plates and cuvettes
- Chamber is designed for one-handed use
- Chamber is lightweight
- Cuvette slot accepts any standard cuvette

For More Information
Web: www.bio-rad.com/mxcell
Request or download bulletins: 5598, 5634, or 5760A

Ordering Information

Catalog #	Description
165-2670	**Gene Pulser MXcell Electroporation System**, 100/240 V, 50/60 Hz, exponential-decay and square-wave delivery, includes power module, plate chamber, 1 x 96-well electroporation plate
165-2673	**Gene Pulser MXcell ShockPod Cuvette Chamber**, includes integral leads for connection to the Gene Pulser MXcell electroporation system
165-2674	**Gene Pulser MXcell Electroporation System with MXcell ShockPod Cuvette Chamber**, 100/240 V, 50/60 Hz, exponential-decay and square-wave delivery, includes power module, plate chamber, 1 x 96-well electroporation plate, cuvette chamber
165-2671	**Power Module**
165-2672	**Plate Chamber**
Electroporation Plates	
165-2681	**96-Well Electroporation Plate**
165-2682	**24-Well Electroporation Plate**
165-2683	**12-Well Electroporation Plate**
Cuvette Packs*	
165-2081	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 5
165-2088	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 50
165-2091	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 500

* Please inquire about volume pricing.

Gene Pulser Xcell™ Electroporation Systems

The Gene Pulser Xcell system is a modular electroporation system for transfecting every cell type. The system includes a main unit, a ShockPod cuvette chamber, and your choice of accessory modules: the capacitance extender (CE module) and the pulse controller (PC module).

Features and Benefits

- **Universal electroporation** — transfects all cell types, from primary and stem cells to bacteria and yeast
- **Preset protocols** — include the most common mammalian and bacterial cell types
- **Flexibility** — choice of programs for preset protocols, optimization protocols, manual operation, or user protocols
- **Protocol library** — collection of electroporation protocols for every cell type including primary, immortal, and bacterial cells
- **Data management** — enables storage and recall of parameters used in the previous 100 experiments for easy troubleshooting
- **Reproducibility** — uses PulseTrac™ circuitry and arc protection to ensure reproducibility and sample protection



Gene Pulser Xcell System Selection Guide

System		Comments
Gene Pulser Xcell Total System		The complete electroporation system for transfection of both eukaryotic and prokaryotic cells; includes both the CE and the PC modules.
Gene Pulser Xcell Eukaryotic System		For the electroporation of most eukaryotic cells, including mammalian cells and plant protoplasts; includes the CE module.
Gene Pulser Xcell Microbial System		For the electroporation of bacteria and fungi as well as other applications where high-voltage pulses are applied to samples of small volume; includes the PC module.

For More Information
Web: www.bio-rad.com/xcell
Request or download bulletins: 5445 and 5542

Ordering Information

Catalog #	Description
165-2660	**Gene Pulser Xcell Total System**, for mammalian and microbial cells, 100/240 V, 50/60 Hz, exponential-decay and square-wave delivery, includes main unit, CE module, PC module, ShockPod cuvette chamber, 15 sterile cuvettes (5 each of 0.1, 0.2, and 0.4 cm gap), cuvette rack
165-2661	**Gene Pulser Xcell Eukaryotic System**, 100/240 V, 50/60 Hz, exponential-decay (25–3,275 µF range) and square-wave delivery, includes main unit, CE module, ShockPod cuvette chamber, 5 sterile cuvettes (0.4 cm gap), cuvette rack
165-2662	**Gene Pulser Xcell Microbial System**, 100/240 V, 50/60 Hz, exponential-decay delivery, includes main unit, PC module, ShockPod cuvette chamber, 10 sterile cuvettes (5 each of 0.1 and 0.2 cm gap), cuvette rack
Components	
165-2666	**Gene Pulser Xcell Main Unit**, 100/240 V, 50/60 Hz
165-2667	**Gene Pulser Xcell CE Module**, 25–3,275 µF range controlled by main unit, includes integral leads
165-2668	**Gene Pulser Xcell PC Module**, 50–1,000 Ω range controlled by main unit, includes integral leads
165-2669	**Gene Pulser Xcell ShockPod Cuvette Chamber**, includes integral leads for connection to Gene Pulser Xcell, Gene Pulser II, or MicroPulser electroporators
165-2095	**Gene Pulser Cuvette Rack**

MicroPulser™ Electroporator

The MicroPulser electroporator is a simple yet versatile instrument that enables safe and reproducible transformation of bacteria, yeast, and other microorganisms. Transformation efficiencies much higher than those obtained with chemical methods can be achieved. Unique features of the system include:

- One-button pulse delivery, attached cuvette chamber, and rapid charge time for fast sample handling
- Delivery of exponential waveform for prokaryotic cells
- Convenient preset optimized programs for commonly studied bacteria and fungi
- Arc quenching system that significantly reduces arcing, protecting against loss of valuable samples
- Broad range of parameters for manual optimization
- High-voltage (3,000 V) capability for improved efficiency in larger-volume cuvettes
- Compact, space-saving design
- Audible and visible pulse indicators
- Display of time constant and actual voltage delivered to monitor reproducibility

For More Information
Web: www.bio-rad.com/micropulser
Request or download bulletins: 2751 and 5542



MicroPulser electroporator with cuvette chamber attached.
Electroporator is shown connected to the cuvette chamber.

Ordering Information

Catalog #	Description
165-2100	**MicroPulser Electroporator**, includes a cuvette chamber with leads, 10 sterile cuvettes (5 each of 0.1 cm and 0.2 cm gap)

Gene Pulser®/MicroPulser™ Electroporation Cuvettes

Bio-Rad offers high-quality electroporation cuvettes that deliver consistent pulses to your valuable samples, ensuring reproducible results. Cuvettes are available in three different gap widths: 0.4, 0.2, and 0.1 cm, for optimal field strength delivery to a wide range of cell types. Features of the cuvettes include:

- **Guaranteed efficiency** — manufactured to precise gap tolerances to ensure maximum electroporation efficiency and reproducibility between experiments
- **Universal compatibility** — can be used with Gene Pulser MXcell™, Gene Pulser Xcell™, Gene Pulser II, and most other electroporation systems
- **Ensured sterility** — each cuvette is assembled in a cleanroom environment, washed, fitted with a snug cap, individually wrapped, and sterilized by gamma irradiation
- **Sturdy construction** — durable polycarbonate withstands pulses of very high voltage
- **Color-coded caps and bags** — easy identification of different cuvette sizes
- **Consistent chamber shape** — seamless plastic molding eliminates leaking and keeps the aluminum plates parallel, which is essential for uniform sample treatment and safety
- **Smooth electrode surface** — the aluminum plates are subjected to an 11-step etching and cleaning process for uniform pulse delivery to the entire sample



For More Information
Web: www.bio-rad.com/electroporationcuvettes
Request or download bulletins: 1908 and 5542

Ordering Information

Catalog #	Description
Standard Packs	
165-2088	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 50
165-2086	**Gene Pulser/MicroPulser Cuvettes**, 0.2 cm gap, 50
165-2089	**Gene Pulser/MicroPulser Cuvettes**, 0.1 cm gap, 50
Jumbo Packs*	
165-2091	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 500
165-2092	**Gene Pulser/MicroPulser Cuvettes**, 0.2 cm gap, 500
165-2093	**Gene Pulser/MicroPulser Cuvettes**, 0.1 cm gap, 500
Mini Packs	
165-2081	**Gene Pulser/MicroPulser Cuvettes**, 0.4 cm gap, 5
165-2082	**Gene Pulser/MicroPulser Cuvettes**, 0.2 cm gap, 5
165-2083	**Gene Pulser/MicroPulser Cuvettes**, 0.1 cm gap, 5

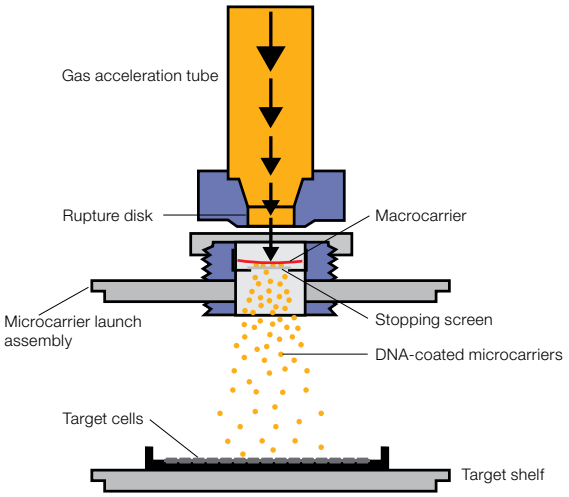
* Please inquire about volume pricing.

Biolistic Particle Delivery Systems

Biolistic technology, or particle bombardment, is a direct physical method of delivering nucleic acids into cells. The Helios® gene gun and PDS-1000/He™ systems use advanced biolistic technology to transform cells in situ. This technology can be applied to the widest range of targets, including cell cultures, tissues, organs, plants, animals, and bacteria as well as organelles. The instruments use a helium pulse to accelerate high-density gold or tungsten particles coated with nucleic acids directly into target cells. Adjusting the pressure of the helium enables accurate penetration through the plant cell wall or cell membrane and into the cell.

Particle Delivery Application Notes and Protocols
Bio-Rad offers detailed application notes and protocols describing biological and bombardment conditions for many applications. Visit us on the Web at **www.bio-rad.com/biolistics** to download application notes and protocols.

For More Information
Web: www.bio-rad.com/biolistics
Request or download bulletin: 5443



PDS-1000/He system particle delivery method. High-pressure helium is used to propel a macrocarrier sheet loaded with DNA-coated gold or tungsten microcarriers toward target cells. The macrocarrier is halted after a short distance and the DNA coated microcarriers continue traveling toward the target to penetrate the cells.

Biolistic Systems Selection Guide by Application

Factors Affecting Transformation	Helios Gene Gun System	PDS-1000/He System	PDS-1000/He System with Hepta™ Adaptor
Experimental conditions	In situ, in vitro, in vivo, ex vivo	In vitro, ex vivo, in vivo (plants)	In vitro, ex vivo, in vivo (plants)
Target area	Small (2 cm^2)	Large (40 cm^2)	Largest (~75 cm^2)
Pressure range	100–600 psi	450–2,200 psi	450–2,200 psi, reduced by 7-way spread of helium
Target type	**Animals:** Any tissue exposed to barrel (skin, organs); cell, explant, and organ culture **Plants:** Field and greenhouse use, plant cell culture, explants **Yeast, bacteria, other microbes**	**Animals:** Cell and organ culture **Plants:** Small intact plants, plant cell culture, explants **Yeast, bacteria, other microbes** **Organelles (chloroplasts, mitochondria, etc.)**	**Animals:** Cell and organ culture **Plants:** Cells with thin cell walls **Yeast, bacteria, other microbes**

Helios® Gene Gun System

The Helios gene gun is a convenient handheld device that provides rapid and direct gene delivery to cells in situ. The unit uses an adjustable helium pulse to sweep DNA-, RNA-, or biomaterial-coated gold microcarriers from the inner wall of a small plastic cartridge directly into target cells. Cartridge "bullets" are simple to prepare using the tubing prep station.

- Provides easy-to-use, rapid, versatile gene delivery independent of target cell type
- Facilitates both transient and stable expression
- Requires only small amounts of DNA and cells; no carrier DNA needed
- Enables codelivery of more than one plasmid
- Allows transfer of large DNA fragments
- Targets intracellular gene delivery to many cells
- Works for both in vitro and in vivo transformation
- Delivers no extraneous genes or proteins
- Interactive CD-ROM (available separately; order the Particle Delivery Systems Training and Application Guide CD-ROM) guides all aspects of transfection using biolistic particle delivery technology



The Helios gene gun system includes one vial of each of the three sizes of gold microcarriers and a cartridge kit that includes 15 m (50') of Tefzel tubing, five cartridge collection/storage vials, five desiccant pellets, and 0.5 g of PVP for the sample tubing coating procedure. This is sufficient material (excluding nucleic acids, spermidine, $CaCl_2$, and absolute ethanol) for preparing approximately 1,000 gene gun samples.

For More Information
Web: www.bio-rad.com/helios
Request or download bulletins: 5443 and 5446

Ordering Information

Catalog #	Description
165-2431*	**Helios Gene Gun System**, 100/120 V, includes Helios gene gun kit, helium hose assembly, helium regulator, tubing prep station, syringe kit, Tefzel tubing, tubing cutter, Helios gene gun optimization kit
165-2432	**Helios Gene Gun System**, 220/240 V
165-2451	**Helios Gene Gun Low-Pressure System**, 100/120 V, same as #165-2431 with low-pressure regulator (maximum 400 psi)
165-2452	**Helios Gene Gun Low-Pressure System**, 220/240 V

* Additional items required for operation of the Helios gene gun system: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to the desired output pressure. Required items for tubing preparation: nitrogen tank, grade 4.8 (99.998% pure) or higher; nitrogen regulator (#165-2425 recommended for U.S. standard connections); 100% ethanol (fresh for each microcarrier precipitation); spermidine; plasmid.

Accessories for Helios® Gene Gun

GeneShot™ Control Cartridges

GeneShot control cartridges are ready-to-use "bullets" for the Helios gene gun. Each cartridge contains the *lacZ* (β-galactosidase) and *luc* (firefly luciferase) reporter genes on 1.6 µm gold particles. Driven by a strong mammalian promoter, the human cytomegalovirus (CMV) immediate early promoter, these positive controls yield reporter gene activity useful for optimizing Helios gene gun settings. The cartridges can be stored desiccated at room temperature or at 4°C for one year.

For More Information
Web: www.bio-rad.com/helios

Sample Preparation Accessories for Helios Gene Gun
Gold microcarriers, Tefzel tubing, cartridge collection/storage vials, and desiccant pellets are needed for Helios gene gun sample preparation. The gold microcarriers are available in 0.6, 1.0, and 1.6 µm diameters. Lengths of Tefzel tubing (up to 76 cm or 30") are coated with the DNA- or RNA-microcarrier complexes using the tubing prep station. Coated tubing is cut into 1.25 cm (0.5") cartridges using the tubing cutter. Sample cartridges can be stored at 4°C in cartridge collection/storage vials with a desiccant pellet for later use. Additional barrel liners, cartridge holders, and other accessories are also available.

Ordering Information

Catalog #	Description
165-2244	**GeneShot Control Cartridges**, positive control bullets, 12
165-2412	**Helium Hose Assembly**, with Swagelok quick-connect fittings
165-2413	**Helium Regulator**, CGA 580 female fitting (U.S. standard), with pressure relief valve; maximum pressure 2,600 psi
165-2414	**Low-Pressure Helium Regulator for Helios Gene Gun**, maximum pressure 400 psi
165-2418	**Tubing Prep Station**, 100/120 V, includes tubing support cylinder, power cord, O-rings, tubing prep unit, 12' Nalgene nitrogen regulator hose, two 3/16" barb-to-male Luer-Lok fittings, nitrogen flowmeter fitting, two 1/8" barb-to-male Luer-Lok fittings, 5/64" hex wrench, 10 ml syringe holder
165-2420	**Tubing Prep Station**, 220/240 V
165-2421	**Syringe Kit**, includes syringe adaptor tubing (silicone, 5', 0.104" ID x 0.192" OD), five 10 ml syringes, syringe adaptor fitting, five 1/8" barb-to-female Luer-Lok fittings
165-2422	**Tubing Cutter**, includes tubing cutter unit, 10 razor blades
165-2424	**Helios Gene Gun Optimization Kit**, includes 0.25 g 0.6 µm gold microcarriers, 0.25 g 1.0 µm gold microcarriers, 0.25 g 1.6 µm gold microcarriers, cartridge kit
165-2440	**Cartridge Kit**, contains 0.5 g PVP (MW 360,000), 5 cartridge collection/storage vials, 5 desiccant pellets, 50' Tefzel tubing
165-2262	**0.6 µm Gold Microcarriers**, 0.25 g
165-2263	**1.0 µm Gold Microcarriers**, 0.25 g
165-2264	**1.6 µm Gold Microcarriers**, 0.25 g
165-2425	**Nitrogen Regulator for U.S. Standard Connections**
165-2416	**O-Rings**, 5
165-2417	**Barrel Liner**, 5
165-2426	**Cartridge Holder**, white, 5
165-2435	**Cartridge Extractor Tool**, for removal of discharged cartridge
165-2436	**Battery**, 9 V
165-2441	**Tefzel Tubing**, 15 m (50')
165-2475	**Helios Diffusion Screens**, 5
165-2411	**Helios Gene Gun Kit**, 100/120 V, includes Helios gene gun, 5 O-rings, 5 barrel liners, 5 white cartridge holders, cartridge extractor tool, 9 V battery

PDS-1000/He™ and Hepta™ Systems

PDS-1000/He System
The PDS-1000/He system accelerates nucleic acid-coated gold or tungsten microparticles (0.6–1.6 µm) to velocities necessary to transfect cells, tissues, or organelles. The system uses a burst of high-pressure helium gas to accelerate a plastic macrocarrier disk carrying microparticles toward target cells. A stopping screen retains the macrocarrier while allowing the microparticles to penetrate the target cells. The PDS-1000/He system provides:

- A reproducible method for transfecting intact cells in culture, requiring little manipulation of cells
- Transfection of cells with unique growth requirements that are not amenable to other methods of gene transfer
- Interactive training and application guide (CD-ROM, available separately)



Hepta Adaptor PDS-1000/He System

PDS-1000/He System with Hepta Adaptor

The Hepta adaptor, which fits into the shocking chamber of the PDS-1000/He system, splits the helium shock wave over seven macrocarriers. By spreading the DNA-coated particles over a larger area, the system maximizes the number of cells transformed, increasing transfection efficiency by a factor of seven to ten. Pressure and particle velocity are reduced, making the system ideal for plants and cell cultures that require less forceful penetration.

Accessories for the PDS-1000/He and Hepta Systems

Accessories for the PDS-1000/He and Hepta systems include:

- Rupture disks of various strengths to contol the force of the helium shock wave
- Gold and tungsten particles (microcarriers) of various diameters
- Macrocarriers
- Stopping screens
- Optimization kit to help fine-tune the bombardment conditions for your cells of interest. The kit contains samples of the gold microcarriers and the 9 rupture disks, stopping screens, and macrocarriers for 500 bombardments
- Not provided: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to 2,600 psi; vacuum source

For More Information
Web: www.bio-rad.com/pds1000
Request or download bulletins: 5443 and 5447

Ordering Information

Catalog #	Description
165-2257*	**PDS-1000/He System**, includes helium pressure regulator, solenoid, spacer rods, microcarrier launch assembly, target shelf, 5 macrocarrier holders, tubing
165-2258*	**PDS-1000/He Hepta System**, includes PDS-1000/He system, Hepta adaptor
165-2225	**Hepta Adaptor for PDS-1000/He System**, includes 5 stopping screens
165-2259	**Voltage Converter**, for 220/240 V line voltage
Accessories	
165-2278	**500 Optimization Kit**, includes 0.25 g each of 0.6 µm, 1.0 µm, and 1.6 µm gold microcarriers, 100 each of 9 rupture disks, 500 macrocarriers, 500 stopping screens
165-2335	**Macrocarriers**, 500
165-2322	**Macrocarrier Holders**, 5
165-2326	**450 psi Rupture Disks**, 100
165-2327	**650 psi Rupture Disks**, 100
165-2328	**900 psi Rupture Disks**, 100
165-2329	**1,100 psi Rupture Disks**, 100
165-2330	**1,350 psi Rupture Disks**, 100
165-2331	**1,550 psi Rupture Disks**, 100
165-2332	**1,800 psi Rupture Disks**, 100
165-2333	**2,000 psi Rupture Disks**, 100
165-2334	**2,200 psi Rupture Disks**, 100
165-2336	**Stopping Screens**, 500
165-2226	**Hepta Stopping Screens**, 50
165-2262	**0.6 µm Gold Microcarriers**, 0.25 g
165-2263	**1.0 µm Gold Microcarriers**, 0.25 g
165-2264	**1.6 µm Gold Microcarriers**, 0.25 g
165-2266	**Tungsten M-10 Microcarriers**, ~0.7 µm, 6 g
165-2267	**Tungsten M-17 Microcarriers**, ~1.1 µm, 6 g
165-2268	**Tungsten M-20 Microcarriers**, ~1.3 µm, 6 g
165-2269	**Tungsten M-25 Microcarriers**, ~1.7 µm, 6 g

* Additional items required for operation of the PDS-1000/He system: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to 2,600 psi; vacuum source.

DNA Amplification/PCR

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Digital PCR

Several areas of research depend on the ability to study target DNA sequence variations. Digital PCR technology offers the ability to quantify molecular genetic changes. It is employed by researchers using applications such as copy number variation, rare mutation detection, and gene expression analysis. Bio-Rad's QX100™ Droplet Digital™ PCR system combined with our ddPCR™ supermix reagent kits, next generation sequencing (NGS) library quantification kits, and reliable thermal cyclers offer researchers an easy-to-use, highly accurate, and precise digital PCR package.

Learn More about the Technology
Web: www.bio-rad.com/tech/ddPCR

See Also

C1000 Touch thermal cycler: page 327.

PX1 PCR plate sealer: page 352.

New QX100™ Droplet Digital™ PCR System

The QX100 Droplet Digital PCR (ddPCR™) system provides an absolute measure of target DNA molecules with unrivaled performance in precision, accuracy, and sensitivity for quantitative PCR applications. The ddPCR system provides a revolutionary approach to target DNA quantification by eliminating the need for standard curves.

The QX100 droplet generator partitions samples into 20,000 nanoliter-sized droplets. After PCR on a thermal cycler, droplets from every sample are streamed in single file on the QX100 droplet reader. The PCR-positive and PCR-negative droplets are counted to provide absolute quantification of target DNA in digital form.

The ddPCR system provides:

- **Unrivaled accuracy** — achieve high resolution of copy number variation states and allelic discrimination
- **Unmatched sensitivity** — measure the varying degrees of mutagenesis for detection of rare DNA target copies
- **High precision** — measure gene expression and miRNA levels with ±10% precision
- **True validation** — quantify NGS library preparations without the use of standard curves and validate NGS results in digital form

Accessories

Several accessories are available for the QX100 ddPCR system. The system requires the proprietary oil chemistries supplied by Bio-Rad, including reagents and oils for droplet generation and reading. The droplet generator consumes disposable cartridges and gaskets during use.

For More Information
Web: www.bio-rad.com/QX100
Request or download bulletin: 6237



Ordering Information

Catalog #	Description
QX100 Droplet Digital PCR System	
186-3001	**QX100 ddPCR System with Laptop**
186-3002	**QX100 Droplet Generator**
186-3003	**QX100 Droplet Reader**
Accessories	
186-3004	**Droplet Reader Oil**, 2 x 1 L bottles
186-3005	**Droplet Generator Oil**, 10 x 7 ml bottles
186-3006	**Droplet Generator Cartridges and Gaskets**, 24 DG8 cartridges, 24 DG8 gaskets, 5 pkgs
186-3008	**DG8 Cartridges for QX100 Droplet Generator**, 24 cartridges, 1 pkg
186-3009	**DG8 Gaskets for QX100 Droplet Generator**, 24 gaskets, 1 pkg

New QX100™ Droplet Digital™ PCR System Reagents

The QX100™ ddPCR™ system can be used to partition either complementary DNA (cDNA) or RNA as a template.

- **ddPCR supermix for probes** — a 2x supermix used to partition and amplify DNA for use in digital PCR
- **One-step RT-ddPCR kit for probes** — a 2x RT-ddPCR supermix used to partition RNA for use in RT-ddPCR
- **Droplet PCR supermix** — a 2x supermix used for DNA sample preparation for applications such as NGS library preparation and PCR cloning

ddPCR Supermix for Probes

The ddPCR supermix for probes is a ready-to-use 2x supermix that has been optimized to achieve unrivaled performance when used in combination with the QX100 Droplet Digital PCR system. The QX100 droplet generator partitions a 20 µl PCR reaction containing sample DNA, primer pairs, TaqMan probes, and the ddPCR supermix into 20,000 water-in-oil droplets. During the partitioning, target DNA and background DNA are randomly distributed among the droplets. After PCR amplification in a standard thermal cycler, the PCR-positive and PCR-negative droplets are counted to provide absolute quantification of target DNA in digital form.

Droplet PCR Supermix

The droplet PCR supermix has been optimized to amplify rare target DNA and NGS library preparations. The ddPCR supermix provides unbiased amplification and greater template coverage of sequencing template. Partitioning the PCR reaction into droplets creates 20,000 independent microreactors. Diluting the background DNA into droplets enriches for rare target sequences and creates a greater chance for rare target amplification. Partitioning the DNA into droplets also constrains nonspecific amplification to a single droplet, preventing the nonspecific product from biasing final results, which can happen when nonspecific products are amplified in a bulk reaction.

Droplet Digital PCR NGS Library Quantification Kits

The Bio-Rad QX100 Droplet Digital PCR system is the optimal solution for preparation and quantification of NGS libraries. Partitioning the library preparation into 20,000 droplets prior to PCR amplification removes the bias PCR amplification can have on NGS results. The QX100 system can also be used to digitally perform a quality check on the library and to quantify the concentration of desired fragments, increasing the reliability of the sequencing process several fold over current methods.

The QX100 droplet digital PCR system lets you:

- Achieve greater coverage of sequencing template with unbiased amplification
- Quickly and reliably determine the quality of the library, including fragment composition and real concentration
- Reliably and accurately normalize fragments that form clusters
- Optimize the use of consumables, labor, and instrument time for the highest productivity with NGS

For More Information
Web: www.bio-rad.com/digitalpcr
Request or download bulletins: 6237 and 6250

Ordering Information

Catalog #	Description
ddPCR Supermix for Probes	
186-3026	**ddPCR Supermix for Probes**, 2 x 1 ml vials, 2x supermix, for use in sample preparation for QX100 droplet generator
186-3010	**ddPCR Supermix for Probes**, 5 x 1 ml vials, 2x supermix, for use in sample preparation for QX100 droplet generator
186-3027	**ddPCR Supermix for Probes**, 5 x 5 ml vials, 2x supermix, for use in sample preparation for QX100 droplet generator
186-3028	**ddPCR Supermix for Probes**, 10 x 5 ml vials, 2x supermix, for use in sample preparation for QX100 droplet generator
186-3022	**One-Step RT-ddPCR Kit for Probes**, 5 x 1 ml, 500 x 20 µl reactions, 2x RT-ddPCR mix
186-3021	**One-Step RT-ddPCR Kit for Probes**, 2 x 1 ml, 200 x 20 µl reactions, 2x RT-ddPCR mix
Droplet PCR Supermix	
186-3023	**Droplet PCR Supermix**, 2 x 1 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 droplet generator
186-3024	**Droplet PCR Supermix**, 5 x 1 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 droplet generator
186-3025	**Droplet PCR Supermix**, 5 x 5 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 droplet generator
ddPCR NGS Library Quantification Kits	
186-3040	**Library Quantification Assay for Illumina TrueSeq**, includes 1 vial of primers and probes supplied at 20x concentration and 2x ddPCR supermix for probes
186-3041	**Library Quantification Assay for Ion Torrent**, includes 1 vial of primers and probes supplied at 20x concentration and 2x ddPCR supermix for probes
186-3052	**ddPCR Buffer Control Kit**, 2 x 4.5 ml bottle, 2x buffer

Thermal Cyclers for PCR

Instruments range from personal thermal cyclers to the flexible 1000 series. Multiple modules and chassis provide options for low- to high-throughput capabilities.

Learn More about the Technology
Web: www.bio-rad.com/tech/PCR

Thermal Cycler Selection Guide

	1000-Series Thermal Cyclers		Personal Thermal Cyclers	
Feature	**S1000**™ page 326	**C1000 Touch**™ page 327	**T100**™ page 329	**MJ Mini**™ page 330
Peltier-effect technology	•	•	•	•
Upgradable to real-time PCR		•		
Interchangeable sample blocks	•	•		
Number of wells	96, 96 deep, dual 48, or 384	96, 96 deep, dual 48, or 384	96	48
Gradient capability	•	•	•	•
Graphical user interface		•	•	
Full-color display		•	•	
Fast PCR protocol templates	•	•	•	•
Choice of temperature control mode	•	•	•	•
Power failure restore	•	•	•	•
Programmable ramp rates	•	•	•	•
Networking capability	•	•		
Reports on cycler use and performance		•	•	
Heated lid	Adjustable	Adjustable	Fixed	Adjustable
Full-skirted plate compatibility	•	•		
Protocol autowriter		•		
USB flash drive compatibility		•	•	

1000-Series Thermal Cyclers

Bio-Rad 1000-series thermal cyclers offer a fully modular platform. Choose the full-featured C1000 Touch™ cycler, the basic S1000™ cycler, or a combination of both. The cyclers can accommodate different throughput needs with easily interchangeable reaction blocks.

S1000™ Thermal Cycler

The S1000 thermal cycler can be used as a stand-alone, dependable instrument for PCR. Up to three S1000 cyclers can be connected to a C1000 Touch™ thermal cycler to form a high-throughput multi-bay instrument. The S1000 cycler offers the same thermal performance as the C1000 Touch cycler and lets you:

- Choose a reaction module that suits your needs — dual 48/48-well fast, 96-well fast, 96-deep well, or 384-well format
- Get optimal sealing using your favorite vessels and sealers with the redesigned, fully adjustable heated lid



For More Information
Web: www.bio-rad.com/S1000
Request or download bulletins: 6082 and 6094

Ordering Information

Catalog #	Description
184-2000	**S1000 Thermal Cycler Chassis**, includes power cord; does not include reaction module
185-2148	**S1000 Thermal Cycler with Dual 48/48 Fast Reaction Module**, includes S1000 thermal cycler chassis, dual 48/48 fast reaction module
185-2196	**S1000 Thermal Cycler with 96-Well Fast Reaction Module**, includes S1000 thermal cycler chassis, 96-well fast reaction module
185-2197	**S1000 Thermal Cycler with 96-Deep Well Reaction Module**, includes S1000 thermal cycler chassis, 96-deep well reaction module
185-2138	**S1000 Thermal Cycler with 384-Well Reaction Module**, includes S1000 thermal cycler chassis, 384-well reaction module
Accessories	
184-8000	**USB Cable**, for use with C1000, C1000 Touch, and S1000 thermal cyclers
184-9000	**Tube Frame**, supports individual 0.2 ml tubes in the C1000, C1000 Touch, and S1000 dual 48- and 96-well reaction modules
184-9001	**Tube Frame**, supports individual 0.2 ml tubes in the C1000 Touch and S1000 96-deep well reaction module
184-9010	**Touch-Screen Protector**, for use with C1000 Touch thermal cycler, 2
184-1001	**1000-Series Connectivity Kit**, includes mouse, mouse pad, USB key

C1000 Touch™ Thermal Cycler

The C1000 Touch cycler is the flagship of the 1000-series thermal cycling platform, offering unmatched performance for fast, reliable results. The state-of-the-art interface allows new ways to optimize protocols and monitor runs.

Benefits include:

- Easily upgrade to real-time PCR using the CFX96™ or CFX384™ optical reaction module
- Quickly optimize reactions using the protocol autowriter
- Save time creating and viewing protocols using the large color touch-screen display and intuitive graphical programming
- Get answers quickly using desktop support, data logging, and run reports
- Email notification of run completion capability
- Back up your data and manage and transfer files using a USB flash drive
- Optional log-in, restricted user privileges, and secure mode for controlled environments and file protection



- Increase throughput simply and easily by connecting up to three additional S1000™ cyclers or adding PC control for up to 32 cyclers

For More Information
Web: www.bio-rad.com/C1000Touch
Request or download bulletin: 6085 and 6094

Ordering Information

Catalog #	Description
184-1100	**C1000 Touch Thermal Cycler Chassis**, includes USB flash drive, power cord; does not include reaction module
185-1148	**C1000 Touch Thermal Cycler with Dual 48/48 Fast Reaction Module**, includes C1000 Touch thermal cycler chassis, dual 48/48 fast reaction module, USB flash drive
185-1196	**C1000 Touch Thermal Cycler with 96-Well Fast Reaction Module**, includes C1000 Touch thermal cycler chassis, 96-well fast reaction module, USB flash drive
185-1197	**C1000 Touch Thermal Cycler with 96-Deep Well Reaction Module**, includes C1000 Touch thermal cycler chassis, 96-deep well reaction module, USB flash drive
185-1138	**C1000 Touch Thermal Cycler with 384-Well Reaction Module**, includes C1000 Touch thermal cycler chassis, 384-well reaction module, USB flash drive

See Also

CFX96 Touch real-time PCR detection system: page 333.
CFX384 Touch real-time PCR detection system: page 335.

Reaction Modules

Reaction Module Specifications





Reaction Module	96-Well Fast	96-Deep Well	Dual 48/48-Well Fast	384-Well
Sample capacity	96 x 0.2 ml tubes or 1 x 96-well plate	96 x 0.2 ml tubes, 48 x 0.5 ml tubes, or 1 x 96-well plate	2 x 48 x 0.2 ml tubes or 2 x 48-well plates	1 x 384-well plate
Maximum ramp rate	5°C/sec	2.5°C/sec	4°C/sec	2.5°C/sec
Average ramp rate	3.3°C/sec	2°C/sec	3°C/sec	2°C/sec
Temperature range	0–100°C	0–100°C	0–100°C	0–100°C
Temperature accuracy	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C
Temperature uniformity	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C

Thermal Gradient (available on all reaction modules)

Gradient range	30–100°C
Temperature differential range	1–24°C

Ordering Information

Catalog #	Description
184-0148	**Dual 48/48 Fast Reaction Module**, independent dual 48-well reaction module, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
184-0196	**96-Well Fast Reaction Module**, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
184-0197	**96-Deep Well Reaction Module**, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
184-0138	**384-Well Reaction Module**, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled

DNA Engine® Alpha™ Unit Reaction Modules

DNA Engine Alpha unit reaction modules fit DNA Engine Dyad™, Disciple™, Tetrad® 1, and Tetrad 2 thermal cyclers.

For More Information
Web: www.bio-rad.com/dnaengine
Request or download bulletins: 5219, 5221, and 5277

Alpha™ Unit Reaction Modules

The Alpha unit reaction modules feature adjustable heated lids that are manually set to optimize the sealing pressure for different types of vessels and sealers.

96-Well Alpha Unit, Gradient Enabled

- Holds 96 x 0.2 ml tubes or one 96-well plate

384-Well Alpha Unit

- Holds one 384-well plate


96-Well Alpha Unit, Gradient Enabled

48/48 Dual Alpha Unit

- Holds 48 x 0.2 ml tubes or one 48-well plate
- Independently controllable blocks, separate protocols may run side by side



48/48 Dual Alpha Unit

Ordering Information

Catalog #	Description
Single-Block Alpha Units	
ALS-1296G	**96-Well Alpha Unit with Hot Bonnet Heated Lid**, holds one 96-well plate or 96 x 0.2 ml tubes
ALS-1238G	**384-Well High-Capacity Alpha Unit with Hot Bonnet Heated Lid**, holds one 384-well microplate
Dual-Block Alpha Units	
ALD-1244G	**48/48 Dual Alpha Unit with Two Heated Lids**, includes 2 independent blocks, each block holds 48 x 0.2 ml tubes or one 48-well plate

Personal Thermal Cyclers

T100™ Thermal Cycler

The T100 thermal cycler is a compact, 96-well thermal cycler that offers a comprehensive package of features, including an easy-to-use touch screen, thermal gradient, and reliable performance.

With the T100 thermal cycler, you can:

- Save time programming with the intuitive touch screen
- Get superior results faster by optimizing your PCR assays in a single run using a thermal gradient
- Save valuable benchspace with the compact design
- Keep your protocols organized using personalized folders or a USB flash drive

For More Information
Web: www.bio-rad.com/T100
Request or download bulletin: 6065



See Also

PCR plastic consumables: pages 353–368.

PCR reagents: pages 342–351.

MiniOpticon real-time PCR detection system: page 332.

Nucleic acid sample preparation: pages 10–18.

Ordering Information

Catalog #	Description
186-1096	**T100 Thermal Cycler**, includes 96-well thermal cycler, power cord, tube support ring
186-2000	**Tube Support Ring**, extra tube support ring for use with individual tubes in the T100 thermal cycler, 2
186-3000	**Touch-Screen Protector**, for use with T100 thermal cycler, 2
Recommended Consumables	
170-8890	**iScript cDNA Synthesis Kit**, 25 x 20 µl reactions, includes 5x iScript reaction mix, iScript reverse transcriptase, nuclease-free water
170-8896	**iScript Select cDNA Synthesis Kit**, 25 x 20 µl reactions, includes 5x iScript reaction mix, iScript reverse transcriptase, oligo(dT), random primer mix, gene specific primer enhancer solution, nuclease-free water
170-8870	**iTaq DNA Polymerase**, 250 U (5 U/µl), includes 10x PCR buffer, 50 mM $MgCl_2$ solution
172-5301	**iProof High-Fidelity DNA Polymerase**, 100 U (2 U/µl), includes 5x HF buffer, 5x GC buffer, 50 mM $MgCl_2$ solution, DMSO
HSS-9601	**Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates**, clear shell, clear well, 25
MLP-9601	**Multiplate High-Profile 96-Well Unskirted PCR Plates**, clear, 25
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, 100
TBS-1201	**0.2 ml 12-Tube Strips without Caps**, clear, 100
TCS-1201	**Domed 12-Cap Strips**, for 0.2 ml PCR tubes and plates, clear, 200
TWI-0201	**0.2 ml PCR Tubes with Domed Caps**, clear, 1,000

MJ Mini™ Personal Thermal Cycler

The MJ Mini personal thermal cycler offers exceptional performance and quality in a compact 48-well design. Features include:

- A 6 x 8 sample array that accommodates one 48-well plate, 48 x 0.2 ml tubes, 6 x 8-tube strips, or up to 12 x 0.5 ml tubes
- Thermal gradient technology that permits simultaneous incubation at eight different temperatures to optimize reactions in a single run
- Choice of text-based or graphical protocol viewing modes
- A fully adjustable heated lid that accommodates a wide range of reaction vessels



For More Information
Web: www.bio-rad.com/MJMini
Request or download bulletin: 5262

Ordering Information

Catalog #	Description
PTC-1148C	**MJ Mini Personal Thermal Cycler**, includes 48-well thermal cycler, power cord
Recommended Consumables	
TWI-0201	**PCR Tubes with Domed Caps (0.2 ml)**, clear, 1,000
TFI-0201	**PCR Tubes with Flat Caps (0.2 ml)**, clear, 1,000
TLS-0801	**Low-Profile 8-Tube Strips without Caps (0.2 ml)**, clear, 120 strips (960 PCR tubes)
TCS-0801	**Domed 8-Cap Strips**, for 0.2 ml PCR tubes and plates, clear, 120
TCS-0803	**Optical Flat 8-Cap Strips**, for 0.2 ml PCR tubes and plates, ultraclear, 120
TBI-0502	**PCR Tubes with Flat Caps (0.5 ml)**, clear, 800 (8 bags of 100)
MLL-4801	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, 8 x 6 format, clear, 50

Real-Time PCR Systems

Bio-Rad's real-time PCR detection systems are available as individual systems or as upgrades to Bio-Rad's C1000 Touch™ thermal cyclers. The detection systems' optical modules allow target sequence detection via fluorescence detection chemistry. Systems include a 48-well system that enables two-target detection as well as sophisticated two- to five-target detection systems with 96- or 384-wells. See the selection guide below for comparative specifications for these real-time systems.

Learn More about the Technology
Web: www.bio-rad.com/tech/qpcr

See Also

RNA isolation kits: pages 10–12.

Experion system: pages 250–256.

PCR reagents: pages 342–351.

PrimePCR assays and panels: page 341.

PX1 PCR plate sealer: page 352.

PCR plastic consumables: pages 353–368.

Real-Time PCR System Selection Guide







Feature	MiniOpticon™	CFX Connect™	CFX96 Touch™	NEW CFX96 Touch Deep Well™	CFX384 Touch™
Base thermal cycler	MJ Mini™	CFX Connect	C1000 Touch	C1000 Touch	C1000 Touch
Sample capacity	48 wells	96 wells	96 wells	96 wells	384 wells
Sample volume	Up to 100 µl	Up to 50 µl	Up to 50 µl	Up to 125 µl	Up to 30 µl
Light source	48 blue-green LEDs	3 filtered LEDs in optics shuttle	6 filtered LEDs in optics shuttle	6 filtered LEDs in optics shuttle	5 filtered LEDs in optics shuttle
Optical detection	2 photodiodes	3 photodiodes in optics shuttle	6 photodiodes in optics shuttle	6 photodiodes in optics shuttle	5 photodiodes in optics shuttle
Excitation range	470–500 nm	450–535 nm	450–684 nm	450–684 nm	450–650 nm
Detection range*	523–700 nm	515–580 nm	515–730 nm	515–730 nm	515–690 nm
Multiplex capability	Up to 2 targets	Up to 2 targets	Up to 5 targets	Up to 5 targets	Up to 4 targets
FRET capability	—	•	•	•	•
Maximum ramp rate	2.5°C/sec	5°C/sec	5°C/sec	2.5°C/sec	2.5°C/sec
Gradient capability	•	•	•	•	•
Gradient range	35–99°C	30–100°C	30–100°C	30–100°C	30–100°C
Maximum gradient span	16°C	24°C	24°C	24°C	24°C
CFX Qualification Plate	—	•	•	•	•
SsoFast™ EvaGreen Control Assay	•	•	•	•	•

* Refer to system instruction manuals or bulletins 5274, 6093, 6096, and 6105 for information about useful detection ranges for specific dyes.

MiniOpticon™ Real-Time PCR Detection System

The MiniOpticon system is a two-color real-time PCR detection system built on the high-performance, gradient-enabled MJ Mini thermal cycler. Using a fixed array of 48 blue-green long-lasting LEDs and two filtered photodiodes, the MiniOpticon system minimizes cross talk and maximizes fluorophore excitation and detection for accurate and reproducible results.

The MiniOpticon real-time PCR detection system includes CFX Manager™ software for streamlined system operation and sophisticated data analysis. The package offers automated data quality control and tools to perform normalized gene expression using multiple reference genes and target-specific reaction efficiencies, melt-curve analysis, end-point analysis, and allelic discrimination.



For More Information
Web: www.bio-rad.com/miniopticon
Request or download bulletins: 5843 and 5844

Ordering Information

Catalog #	Description
CFB-3120	**MiniOpticon Real-Time PCR Detection System**, includes optical housing, MJ Mini thermal cycler, analysis software
184-5003	**CFX Manager Software, MiniOpticon**, includes CFX Manager software, installation CD, quick guides, instruction manual for MiniOpticon system
Accessories	
TLS-0851	**Low-Profile 8-Tube Strips without Caps (0.2 ml)**, white, 120 strips (960 PCR tubes)
TCS-0803	**Optical Flat 8-Cap Strips**, for 0.2 ml PCR tubes and plates, ultraclear, 120
MLL-4851	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, white, 50
170-9799	**Real-Time PCR Applications Guide**

CFX Connect™ Real-Time PCR Detection System

The CFX Connect real-time PCR detection system offers two-target analysis for SYBR® Green/EvaGreen and duplex experiments in a 96-well format. The system incorporates innovative optical technologies with long-lasting LEDs and solid-state components to provide maximum reliability and flexibility. Included with the system is the powerful, easy-to-use CFX Manager software for system operation and data analysis.

- Quickly obtain results with factory-calibrated dyes, quick setup, and intuitive software
- Save time and reduce costs by optimizing assays in a single run using the thermal gradient
- Quickly and accurately validate and analyze data with the advanced analysis modules of CFX Manager software



- Analyze data when and where you want by receiving email notification with an attached data file when a run is complete
- Increase throughput and flexibility by running up to 4 instruments from 1 computer
- Import data into qbase^{PLUS} software for access to wizard-guided statistical analysis, advanced copy number variation analysis, and global mean normalization methods

For More Information
Web: www.bio-rad.com/cfxconnect
Request or download bulletins: 6102, 6103, and 6105

Ordering Information

Catalog #	Description
185-5200	**CFX Connect Real-Time PCR Detection System**, includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
185-5201	**CFX Connect Real-Time PCR Detection System**, includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable
Accessories	
184-5098	**CFX Qualification Plate**, 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
HSP-9601	**Hard-Shell Low-Profile 96-Well Skirted PCR Plates**, white shell, clear well, 50
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, package of 100
170-9799	**Real-Time PCR Applications Guide**

CFX96 Touch™ Real-Time PCR Detection System

The CFX96 Touch real-time PCR detection system meets all your real-time PCR needs — whether you are running your first experiment or analyzing complex gene expression studies. With five-target detection, industry-leading stand-alone functionality, superior thermal cycler performance, and easy-to-use software, the CFX96 Touch system has been designed to advance your qPCR.



The CFX96 Touch real-time PCR detection system makes it easy for you to:

- Start doing experiments right away with factory-calibrated optics and minimal setup
- Incorporate real-time PCR into your laboratory with a compact footprint and the ability to set up runs and view data traces in real time on the integrated LCD touch screen
- Fit experiments into your schedule by shortening run times with fast thermal cycling
- Save research time by optimizing experiments in a single run using a thermal gradient
- Conserve your samples and reagents with true five-target multiplexing and optimal quantitative results using sample volumes as low as 10 µl

For More Information
Web: www.bio-rad.com/cfx96-pcr
Request or download bulletins: 6075, 6076, and 6093

Ordering Information

Catalog #	Description
184-5096*	**CFX96 Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
184-5097*	**CFX96 Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable
185-5196	**CFX96 Touch Real-Time PCR Detection System**, includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
185-5195	**CFX96 Touch Real-Time PCR Detection System**, includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable
Accessories	
184-5098	**CFX Qualification Plate**, 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
TLS-0801	**Low-Profile 8-Tube Strips without Caps (0.2 ml)**, clear, 120 strips (960 tubes)
TCS-0803	**Optical Flat 8-Cap Strips**, for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP-9601	**Hard-Shell Low-Profile 96-Well Skirted PCR Plates**, white shell, clear well, 50
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, package of 100
170-9799	**Real-Time PCR Applications Guide**

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

New CFX96 Touch Deep Well™ Real-Time PCR Detection System

The CFX96 Touch Deep Well real-time PCR detection system offers precise quantification and target discrimination for up to five targets in large-volume reactions up to 125 µl. The system incorporates industry-leading technology and stand-alone functionality to provide a robust and easy-to-use real-time PCR system for reliable results.



The CFX96 Touch Deep Well real-time PCR detection system provides:

- Minimal setup with factory-calibrated dyes
- Easy viewing of real-time data traces with integrated LCD touch screen
- Fast experiment optimization with built-in thermal gradient
- User-friendly data analysis modules with CFX Manager software
- Effortless export of RDML files for import into qbase^{PLUS} software

For More Information
Web: www.bio-rad.com/CFX96DeepWell
Request or download bulletins: 5990, 6238, and 6243

Ordering Information

Catalog #	Description
185-4096	**CFX96 Touch Deep Well Real-Time PCR Detection system**, includes C1000 Touch thermal cycler chassis, CFX96 Deep Well optical module, CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
185-4095	**CFX96 Touch Deep Well Real-Time PCR Detection system**, includes C1000 Touch thermal cycler chassis, CFX96 Deep Well optical module, CFX Manager software, license for qbase^{PLUS} software, communication cable
184-4096*	**CFX96 Deep Well Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
184-4095*	**CFX96 Deep Well Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable
Accessories	
184-5098	**CFX Qualification Plate**, 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
TLS-0801	**Low-Profile 8-Tube Strips without Caps (0.2 ml)**, clear, 120 strips (960 tubes)
TCS-0803	**Optical Flat 8-Cap Strips**, for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP-9601	**Hard-Shell Low Profile 96-Well Skirted PCR Plates**, white shell, clear well, 50
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, package of 100
170-9799	**Real-Time PCR Applications Guide**

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

CFX384 Touch™ Real-Time PCR Detection System

The CFX384 Touch real-time PCR detection system brings flexibility and ease of use to researchers performing high-throughput real-time PCR in a 384-well format. With the ability to run without a computer, superior performance, and powerful yet easy-to-use software, the CFX384 Touch system has been designed to advance your qPCR.



The CFX384 Touch real-time PCR detection system makes it easy to:

- Rely on performance with an optical system that uses long-lasting solid-state technology with filtered LEDs and filtered photodiodes for precise quantification and target discrimination
- Conserve your samples and reagents by performing four-target multiplex reactions with optimal quantitative results using sample volumes as low as 3 µl
- Quickly set up runs and monitor amplification traces in real time on the integrated LCD touch screen
- Configure the system to fit your laboratory needs by running the CFX384 Touch system in several control configurations, including integrated with the CFX automation system

For More Information
Web: www.bio-rad.com/cfx384-pcr
Request or download bulletins: 6072, 6077, and 6096

Ordering Information

Catalog #	Description
184-5384*	**CFX384 Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
184-5385*	**CFX384 Optical Reaction Module**, for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase^{PLUS} software, communication cable
185-5484	**CFX384 Touch Real-Time PCR Detection System**, includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable, reagents, consumables
185-5485	**CFX384 Touch Real-Time PCR Detection System**, includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, CFX Manager software, license for qbase^{PLUS} software, communication cable
Accessories	
184-5099	**CFX Qualification Plate**, 384-well format, for use with CFX384 or CFX384 Touch system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
HSP-3805	**Hard-Shell 384-Well Standard PCR Plates**, clear shell, white well, 50
MSB-1001	**Microseal 'B' Adhesive Seals**, optically clear, package of 100
170-9799	**Real-Time PCR Applications Guide**

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

CFX Automation System

The CFX automation system works with the CFX Connect, CFX96 Touch, CFX96 Touch Deep Well, and CFX384 Touch real-time PCR detection systems to enable walk-away, high-throughput operation in a simplified format that does not compromise precision. The plug-and-go benchtop plate handler has the capacity to stack and load up to twenty 384-well PCR plates at a time. This system facilitates the automation of workflows, generation of large volumes of data, and rapid analysis of data. It is ideally suited to meet the high-throughput requirements of today's drug discovery workflows, letting you process up to 7,680 samples in a single run of twenty 384-well plates on the CFX384 Touch system.

The CFX automation system makes it easy to:

- Maximize laboratory throughput by integrating with the CFX Connect, CFX96 Touch, CFX96 Touch Deep Well, or CFX384 Touch real-time PCR detection system for hands-free running of up to 20 plates
- Improve experimental workflow and automation tasks to ensure maximum productivity
- Track samples using the integrated bar code reader
- Navigate, set up, and execute multiple PCR experiments using intuitive CFX automation control software



- Define PCR protocols for an entire plate stack at once
- Receive email notification with an attached data file or report upon completion of a single run

For More Information
Web: www.bio-rad.com/cfxautomation
Request or download bulletin: 5879

Ordering Information

Catalog #	Description
184-5072	**CFX Automation System**, includes robotic plate handler, base tray, bar code scanner, CFX automation control software CD

PCR Instrument Validation Tools

Bio-Rad's PCR instrument validation tools allow you to easily test the performance of your real-time PCR system.

Instrument Validation Tool Selection Guide

	 MiniOpticon™	 CFX Connect™	 CFX96 Touch™	 NEW CFX96 Touch Deep Well™	 CFX384 Touch™
NEW CFX qualification plate	—	•	•	•	•
SsoFast™ EvaGreen® control assay	•	•	•	•	•

New CFX Qualification Plate

The CFX qualification plate is an easy-to-use tool for validating the performance of your CFX system. The plate is predispensed with an optimized assay, SsoAdvanced™ SYBR® Green supermix, and nuclease-free water. The CFX qualification plate can be incorporated into an instrument qualification procedure for easy tracking of your instrument's performance. Features include:

- 2-fold discrimination with 99.7% confidence level
- Predefined thermal cycling protocol and plate templates for a streamlined workflow
- 1-click for pass/fail results with CFX Manager™ software



For More Information
Web: www.bio-rad.com/cfxqualification
Request or download bulletin: 6323

Ordering Information

Catalog #	Description
184-5098	**CFX Qualification Plate**, 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
184-5099	**CFX Qualification Plate**, 384-well format, for use with CFX384 or CFX384 Touch system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water

SsoFast™ EvaGreen® Control Assay

The SsoFast EvaGreen control assay is a predesigned control kit that allows you to control experimental conditions, making the kit ideal for training new users on real-time PCR (qPCR) or verifying the performance of a qPCR system. Features include:

- **High efficiency results** — the control assay demonstrates high efficiency over a broad dynamic range from 10^2–10^8 relative fluorescence units (RFU)



See Also
SsoFast EvaGreen supermix: page 345.

- **Straightforward protocol** — includes instructions for setting up a dilution series to create a standard curve
- **Training tool** — convenient format with template, predesigned primers, and a recommended thermal cycling protocol makes it easy to use for training new users on real-time PCR setup, instrument operation, and data analysis

For More Information
Web: www.bio-rad.com/ssofastcontrolassay
Request or download bulletin: 5973

Ordering Information

Catalog #	Description
172-5996	**SsoFast EvaGreen Control Assay**, predesigned kit for verifying performance of real-time PCR systems or training new users, includes 10^8 copies/µl of control assay DNA template, 100x control assay primer mix (50 µM each primer), SsoFast EvaGreen supermix, and nuclease-free water

PCR and Real-Time PCR Software

Bio-Rad PCR and real-time software supports multi-instrument control and collection and analysis of real-time PCR data. Probe and primer design software enables rapid design of robust real-time PCR assays.

Amplification Software System Requirements

	Minimum	Recommended
Operating system	Windows XP Professional SP2, Windows 7	Windows XP Professional SP2, Windows 7
Processor	1 GHz	2 GHz
RAM	1 GB (2 GB for Windows 7)	2 GB
Hard drive space	10 GB	20 GB
Screen resolution	1,024 x 768 with true-color mode	1,280 x 1,024 with true-color mode
Drive	CD-ROM	CD-RW
USB port	2.0 Hi-Speed	2.0 Hi-Speed

CFX Manager™ Software

CFX Manager software sets the standard for real-time data acquisition and analysis. This version supports the CFX96™, CFX96 Touch™, CFX96 Touch Deep Well™, CFX Connect™, CFX384™, CFX384 Touch™, and MiniOpticon™ real-time PCR detection systems. Bio-Rad® PrimePCR™ users will benefit from full software integration, from starting a run to insightful data analysis. The software enables you to:

- Get started quickly using the Startup Wizard
- Analyze your results when and where you want following email notification with an attached data file when a run is complete
- Make faster data-driven decisions by easily visualizing all your important run data in a single window using Custom Data View
- Extract more meaningful information from each run using analyses such as volcano plots, which emphasize statistically significant targets, and clustergrams, which arrange samples and targets into groups of similar expression
- Export only the data you want in your preferred format with Custom Data Export

For More Information
Web: www.bio-rad.com/cfx-manager-software

Ordering Information

Catalog #	Description
184-5000	**CFX Manager Software**, includes installation CD, quick guides, instruction manual
184-5003	**CFX Manager Software, MiniOpticon**, includes installation CD, quick guides, instruction manual for MiniOpticon system

CFX Manager™ Software, Security Edition

CFX Manager software, Security Edition provides important tools for compliance with U.S. FDA 21 CFR Part 11 regulations. The Security Edition requires a valid Windows XP, Windows Vista, or Windows 7 username and password for login, requires a hardware protection key to be attached to a USB port on the computer, uses file encryption to ensure files cannot be opened or edited using other programs, and allows multiple electronic signatures. The software also ensures integrity and validity are checked each time a file is opened with automatic file checking and allows read-only information displayed in the time- and date-stamped audit trail to be viewed only while the data file of interest is open.

Note: A CFX96 or CFX384 real-time PCR detection system is required to use this software.

For More Information
Web: www.bio-rad.com/cfx-manager-software-security-edition
Request or download bulletin: 5690

Ordering Information

Catalog #	Description
184-5001	**CFX Manager Software, Security Edition**, includes 1 user license, installation CD, HASP HL key
184-5005	**CFX Manager Software, Security Edition**, includes 5 user licenses, 5 installation CDs, 5 HASP HL keys
184-5010	**CFX Manager Software, Security Edition**, includes 10 user licenses, 10 installation CDs, 10 HASP HL keys

CFX Manager™ Software, Chinese and Russian Editions

CFX Manager software, Chinese and Russian Editions work with the regional settings of the Windows XP, Windows Vista, and Windows 7 operating systems to provide localized, language-specific environments. The Chinese and Russian Editions also provide hardware protection to CFX Manager software: a HASP hardware license (HL)-based key must be attached to a USB port on the computer to use the software in regional language mode.

For More Information
Web: www.bio-rad.com/cfx-manager-software-chinese-edition; www.bio-rad.com/cfx-manager-software-russian-edition

Ordering Information

Catalog #	Description
184-5008	**CFX Manager Software, Chinese Edition**, includes 3 user licenses, installation CD, 3 HASP HL keys
184-5028	**CFX Manager Software, Russian Edition**, includes 3 user licenses, installation CD, 3 HASP HL keys

Precision Melt Analysis™ Software

Precision Melt Analysis software imports and analyzes data files generated from the CFX96 Touch, CFX96 Touch Deep Well, CFX384 Touch, or CFX Connect real-time PCR detection system to genotype samples based on the thermal denaturation properties of double-stranded DNA. The software can be used for a variety of genotyping applications, including scanning for new gene variants, screening DNA samples for SNPs, identifying insertions/deletions or other unknown mutations, and determining the percentage of methylated DNA in unknown samples. The software enables you to:

- Assign sample genotypes automatically based on cluster analysis or manually using multiple data view options to tailor the software to the appropriate analysis



- Generate a basic representation of the different clusters based on curve shifting (homozygotes) and curve shape change (heterozygotes) using the normalized melt curves plot feature
- Compare data between multiple file runs by combining them into a single melt study — develop a standard library of melt curve runs to analyze an unlimited number of melt experiments without having to export data
- View multiple displays of the data, including a simultaneous display of the original melt curves and the normalized plot
- Export data to multiple formats, including spreadsheet, image, XML, and HTML files
- Analyze multiple experiments from a single plate using the Well Groups feature
- Arrange melt data or melt study data into a customizable report

For More Information
Web: www.bio-rad.com/precision-melt-analysis-software
Request or download bulletin: 5798

Ordering Information

Catalog #	Description
184-5025	**Precision Melt Analysis Software**, includes 2 user licenses, installation CD, 2 HASP HL keys, melt calibration kit
184-5015	**Precision Melt Analysis Software Only**, includes 2 user licenses, installation CD, 2 HASP HL keys
184-5020	**Melt Calibration Kit**, includes melt calibration DNA standard, melt primers, precision melt supermix

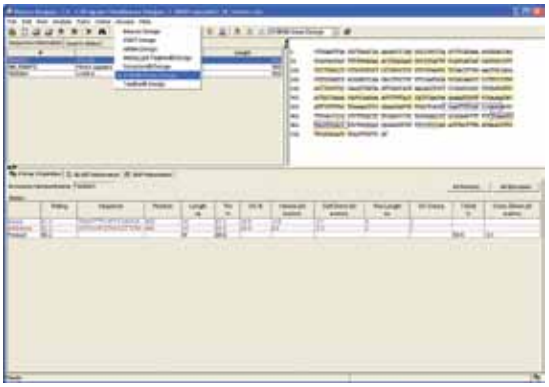
Beacon Designer Software

Beacon Designer software from PREMIER Biosoft International generates optimal primer and probe sequences for real-time quantitative PCR assays. Primer efficiency is enhanced by avoiding template secondary structure identified by connecting to the mfold server (Zuker 2003). Beacon Designer software can be used to evaluate predesigned primers and to design compatible oligonucleotide probes, extending the assay design. The program displays the location of primers and probes, all possible dimers, cross-dimers, and repeats, all in a graphical format.

Beacon Designer is now supplied with PrimerPlex for the design of oligonucleotides for multiplex analysis systems such as the Bio-Plex® suspension array system.

Versatile Assay Development

- Design optimal primer-probe sets for single-tube multiplex assays using Beacon Designer software's proprietary algorithms
- Ensure SYBR® Green I assay specificity by avoiding cross-homologies identified by automatically interpreting BLAST search results
- Design HRM analysis primers for all mutation types including deletions, insertions, substitutions, and mixed mutations, along with SNPs



Beacon Designer main window. The drop-down menu shows the available assays: TaqMan, molecular beacon, FRET, SYBR® Green, HRMA, Scorpions, and MethyLight.

- Have comprehensive support of probe-based assays, such as TaqMan, molecular beacon, FRET, LNA, and NASBA assays, for studying differential gene expression or detecting SNPs

Beacon Designer software enables assay design for any of Bio-Rad's real-time PCR detection systems.

For More Information
Web: www.bio-rad.com/beacon-designer-software
Request or download bulletin: 2766

Ordering Information

Catalog #	Description
170-8734	**Beacon Designer Probe/Primer Design Software**, includes 3 user licenses, installation CD, quick guide

Real-Time PCR Assays and Panels

PrimePCR™ assays and panels for real-time PCR are expertly designed and wet-lab validated to ensure optimal assay performance and compliance with the Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) guidelines (Bustin et al. 2009).

New PrimePCR™ Assays and Panels

Wet-Lab Validated for Guaranteed Performance

Wet-lab validation of every assay provides confidence in results while eliminating time-consuming assay design and optimization steps. Assays are validated with iScript™ advanced cDNA synthesis kit for RT-qPCR and SsoAdvanced™ SYBR® Green supermix for superior performance. Validation information is available for every assay.

Assay Performance Standards

Sensitivity	Accurate detection of 20 copies
Specificity	Amplicon sequences validated with next generation sequencing (NGS); minimal primer-dimer formation and genomic DNA cross-reactivity
Amplification efficiency	90–110%
Linear dynamic range	Minimum of 6 orders of magnitude; detection of a synthetic template standard curve from 20 to 20 million copies
R^2	>0.99

Over 300 Pathway and Collection Panels

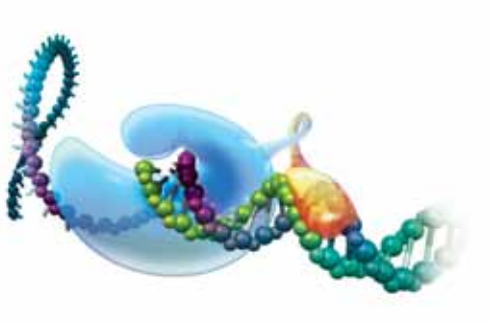
Predesigned plates are available for canonical pathways and related collections to help identify and investigate key targets in a biological pathway of interest. Predesigned plates can be modified to include user-selected assays.

Customizable 96- and 384-Well Plate Formats

Easy-to-use custom plate configurator allows users to lay out assays on a plate exactly as they choose, or to use a suggested template.

Fully Integrated with CFX Manager™ Software

Full integration with CFX real-time PCR systems and data analysis software streamlines data collection and analysis.



The PrimePCR product family includes :

- **Predesigned assays** — genome-wide human primer assays for SYBR® Green gene expression analysis available in 200, 1,000, and 2,500 reactions. Genome-wide mouse assays are coming soon
- **Custom assays** — order your primer sequences of interest; available in 200, 1,000, and 2,500 reactions
- **Custom PCR plates** — custom-configured 96- and 384-well PCR plates with PrimePCR assays
- **Predesigned pathway and collection panels** — predesigned 96- and 384-well PCR pathway and collection panels
- **DNA templates** — gene-specific synthetic DNA templates can be used as a positive control for the corresponding gene-specific assay
- **Experimental controls** — control assays are available for reverse transcription, RNA quality, genomic DNA contamination, and PCR performance

For More Information
Web: www.bio-rad.com/PrimePCR
Download bulletins: 6262, 6263, and 6290

Ordering Information

To place an order, please visit **www.bio-rad.com/PrimePCR**.

See Also

iScript advanced cDNA synthesis kit for RT-qPCR: pages 342–343.

SsoAdvanced™ SYBR® Green supermix: page 344.

iTaq universal SYBR® Green supermix: page 345.

PCR Reagents

PCR reagents such as ready-to-use 2x supermixes and cDNA synthesis kits are optimized for reverse transcription (RT), PCR, or qPCR applications, including high resolution melt (HRM) analysis, long, proofreading, and fast PCR, and chromatin analysis.

Reverse Transcription Reagents

Bio-Rad's reverse transcription reagents are formulated for efficient reverse transcription across a broad linear dynamic range. The potent RNase A inhibitors in the reagents protect RNA during setup and reverse transcription. Reagents have flexible input RNA capacity to suit different experimental needs and are optimized for gene expression analysis using real-time PCR.

For More Information
Web: www.bio-rad.com/RTreagents

Reverse Transcription Reagents

NEW iScript™ Advanced cDNA Synthesis Kit for RT-qPCR

- Increased qPCR data throughput and cost effectiveness from a single 20 µl RT reaction
- Superior sensitivity and broad linear dynamic range for RT (7.5 µg–100 fg)
- 2-tube kit (5x iScript reaction mix and iScript reverse transcriptase) for ease of use and reduced reaction setup time
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for RT-qPCR and eliminates additional RNase H+ step
- Potent blend of RNaseA inhibitor protects RNA during setup and RT
- Short 35-min protocol allows fast qPCR data generation

For More Information
Request or download bulletin: 6090

	Reduce pipetting variability	Maximize data from single 20 µl reaction	Fast and easy to use	Select my own primers
Product	**iScript reverse transcription supermix for RT-qPCR**	**iScript advanced cDNA synthesis kit for RT-qPCR**	**iScript cDNA synthesis kit**	**iScript Select cDNA synthesis kit**
Sensitivity	1 µg–100 fg total RNA	7.5 µg–100 fg total RNA	1 µg–100 fg total RNA	1 µg–1 pg total RNA
Kit Contains	5x iScript RT supermix (dNTPs, oligo[dT], random primers, buffer components, and iScript reverse transcriptase)	iScript reverse transcriptase 5x iScript advanced reaction mix (dNTPs, oligo[dT], random primers, and buffer components)	iScript reverse transcriptase 5x iScript reaction mix (dNTPs, oligo[dT], random primers, and buffer components)	iScript reverse transcriptase 5x iScript reaction mix (dNTPs and buffer components) Oligo(dT), random primers, and gene-specific primer (GSP) enhancer solution (3 vials)
Results	cDNA ready in 40 min for qPCR	cDNA ready in 35 min for qPCR	cDNA ready in 40 min for qPCR	cDNA ready in 40–90 min for qPCR

iScript Reverse Transcription Supermix for RT-qPCR

- One-tube format for simple and fast setup and reduced pipetting variability
- 5x formulation enables RNA volumes up to 16 µl, avoiding the need to concentrate
- Liquid format at –20°C offers superior stability and eliminates freeze/thaw cycle
- Superior sensitivity and broad linear dynamic range for RT (1 µg–100 fg)
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for RT-qPCR and eliminates additional RNase H+ step
- Potent blend of RNaseA inhibitor protects RNA during setup and RT
- Short 40 min protocol allows fast qPCR data generation

For More Information
Request or download bulletin: 6090

iScript cDNA Synthesis Kit

- Two-tube kit (5x iScript reaction mix and iScript reverse transcriptase) for ease of use and reduced reaction setup time
- Superior sensitivity and broad linear dynamic range for RT (1 µg–100 fg)
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for RT-qPCR and eliminates additional RNase H+ step
- Potent blend of RNaseA inhibitor protects RNA during setup and RT
- Short 40 min protocol allows fast qPCR data generation

For More Information
Request or download bulletin: 6090

iScript Select cDNA Synthesis Kit

- 5-tube kit (random primers, oligo[dT], 5x iScript Select reaction mix, iScript reverse transcriptase, and gene-specific primer-enhancer solution)
- Choice of priming strategy
- Reliable synthesis of long cDNA >6 kb in length
- Superior sensitivity and broad linear dynamic range for RT (1 µg–1 pg)

For More Information
Request or download bulletin: 6090

Ordering Information

Catalog #	Description
iScript Reverse Transcription Supermix for RT-qPCR	
170-8840	**iScript Reverse Transcription Supermix for RT-qPCR**, 25 x 20 µl reactions, includes 100 µl 5x iScript RT supermix, 200 µl 5x iScript RT supermix no-RT control (50 reactions), and nuclease-free water
170-8841	**iScript Reverse Transcription Supermix for RT-qPCR**, 100 x 20 µl reactions, includes 400 µl 5x iScript RT supermix, 200 µl 5x iScript RT supermix no-RT control (50 reactions), and nuclease-free water
iScript Advanced cDNA Synthesis Kit	
170-8842	**iScript Advanced cDNA Synthesis Kit for RT-qPCR**, 50 x 20 µl reactions, includes 200 µl 5x iScript advanced reaction mix, 50 µl iScript advanced reverse transcriptase, and nuclease-free water
170-8843	**iScript Advanced cDNA Synthesis Kit for RT-qPCR**, 250 x 20 µl reactions, includes 1,000 µl 5x iScript advanced reaction mix, 250 µl iScript advanced reverse transcriptase, and nuclease-free water
iScript cDNA Synthesis Kit	
170-8890	**iScript cDNA Synthesis Kit**, 25 x 20 µl reactions, includes 100 µl 5x iScript reaction mix, 25 µl iScript reverse transcriptase, and nuclease-free water
170-8891	**iScript DNA Synthesis Kit**, 100 x 20 µl reactions, includes 400 µl 5x iScript reaction mix, 100 µl iScript reverse transcriptase, and nuclease-free water
iScript Select cDNA Synthesis Kit	
170-8896	**iScript Select cDNA Synthesis Kit**, 25 x 20 µl reactions, includes 400 µl iScript select reaction mix, 25 µl iScript reverse transcriptase, 200 µl oligo(dT) mix, 200 µl random primer mix, 200 µl gene-specific primer enhancer solution, and nuclease-free water
170-8897	**iScript Select cDNA Synthesis Kit**, 100 x 20 µl reactions, includes 400 µl iScript Select reaction mix, 100 µl iScript reverse transcriptase, 200 µl oligo(dT) mix, 200 µl random primer mix, 200 µl gene-specific primer enhancer, and nuclease-free water

Real-Time qPCR Supermixes

Ready-to-use 2x supermixes are suitable for use in qPCR and tested for reliable amplification over a wide dynamic range of template input: gDNA, cDNA, and plasmid DNA.

For More Information
Web: www.bio-rad.com/supermixes






Property	SsoAdvanced™/ SsoFast™ Supermixes	iTaq™ Universal Supermixes	iQ™ Supermixes	Application-Specific qPCR Supermixes and Kits (HRM & Epigenetics)
Tolerance for PCR inhibitors	•••	—	—	—
Sensitive detection of low-level target genes	•••	•••	••	•••
High efficiency even for difficult amplicons	•••	••	••	•••
Broad range of reaction conditions	•••	••	•	•
Standard and fast cycling	•••	•••	•	•
Compatibility with any real-time instrument	—	•••	—	—

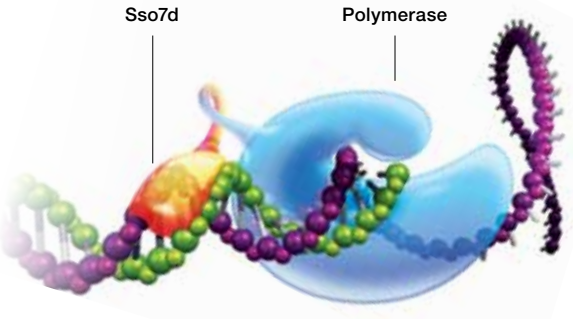
SsoAdvanced™/SsoFast™ qPCR Supermixes

SsoAdvanced™ SYBR® Green Supermix

- Novel Sso7d fusion polymerase enables increased resistance to PCR inhibitors and increases processing for dye-based qPCR
- Robust formulation delivers maximum efficiency, sensitivity, and reproducibility across a broad range of standard and fast cycling conditions
- Antibody-mediated hot-start technology and optimized buffer allow for instant polymerase activation and rapid polymerization kinetics to enable fast PCR
- Advanced formulation tolerates a broad range of reaction conditions, primer concentrations, and temperature ranges

SsoFast™ Probes Supermix

- Robust formulation allows simultaneous detection of up to two different gene targets using fluorogenic probes with maximum efficiency, sensitivity, and reproducibility across a broad range of standard and fast cycling conditions
- Novel Sso7d fusion polymerase enables increased resistance to PCR inhibitors and increases processing for probe-based qPCR
- Antibody-mediated hot-start technology and optimized buffer allow for instant polymerase activation and rapid polymerization kinetics to enable fast PCR



The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, increases processivity, and provides greater speed and reduced reaction times compared to conventional DNA polymerases. Sso7d fusion polymerases are significantly more resistant to PCR inhibitors, making the SsoAdvanced and SsoFast supermixes ideal choices for challenging applications, such as direct qPCR, without the need for sample preparation.

For More Information
Request or download bulletin: 6090

SsoFast Probes Supermix with ROX
Developed and validated for Applied Biosystems standard and fast 7900HT qPCR instruments.

SsoFast™ EvaGreen® Supermix
- Inhibitor tolerance and enhanced processivity with Sso7d fusion polymerase
- Robust formulation ensures maximum efficiency, sensitivity, and reproducibility for qPCR
- Instant polymerase activation and rapid polymerization kinetics deliver fast qPCR results

SsoFast EvaGreen Supermix with Low ROX
- Blended with ROX for optimal performance on Applied Biosystems standard and fast 7500 and ViiA 7 qPCR instruments

For More Information
Request or download bulletin: 6090

New iTaq™ Universal Supermixes

iTaq Universal SYBR® Green Supermix
- Formulation developed for optimal results on any real-time PCR instrument
- Advanced 2x ready-to-use supermix, formulated to deliver robust qPCR results with superior sensitivity, efficiency, and specificity
- Optimized buffer allows consistent results using both standard and fast cycling protocols
- Antibody-mediated iTaq DNA polymerase enables fast activation and superior specificity in qPCR

iTaq Universal Probes Supermix
- Formulation developed for optimal results on any qPCR instrument
- Optimized buffer allows consistent results for simplex and duplex reactions using both standard and fast cycling protocols



- Advanced 2x ready-to-use supermix, formulated to deliver robust qPCR results with superior sensitivity, efficiency, and specificity
- Antibody-mediated iTaq DNA polymerase enables fast activation and superior specificity in qPCR

For More Information
Request or download bulletin: 6090

iQ™ Supermixes

iQ™ SYBR® Green Supermix
- Analysis of low-, medium-, and high-abundance target genes with superior sensitivity and efficiency
- Formulated for maximum SYBR® Green I stability and performance in a wide variety of real-time PCR instruments
- Antibody-mediated hot-start polymerase for quick activation and increased specificity

iQ Supermix
- Maximum efficiency and sensitivity for qPCR using fluorogenic probes
- Reliable amplification over a wide dynamic range of human gDNA and pDNA concentrations
- Contains antibody-mediated hot-start iTaq DNA polymerase for quick activation and increased specificity

iQ Multiplex Powermix
- Robust supermix formulated for sensitive and efficient multiplex qPCR
- Reliable quantification of up to 4 targets (when there is up to 10^6-fold difference in expession levels between target genes) or up to 5 targets
- Linearity over 6 orders of magnitude of input cDNA and 4 orders of magnitude of input gDNA
- Suitable for a wide variety of applications, including gene expression analysis, SNP genotyping, SNP analysis, GMO detection, and viral load detection

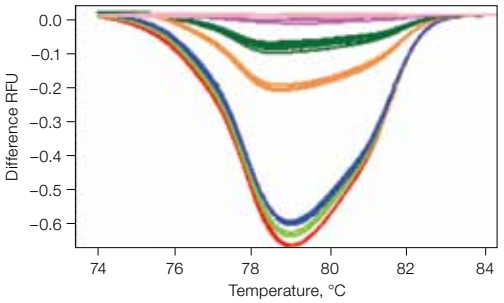
For More Information
Request or download bulletin: 6090

Application-Specific qPCR Supermixes and Kits (HRM and Epigenetics)

Precision Melt Supermix

- Optimized formulation containing EvaGreen dye delivers robust PCR and high resolution melt (HRM) performance
- Sensitive and effective discrimination of all 4 SNP classes across a broad range of amplicons
- Accurate detection of CpG methylation status for epigenetic studies
- Exceptional room temperature stability for high-throughput HRM studies
- Reliable performance on any HRM-capable thermal cycler

For More Information
Web: www.bio-rad.com/supermixes
Request or download bulletins: 5798 and 6137



Accurate methylation detection with precision melt supermix. Mixtures of methylated and unmethylated human genomic DNA of varying ratios were analyzed using HRM on a CFX384™ real-time PCR detection system. Increasing amounts of methylated DNA (■, 0%; ■, 2%; ■, 5%; ■, 50%; ■, 75%; ■, 95%; and ■, 100%) were analyzed for methylation of the human *RARB2* gene. The genomic region contains 7 CpG sites and is 88 base pairs in length. Total run time including melt curve = 190 min. RFU, relative fluorescence units.

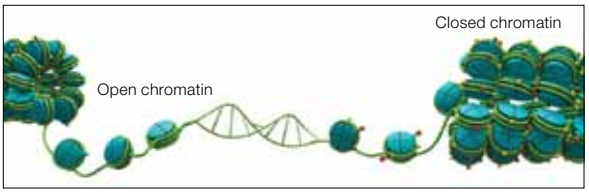
EpiQ™ Chromatin Analysis Kit

- Novel technique generates quantitative chromatin structure information with strong correlation to gene expression levels
- Quantitative assessment of chromatin structure of target genes in cultured cells
- Kit discriminates open, actively transcribed chromatin regions from closed, transcriptionally silent regions
- In situ chromatin digestion, genomic DNA purification, and qPCR all combined in 1 workflow
- Short assay time — assessment of chromatin structure can be accomplished in less than 6 hr
- Small sample requirement — as little as 5 x 10^4 cells are required to perform analysis

EpiQ Chromatin SYBR® Green Supermix

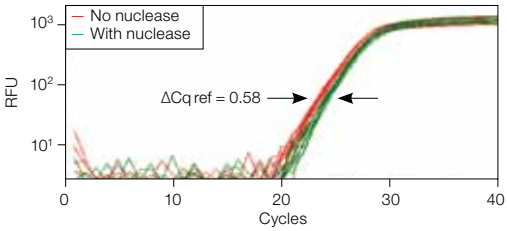
- Robust formulation delivers superior sensitivity and efficiency for qPCR from genomic DNA templates
- Protocol is optimized for difficult qPCR reactions for high GC amplicons
- Supermix contains fluorescein and ROX and is compatible with all qPCR instruments except Applied Biosystems 7000, 7300, 7700, and 7900 models (additional ROX can be added by ordering the dye separately, #172-5858)

For More Information
Web: www.bio-rad.com/epiq
Request or download bulletin: 6020

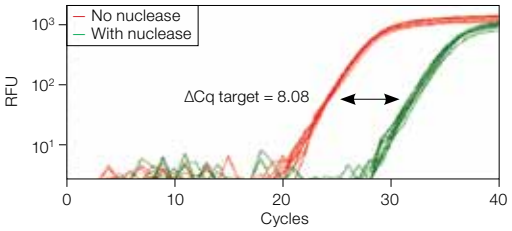


Chromatin consists of DNA spooled around complexes of histone protein molecules called nucleosomes (■).

A. *HBB* — Reference Gene (epigenetically silenced)



B. *GAPDH* — Target Gene (constitutively expressed)



The EpiQ chromatin analysis kit utilizes nuclease accessibility to discriminate open vs. closed chromatin regions. Amplification of proximal promoter regions for the epigenetically silenced *HBB* (reference) gene or the constitutively expressed *GAPDH* (target) gene was carried out in HeLa cells using the EpiQ kit and EpiQ chromatin SYBR® Green supermix on the CFX96™ real-time PCR detection system. **A**, closed chromatin regions were protected from nuclease digestion and remained intact prior to amplification, resulting in minimal quantification cycle (Cq) delays (ΔCq = 0.58) following nuclease treatment; **B**, open chromatin regions were susceptible to nuclease digestion and were unavailable for amplification, leading to significant Cq delays (ΔCq = 8.08) after nuclease treatment. A comparison of ΔCqs with the amplification efficiencies for each gene target factored in was used to determine the accessibility of the target gene, calculated to be >99% for *GAPDH*. RFU, relative fluorescence units.

Real-Time qPCR Reagents Selection Guide

	SYBR® Green / EvaGreen Supermixes					Probes Supermixes				One-Step Kits for RT-qPCR	
Real-Time qPCR Instrument	SsoAdvanced™ SYBR® Green Supermix*	iTaq Universal SYBR® Green Supermix	iQ™ SYBR® Green Supermix	SsoFast™ EvaGreen® Supermix	EpiQ Chromatin SYBR® Green Supermix	SsoFast Probes Supermix	iTaq Universal Probes Supermix	iQ Supermix	iQ Multiplex Powermix	iScript One-Step RT-PCR Kit with SYBR® Green	iScript One-Step RT-PCR Kit for Probes
Bio-Rad											
CFX96, CFX96 Touch™, CFX384™, CFX384 Touch™, CFX Connect™	•	•	•	•	•	•	•	•	•	•	•
iQ™, iQ™5, MyiQ™, MyiQ™2	•	•	•	•	•	•	•	•	•	•	•
MiniOpticon™, DNA Engine Opticon® I and II	•	•	•	•	•	•	•	•	•	•	•
Applied Biosystems											
StepOne/StepOne Plus	◆	•	◆	◆	•	◆	•	◆	◆	◆	◆
7500, ViiA 7	—	•	—	—	•	—	•	—	—	—	—
7000, 7300, 7700, 7900HT	—	•	—	—	—	—	•	—	—	—	—
Stratagene											
Mx3000P, 3005P, 4000	•	•	•	•	•	•	•	•	•	•	•
Eppendorf											
Mastercycler ep *realplex* 2 or 4	•	•	•	•	•	•	•	•	•	•	•
QIAGEN/Corbett											
Rotor-Gene 3000, 6000, Q	•	•	•	•	•	•	•	•	•	•	•
Roche											
LightCycler 480	•	•	•	•	•	•	•	•	•	•	•
LightCycler 1.0, 1.5, 2.0	▲	▲	▲	▲	•	▲	▲	▲	▲	▲	▲
Idaho Technology											
LightScanner HR-1	•	•	•	•	•	•	•	•	•	•	•
LightScanner 32	▲	▲	▲	▲	•	▲	▲	▲	▲	▲	▲

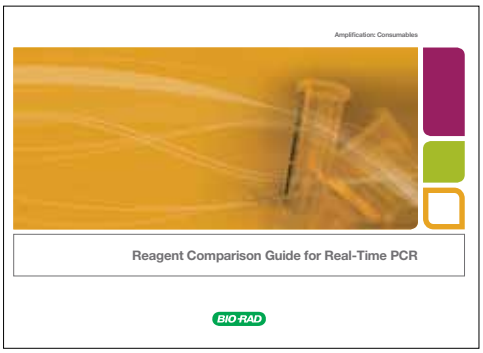
• Recommended for use as is; ◆ ROX reference setting must be turned "off"; ▲ BSA must be added according to instrument specifications

* SsoAdvanced™ universal SYBR® Green supermix will be available soon.

Reagents and Assay Comparison

With the introduction of the minimum information for publication of quantitative real-time PCR experiments (MIQE) guidelines for publishing real-time PCR results (Bustin et al. 2009), it has become increasingly important to ensure that data generated from these experiments are fully validated for acceptable performance. As a strong supporter of the MIQE guidelines and a leading manufacturer of real-time PCR instruments and consumables, Bio-Rad strives to help researchers make informed decisions about the wide variety of reagents offered on the market today.

This guide is intended to help researchers design effective reagent comparisons and maximize the quality of data generated in their real-time PCR experiments.



For More Information
Request or download bulletin: 6252

Ordering Information

Catalog #	Description
SsoAdvanced Supermixes	
172-5260	**SsoAdvanced SYBR Green Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5261	**SsoAdvanced SYBR Green Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5262	**SsoAdvanced SYBR Green Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
172-5264	**SsoAdvanced SYBR Green Supermix**, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
172-5265	**SsoAdvanced SYBR Green Supermix**, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
172-5230	**SsoFast Probes Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5231	**SsoFast Probes Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5232	**SsoFast Probes Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
172-5233	**SsoFast Probes Supermix**, 20 ml (20 ml bottle), 2,000 x 20 µl reactions
iTaq Universal Supermixes	
172-5120	**iTaq Universal SYBR Green Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5121	**iTaq Universal SYBR Green Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5122	**iTaq Universal SYBR Green Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
172-5124	**iTaq Universal SYBR Green Supermix**, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
172-5125	**iTaq Universal SYBR Green Supermix**, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
172-5130	**iTaq Universal Probes Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5131	**iTaq Universal Probes Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5132	**iTaq Universal Probes Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
172-5134	**iTaq Universal Probes Supermix**, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
172-5135	**iTaq Universal Probes Supermix**, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

continues

Ordering Information

Catalog #	Description
iQ Supermixes	
170-8880	**iQ SYBR Green Supermix**, 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
170-8882	**iQ SYBR Green Supermix**, 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
170-8884	**iQ SYBR Green Supermix**, 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
170-8885	**iQ SYBR Green Supermix**, 50 ml (50 ml bottle), 2,000 x 50 µl reactions
170-8886	**iQ SYBR Green Supermix**, 25 ml (5 x 5 ml vials), 1,000 x 50 µl reactions
170-8887	**iQ SYBR Green Supermix**, 50 ml (10 x 5 ml vials), 2,000 x 50 µl reactions
170-8860	**iQ Supermix**, 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
170-8862	**iQ Supermix**, 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
170-8864	**iQ Supermix**, 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
172-5848	**iQ Multiplex Powermix**, 1.25 ml (1 x 1.25 ml vial), 50 x 50 µl reactions
172-5849	**iQ Multiplex Powermix**, 5 ml (4 x 1.25 ml vials), 200 x 50 µl reactions
Application-Specific Kits and Reagents	
172-5110	**Precision Melt Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5400	**EpiQ Chromatin Analysis Kit**, 50 preparations
172-5401	**EpiQ Chromatin Analysis Kit**, 100 preparations
172-5404	**EpiQ Chromatin SYBR Green Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5405	**EpiQ Chromatin SYBR Green Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
Additional Real-Time qPCR Supermixes*	
172-5200	**SsoFast EvaGreen Supermix**, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
172-5201	**SsoFast EvaGreen Supermix**, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
172-5202	**SsoFast EvaGreen Supermix**, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
172-5203	**SsoFast EvaGreen Supermix**, 20 ml (20 ml bottle), 2,000 x 20 µl reactions
172-5204	**SsoFast EvaGreen Supermix**, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
172-5205	**SsoFast EvaGreen Supermix**, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
172-5210	**SsoFast EvaGreen Supermix with Low ROX**, 200 x 20 µl reactions
172-5211	**SsoFast EvaGreen Supermix with Low ROX**, 500 x 20 µl reactions
172-5212	**SsoFast EvaGreen Supermix with Low ROX**, 1,000 x 20 µl reactions
172-5213	**SsoFast EvaGreen Supermix with Low ROX**, 2,000 x 20 µl reactions, 20 ml bottle
172-5250	**SsoFast Probes Supermix with ROX**, 200 x 20 µl reactions
172-5251	**SsoFast Probes Supermix with ROX**, 500 x 20 µl reactions
172-5252	**SsoFast Probes Supermix with ROX**, 1,000 x 20 µl reactions
172-5253	**SsoFast Probes Supermix with ROX**, 2,000 x 20 µl reactions, 20 ml bottle
EpiQ Chromatin Analysis	
172-5400	**EpiQ Chromatin Analysis Kit**, 50 preparations, contains components for chromatin digestion, analysis, and genomic DNA purification, and 2x real-time PCR mix for 500 x 20 µl reactions
172-5401	**EpiQ Chromatin Analysis Kit**, 100 preparations, 1,000 x 20 µl reactions
172-5402	**EpiQ Chromatin Preparation Kit**, 50 preparations, contains components for chromatin digestion, analysis, and genomic DNA purification prior to real-time PCR analysis
172-5403	**EpiQ Chromatin Preparation Kit**, 100 preparations
172-5404	**EpiQ Chromatin SYBR Green Supermix**, 500 x 20 µl reactions, 5 ml, 2x real-time PCR mix contains dNTPs, iTaq DNA polymerase, $MgCl_2$, SYBR Green I, ROX passive reference dye, fluorescein, stabilizers
172-5405	**EpiQ Chromatin SYBR Green Supermix**, 1,000 x 20 µl reactions, 10 ml

* For more information, go to **www.biorad.com/supermixes**.

One-Step RT-PCR Reagents

Benefits of iScript one-step kits:

- Provide powerful combination of iScript RNase H+ reverse transcriptase and antibody-mediated hot-start iTaq DNA polymerase
- Are ideal for rapid, high-throughput gene expression analysis



iScript One-Step RT-PCR Kit with SYBR® Green

- For use on a broad range of qPCR instruments
- Extremely sensitive detection (100 ng–1 pg) of input RNA

iScript One-Step RT-PCR Kit for Probes

- For use with all types of hybridization probes, including dual-labeled oligonucleotide probes, FRET probes, and molecular beacons
- Extremely sensitive detection (1 µg–1 pg) of input RNA

For More Information
Web: www.bio-rad.com/RTreagents
Request or download bulletin: 6090

Ordering Information

Catalog #	Description
iScript One-Step RT-PCR Kit with SYBR Green	
170-8892	**iScript One-Step RT-PCR Kit with SYBR Green**, 50 x 50 µl reactions, includes iScript reverse transcriptase for one-step RT-PCR, 2x SYBR Green RT-PCR reaction mix, nuclease-free water
170-8893	**iScript One-Step RT-PCR Kit with SYBR Green**, 200 x 50 µl reactions
iScript One-Step RT-PCR Kit for Probes	
170-8894	**iScript One-Step RT-PCR Kit for Probes**, 50 x 50 µl reactions, includes iScript reverse transcriptase for one-step RT-PCR, 2x probes RT-PCR reaction mix, nuclease-free water
170-8895	**iScript One-Step RT-PCR Kit for Probes**, 200 x 50 µl reactions

High-Fidelity and Standard PCR Reagents

iProof™ High-Fidelity DNA Polymerase

- A high-fidelity DNA polymerase with 52-fold more accuracy than Taq DNA polymerase
- Unique *Pyrococcus*-like proofreading enzyme is fused to a dsDNA binding protein, Sso7d
- Long and fast PCR applications — fragments up to 37 kb are amplified in less time (15–30 sec/kb) and with less enzyme (0.25–1 U/reaction)
- Convenient 2x supermix formats available with GC high-fidelity buffer



For More Information
Request or download bulletin: 5211
Web: www.bio-rad.com/standardpcrreagents

ROX Passive Reference Dye

- Formulated as a 50x concentrated stock solution for use on ABI 7000, 7300, 7700, and 7900 qPCR instruments
- For instruments that use 580–585 nm excitation for passive reference, such as Stratagene Mx3000P, Mx3005P, and Mx4000, and ABI 7500 real-time PCR instruments, treat as a 750x concentrated solution
- An internal reference is not required for any Bio-Rad real-time detection system

dNTP Mix

- Formulated for consistency and higher efficiency in PCR and qPCR
- Robust dNTP solution withstands multiple rounds of freeze-thawing and temperature cycling

iTaq DNA Polymerase

- Antibody-mediated hot-start DNA polymerase for quick 3 min activation at 95°C
- Polymerase prevents nonspecific amplification and primer-dimers in both PCR and real-time PCR applications

For More Information
Request or download bulletin: 2779



Ordering Information

Catalog #	Description
iProof High-Fidelity DNA Polymerase, Master Mixes, and Buffers	
172-5300	**iProof High-Fidelity DNA Polymerase**, 2 U/µl, 20 U, includes 5x reaction buffers, $MgCl_2$ solution, DMSO
172-5301	**iProof High-Fidelity DNA Polymerase**, 2 U/µl, 100 U
172-5302	**iProof High-Fidelity DNA Polymerase**, 2 U/µl, 500 U
172-5330	**iProof High-Fidelity PCR Kit**, 2 U/µl, 50 U, includes 5x reaction buffers, $MgCl_2$ solution, DMSO, dNTPs, λ DNA, 1.3 and 10 kb primers, DNA standard
172-5310	**iProof HF Master Mix**, 2.5 ml, 100 x 50 µl reactions (for highest fidelity with most templates)
172-5320	**iProof GC Master Mix**, 2.5 ml, 100 x 50 µl reactions (for GC-rich templates)
172-5391	**5x iProof HF Buffer**, 1.5 ml (for highest fidelity with most templates)
172-5392	**5x iProof GC Buffer**, 1.5 ml (for GC-rich templates)
172-5393	**5x iProof HPLC HF Buffer**, 1.5 ml
172-5394	**5x iProof HPLC GC Buffer**, 1.5 ml
ROX Passive Reference Dye	
172-5858	**ROX Passive Reference Dye**, 0.5 ml
dNTP Mix	
170-8874	**dNTP Mix**, 200 µl premixed solution, contains 10 mM each dNTP (dATP, dCTP, dGTP, dTTP)
iTaq DNA Polymerase	
170-8870	**iTaq DNA Polymerase**, 5 U/µl, includes 250 U polymerase, 1.25 ml 10x PCR buffer
170-8875	**iTaq DNA Polymerase**, 5 U/µl, includes 5,000 U polymerase, 25 ml 10x PCR buffer, 25 ml 50 mM $MgCl_2$ solution
$MgCl_2$	
170-8872	**$MgCl_2$ Solution**, 50 mM, 1.25 ml

PCR Plate Sealer

See Also

Heat sealing films and foils: pages 365–366.

SsoAdvanced™ SYBR® Green supermix: page 344.

iTaq universal SYBR® Green supermix: page 345.

New PX1™ PCR Plate Sealer

The PX1 PCR plate sealer consistently seals PCR plates by providing uniform heat and pressure across an entire microplate when sealing. This semiautomated heat sealer helps deliver reliable results by removing human variability from plate sealing and minimizing sample evaporation.

The PX1 sealer features an easy-to-use, intuitive touch screen interface. The thermal sealing process is simplified by allowing sealing temperature and time to be modified with the touch of a button.



- **Fast start-up time** — avoid delaying an experiment while the sealer warms up
- **Extremely intuitive** — save time programming the instrument
- **Quickly access sealing protocols** — save programming time by using stored protocols
- **Compact footprint** — accommodate crowded lab benches
- **Fully validated** — have confidence in your results

For More Information
Web: www.bio-rad.com/pcrplatesealer
Request or download bulletin: 6257

Ordering Information

Catalog #	Description
PX1 PCR Plate Sealer	
181-4000	**PX1 PCR Plate Sealer**, includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, and power cord
Accessories	
181-4080	**Sealing Frame**, extra sealing frame for use with PX1 PCR plate sealer, 1
181-4085	**Plate Support Block**, extra plate support block for use with PX1 PCR plate sealer, 1
Heat Seals for PX1 PCR Plate Sealer	
181-4030	**Optically Clear Heat Seal**, pack of 100
181-4035	**Permanent Clear Heat Seal**, pack of 100
181-4040	**Pierceable Foil Heat Seal**, pack of 100
181-4045	**Peelable Foil Heat Seal**, pack of 100

For more information on the heat seals that are compatible with the PX1 PCR Plate Sealer see page 365.

PCR Plastic Consumables

Bio-Rad thin-wall PCR tubes, PCR plates, seals, and accessories are manufactured for optimal fit and cycling performance in a variety of thermal cyclers and real-time PCR instruments, including all Bio-Rad platforms. These high-quality consumables are suitable for a wide variety of applications. Bio-Rad tubes, tube caps, and PCR plates are molded, inspected, and packaged in a Class 100,000 or 10,000 cleanroom environment to prevent possible nucleic acid or nuclease contamination, then process-sampled and tested to be negative for DNase, RNase, and human DNA.

For More Information
Web: www.bio-rad.com/pcrplastics
Request or download bulletin: 6090

Instrument Compatibility of PCR Plastic Consumables

	Individual and Strip Tubes			384-Well Plates		96-Well Plates	
	Individual High-Profile	**Strips High-Profile**	**Strips Low-Profile**	**Hard-Shell® Standard**	**Hard-Shell 480**	**Microseal® Semi-Skirted High-Profile**	**Microseal Skirted Low-Profile**
Product	TBI-0201, TFI-0201, TWI-0201 page 355	TBC-xxxx*, TBS-xxxx* page 355	TLS-08xx* page 355	HSP-3xxx* page 361	HSR-48xx* page 362	MSS-xxxx* page 360	MSP-9xxx* page 360
Thermal Cycler							
Bio-Rad® C1000™, C1000 Touch™, S1000™	•	•	•	•	•		•
Bio-Rad® DNA Engine®, Tetrad®, Tetrad 2, Dyad®, Dyad Disciple™, PTC-100®	•	•	•	•	•		•
Bio-Rad® T100™, MyCycler™, iCycler®	•	•					
Bio-Rad® MJ Mini™	•	•	•				
Applied Biosystems 0.2 ml tube cyclers (2720, 9700, Veriti)	•	•				•	
Applied Biosystems 0.1 ml tube cyclers (9800 fast, Veriti fast)			•				
Applied Biosystems 384-well cyclers (9700, Veriti)				•	•		
Eppendorf Mastercycler series	•	•	•	•	•		•
Real-Time PCR Instrument							
Bio-Rad® CFX Connect™, CFX96™, CFX96 Touch™, CFX384™**, CFX384 Touch™**			•	•	•		•
Bio-Rad® iCycler iQ®, iQ™5, MyiQ™, MyiQ™2		•					
Bio-Rad® Chromo4™		•	•				•
Bio-Rad® DNA Engine Opticon®, Opticon 2			•				•
Bio-Rad® MiniOpticon™**			•				
Applied Biosystems standard systems (7300, 7500, 7900HT, ViiA7)		•		•	•	•	
Applied Biosystems fast systems (7500 fast, 7900HT fast, StepOne, StepOnePlus, ViiA7)			•	•	•		
Eppendorf Mastercycler ep *realplex*		•	•				•
Stratagene (Agilent) Mx series		•					
Corbett (QIAGEN) Rotor-Gene	•						
Roche LightCycler 480					•		
Other Instruments							
Applied Biosystems DNA sequencers (3100, 3700, 3730)				•		•	
Idaho Technology LightScanner				•			•

continues

Instrument Compatibility of PCR Plastic Consumables (cont.)

	96- and 48-Well Plates							
	Hard-Shell Semi-Skirted High-Profile	**Hard-Shell Skirted Low-Profile**	**Hard-Shell Semi-Skirted Low-Profile**	**Hard-Shell 480**	**Multiplate™ Unskirted High-Profile**	**Multiplate Unskirted Low-Profile**	**iQ™ Semi-Skirted High-Profile**	**Concord™ Skirted Low-Profile**
Product	HSS-9xxx* page 358	HSP-9xxx* page 358	HSL-9xxx page 358	HSR-9xxx page 358	MLP-xxxx* page 359	MLL-xxxx* page 359	223-9441 page 360	CON-9601 page 361
Thermal Cycler								
Bio-Rad C1000, C1000 Touch, S1000	•	•	•		•	•	•	•
Bio-Rad DNA Engine, DNA Engine Tetrad, DNA Engine Tetrad 2, DNA Engine Dyad, Dyad Disciple, PTC-100	•	•			•	•	•	•
Bio-Rad MyCycler					•		•	
Bio-Rad T100, iCycler	•				•		•	
Bio-Rad MJ Mini					•	•		
Applied Biosystems 0.2 ml tube cyclers (2720, 9700, Veriti)	•				•		•	
Applied Biosystems 0.1 ml tube cyclers (9800 fast, Veriti fast)			•			•		
Eppendorf Mastercycler series	•	•	•		•	•	•	•
Real-Time PCR Instrument								
Bio-Rad CFX Connect, CFX96, CFX96 Touch		•	•			•		
Bio-Rad iCycler iQ, iQ 5, MyiQ, MyiQ2	•				•		•	
Bio-Rad Chromo4™	•	•			•	•	•	
Bio-Rad DNA Engine®, DNA Engine Opticon™, Opticon 2		•				•		
Bio-Rad MiniOpticon™**						•		
Applied Biosystems standard systems (7500, 7900HT, ViiA 7)	• Except ViiA 7				• Except 7900HT		• Except 7900HT	
Applied Biosystems (StepOnePlus)						•		
Applied Biosystems (7500 fast, ViiA 7 fast)			•			•		
Eppendorf Mastercycler ep *realplex*	•	•	•		•	•	•	
Stratagene (Agilent) Mx series	•				•		•	
Roche LightCycler 480				•				
Other Instruments								
Applied Biosystems DNA sequencers (3100, 3700, 3730)	•				•			
Idaho Technology LightScanner		•			•	•		

* Go to the page numbers shown for the list of catalog numbers containing this prefix.

** CFX384, CFX384 Touch, and MiniOpticon real-time PCR detection systems are factory calibrated for white tubes and white-well plates. White plastics are recommended due to their superior signal-to-noise ratio. Using clear tubes or clear-well plates on these instruments will require user calibration.

Thin-Wall PCR Tubes

PCR Tubes and Strips

Individual PCR Tubes, 0.2 and 0.5 ml

These high-profile PCR tubes have double-locking caps that won't pop open during cycling. PCR volume ranges are 5–125 µl for 0.2 ml tubes and 10–200 µl for 0.5 ml tubes. Tubes with flat, frosted caps for easy labeling are available in both 0.2 and 0.5 ml sizes (not suitable for real-time PCR). The 0.5 ml individual tubes with attached caps are available in resealable plastic bags of 100 tubes.



PCR Tube and Cap Strips

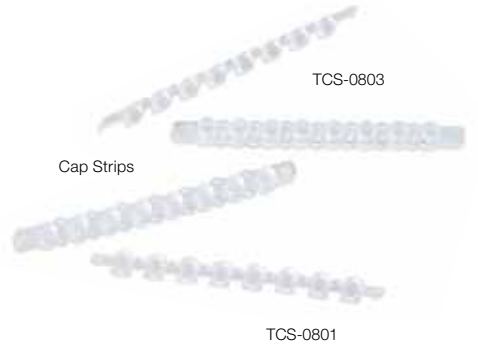
Both tubes and caps are available in strips of 8 or 12 for use in 48- and 96-well sample blocks.

- Tight sealing and convenient handling for multiple samples
- Choice of domed or flat optical cap strips



High-Profile PCR Tube Strips
Recommended reaction volumes are 5–125 µl. Tube strips and domed cap strips are also available packaged together in convenient bags sufficient for 96 samples. The resealable bags protect unused tubes and caps from accidental contamination.

Low-Profile PCR Tube Strips
These tubes reduce the potential for condensation and also allow greater light capture in fluorescence assays such as those performed in real-time PCR. Low-profile tubes are ideal for use in fast and low-volume PCR reactions. Overall height, including flat optical caps and 96-place rack, is 18.3 mm. Tube height is 15.5 mm. Low-profile tubes are available in opaque white for optical applications.



Flat and Domed Cap Strips for PCR Tubes and PCR Plates
These cap strips provide extremely tight sealing of all Bio-Rad PCR tubes and plates during thermal cycling and cold storage. Flat cap strips feature ultraclear upper surfaces, which are ideal for fluorescence applications. Average light transmittance is 1.7-fold higher than with standard-clarity domed cap strips. Flat caps are available in strips of 8 and domed caps are available in strips of 8 or 12. Use of a capping tool is recommended for proper sealing of caps on tubes or plates.

For More Information
Web: www.bio-rad.com/pcrplastics

Ordering Information

Catalog #	Description
Individual PCR Tubes with Attached Caps (0.2 ml)	
TFI-0201	**PCR Tubes with Flat Caps (0.2 ml)**, clear, 1,000
TWI-0201	**PCR Tubes with Domed Caps (0.2 ml)**, clear, 1,000
Individual PCR Tubes without Caps (0.2 ml)	
TBI-0201	**PCR Tubes without Caps (0.2 ml)**, clear, 1,000
Individual PCR Tubes with Attached Caps (0.5 ml)	
TBI-0501	**PCR Tubes with Flat Caps (0.5 ml)**, clear, 1,000 (2 bags of 500)
TBI-0502	**PCR Tubes with Flat Caps (0.5 ml)**, clear, 800 (8 bags of 100)
High-Profile Tube Strips without Caps	
TBS-0201	**8-Tube Strips without Caps**, clear, 125 strips (1,000 PCR tubes)
TBS-1201	**12-Tube Strips without Caps**, clear, 100 strips (1,200 PCR tubes)
Low-Profile 8-Tube Strips without Caps	
TLS-0801	**Low-Profile 8-Tube Strips without Caps**, clear, 120 strips (960 PCR tubes)
TLS-0851	**Low-Profile 8-Tube Strips without Caps**, white, 120 strips (960 PCR tubes)
Domed Cap Strips	
TCS-0801	**Domed 8-Cap Strips**, for PCR tubes and plates, clear, 130
TCS-1201	**Domed 12-Cap Strips**, for PCR tubes and plates, clear, 200
Optical Flat Cap Strips	
TCS-0803	**Optical Flat 8-Cap Strips**, for PCR tubes and plates, ultraclear, 120
High-Profile Polypropylene Tube Strips with Domed Cap Strips	
TBC-0802	**8-Tube Strips and Domed Cap Strips**, clear, 20 bags of 12 x 8-tube strips and 12 x 8-cap strips (1,920 PCR tubes and caps)
TBC-1202	**12-Tube Strips and Domed Cap Strips**, clear, 20 bags of 8 x 12-tube strips and 8 x 12-cap strips (1,920 PCR tubes and caps)

Capping Tools and Racks

96-Place PCR Tube Rack and Cover

These stackable storage units for tubes and unskirted and semi-skirted PCR plates provide a stable platform for preparing or centrifuging reactions.

PCR Tube Rack

The PCR tube rack conforms to ANSI/SBS standards and provides a stable platform for PCR tubes and 96-well plates.

Easy Cap™ Tool

The Easy Cap tool provides the pressure necessary to achieve a tight seal, one tube at a time, when capping individual or strip tubes. The narrow end securely fastens domed caps to tubes or 96-well PCR plates. The wide end firmly holds thin-wall 0.5 ml tubes to prevent accidental crushing when opening or closing. The side slot allows easy opening of tight-fitting caps without generating aerosols.

Strip Cap Tool

This tool quickly and easily seals 8- and 12-cap strips on PCR plates or tubes. A grooved channel on one side is designed to seal domed caps, while the flat edge on the opposite side seals flat caps. For best results, seal tube strips while they are in a thermal cycler block or in a 96-place rack.



For More Information
Web: www.bio-rad.com/PCRplasticaccessories

Ordering Information

Catalog #	Description
TRC-9601	**PCR Tube Racks**, ANSI/SBS standard, white, 10
TRC-0501	**96-Place Racks**, with covers, for PCR tubes and unskirted and semi-skirted microplates, assorted colors, 5
ECT-1000	**Easy Cap Tool**, ensures tight seal for 0.2 ml PCR tubes or 96-well microplates
ECT-2000	**Strip Cap Tool**, for sealing 8- and 12-cap strips on PCR plates or tubes

PCR Plates

Multiplate™ 48-Well PCR Plates

The versatile, unskirted design and 48-well format make these Multiplate unskirted PCR plates ideal for laboratories using 48-well blocks on Bio-Rad instruments. The plates are suitable for reaction volumes of 5–125 µl. The polypropylene construction of Multiplate PCR plates confers very low protein binding and excellent preservation of sample volume. When less than a full plate is needed, these plates can be easily cut with scissors to the required size. Two plate styles are available:

- **High-profile (20.7 mm) wells, clear color** — designed to fit in most thermal cyclers
- **Low-profile (15.5 mm) wells, clear color or white** — optimized for fast PCR and low-volume reactions

For More Information
Web: www.bio-rad.com/48wellpcrplates



Multiplate High-Profile 48-Well Unskirted PCR Plate



Multiplate Low-Profile 48-Well Unskirted PCR Plate

Ordering Information

Catalog #	Description
MLP-4801	**Multiplate High-Profile 48-Well Unskirted PCR Plates**, clear, 50 plates
MLL-4801	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, clear, 50 plates
MLL-4851	**Multiplate Low-Profile 48-Well Unskirted PCR Plates**, white, 50 plates

See Also

PX1 PCR plate sealer: page 352.

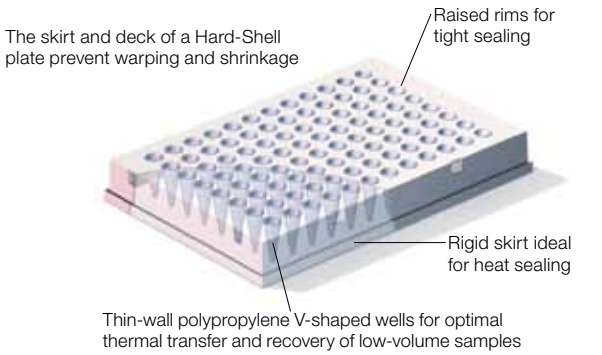
Heat Sealing films and foils: pages 365–366.

PCR plate seals: pages 363–367.

Hard-Shell®* 96-Well PCR Plates

Hard-Shell PCR plates are specifically designed to withstand the stresses of heat sealing, thermal cycling, and robotic handling. The patented two-component design features a skirt and deck molded from a rigid, thermostable polymer. The thin-wall wells are molded of virgin polypropylene selected for low DNA binding. These plates can withstand –80°C storage and high centrifugation forces, making them convenient for alcohol precipitations. Uniform wells reduce well-to-well variability in optical assays.

- White-well option allows increased fluorescent signal strength
- Black alphanumeric labeling for easy well identification
- Color-coded skirts with clear or white wells
- Low-cost, user-readable bar code option



Hard-Shell Low-Profile 96-Well Skirted PCR Plates

- Reaction volumes of 5–125 µl (200 µl maximum)
- Low-profile (16.06 mm) wells optimized for low-volume reactions and fast PCR
- Full skirt for robotic handling and labeling surface
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Bar-coded plates are available

Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates

- Reaction volumes of 5–125 µl (350 µl maximum)
- High-profile (20.75 mm) wells that fit most thermal cyclers, real-time PCR detection systems, and DNA sequencers
- Warp-free half-height skirt for improved robotic handling
- Bar-coded plates are available

NEW Hard-Shell Low-Profile 96-Well Semi-Skirted PCR Plates

- Reaction volumes of 5–125 µl (200 µl maximum)
- Low-profile (15.51 mm) wells optimized for low-volume reactions and fast PCR
- Semi-skirted design enables compatibility with Applied Biosystems 7500 fast and ViiA 7 fast instruments
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Bar-coded plates are available



Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plate

NEW Hard-Shell 96-Well 480 PCR Plates

Hard-Shell 96-well 480 PCR plates are optimized to work on the Roche LightCycler 480 96-well block. They are designed to withstand the stresses of thermal cycling. Superior stability and flatness is provided via a two-component design. Features include:

- Designed specifically for the Roche LightCycler 480
- Extremely uniform wells that reduce well-to-well variability in real-time PCR
- Warp-free skirt and deck
- Black alphanumeric labeling for easy well identification
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Bar-coded along row A
- 200 µl maximum volume

For More Information
Web: www.bio-rad.com/96wellpcrplates
Request or download bulletin: 5496

* U.S. patents 7,347,977, 6,340,589, and 6,528,302.

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Low-Profile 96-Well Skirted PCR Plates			
White shell, 50 plates	HSP-9601	HSP-9655	—
Red shell, 50 plates	HSP-9611	—	—
Yellow shell, 50 plates	HSP-9621	—	—
Blue shell, 50 plates	HSP-9631	HSP-9635	—
Green shell, 50 plates	HSP-9641	HSP-9645	—
Black shell, 50 plates	HSP-9661	HSP-9665	HSP-9666
White shell, bar-coded, 50 plates	HSP-9901	HSP-9955	—
White shell, bulk pack of 400 plates	HSP-9601B	—	—
Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSS-9601	—	—
Green shell	HSS-9641	—	—
Black shell	—	HSS-9665	—
Clear shell, bar-coded	HSS-9901	—	—
Hard-Shell Low-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSL-9601	HSL-9605	—
Green shell	HSL-9641	HSL-9645	—
Clear shell, bar-coded	HSL-9901	HSL-9905	—

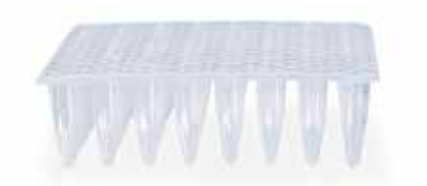
Hard-Shell 96-Well 480 PCR Plates

HSR-9905	**Hard-Shell 96-Well 480 PCR Plates**, clear shell/white well PCR plate for use with Roche LightCycler 480 real-time PCR system, bar-coded, rigid 2-component designs, 25 plates
HSR-9905K	**Hard-Shell 96-Well 480 PCR Plates Kit**, for use with Roche LightCycler 480 real-time PCR system, includes 100 bar-coded clear shell/white well PCR plates (4 packs of #HSR-9905) and 100 Microseal 'C' optical seals (#MSC-1001)
HSR-9901	**Hard-Shell 96-Well 480 PCR Plates**, clear shell/clear well PCR plate for use with Roche LightCycler 480 real-time PCR system, bar-coded, rigid 2-component design, 25 plates
HSR-9901K	**Hard-Shell 96-Well 480 PCR Plates Kit**, for use with Roche LightCycler 480 real-time PCR system, includes 100 bar-coded clear shell/clear well PCR plates (4 packs of #HSR-9901) and 100 Microseal 'C' optical seals (#MSC-1001)

Multiplate™ 96-Well PCR Plates

Multiplate High-Profile 96-Well Unskirted PCR Plates

The single-component polypropylene construction of Multiplate PCR plates confers very low protein binding and excellent retention of sample. When less than a full plate is needed, these plates are easily cut with scissors to the required size. The plates are suitable for PCR volumes of 5–125 µl.



Multiplate High-Profile 96-Well Unskirted PCR Plate

Multiplate Low-Profile 96-Well Unskirted PCR Plates

Multiplate low-profile PCR plates combine the unskirted feature of the original Multiplate plate, but are 5 mm lower in overall height. The lower height (15.50 mm) reduces the potential for condensation and offers advantages for fast PCR, low-volume reactions, and light capture in fluorescence assays such as real-time PCR. A rigid top surface provides firm handling, while still allowing the plate to be cut for use in other formats.



Multiplate Low-Profile 96-Well Unskirted PCR Plate

For More Information
Web: www.bio-rad.com/96wellpcrplates

Ordering Information

Catalog #	Description
Multiplate High-Profile 96-Well Unskirted PCR Plates	
MLP-9601	**Multiplate High-Profile 96-Well Unskirted PCR Plates**, clear, 25 plates
MLP-9651	**Multiplate High-Profile 96-Well Unskirted PCR Plates**, white, 25 plates
MLP-9631	**Multiplate High-Profile 96-Well Unskirted PCR Plates**, blue, 25 plates
Multiplate Low-Profile 96-Well Unskirted PCR Plates	
MLL-9601	**Multiplate Low-Profile 96-Well Unskirted PCR Plates**, clear, 25 plates
MLL-9651	**Multiplate Low-Profile 96-Well Unskirted PCR Plates**, white, 25 plates

iQ™ High-Profile 96-Well Semi-Skirted Real-Time PCR Plates

These semi-skirted, high-profile PCR plates are optimized for iQ™5, iCycler iQ®, MyiQ™2, and MyiQ™ real-time PCR detection systems. The semi-skirted design adds stiffness and a labeling surface. Plates are perforated every three columns for easy setup of triplicate reactions.

For More Information
Web: www.bio-rad.com/96wellpcrplates



Ordering Information

Catalog #	Description
223-9441	**iQ High-Profile 96-Well Semi-Skirted PCR Plates**, 25 plates

Microseal® 96-Well PCR Plates

Microseal High-Profile 96-Well Semi-Skirted PCR Plates

These PCR plates are designed for Applied Biosystems 0.2 ml tube cyclers, standard real-time PCR systems, and DNA sequencers. They are not recommended for use in Bio-Rad thermal cyclers because the raised ridges around the plate prevent proper sealing in these instruments.



Microseal High-Profile 96-Well Semi-Skirted PCR Plate

Microseal Low-Profile 96-Well Skirted PCR Plates

These PCR plates feature single-component construction and a skirted design that is suitable for high-throughput plate handling. The robot-friendly design features low-binding polypropylene construction, locator holes, and flat vertical sidewalls for secure handling and easy bar coding. Raised rims around wells provide an excellent surface for tight sealing with a variety of sealing methods and allow easy release of the sealer from the plate. Bar-coded plates are also available.



Microseal Low-Profile 96-Well Skirted PCR Plate

For More Information
Web: www.bio-rad.com/96wellpcrplates

Ordering Information

Catalog #	Description
Microseal High-Profile 96-Well Semi-Skirted PCR Plates	
MSS-9601	**Microseal High-Profile 96-Well Semi-Skirted PCR Plates**, clear, 25 plates
Microseal Low-Profile 96-Well Skirted PCR Plates	
MSP-9601	**Microseal Low-Profile 96-Well Skirted PCR Plates**, clear, 50 plates
MSP-9605	**Microseal Low-Profile 96-Well Skirted PCR Plates**, bar-coded, clear, 50 plates

Concord™ Low-Profile 96-Well Skirted Polycarbonate PCR Plates

Concord 96-well PCR plates have a thin-wall polycarbonate construction that allows excellent heat transfer. A minimum sample volume of 20 µl is recommended for oil-free cycling with these plates.

For More Information
Web: www.bio-rad.com/96wellpcrplates



Ordering Information

Catalog #	Description
CON-9601*	**Concord Low-Profile 96-Well Skirted Polycarbonate PCR Plates**, clear, 25 plates
CVR-9601	**Dust Covers**, for Concord polycarbonate PCR plates, nonsealing, 25 covers

* Not recommended for use with ^{35}S.

Hard-Shell® 384-Well Standard PCR Plates

Hard-Shell PCR plates are designed to withstand the stresses of thermal cycling and robotic handling. The patented two-component design provides superior stability and flatness, allowing precise positioning for automation. Features include:

- Reaction volumes of 1–30 µl (50 µl maximum)
- Extremely uniform wells that reduce well-to-well variability in optical assays such as those performed in real-time PCR
- Compatibility with most 384-well thermal cyclers, real-time PCR detection systems, and DNA sequencers
- White-well option for increased fluorescent signal strength
- Color-coded skirts with clear or white wells
- Warp-free skirt and deck for improved robotic handling



- Footprint and well spacing that match ANSI/SBS standard dimensions
- Low-cost, user-readable bar code option

For More Information
Web: www.bio-rad.com/384wellpcrplates
Request or download bulletin: 5496

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell 384-Well Standard PCR Plates			
Clear shell, 50 plates	HSP-3801	HSP-3805	—
White shell, 50 plates	HSP-3851	—	—
Red shell, 50 plates	HSP-3811	—	—
Yellow shell, 50 plates	HSP-3821	—	—
Blue shell, 50 plates	HSP-3831	—	—
Green shell, 50 plates	HSP-3841	—	—
Black shell, 50 plates	—	HSP-3865	HSP-3866
Clear shell, bar-coded, 50 plates	HSP-3901	HSP-3905	—
Clear shell, bulk pack of 500 plates	HSP-3801B	—	—

Hard-Shell® 384-Well 480 PCR Plates

Hard-Shell 384-well 480 PCR plates are optimized to work on the Roche LightCycler 480 and a range of Bio-Rad and Applied Biosystems instruments. They are designed to withstand the stresses of thermal cycling and robotic handling. The two-component design provides superior stability and flatness. Features include:

- Reaction volumes of 1–30 µl (50 µl maximum)
- Extremely uniform wells that reduce well-to-well variability in real-time PCR
- Warp-free skirt and deck for improved robotic handling
- Black alphanumeric labeling for easy well identification
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Bar-coded at row A side; available in clear or white well



For More Information
Web: www.bio-rad.com/384wellpcrplates
Request or download bulletin: 5496

Ordering Information

Catalog #	Description
HSR-4805	**Hard-Shell 384-Well 480 PCR Plates**, clear shell/white well PCR plate for Roche LightCycler 480 real-time PCR system, bar-coded, rigid 2-component design, 50 plates
HSR-4805K	**Hard-Shell 384-Well 480 PCR Plates Kit**, for use with Roche LightCycler 480 real-time PCR system, includes 100 bar-coded clear shell/white well PCR plates (2 packs of #HSR-4805) and 100 Microseal 'C' optical seals (#MSC-1001)
HSR-4801	**Hard-Shell 384-Well 480 PCR Plates**, clear shell/clear well PCR plate for Roche LightCycler 480 real-time PCR system, bar-coded, rigid 2-component design, 50 plates
HSR-4801K	**Hard-Shell 384-Well 480 PCR Plates Kit**, for use with Roche LightCycler 480 real-time PCR system, includes 100 bar-coded clear shell/clear well PCR plates (2 packs of #HSR-4801) and 100 Microseal 'C' optical seals (#MSC-1001)

Microseal® 384-Well Skirted PCR Plates

Microseal 384-well skirted PCR plates feature single-component construction and are ideal for high-throughput thermal cycling applications.

- Bar coding option is available
- Footprint and well spacing match ANSI/SBS microplate standards

For More Information
Web: www.bio-rad.com/384wellplates

Ordering Information

Description	50 Plates	Bar-Coded, 50 Plates
Microseal 384-Well Skirted PCR Plates		
Clear	MSP-3842	MSP-3846
White	MSP-3852	—
Black	MSP-3862	—

PCR Seals

Effective sealing is essential for PCR and qPCR reactions. Besides cap strips (page 355), Bio-Rad offers many sealing options to best fit your needs.

PCR Plate Seals

Microseal® 'C' Optical Seals

Microseal 'C' optical seals are optically clear adhesive films designed for optical assays such as those performed in real-time PCR. This film features a pressure-sensitive adhesive. They can be used for microplates with raised well rims.



Microseal 'C' Optical Seals

Microseal 'B' Adhesive Seals, Optically Clear

Microseal 'B' seals provide an adhesive-based sealing option for thermal cycling using thin-wall PCR plates. The strong adhesive layer ensures secure sample storage (as low as –40°C and up to 110°C) or transport before or after cycling as well as tight sealing during thermal cycling when supplemental pressure is applied by a heated lid. This clear polyester film allows easy inspection of sample wells and effective light transmission for optical assays. The sealing surface is protected from contamination by a peel-away release liner. Perforated end-tabs allow removal of overhanging film for automation and other applications. Accessories include:

- **Optical compression pad (96-well)** — enhances the seal integrity of Microseal 'B' clear seals when used in real-time PCR detection systems
- **Optical film sealing kit** — contains 100 Microseal 'B' clear seals and an optical compression pad



Microseal 'B' Adhesive Seals

Microseal 'A' Film

Microseal 'A' film quickly and effectively seals the full range of Bio-Rad PCR plates and tubes. The pliant inner layer is designed to seal tightly during cycling, yet to release smoothly to minimize the risk of aerosol formation and cross-contamination of samples. A peel-away release liner protects the sealing surface from contamination (not suitable for real-time qPCR). An optional sealing roller provides a quick way to firmly seal Microseal 'A' film on an entire array of wells.



Microseal 'A' Film

Sealing Roller

Microseal 'F' Foil

These aluminized foil seals work from –80 to 105°C. Microseal 'F' features a traditional adhesive layer. Thin enough to pierce with a pipet tip for recovery of samples from individual wells, they are suitable for use with automated systems such as the ABI 3700 DNA analyzer. In addition to cold storage applications, they can be used for thermal cycling for sample volumes of 25 µl (96-well) or 5 µl (384-well).



Optical Compression Pad

96-Well PCR Plate Sealing Mats

These reusable mats are convenient for sealing 96-well PCR plates; they are not suitable for qPCR.

Pressure Pad

This foam pad with magnet distributes lid pressure uniformly over sealing film on plates used in thermal cyclers.



Microseal 'F' Foil

Optical Sealing Tape

An adhesive-based sealing option for optical assays demanding a low-fluorescent background. Recommended for the Idaho Technology LightScanner system.

For More Information
Web: www.bio-rad.com/pcrseals



96-Well PCR Plate Sealing Mat

Ordering Information

Catalog #	Description
MSC-1001	**Microseal 'C' Optical Seals**, 100 pressure-sensitive adhesive seals
MSA-5001	**Microseal 'A' Film**, 50 seals
MSB-1001	**Microseal 'B' Adhesive Seals**, 100 optically clear seals
MSF-1001	**Microseal 'F' Foil**, 100 adhesive seals
MSR-0001	**Sealing Roller**, for sealing PCR plates with films
ADR-3296	**Optical Compression Pad**, for improved film sealing of 96-well plates in DNA Engine Opticon 2 and Chromo4 systems
ADR-5001	**Pressure Pad**, uniformly distributes lid pressure for sealing film
MSO-1001	**Optical Film Sealing Kit**, for 96-well plates, includes optical compression pad, 100 Microseal 'B' clear adhesive seals
223-9442	**96-Well PCR Plate Sealing Mats**, 5
223-9444	**Optical Sealing Tape**, 100 sheets

New Heat Sealing Films and Foils

Bio-Rad offers a family of heat sealing films and foils for use with the PX1™ PCR plate sealer. These sealing solutions help deliver consistent and reliable data by minimizing sample evaporation during thermal cycling.

For More Information
Web: www.bio-rad.com/heatseals
Request or download bulletin: 6257

Optically Clear Heat Seals

These clear polymer films provide a secure sealing option for PCR and real-time PCR applications. The seals are peelable pre- and post-cycling, allowing easy sample retrieval when desired. Features include:

- High light transmission, ideal for optical assays
- Low level of autofluorescence to minimize interference with qPCR detection
- Clear film enables easy inspection of sample wells
- Seal integrity from –80 to 110°C



Optically Clear Heat Seals

Permanent Clear Heat Seal

These seals provide the strongest heat sealing option and are ideal when seals will not be removed. These seals are recommended for water bath cycling. Features include:

- Strong permanent adhesive can withstand water bath cycling
- Clear film enables easy inspection of sample wells
- High solvent resistance
- Seal integrity from –80 to 110°C



Permanent Clear Heat Seal

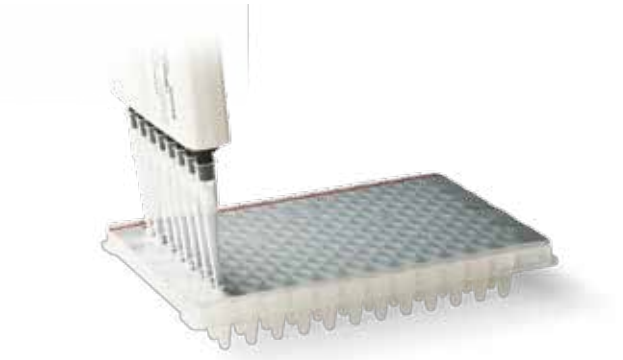
See Also

PX1 PCR plate sealer: page 352.
PCR plates: pages 357–362.

Pierceable Foil Heat Seal

This seal provides a secure sealing option for standard PCR and Droplet Digital™ PCR (ddPCR™) applications. This pierceable foil film enables sample retrieval from select wells. Plates with pierced seals can be resealed with another pierceable foil heat seal. Features include:

- Compatible with ddPCR as validated using the QX100™ Droplet Digital™ PCR system workflow
- High solvent resistance
- Colored stripe clearly identifies sealing surface
- Seal integrity from –20 to 110°C



Pierceable Foil Heat Seal

Peelable Foil Heat Seal

The peelable foil heat seal is ideal for sample storage. This seal can be easily peeled from PCR plates stored in a –80°C freezer or in liquid nitrogen. This seal is also validated for sealing PCR plates. Features include:

- Forms a peel-away seal
- Moderate solvent resistance
- Seal integrity from –200 to 110°C



Peelable Foil Heat Seal

For More Information
Web: www.bio-rad.com/heatseals
Request or download bulletin: 6257

Ordering Information

Catalog #	Description
181-4030	**Optically Clear Heat Seal**, pack of 100
181-4035	**Permanent Clear Heat Seal**, pack of 100
181-4040	**Pierceable Foil Heat Seal**, pack of 100
181-4045	**Peelable Foil Heat Seal**, pack of 100

Sealing Pads for Automation

Microseal® 'P' and 'P+' Sealing Pads

These reusable sealing pads are designed to adhere to a motorized heated lid. Use 'P' pads with Power Bonnet™ lids, and 'P+' pads with Moto Alpha™ units. Microseal 'P+' pads provide improved sealing of low-volume reactions — as low as 5 µl in 96-well plates and 1 µl in 384-well plates. Each pad may be used for approximately 25 runs.



Microseal 'P+' Sealing Pad

Auto-Sealing Lids for PCR Plates

These lids are reusable automation-friendly sealers that prevent evaporation and contamination during reaction assembly and seal tightly for thermal cycling when the cycler lid is closed. They can be reused up to 50 times. The lids are constructed of metal with an attached compressible pad. Two varieties are available: a self-releasing arched lid and an arched lid with wide tabs for robotic grippers.

For More Information
Web: www.bio-rad.com/pcrseals



Auto-Sealing Lids

Ordering Information

Catalog #	Description
Microseal 'P' and 'P+' Pads	
MSP-1001	**Microseal 'P' Pads**, reusable, for Power Bonnet lids, 10
MSP-1002	**Microseal 'P+' Pads**, reusable, for Moto Alpha unit lids, 10
MSP-1003	**Microseal 'P' Replacement Pads**, for MSL-2032, reusable, 10
Auto-Sealing Lids for PCR Plates	
MSL-2012	**Flat Auto-Sealing PCR Plate Lids**, reusable, 4
MSL-2022	**Arched Auto-Sealing PCR Plate Lids**, reusable, 4
MSL-2032	**Arched Auto-Sealing PCR Plate Lids with Wide Tabs**, reusable, 4

Chill-out™ Liquid Wax

Chill-out liquid wax provides an excellent vapor barrier that may be used instead of mineral oil in thermal cyclers without heated lids. After cycling, the tubes are chilled below 10°C to harden the wax. The solid layer protects samples from spills or aerosol formation, but is easy to penetrate with a pipet tip for sample retrieval. Chill-out liquid wax is available in a clear formulation for use in fluorescence assays, such as those performed in real-time PCR, and in a bright red formulation, easily visible when recovering reaction products (not recommended for sealing Microseal® 384-well PCR plates).

For More Information
Web: www.bio-rad.com/pcrseals



Ordering Information

Catalog #	Description
CHO-1401	**Chill-out Liquid Wax**, red, 100 ml
CHO-1404	**Chill-out Liquid Wax**, red, 1 L
CHO-1411	**Chill-out Liquid Wax**, clear, optical grade, 100 ml
CHO-1414	**Chill-out Liquid Wax**, clear, optical grade, 1 L

Frame-Seal™ Incubation Chambers

Frame-Seal incubation chambers are easy-to-use, strongly adhesive hybridization chambers with flexible plastic coverslips. They provide vapor-tight sealing for FISH, polonies, in situ PCR, and PRINS and allow samples to be recovered easily. The seal withstands temperatures up to 97°C. Frame-Seal chambers should be used with plain (unprinted) glass slides. Slides with highly hydrophobic ink patterns are not recommended for use with Frame-Seal chambers. They are UV-treatable for inactivation of contaminating DNA.



For More Information
Web: www.bio-rad.com/pcrseals

Ordering Information

Catalog #	Description
SLF-0201	**Frame-Seal Incubation Chambers**, 9 x 9 mm, 25 µl capacity, coverslips included, 100
SLF-0601	**Frame-Seal Incubation Chambers**, 15 x 15 mm, 65 µl capacity, coverslips included, 100
SLF-1201	**Frame-Seal Incubation Chambers**, 17 x 28 mm, 125 µl capacity, coverslips included, 100
SLF-3001	**Frame-Seal Incubation Chambers**, 19 x 60 mm, 300 µl capacity, coverslips included, 100

Plastic Consumables and General Laboratory Equipment

Micropipets, Tips, and Micro Test Tubes	**370**
Pipets	370
Pipet Tips	371
Micro Test Tubes	375
Reservoirs, EIA Plates, and Additional Plastic Products	376
General Laboratory Equipment	**379**

Micropipets, Tips, and Micro Test Tubes

For liquid-handling applications, Bio-Rad offers pipets, pipet tips, reagent reservoirs, 96-well EIA plates, and tubes.

Pipets

A full set of high-precision micropipets is available for all your liquid handling needs.

Micropipets and Accessories

Professional Micropipets
These adjustable-volume digital pipets deliver exceptional performance and are guaranteed to function efficiently and reliably for years. Micropipets are available in five volume ranges: 0.1–2.0, 0.5–10, 2–20, 20–200, and 100–1,000 µl.

Micropipet features include:

- Adjustable digital dial with volume lock
- Improved ergonomic handle and tip ejector
- Accommodation of standard pipet tips and serological pipets
- 3-year warranty*
- Fully autoclavable*

* Except pipet controller.

8-Channel Professional Micropipet
This multichannel micropipet is ideal for use with standard 96-well formats. It has an adjustable working volume range of 20–200 µl. A volume lock feature will prevent any accidental volume changes. Along with its ergonomic handle for right- and left-hand use, the manifold can rotate 360º for added pipetting comfort. A curved ejector design pushes tips off in a single step with minimal applied force.

Each channel has an independent precision piston assembly to ensure accuracy and reproducibility from one pipetting series to the next as well as between channels. Each pipet has been tested and supplied with a certificate of quality and a calibration key. The multichannel pipet is fully autoclavable.

Professional Pipet Controller
This lightweight, ergonomic, cordless pipet controller can be used with all plastic or glass pipets between 0.1–100 ml. Single-hand operation is easy with two-button speed control for aspirating and dispensing. A large LCD display clearly indicates battery status, pipet mode, and pipet speed. The unit comes with a bench stand, wall mount, charger, and 0.45 µm filter.

For More Information
Web: www.bio-rad.com/micropipets



Professional Micropipets

Professional Micropipet Specifications

	Volume Range, µl	Channels	Adjustable-Volume Increments, µl
P2	0.1–2.0	1	0.002
P10	0.5–10	1	0.02
P20	2–20	1	0.02
P200	20–200	1	0.2
P1000	100–1,000	1	2.0
8-channel, P200	20–200	8	0.2



8-Channel Professional Micropipet



Pipet Controller

Professional Micropipet Set with Backpack
The professional micropipet set with backpack is a ready-to-go, complete set for those who need to start up a new lab or refresh lab equipment to meet their pipetting needs. This set comes with four professional micropipets (0.5–10, 2–20, 20–200 and 100–1,000 µl), a round carousel pipet rack that can hold up to six single-channel micropipets, four racks of Bio-Rad pipet tips (TBR-14, -35, -40, and Prot/Elec™) for general lab use, and a Bio-Rad backpack.

Carousel Pipet Rack
This round benchtop pipet rack holds up to six single-channel pipets.



Professional Micropipet Set with Backpack

Ordering Information

Catalog #	Description
166-0499	**Professional Micropipet**, adjustable volume, 0.1–2.0 µl
166-0505	**Professional Micropipet**, adjustable volume, 0.5–10 µl
166-0506	**Professional Micropipet**, adjustable volume, 2–20 µl
166-0507	**Professional Micropipet**, adjustable volume, 20–200 µl
166-0508	**Professional Micropipet**, adjustable volume, 100–1,000 µl
166-0495	**Professional Micropipet**, 8-channel, adjustable volume, 20–200 µl
166-0486	**Professional Pipet Set with Backpack**, set includes 4 professional series micropipets: P10, P20, P200, P1000, carousel pipet rack, 4 racks of pipet tips (TBR-14, -35, -40, Prot/Elec), and Bio-Rad backpack
166-0490	**Professional Pipet Controller**, 120 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
166-0491	**Professional Pipet Controller**, 220 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
166-0487	**Carousel Pipet Rack**, holds 6 single-channel micropipets

Pipet Tips

Bio-Rad's pipet tips are made from virgin polypropylene and have been accurately molded for an airtight fit. The tips are guaranteed to have a smooth interior surface, which is essential for precision pipetting.

- Tips and racks are autoclavable at 120°C at 15 lb of pressure for 15 min; tips presterilized by E-beam irradiation are also available
- All materials used in both natural and colored pipet tips have been formulated without heavy metals
- Xcluda™ pipet tips have been independently tested and certified to be free of DNase, RNase, and pyrogens
- Pipet tip racks are manufactured from polypropylene, with a plastic content code of 5, and are free of labels for convenient recycling

Tip Selection Guide

Pipet Type	Tip Type
Bio-Rad Professional	
0.1–2.0 µl	Xcluda™ A, Seque/Pro™, BR-14, TBR-14
0.5–10 µl	Xcluda A, Seque/Pro, BR-31, TBR-14
2–20 µl	Xcluda B, Prot/Elec™, BR-35, TBR-35
20–200 µl	Xcluda D, Prot/Elec, MTP-26, -35, -37, -38, MTP-S 28, BR-35, -37, -38, -39, TBR-35
100–1,000 µl	Xcluda H, BR-40, 41, TBR-40, -41
Costar (8-Pette, 12-Pette)	
20–200 µl	28
25–200 µl	28
Eppendorf	
0.5–10 µl	Seque/Pro, Xcluda F, 31
2–20 µl	Prot/Elec, Xcluda B, 14, 35, 37–39
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
50–250 µl	39, 40, 41
100–1,000 µl	Xcluda H, 41
Excalibur	
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41
Thermo Labsystems Finnpipette	
5–40 µl	Prot/Elec, Xcluda B, C, G, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C and G, 35, 37–39
200–1,000 µl	Xcluda E

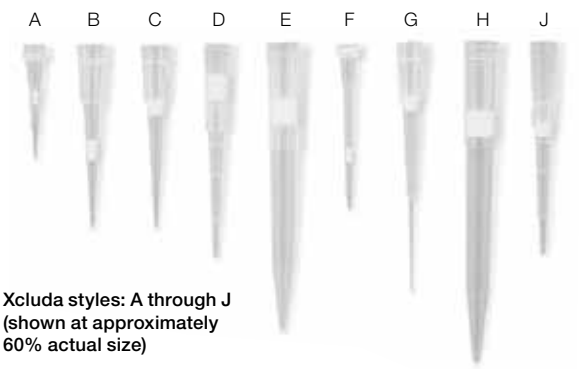
Pipet Type	Tip Type
Oxford Benchmate	
0.5–10 µl	Seque/Pro, Xcluda A, 14
10–50 µl	Xcluda J, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C, D, G, 35, 37–39
200–1,000 µl	Xcluda E
Rainin Pipetman and EDP Series	
0.1–10 µl	Seque/Pro, Xcluda F, 31
2–20 µl	Prot/Elec, Seque/Pro, Xcluda B, 31, 35, 37–39
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
20–200 µl	Prot/Elec, Xcluda D, 35, 37–39
100–1,000 µl	Xcluda E, 40, 41
Socorex	
0.5–10 µl	Seque/Pro
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41
Titertek Flow	
5–200 µl	26
5–300 µl	Xcluda D
Volac	
1–20 µl	Prot/Elec, 31, 35, 37–39
1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	40, 41

See Also
Thermal cyclers for PCR: pages 326–330.
Real-time PCR systems: pages 331–336.

Xcluda™ Aerosol Barrier Pipet Tips

Xcluda aerosol barrier pipet tips guard against aerosol contamination of samples, a feature of particular importance in PCR experiments. The barrier will not seal on contact with liquid if unintentional overpipetting occurs, which protects samples from accidental loss. Offered in nine different styles, the tips fit a variety of pipets. They are available presterilized in fully enclosed racks and are independently tested and certified to be free of DNase, RNase, and pyrogens.

For More Information
Web: www.bio-rad.com/xcluda



Xcluda styles: A through J (shown at approximately 60% actual size)

Ordering Information

Catalog #	Description
211-2001	**Xcluda Style A**, 0.5–10 µl, 960
211-2006	**Xcluda Style B**, 2–20 µl, 960
211-2011	**Xcluda Style C**, 10–100 µl, 960
211-2016	**Xcluda Style D**, 20–200 µl, 960
211-2021	**Xcluda Style E**, 100–1,000 µl, 960
211-2026	**Xcluda Style F**, 0.5–10 µl, 1,000
211-2031	**Xcluda Style G**, 10–100 µl, 1,000
211-2036	**Xcluda Style H**, 100–1,000 µl, 1,000
211-2041	**Xcluda Style J**, 10–100 µl, 960

Pipet Tips for Gel Loading

Seque/Pro™ Capillary Pipet Tips

Seque/Pro capillary pipet tips have an average OD of <0.3 mm, making them ideal for loading sequencing gels or IEF tube gels. Seque/Pro tips perform best when used with Eppendorf ultra micro pipets (0.5–10 µl) and can also be used with Rainin Pipetman 10 and 20 µl pipets.

Prot/Elec™ Pipet Tips

Prot/Elec tips fit easily within a gap of 0.75 mm between vertical slab gel plates while maintaining a large bore for fast sample flow. The 200 µl capacity tips are molded to fit Rainin Pipetman 20, 100, and 200 pipets and Eppendorf 20 and 100 µl pipets. Prot/Elec tips are also available with an aerosol barrier to guard against airborne contaminants and cross-contamination of samples (see Xcluda style G).



For More Information
Web: www.bio-rad.com/gelloading
Request or download bulletins: 5258 and 5676

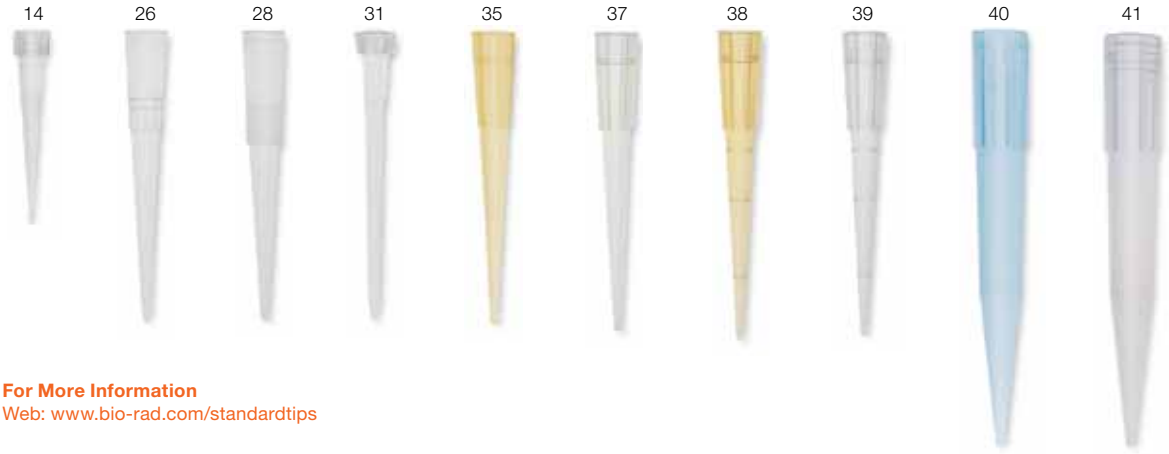
See Also

Sequi-Gen GT sequencing cell: page 248.
Vertical electrophoresis systems: pages 131–160.

Ordering Information

Catalog #	Description
223-9911	**Seque/Pro Capillary Pipet Tips**, in enclosed autoclavable rack, 0.5–10 µl, 200
223-9912	**Seque/Pro Capillary Pipet Tips**, sterilized in enclosed rack, 0.5–10 µl, 200
223-9915	**Prot/Elec Pipet Tips**, bulk pack, plastic bag in dust-free box, 1–200 µl, 1,000
223-9917	**Prot/Elec Pipet Tips**, racked, 12 x 17 format, 204 per rack with a cover on each rack, 1–200 µl, 1,020
223-9916	**Prot/Elec Pipet Tips**, racked, 8 x 12 format, 96 per rack with a cover on each rack, 1–200 µl, 960

Standard Pipet Tips



For More Information
Web: www.bio-rad.com/standardtips

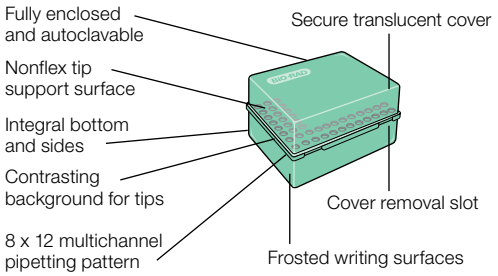
See Also

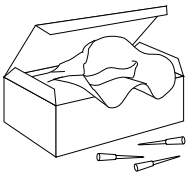
PCR tubes: page 355–356.

Tip Packaging Options

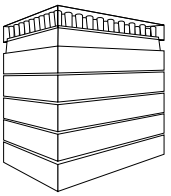
	Standard Tip Type Number									
Packaging Option	**14**	**26**	**28**	**31**	**35**	**37**	**38**	**39**	**40**	**41**
BR	•		•	•	•	•	•	•	•	•
RBR					•					
TBR	•				•				•	•
MTP		•			•	•	•			
MTP-S (sterilized)			•		•	•	•			

MTP
8 x 12 format, enclosed, nonflex racks are suitable for repeated reloading and autoclaving. Racked tips are also available presterilized.

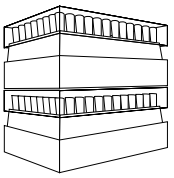




BR
Bulk tips, plastic bag in a dust-free box.



RBR
Racked tips, one cover on a stack of nested racks.



TBR
Ideal for autoclaving, each rack has its own lid and covered bottom for full enclosure.

Ordering Information

Catalog #	Description
MTP 8 x 12 Format, Enclosed Racks	
223-9301	**MTP-26 Tips**, natural, 5–200 µl, 960
223-9303	**MTP-35 Tips**, yellow, 1–200 µl, 960
223-9304	**MTP-37 Tips**, natural, 1–200 µl, 960
223-9313	**MTP-38 Tips**, yellow, graduated, beveled, 1–200 µl, 960
MTP-S 8 x 12 Format, Enclosed Racks, Presterilized*	
223-9307	**MTP-28-S Tips**, natural, 25–200 µl, 960
223-9308	**MTP-35-S Tips**, yellow, 1–200 µl, 960
223-9309	**MTP-37-S Tips**, natural, 1–200 µl, 960
223-9318	**MTP-38-S Tips**, yellow, graduated, beveled, 1–200 µl, 960
BR Bulk Tips	
223-9014	**BR-14 Tips**, natural, 0.1–10 µl, 1,000
223-9028	**BR-28 Tips**, natural, 25–200 µl, 1,000
223-9031	**BR-31 Tips**, natural, 0.5–10 µl, 1,000
223-9035	**BR-35 Tips**, yellow, 1–200 µl, 1,000
223-9037	**BR-37 Tips**, natural, 1–200 µl, 1,000
223-9038	**BR-38 Tips**, yellow, graduated, beveled, 1–200 µl, 1,000
223-9039	**BR-39 Tips**, natural, graduated, beveled, 1–200 µl, 1,000
223-9040	**BR-40 Tips**, blue, 100–1,000 µl, 500
223-9041	**BR-41 Tips**, natural, 100–1,000 µl, 500
RBR Racked Tips, One Cover on Nested Racks	
223-9135	**RBR-35 Tips**, yellow, 1–200 µl, 1,000
TBR Racked Tips, Cover on Each Rack	
223-9354	**TBR-14 Tips**, natural, 0.1–10 µl, 1,000
223-9347	**TBR-35 Tips**, yellow, 1–200 µl, 1,000
223-9350	**TBR-40 Tips**, blue, 100–1,000 µl, 1,000
223-9351	**TBR-41 Tips**, natural, 100–1,000 µl, 1,000

* Presterilized racks and polyethylene plugs are not suitable for autoclaving. Order unsterilized racks to reload tubes and autoclave.

Micro Test Tubes

Titertube® Micro Test Tubes

Tubes and racks are made of polypropylene; they are autoclavable to 120°C and freezable to –80°C. The polyethylene plugs, which seal tightly for storage, are not designed for repeated use and cannot be autoclaved. The tubes are offered in sterile and unsterilized strips of eight, which may be cut to separate the tubes. Titertube micro test tubes have:

- 1 ml capacity, 8.8 x 45 mm
- Spacing that matches 96-well plates
- Enclosed racks that stack to store 5,800 samples/ft^3
- Racks with a grid for identification of contents



For More Information
Web: www.bio-rad.com/titertube

Ordering Information

Catalog #	Description
223-9390	**Titertube Micro Test Tubes**, unsterilized, 10 racks of 96 tubes
223-9395*	**Titertube Micro Test Tubes**, presterilized, 10 racks of 96 tubes
223-9391	**Titertube Micro Test Tubes**, unsterilized, bulk, 1,000
223-9393	**Titertube Plugs**, unsterilized, 960 in 120 strips of 8
223-9392*	**Titertube Plugs**, presterilized, 960 in 120 strips of 8
223-9394	**Titertube Rack**, empty, holds 96 Titertube micro test tubes, 10

* Presterilized racks and polyethylene plugs are not suitable for autoclaving. Order unsterilized racks to reload tubes and autoclave.

EZ Micro™ and Standard Micro Test Tubes

EZ Micro graduated polypropylene test tubes have a frosted marking area and a flat top that is pierceable by a 19 gauge or thicker needle. Standard polypropylene micro test tubes are recommended for solvent extraction and heating when a very tight cap seal is required. Because of their tighter cap fit, standard tubes may be more difficult to manipulate in applications that require repeated opening and closing of the tubes. Separate polyethylene caps for the 1.5 ml capless tubes have a knurled top for easy handling.

For More Information
Web: www.bio-rad.com/ezmicro
Request or download bulletin: 5676

The micro test tubes are:

- Suitable for general-purpose benchtop centrifuge use; sturdy uniform walls easily withstand up to 13,000 x g
- Autoclavable* to 120°C; freezable to –80°C
- Available in 2 ml, 1.5 ml, and 500 µl sizes



1.5 ml Colored Microcentrifuge Tubes (* not autoclavable).



500 µl EZ Micro | 1.5 ml EZ Micro | 2 ml EZ Micro | 1.5 ml Standard | 1.5 ml Capless

Ordering Information

Catalog #	Description
223-9503	**EZ Micro Test Tubes**, 500 µl, natural, 1,000
223-9480	**EZ Micro Test Tubes**, 1.5 ml, natural, 500
223-9430*	**EZ Micro Test Tubes**, 2 ml, natural, 500
223-9501	**Micro Test Tubes**, standard, 1.5 ml, natural, 500
223-9500	**Micro Test Tubes**, capless, 1.5 ml, polypropylene, natural, graduated, 500
223-9490	**Separate Caps**, for capless micro test tubes, white, 1,000
166-0473	**Colored Microcentrifuge Tubes**, 1.5 ml, 6 colors, 600

* To fit centrifuges, 2 ml tubes have thinner walls than standard tubes and are intended for short runs at less than 13,000 x g. Heavy samples, high g forces, long runs, or centrifuges that radiate excess heat may damage these tubes.

Screwcap Micro Test Tubes

Screwcap micro test tubes and caps are made of polypropylene. O-rings are made of a blend of polyethylene and polypropylene. Features include:

- O-ring operating range from –55 to 150°C
- Uniform walls for uniform heat transfer
- Conical bottoms for pellet collection
- Knurled caps for easy handling

For More Information
Web: www.bio-rad.com/screwcap
Request or download bulletin: 5676



0.5 ml Conical | 0.5 ml Skirted | 1.5 ml Conical | 2.0 ml Skirted | Screwcap

Ordering Information

Catalog #	Description
224-0165	**0.5 ml Conical Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0185	**0.5 ml Skirted Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0100	**1.5 ml Conical Tubes**, with separate O-ring screwcaps, unsterilized, 500
224-0110	**1.5 ml Conical Tubes**, with installed O-ring screwcaps, sterilized, 500
224-0130	**2.0 ml Skirted Tubes**, with separate O-ring screwcaps, unsterilized, 500
224-0140	**2.0 ml Skirted Tubes**, with installed O-ring screwcaps, sterilized, 500

Reservoirs, EIA Plates, and Additional Plastic Products

See Also
PCR tubes: page 355–356.
ELISA reagents: page 308.
Microplate readers: pages 306–307.

Reagent Reservoirs

Disposable reagent reservoirs are presterilized and compatible with multichannel pipets. Their sloping design enables effective liquid pickup. The 50 ml capacity is graduated to 25 ml in 5 ml increments.

For More Information
Web: www.bio-rad.com/liquidhandling



Reagent Reservoir

96-Well EIA Plates

For EIAs, ELISAs, and other protein-binding assays, use the Costar 96-well flat bottom EIA plate. This plate binds more protein more uniformly than any other plate.

For More Information
Web: www.bio-rad.com/liquidhandling


Costar 96-Well
Flat Bottom EIA Plate

Ordering Information

Catalog #	Description
224-4872	**Sterilized Reagent Reservoirs**, graduated, polystyrene, 5 per package, box of 200
224-0096	**Costar 96-Well Flat Bottom EIA Plates**, polystyrene, 5 per package, box of 100

Tube Racks and Storage Boxes

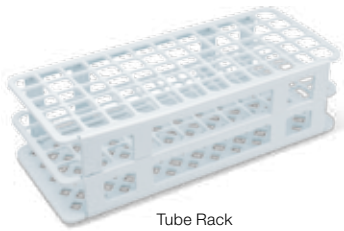
Bio-Rad plastic racks and storage units provide the ultimate in ease of storage and sample organization.

Racks and Storage Box Selection Guide

	Capacity	Dimensions (W x D x H)
Green racks	80 x 1.5/2.0 ml tubes	6.1 x 23.1 x 2.7 cm
Tube racks	60 x 15 ml 24 x 50 ml	10.5 x 24.6 x 7.2 cm 11.0 x 30.0 x 8.5 cm
Storage boxes	100 x 1.5/2.0 ml tubes	14.2 x 14.2 x 5.5 cm

For More Information
Web: www.bio-rad.com/racks
Request or download bulletin: 5258


Storage Boxes and Green Rack


Tube Rack

Ordering Information

Catalog #	Description
166-0481	**Green Racks**, hold 80 x 1.5/2.0 ml tubes, set of 5
166-0482	**Storage Boxes**, hold 100 x 1.5/2.0 ml tubes, set of 5, multicolored
166-0483	**Tube Racks**, hold 60 x 15 ml tubes, set of 5
166-0484	**Tube Racks**, hold 24 x 50 ml tubes, set of 5

See Also
Cuvettes:
pages 25–26.

Additional Plastic Consumables

Bio-Rad now offers a wide selection of disposable plastic components for your everyday cell/bacterial culturing uses in the lab.

- **Petri dishes** – ready-to-use polystyrene cell and bacterial culture petri dishes, 60 mm diameter, sterile
- **Gel staining trays** — plastic disposable trays ideal for staining mini gels
- **Inoculation loops** — the loops are smooth and flexible, making it easy to achieve uniform and smooth streaking without damaging the agar surface. Using disposable inoculation loops eliminates the risk of cross-contamination due to improper sterilization and the loops do not need flaming, which reduces fire hazards in the laboratory; 10 µl, sterile
- **Jellyfish foam floating racks** — hold up to 12 microcentrifuge tubes, for use in cold and hot water baths
- **Disposable plastic transfer pipets** — polyethylene plastic pipet bulbs for liquid handling needs; sterile and nonsterile pipets are available
- **Conical centrifuge tubes** — 15 ml polypropylene conical tubes with volume graduations and screw caps
- **Cell culture tubes** — round bottom snap caps, culture tube, 14 ml, sterile


Gel Staining Trays


Petri Dishes


15 ml Conical Centrifuge Tubes



Jellyfish Foam Floating Rack


Disposable Plastic Transfer Pipets


Inoculation Loops


Cell Culture Tubes

Ordering Information

Catalog #	Description
166-0476	**Cell Culture Tubes**, 17 x 100 mm, 14 ml, sterile, 25
166-0475	**Conical Centrifuge Tubes**, 15 ml, 50
166-0470	**Petri Dishes**, 60 mm diameter, sterile, 500
166-0471	**Inoculation Loops**, 10 µl, sterile, 80
166-0474	**Disposable Plastic Transfer Pipets**, sterile, 500
166-0480	**Disposable Plastic Transfer Pipets**, nonsterile, 500
166-0477	**Gel Staining Trays**, 4
166-0479	**Jellyfish Foam Floating Racks**, 8

General Laboratory Equipment

Centrifuges

- **Mini centrifuge** — includes microtube and PCR strip tube rotors and 0.4 and 0.5 ml tube adaptors; the maximum speed is 6,000 rpm (2,000 x g)
- **Model 16K microcentrifuge** — accommodates 1.5 or 2.0 ml tubes and has a quick-spin feature; the maximum speed is 14,000 rpm (16,000 x g). Safe for coldroom operation
- **PCR tube adaptor for model 16K microcentrifuge** — holds two PCR 8-tube strips or 16 individual 0.2 ml tubes

For More Information
Web: www.bio-rad.com/centrifuges



Model 16K Microcentrifuge
(PCR tube adaptor sold separately)



Mini Centrifuge (includes PCR tube adaptor)

Ordering Information

Catalog #	Description
166-0603	**Mini Centrifuge**, 120 V
166-0613	**Mini Centrifuge**, 220 V
166-0623	**Mini Centrifuge**, 220 V (UK)
166-0602	**Model 16K Microcentrifuge**, 120 V
166-0612	**Model 16K Microcentrifuge**, 220 V
166-0620	**PCR Tube Adaptor**, for model 16K microcentrifuge

Mixing Devices

- **Mini rocker** — provides superior three-dimensional mixing action; gentle yet thorough rocking makes it ideal to use for western blot incubations and gel staining. Compact footprint requires minimal benchspace
- **Tube roller** — allows mixing of samples both horizontally and vertically. The compact design enables it to fit inside our mini incubation oven, making it ideal for mixing liquids while incubating. Comes with three interchangeable tube rotisseries to accommodate tubes from 1.5–50 ml. Compact footprint requires minimal benchspace
- **BR-2000 vortexer** — a general-purpose vortex mixer; a flathead dimpled adaptor is also available
- **UltraRocker™ rocking platform** — dual-platform rocker that can be used for staining and destaining gels and blots, Southern hybridization, and overnight incubation

For More Information
Web: www.bio-rad.com/mixingdevices



Mini Rocker



Tube Roller



BR-2000 Vortexer (flathead dimpled adaptor sold separately)



UltraRocker Rocking Platform

See Also

Micro test tubes:
pages 375–376.

PCR tubes:
pages 355–356.

Ordering Information

Catalog #	Description
166-0710	**Mini Rocker**, 120 V, includes two blotting boxes, power cord
166-0720	**Mini Rocker**, 230 V (EU/UK), includes two blotting boxes, 2 power cords (EU/UK)
166-0711	**Tube Roller**, 120 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
166-0721	**Tube Roller**, 230 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
166-0722	**Tube Roller**, 230 V (UK), includes 3 tube carousels for 1.5, 15, and 50 ml tubes
166-0610	**BR-2000 Vortexer**, 120 V
166-0611	**BR-2000 Vortexer**, 230 V
166-0621	**BR-2000 Vortexer**, 230 V (UK)
166-0622	**Flathead Dimpled Adaptor**, for BR-2000 vortexer
166-0709	**UltraRocker Rocking Platform**, 120 V
166-0719	**UltraRocker Rocking Platform**, 230 V

Temperature Control Equipment

- **Digital dry bath** — digitally controlled dry bath that is ideal for a multitude of laboratory procedures where incubation of samples is needed. It is accurate, built for safe continuous operation, economical, and versatile. Comes with one aluminum alloy 1.5 ml heating block (24 x 1.5 ml capacity). Additional 0.5, 2.0, and 15 ml heating blocks with 24 x 0.5, 24 x 2.0, and 12 x 15 ml capacity, respectively, can be purchased separately; 15 ml dry bath block not shown
- **Mini incubation oven** — can accommodate up to eighty 6.5 cm plates and operates at temperatures up to 60°C. Contains a rear port to allow insertion of our tube roller or mini rocker for temperature-controlled mixing
- **Water bath** — temperature controlled, dependable, affordable water bath that includes stainless steel tank and lid, electrostatically applied finish that resists rust, corrosion, and scratches, over-temperature protection, and thermometer
- **DyNA Chill cooler** — keeps samples (up to 12 in 1.5–2.0 ml microtubes) chilled. Simply cool the DyNA Chill cooler to the desired temperature overnight, then chill samples without the mess of an ice bucket.

For More Information
Web: www.bio-rad.com/tempcontrol



Digital Dry Bath



0.5 ml
Dry Bath Block



2.0 ml
Dry Bath Block



Mini Incubation Oven



Water Bath



DyNA Chill Cooler

Ordering Information

Catalog #	Description
166-0562	**Digital Dry Bath**, 120 V, includes 1.5 ml heating block, power cord
166-0563	**Digital Dry Bath**, 230 V (EU/UK), includes 1.5 ml heating block, 2 power cords (EU/UK)
166-0565	**Digital Dry Bath Heating Block, 0.5 ml**, for 24 x 0.5 ml tubes
166-0566	**Digital Dry Bath Heating Block, 2.0 ml**, for 24 x 2.0 ml tubes
166-0567	**Digital Dry Bath Heating Block, 15 ml**, for 12 x 15 ml tubes
166-0564	**DyNA Chill Cooler**, maintains sample temperature between –15°C and room temperature for up to 8 hr without ice
166-0501	**Mini Incubation Oven**, 120 V
166-0521	**Mini Incubation Oven**, 230 V
166-0504	**Temperature-Controlled Water Bath**, 120 V
166-0524	**Temperature-Controlled Water Bath**, 230 V
166-0712	**Mini Incubation Oven and Mini Rocker**
166-0713	**Mini Incubation Oven and Tube Roller**

Biotechnology Explorer™ Educational Products

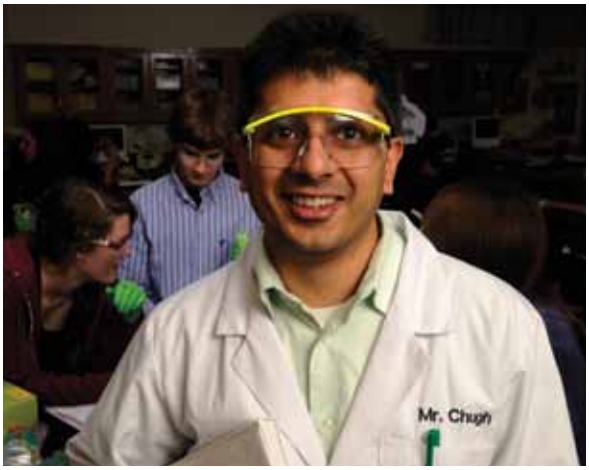
Captivating Science Education	**382**
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Captivating Science Education

Do You Have Teaching Responsibilities?
The Biotechnology Explorer™ program makes it easy for educators to meet AAAS and NSF's Vision and Change in Undergraduate Biology Education: A Call to Action by providing kits, a textbook, and modular lab series that bring research skills into the classroom. Meet the challenge to:

- Integrate core concepts and competencies throughout the curriculum
- Focus on student-centered learning
- Engage the biology community in the implementation of change

For more information about the products listed here, request the current Biotechnology Explorer catalog (bulletin 2112) or visit explorer.bio-rad.com.



Biotechnology: A Laboratory Skills Course

This laboratory textbook blends textbook theory with hands-on laboratory activities and real world applications for your biotechnology course, and it incorporates Biotechnology Explorer kits for easy implementation supported by live technical support. This textbook encourages the next generation of biotechnologists by:

- Developing key skills with multiple activities
- Encouraging students to consider the broader implications of biotechnology with bioethics case studies
- Broadening occupational awareness with profiles of careers in biotech
- Letting students answer a research question using independent research

The teacher supplement provides a thorough background on preparation, setup, results analysis, and assessment. It also provides guidance on how to implement and build your biotechnology course.

Chapters include:

- The Biotechnology Industry
- Laboratory Skills
- Microbiology and Cell Culture
- DNA Structure and Analysis
- Bacterial Transformation and Plasmid Purification
- Polymerase Chain Reaction
- Protein Structure and Analysis
- Immunological Applications
- Research Projects

For More Information
Web: explorer.bio-rad.com/textbook

Ordering Information

Catalog #	Description
166-1025EDU	**Biotechnology: A Laboratory Skills Course**, student edition
166-1027EDU	**Biotechnology: A Laboratory Skills Course**, teacher edition, includes one student edition and one teacher supplement
166-1051EDU	**Laboratory Notebook**

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Modular Laboratory Explorer Series

Integrated College Level Molecular Biology Labs
Looking for authentic lab experiences that carry a gene or protein of interest from isolation to analysis? Bio-Rad's modular lab series provide validated procedures, easy preparation, and reproducible success year after year. Visit **explorer.bio-rad.com** to learn about our advanced series for cloning, sequencing, bioinformatics, and protein expression and purification using affinity chromatography. These flexible, modular lab series can be used as capstone projects or a complete molecular biology course.

Cloning and Sequencing Explorer Series*	Protein Expression and Purification Series*
1. Nucleic Acid Extraction	1. Growth and Expression
2. *GAPDH* PCR	2. SDS-PAGE Electrophoresis
3. Electrophoresis	3. Purification Process Options:
4. PCR Kleen™ Spin Purification	Centrifugation Purification
5. Ligation and Transformation	Hand-Packed Column Purification
6. Microbial Culturing	Prepacked Cartridge Purification
7. Aurum™ Plasmid Mini Purification	4. DHFR Enzymatic Assay
8. Sequencing and Bioinformatics	5. Assessment

* Available as a complete series or as individual modules.



For More Information
Web: explorer.bio-rad.com/cloninglab
explorer.bio-rad.com/proteinpurification

Ordering Information

Catalog #	Description
166-5000EDU*	**Complete Cloning and Sequencing Explorer Series**, includes all 8 modules and curriculum resource CD
166-5002EDU	**Cloning and Sequencing Explorer Series Instruction Manual**, printed in full color
166-5005EDU*	**Nucleic Acid Extraction Module**
166-5010EDU*	***GAPDH* PCR Module**
166-0451EDU	**Electrophoresis Module**
732-6300EDU	**PCR Kleen Spin Purification Module**
166-5015EDU*	**Ligation and Transformation Module**
166-5020EDU	**Microbial Culturing Module**
732-6400EDU	**Aurum Plasmid Mini Purification Module**
166-5025EDU*	**Sequencing and Bioinformatics Module**, includes sequencing primers, control plasmid, and iFinch bioinformatics subscription; sequencing service not included
166-5001EDU	**Curriculum Resource CD**
166-5040EDU*	**Protein Expression and Purification Series**, centrifugation purification process
166-5045EDU*	**Protein Expression and Purification Series**, hand-packed purification process
166-5050EDU*	**Protein Expression and Purification Series**, prepacked purification process
166-5070EDU	**Protein Expression and Purification Series Assessment Module**, formative and summative assessment tool
166-5055EDU*	**Growth and Expression Module**
166-5060EDU*	**SDS-PAGE Electrophoresis Module**
166-5041EDU	**Centrifugation Purification Module**
166-5046EDU	**Hand-packed Purification Module**
166-5051EDU	**Prepacked Purification Module**
166-5065EDU*	**DHFR Enzymatic Assay Module**

* Ships with both temperature-sensitive and room temperature components. Immediately store temperature-sensitive items at 4°C or –20°C as indicated.

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Rapid Blotting and V3 Western Workflow™

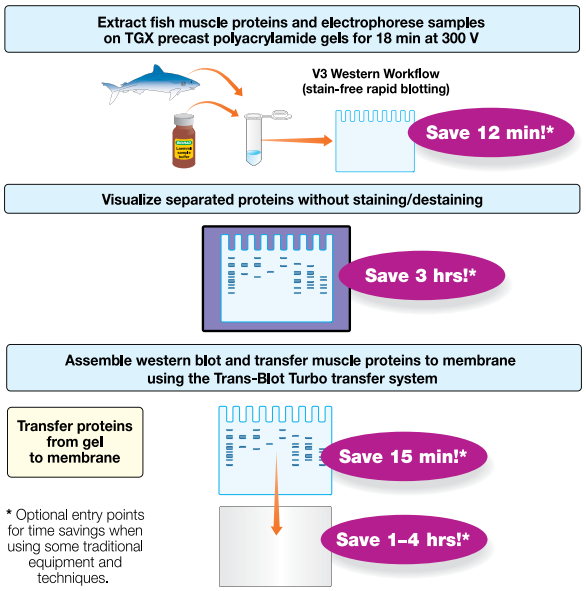
New V3 Western Workflow™ (Stain-Free Rapid Blotting)

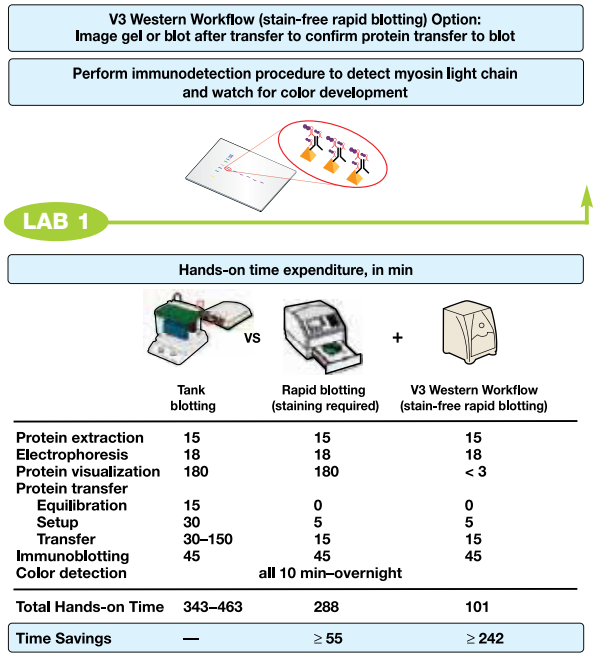
Western Blotting in Less Than Two Hours!
The new rapid blotting or V3 Western Workflow (stain-free rapid blotting) allows you to complete the entire western blot workflow in less than 2–5 hours in the classroom, depending on which time-saving steps are incorporated. TGX Stain-Free™ gels combined with the super fast Trans-Blot® Turbo™ system provide maximum time savings, allowing you to complete the workflow in less than a single 3-hour lab block. Teach students about the exciting new chemistry that allows visualization of samples separated on PAGE gels without staining.

Benefits:

- Time savings
- Stain-free

For More Information
Web: explorer.bio-rad.com/rapidblotting





	Tank blotting	Rapid blotting (staining required)	V3 Western Workflow (stain-free rapid blotting)
Protein extraction	15	15	15
Electrophoresis	18	18	18
Protein visualization	180	180	< 3
Protein transfer			
Equilibration	15	0	0
Setup	30	5	5
Transfer	30–150	15	15
Immunoblotting	45	45	45
Color detection		all 10 min–overnight	
Total Hands-on Time	343–463	288	101
Time Savings	—	≥ 55	≥ 242

Ordering Information

Catalog #	Description
166-2875EDU*	**Rapid Blotting and V3 Western Workflow Starter Kit**, comprehensive protein classroom study kit, includes protein profiler module (#166-2700EDU), western blot module (#166-2800EDU), Trans-Blot Turbo mini nitrocellulose transfer pack, TGX Stain-Free gels, application note, for 32 students; education use only

*Ships with both products listed.

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Real-Time PCR

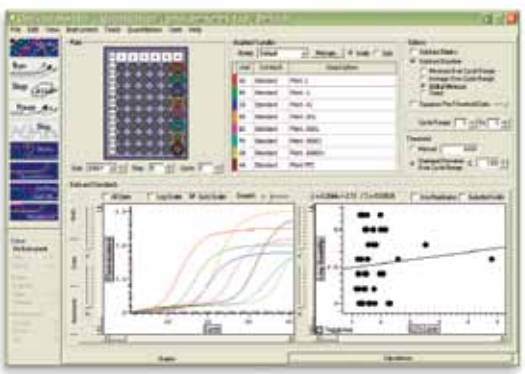
Real-Time PCR Kits

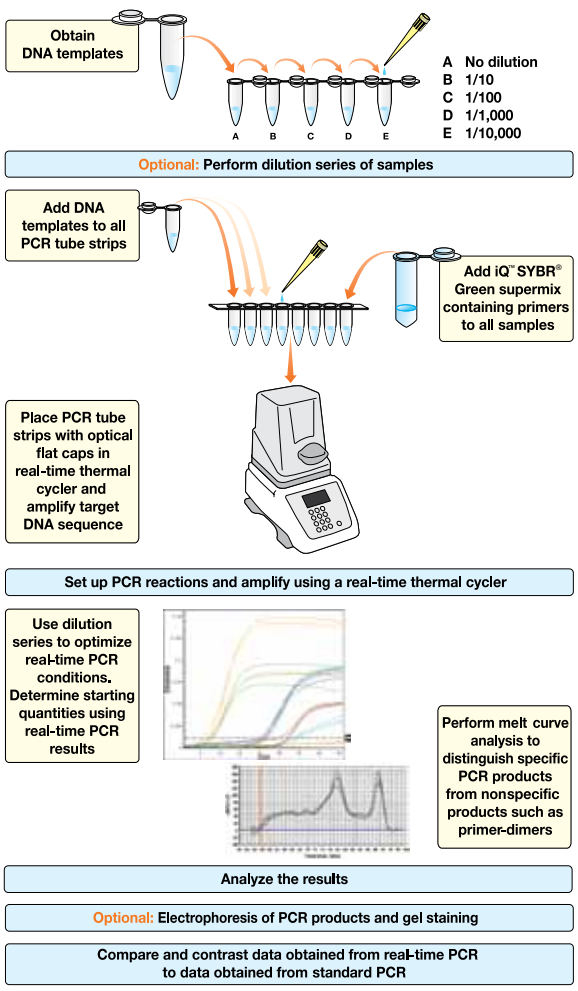
How much DNA is there?

The Bio-Rad® Crime Scene Investigator PCR Basics™ kit is a good starting point for novices to become familiar with real-time PCR techniques using real-time PCR technology. Additionally, DNA fingerprints can still be investigated using gel electrophoresis and melt curve analysis, showing how real-time and standard PCR can be complementary techniques. The Bio-Rad® GMO Investigator™ kit is a tool for teaching the principles of PCR and its use in testing foods for genetic modifications. Demonstrate how much plant DNA is present and then compare how much genetically modified organism (GMO) DNA is recovered from each food sample when using real-time PCR. It is even possible to determine what fraction of a food product has been made with genetically modified ingredients in the same manner standard testing labs do.

- Quantity DNA
- Discover key differences between standard and real-time PCR analysis
- Analyze and evaluate real-time PCR results
- Perform melt curve analysis
- Determine the accuracy and reliability of pipetting techniques
- Learn DNA amplification using real-time PCR

For More Information
Web: explorer.bio-rad.com/real-time





Ordering Information

Catalog #	Description
166-2660EDU	**Crime Scene Investigator PCR Basics Real-Time PCR Starter Kit**
166-2560EDU	**GMO Investigator Real-Time PCR Starter Kit**

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Classroom Kits

Biotechnology Explorer™ Kits

Biotechnology Explorer kits address the critical need for inquiry-based activity — an important component of scientific literacy for an educated citizenry and a launch point of experience and practical training for students interested in careers in biotechnology. The kits range from introductory to advanced topics, including courses guiding students through entire molecular biology workflows.

Areas of biotechnology applications covered include:

- Transformation and microbiology
- Protein analysis and chromatography
- DNA analysis
- PCR amplification
- Fully developed course series in DNA and protein

New IDEA and STEM Kits

Inquiry Dye Electrophoresis Activity and STEM Electrophoresis Kits

Food dyes are an excellent way for students to learn how to run an agarose gel using something they are already familiar with — candy. Run these samples on a student-engineered electrophoresis chamber to demonstrate behind the scenes how this molecular biology workhorse works. Integrate STEM and inquiry!

- Real-world application
- Inquiry-based hands-on laboratory
- Addresses science, technology, engineering, and mathematics with a comprehensive curriculum

For More Information
Web: explorer.bio-rad.com/classroomkits

Ordering Information

Catalog #	Description
166-5075EDU	**IDEA Kit — Inquiry Dye Electrophoresis Activity**, provides materials for 32 students or 8 workstations
166-5080EDU	**STEM Electrophoresis Teacher Demonstration Kit**, provides materials for 8 students or 2 workstations
166-5090EDU	**STEM Electrophoresis Classroom Kit**, provides materials for 32 students or 8 workstations
166-0003EDU	**pGLO Bacterial Transformation Kit**, provides materials for 32 students or 8 workstations
166-0013EDU*	**pGLO Kit SDS-PAGE Extension**, provides materials for 32 students or 8 workstations
166-0005EDU*	**Green Fluorescent Protein (GFP) Chromatography Kit**, provides materials for 32 students or 8 workstations
166-0006EDU*	**Secrets of the Rainforest Kit**, provides materials for 32 students or 8 workstations
166-5030EDU	**Microbes and Health Kit**, provides materials for 32 students or 8 workstations
166-0500EDU	**Long-Wave UV Lamp**, requires 4 AA batteries
166-0530EDU	**Long-Wave UV Penlight**
166-0008EDU	**Size Exclusion Chromatography Kit**, provides materials for 32 students or 8 workstations
166-2900EDU*	**Got Protein? Kit**, provides materials for 320 students or 80 workstations
166-2400EDU*	**ELISA Immuno Explorer Kit**, provides materials for 48 students or 12 workstations
166-2700EDU*	**Comparative Proteomics Kit I: Protein Profiler Module**, provides materials for 32 students or 8 workstations
166-2800EDU*	**Comparative Proteomics Kit II: Western Blot Module**, provides materials for 32 students or 8 workstations
166-5035EDU*	**Biofuel Enzyme Kit**, provides materials for 32 students or 8 workstations
166-0007EDU*	**Forensic DNA Fingerprinting Kit**, provides materials for 32 students or 8 workstations
166-0001EDU*	**Analysis of Precut Lambda DNA Kit**, provides materials for 32 students or 8 workstations
166-0002EDU*	**Restriction Digestion and Analysis of Lambda DNA Kit**, provides materials for 32 students or 8 workstations
166-2300EDU	**Genes in a Bottle Kit**, includes 1 DNA extraction module (#166-2000EDU) and 2 DNA necklace modules (#166-2200EDU); provides materials for 36 students or 9 workstations
166-2600EDU*	**Crime Scene Investigator PCR Basics Kit**, provides materials for 32 students or 8 workstations
166-2100EDU*	**PV92 PCR Informatics Kit**, provides materials for 32 students or 8 workstations
166-2500EDU*	**GMO Investigator Kit**, provides materials for 32 students or 8 workstations

* Ships with both temperature-sensitive and room temperature components. Immediately store temperature-sensitive items at 4°C or –20°C as indicated.

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Appendices and Indices

Trademarks and Legal Notices 388

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Trademarks and Legal Notices

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Affi-Prep®
AG®
Alpha™
Aminex®
AmpliSize®
AnyGel™
Any kD™
Aurum™
Bio-Beads™
Bio-Dot®
BioFrac™
Bio-Gel®
BioLogic™
BioLogic DuoFlow™
BioLogic DuoFlow Maximizer™
BioLogic DuoFlow Pathfinder™
BioLogic DuoFlow QuadTec™
BioLogic Maximizer™
BioLogic QuadTec™
Bio-Lyte®
Bio-Plex®
Bio-Plex Data Pro™
Bio-Plex Manager™
Bio-Plex Pro™
Bio-Rad®
Bio-Rex™
Bio-Safe™
Bio-Scale™
Bio-Sil®
Bio-Silect™
Bio-Spin®
Biotechnology Explorer™
C1000™
C1000 Manager™
C1000 Touch™
Certified™
CFT™
CFX96 Touch™
CFX384 Touch™
CFX Connect™
CFX Manager™
CFX96™
CFX384™
Checkmark™
CHEF-DR®
CHEF Mapper®
Chelex®
ChemiDoc™
Chill-out™
CHT™
ChromLab™
Chromo4™
Clarity™
CleanCut™
Concord™
C/P Lift®
cPrime™
Crime Scene Investigators PCR Basics™
Criterion™
Criterion Stain Free™
DC™
DCode™
ddPCR™
Discover™
DNA Engine®
DNA Engine Dyad®
DNA Engine Opticon®
DNA Engine Tetrad®
Dodeca™
Droplet Digital™
Dual Alpha™
Dyad®
DynaLoop™
Easy Cap™
EasyPack™
Econo™
Econo-Column®
Econo-Pac®
ELISA Immuno Explorer™
ENrich™
EpiQ™
Experion™
EXQuest™
EZ Load™
EZLogic™
EZ Micro™
Fast Blast™
Flamingo™
Foresight™
FPQuest™
Frame-Seal™
Freeze 'N Squeeze™
GelAir™
Gel Doc™
Gene Pulser®
Gene Pulser MXcell™
Gene Pulser Xcell™
GeneShot™
Genes in a Bottle™
GMO Investigator™
Got Protein?™
GS-800™
Hard-Shell®
Helios®
Hepta™
Hot Bonnet®
HydroTech™
i12™
iCycler®
iCycler iQ®
Image Lab™
iMark™
Immun-Blot®
Immunowash™
Immun-Star™
InPlace™
InstaGene™
iProof™
iQ™
iScript™
iTaq™
Kaleidoscope™
LP Data View™
Macro-Prep®
MainFrame™
Micro Bio-Spin™
Microplate Manager®
MicroPulser™
MicroRotofor™
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